Orthography to Phonology: Constraints on the Armenian Schwa

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- Introduction
- Orthography of schwas
- Distribution of inserted schwas
  - Initial cluster
  - Medial cluster
  - Final cluster
- Morphological Deviations
- Cyclic deletion
  - Insertion vs. deletion
  - Parallel allomorphy
- Conclusion
Introduction

- **Title**: Orthography to Phonology: Constraints on the Armenian schwa
- **Orthography**: Look at rule of spelling-pronunciation in Armenian
  - Schwa epenthesis
- **Phonology**: tendencies in pronunciation follow phonological principles
- These principles are:
  - Pure phonology: directional syllabification
  - Morphology: alignment to morpheme boundaries
  - Morphophonology: cyclicity and allomorphy
Why orthography?

- Orthography often used to motivate phonological analyses
  - Cross-linguistically (Chomsky und Halle, 1968) and Armenian (Vaux, 1998)
- Open question if orthographic representations (ORs) match:
  - Underlying Representations, or
  - Surface Representations, or
  - Intermediate Representation (Sproat, 2000)
- Safety measure:
  - Instead of looking at UR->SR transformations, will look at OR->SR
  - Any proposed URs are up for debate, but not the ORs + SRs
  - In fact, will show that ORs probably reflect URs
Introduction

Orthography of Schwas

Distribution of Inserted Schwas
- Initial cluster
- Medial cluster
- Final cluster

Morphological Deviations

Cyclic Deletion
- Insertion vs. deletion
- Parallel allomorphy

Conclusion
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- Morphological Deviations

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- Conclusion
Armenian is Indo-European isolate with its own script
Orthography captures all phonemic contrasts
Predictable to go from orthography to pronunciation
Armenian is Indo-European isolate with it’s own script
Orthography captures all phonemic contrasts
Predictable to go from orthography to pronunciation
Phonology: canonical 6-vowel system

\[
[a] \quad [u] \quad [o] \quad [e] \quad [i] \quad [ə]
\]
Orthography: many-to-one mapping from grapheme to phoneme but still predictable

\[
<\text{u}> \quad <\text{m}> \quad <\text{o}, \text{n}> \quad <\text{t}, \text{t}> \quad <\text{ḷ}> \quad <\text{n}>
<\text{a}> \quad <\text{u}> \quad <\text{o}> \quad <\text{e}> \quad <\text{i}> \quad <\text{ə}>
\]
Transliteration removes many-to-one mapping because tangential for talk
Vowels

- Orthography generally shows surface pronunciation, especially for vowels
  \[e\] \[ov\] \[pu\] \[pan\] \[sird\]
  \(<e>\) \(<ov>\) \(<pu>\) \(<pan>\) \(<sird>\)
- There’s a schwa grapheme \(<n>\), but most surface schwa’s aren’t written

Questions: Going from OR to SR...
1. Is ‘schwa insertion’ productive and predictable?
2. Do ‘reduced’ and ‘inserted’ schwas pattern the same?
3. What are the URs?
• Orthography generally shows surface pronunciation, especially for vowels

\[
\begin{align*}
&e & \text{[e]} & \text{[ov]} & \text{[pu]} & \text{[pan]} & \text{[sird]} \\
&<e> & <ov> & <pu> & <pan> & <sird>
\end{align*}
\]

• There’s a schwa grapheme \(<\eta>\), but most surface schwa’s aren’t written

• Based on ORs vs. SRs of schwas, got 3 categories:

<table>
<thead>
<tr>
<th>OR:</th>
<th>Present</th>
<th>Inserted</th>
<th>Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR:</td>
<td>&lt;ənger&gt;</td>
<td>&lt;tnel&gt;</td>
<td>&lt;kir&gt;</td>
</tr>
<tr>
<td></td>
<td>[əngér]</td>
<td>[tənél]</td>
<td>[kír]</td>
</tr>
<tr>
<td></td>
<td>‘friend’</td>
<td>‘to put’</td>
<td>‘writing’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘to write’</td>
</tr>
</tbody>
</table>
VOWELS

- Orthography generally shows surface pronunciation, especially for vowels
  \[
  \begin{array}{cccccc}
  <e> & <ov> & <pu> & <pan> & <sird>
  \end{array}
  \]

- There’s a schwa grapheme \(<\eta>\), but most surface schwa’s aren’t written

- Based on ORs vs. SRs of schwas, got 3 categories:
  \[
  \begin{array}{|c|c|c|}
  \hline
  OR:  & Present & Inserted & Reduced  \\
  \hline
  \hline
  'friend' & 'to put' & 'writing' & 'to write'  \\
  \hline
  \end{array}
  \]

- Questions: Going from OR to SR...
  1. Is ‘schwa insertion’ productive and predictable?
  2. Do ‘reduced’ and ‘inserted’ schwas pattern the same?
  3. What are the URs?
Laying out

- 3 types of SRs schwas have 3 distinct URs which is close to OR

<table>
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<td>&lt;ənger&gt;</td>
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<td>&lt;kir&gt;</td>
</tr>
<tr>
<td>UR:</td>
<td>[əngér]</td>
<td>[tənél]</td>
<td>[kír]</td>
</tr>
<tr>
<td></td>
<td>/ənger/</td>
<td>/tnel/</td>
<td>/kír/</td>
</tr>
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• 3 types of SRs schwas have 3 distinct URs which is close to OR

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<td>SR:</td>
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<td>&lt;kir&gt;</td>
</tr>
<tr>
<td>UR:</td>
<td>[əŋgér]</td>
<td>[tənél]</td>
<td>[kír]</td>
</tr>
<tr>
<td></td>
<td>/əŋger/</td>
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</table>

• 3 schwas also show separate of phonological constraints

• Focus on ‘inserted schwas’
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- Conclusion
Syllable structure

- Maximal syllable is CjVCC
  
  V  VC  CV  CVC  CVCC  CjVCC
  [e]  [ov]  [pu]  [pan]  [sird]  [gjank]
  <e>  <ov>  <pu>  <pan>  <sird>  <gjank>

- Light on glossing to reduce clutter
Syllable structure

- Maximal syllable is CjVCC
  
  V  VC  CV  CVC  CVCC  CjVCC
  [e] [ov] [pu] [pan] [sird] [gjank]
  <e> <ov> <pu> <pan> <sird> <gjank>

- Light on glossing to reduce clutter

- Complex codas must have falling sonority, and...
  *
  LX  (*rn#  *rn  (*)ns
  *kalt  xarn, xarən  gorənkan  oren(ə)stir
  kajl  tʃerm  *gornkan  toms
Initial clusters

- Many ORs have consonant clusters that are broken up by schwas in SR
- Clusters are especially common root-initially

\[
\begin{array}{cccccc}
1C & 2C & 3C & 4C & 5C & 6C \\
<dal> & <tnel> & <krban> & <mgrdel> & <d3mrtgel> & <krtmmtjel>
\end{array}
\]
Initial clusters

- Many ORs have consonant clusters that are broken up by schwas in SR
- Clusters are especially common root-initially

<table>
<thead>
<tr>
<th>1C</th>
<th>2C</th>
<th>3C</th>
<th>4C</th>
<th>5C</th>
<th>6C</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;dal&gt;</td>
<td>&lt;tnel&gt;</td>
<td>&lt;krban&gt;</td>
<td>&lt;mgrdel&gt;</td>
<td>&lt;dʒmrtgel&gt;</td>
<td>&lt;krtmmtʃel&gt;</td>
</tr>
<tr>
<td>[dal]</td>
<td>[tə.nel]</td>
<td>[kər.ban]</td>
<td>[mə.gər.del]</td>
<td>[dʒə.mərt.gel]</td>
<td>[kərt.mən.tʃel]</td>
</tr>
</tbody>
</table>
Many ORs have consonant clusters that are broken up by schwas in SR.

Clusters are especially common root-initially.

The above words are all either:

- monomorphmic  kørban ‘pocket’, or
- a root and verbal suffix  tən-el ‘to put’

They aren’t derived from another root that has a high vowel:

- *tin for  tən-el

How can we predict these schwas?
Many ORs have consonant clusters that are broken up by schwas in SR.
Clusters are especially common root-initially.

1C 2C 3C 4C 5C 6C
<dal>  <tnel>  <krban>  <mgrdel>  <dʒmrtgel>  <krtmrtʃel>
[dal]  [tə.nel]  [kər.ban]  [mə.gər.del]  [dʒə.mərt.gel]  [kərt.mən.ʃel]

The above words are all either:
- monomorphemic kərbən ‘pocket’, or
- a root and verbal suffix tən-el ‘to put’

They aren’t derived from another root that has a high vowel:
- *tin for tən-el

How can we predict these schwas?
→ Directional syllabification predicts schwa placement!
2C AND 3C

- For 2C and 3C clusters in OR, 1 schwa is added to form SR
- For 2C, schwa is after $C_1$
  \[
  \langle \text{tnel} \rangle \quad \langle \text{tkal} \rangle \quad \langle \text{xmor} \rangle \quad \langle \text{prel} \rangle \\
  [\text{tə.nel}] \quad [\text{tə.kal}] \quad [\text{xə.mor}] \quad [\text{pə.rel}]
  \]
2C AND 3C

- For 2C and 3C clusters in OR, 1 schwa is added to form SR
- For 2C, schwa is after $C_1$

$$<tnel>\quad <tkal>\quad <xmor>\quad <prel>$$

$$[t\text{\textae}.nel] \quad [t\text{\textae}.kal] \quad [x\text{\textae}.mor] \quad [p\text{\textae}.rel]$$

- For 3C, schwa is again after $C_1$

$$<krban>\quad <t\text{\textae}var>\quad <xntal>\quad <prtel>$$

$$[k\text{\textae}r.ban] \quad [t\text{\textae}z.var] \quad [x\text{\textae}n.tal] \quad [p\text{\textae}r.tel]$$

- These small clusters don’t show any special syllabification
2C & 3C

- 2C & 3C: Going from OR to SR is predictable
- *CC: SR can’t have bad consonant clusters
- DEP: schwa added to repair cluster
- ONSET: maximize onsets

<table>
<thead>
<tr>
<th></th>
<th>*CC</th>
<th>DEP</th>
<th>ONSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;tnel&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. tnel</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ət.nel</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. tə.nel</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>*CC</th>
<th>DEP</th>
<th>ONSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;krban&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. krban</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. kə.rə.bar</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. kə.rə.bar</td>
<td>**!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4C: varied positions

- 4C clusters show more options for schwa location:
  \[
  \langle p\text{ndrel} \rangle \quad \langle m\text{grdel} \rangle \\
  [p\text{\v{e}nd.rel}] \quad [m\text{\v{e}.g\v{e}r.del}]
  \]

- Schematically...
  \[
  \langle C\overline{C}CCCV \rangle \quad \langle C\overline{C}CCCV \rangle \\
  [C\text{\v{e}CC.CV}] \quad [C\text{\v{e}.C\text{\v{e}}C.CV}]
  \]

- Choice is based on sonority and directionality
4C: sonority

- In \(<C_1C_2C_3C_4V>\),
- If \(<C_2C_3>\) can form a complex coda, then \([C_1\varepsilon C_2C_3]\).

\begin{align*}
\langle\text{pndrel}\rangle & \quad \langle\text{grdser}\rangle & \quad \langle\text{tndzgal}\rangle \\
[p\text{ênd.rel}] & \quad [g\text{ørd.ser}] & \quad [t\text{øndz.gal}]
\end{align*}

- Predictable from syllabification

<table>
<thead>
<tr>
<th></th>
<th>&lt;pndrel&gt;</th>
<th>*CC</th>
<th>DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>pndrel</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>p\text{ênd.rel}</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>p\text{ø.nêd.rel}</td>
<td>**!</td>
<td></td>
</tr>
</tbody>
</table>
4C: DIRECTION

- In $<C_1C_2C_3C_4V>$,
- But if $<C_2C_3>$ can’t form a complex coda, then $[C_1\varepsilon.C_2\varepsilon C_3]$.

\[
\begin{align*}
\langle \text{mgrdel} \rangle & \quad \langle \text{vrndel} \rangle & \quad \langle \text{plntorel} \rangle \\
[\text{m̃.g̃r.del}] & \quad [\text{ṽ.r̃n.del}] & \quad [\text{p̃.l̃n.to.rel}]
\end{align*}
\]

- Why $\text{m̃.g̃r.del}$ instead of $*\text{mȩg.rȩ.del}$?
In $<C_1C_2C_3C_4V>$,

But if $<C_2C_3>$ can’t form a complex coda, then $[C_1\emptyset.C_2\emptyset C_3]$.

$$<\text{mgrdel}> <\text{vrndel}> <\text{plntorel}>$$

$$[\text{m\textae.g\textae.r.del}] [\text{v\textae.r\textae.n.del}] [\text{p\textae.l\textae.n.to.rel}]$$

Why $\text{m\textae.g\textae.r.del}$ instead of $*\text{m\textae.g.r\textae.del}$?

Right-to-left syllabification with CVCC template (Itô, 1989):

$$\underline{\text{Unsyllabified}} \quad \{\text{mgrdel}\}$$
In $<C_1C_2C_3C_4V>$,

But if $<C_2C_3>$ can’t form a complex coda, then $[C_1\partial.C_2\partial.C_3]$.

$<\text{mgrdel}> \quad <\text{vrndel}> \quad <\text{plntorel}>$

$[\text{mə.gər.del}] \quad [\text{və.rən.del}] \quad [\text{pə.lən.to.rel}]$

Why $\text{mə.gər.del}$ instead of $\ast\text{məg.rə.del}$?

Right-to-left syllabification with CVCC template (Itô, 1989):

Unsyllabified  {mgrdel}  
R-\L  {mgr}.del
4C: DIRECTION

- In $<C_1 C_2 C_3 C_4 V>$,
- But if $<C_2 C_3>$ can’t form a complex coda, then $[C_1\emptyset C_2\emptyset C_3]$.

$$<\text{mgrdel}> <\text{vrndel}> <\text{plntorel}>$$
$$[\text{m\~g\~a}\text{r.del}] [\text{v\~a}\text{r\~e}\text{.del}] [\text{p\~e}\text{.l\~e}\text{n.to.rel}]$$
- Why $\text{m\~g\~a}\text{r.del}$ instead of $*\text{m\~a}\text{g.r\~e}\text{.del}$?
- Right-to-left syllabification with CVCC template (Itô, 1989):

<table>
<thead>
<tr>
<th>Unsyllabified</th>
<th>Syllabified</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt;\text{mgrdel}&gt;$</td>
<td>${\text{mgrdel}}$</td>
</tr>
<tr>
<td>R-$\rightarrow$L</td>
<td>${\text{mgr}}.\text{del}$</td>
</tr>
<tr>
<td></td>
<td>${\text{m}}.\text{g~a}\text{r.del}$</td>
</tr>
</tbody>
</table>
In $<$C₁C₂C₃C₄V$>$,

But if $<$C₂C₃$>$ can’t form a complex coda, then [C₁∅C₂∅C₃].

$<$mgrdel$>$ $<$vrndel$>$ $<$plntorel$>$
[m∅.g∅r.del] [v∅.r∅n.del] [p∅.l∅n.to.rel]

Why m∅.g∅r.del instead of *m∅g.r∅.del?

Right-to-left syllabification with CVCC template (Itô, 1989):

\[
\begin{array}{l}
\text{Unsyllabified} \\
\text{R$\rightarrow$L}
\end{array}
\begin{array}{l}
\{\text{mgrdel}\} \\
\{\text{mgr}\}.\text{del} \\
\{\text{m}\}.\text{g∅r.del} \\
[\text{m∅.g∅r.del}]
\end{array}
\]
- Right-to-left parsing easily translated into left-alignment
- **ALIGN-σ-L**: syllables should be close to left-edge

<table>
<thead>
<tr>
<th></th>
<th>&lt;mgrdel&gt;</th>
<th>*CC</th>
<th>DEP</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>mgrdel</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>məgr.del</td>
<td>*!</td>
<td>*</td>
<td>4</td>
</tr>
<tr>
<td>c</td>
<td>mə.gər.del</td>
<td>**</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>d</td>
<td>məɡ.rə.del</td>
<td>**</td>
<td></td>
<td>8!</td>
</tr>
</tbody>
</table>
• Right-to-left parsing likewise explains schwa location in 5C clusters
• Cə.CəCC.CV if can create complex coda

\[
\begin{align*}
\langle d₃mrtgel \rangle & \quad \langle prnkd-al \rangle \\
[d₃ə.mərt.gel] & \quad [pə.rənk dal]
\end{align*}
\]
Right-to-left parsing likewise explains schwa location in 5C clusters

Cœ.CœCC.CV if can create complex coda

\[
\langle \hat{d}_3mrtgel \rangle \quad \langle prnkd-al \rangle \\
[\hat{d}_3\partial.m\partialrt.gel] \quad [p\partial.r\partialnk.dal]
\]

CœC.CœC.CV if can’t create complex coda

\[
\langle plt\text{ryan} \rangle \quad \langle hrm\text{ftug} \rangle \\
[p\partiall.t\partialr.\text{yan}] \quad [h\partialr.m\partialf.tug]
\]
• Right-to-left parsing likewise explains schwa location in 5C clusters
• Cə.CəCC.CV if can create complex coda
  \[<\text{d}z\text{mrtgel}>\quad <\text{prnkd-al}>\]
  \[\text{[d}z\text{ə.mərt.gel]}\quad \text{[pə.rənk.dal]}\]
• CəC.CəC.CV if can’t create complex coda
  \[<\text{pltryan}>\quad <\text{hrmʃtug}>\]
  \[\text{[pəl.tər. yan]}\quad \text{[hər.məʃ.tug]}\]
• Follows from right-to-left parsing:
  \[<\text{d}z\text{mrtgel}>\quad <\text{pltryan}>\]
- Right-to-left parsing likewise explains schwa location in 5C clusters
- Cœ.CœCC.CV if can create complex coda
  \[
  \langle \text{d₃mrtgel} \rangle \quad \langle \text{prnkd-al} \rangle \\
  [\text{d₃œ.mœrt.gel}] \quad [\text{pœ.rœnk.dal}]
  \]
- CœC.CœC.CV if can’t create complex coda
  \[
  \langle \text{pltryan} \rangle \quad \langle \text{hrmʃtug} \rangle \\
  [\text{pœl.œr.yan}] \quad [\text{hœr.mœʃ.tug}]
  \]
- Follows from right-to-left parsing:
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  \{\text{d₃mrtgel}\} \quad \{\text{pltryan}\}
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• Cœ.CœCC.CV if can create complex coda

\[
\begin{align*}
\langle \text{d₃mrtgel} \rangle & \quad \langle \text{prnkd-al} \rangle \\
[\text{d₃œ.mœrt.gel}] & \quad [\text{pœ.rœnk.dal}]
\end{align*}
\]

• CœC.CœC.CV if can’t create complex coda

\[
\begin{align*}
\langle \text{pltryan} \rangle & \quad \langle \text{hrmʃtug} \rangle \\
[\text{pœl.tœr.yan}] & \quad [\text{hœr.mœʃ.tug}]
\end{align*}
\]

• Follows from right-to-left parsing:

\[
\begin{align*}
\langle \text{d₃mrtgel} \rangle & \quad \langle \text{pltryan} \rangle \\
\{\text{d₃mrtgel}\} & \quad \{\text{pltryan}\} \\
\{\text{d₃mrt}\}.\text{gel} & \quad \{\text{pltr}\}.\text{yan}
\end{align*}
\]
• Right-to-left parsing likewise explains schwa location in 5C clusters
• Cə.CəCC.CV if can create complex coda
  \[<\text{dʒmrtgel}> <\text{prnkd-al}>\]
  \[[\text{dʒə.mərt.gel}] [\text{pə.rənk.dal}]\]
• CəC.CəC.CV if can’t create complex coda
  \[<\text{pltryan}> <\text{hrmʃtug}>\]
  \[[\text{pəl.tər.ɣan}] [\text{hər.məʃ.tug}]\]
• Follows from right-to-left parsing:
  \[<\text{dʒmrtgel}> <\text{pltryan}>\]
  \[\{\text{dʒmrtgel}\} \{\text{pltryan}\}\]
  \[\{\text{dʒ}.mərt.gel\} \{\text{pl}.tər.ɣan\}\]
Right-to-left parsing likewise explains schwa location in 5C clusters

Cə.CəCC.CV if can create complex coda

\[
\begin{align*}
&\langle \hat{d}_3\text{mrtgel} \rangle & \langle \text{prnkd-al} \rangle \\
&[\hat{d}_3\text{ə.mərt.gel}] & [\text{pə.rənk.dal}]
\end{align*}
\]

CəC.CəC.CV if can’t create complex coda

\[
\begin{align*}
&\langle \text{pltryan} \rangle & \langle \text{hrmʃtug} \rangle \\
&[\text{pəl.tər.ɣan}] & [\text{həɾ.məʃ.tug}]
\end{align*}
\]

Follows from right-to-left parsing:

\[
\begin{align*}
&\langle \hat{d}_3\text{mrtgel} \rangle & \langle \text{pltryan} \rangle \\
&\{\hat{d}_3\text{mrtgel}\} & \{\text{pltryan}\} \\
&\{\hat{d}_3\text{mrt}\}.\text{gel} & \{\text{pltr}\}.\text{yan} \\
&\{\hat{d}_3\}.\text{mərt.gel} & \{\text{pl}\}.\text{tər.ɣan} \\
&\hat{d}_3\text{ə.mərt.gel} & \text{pəl.tər.ɣan}
\end{align*}
\]
• Rare to find roots with 6, but they exist
  \[ \langle k\text{rtnmt}\text{f}el \rangle \quad \langle k\text{ntsrmnts}t\text{sug} \rangle \]
  \[ [k\text{rtn}\text{m}\text{n}\text{t}\text{f}el] \quad [k\text{nts}\text{r}\text{m}\text{n}\text{t}s\text{u}g] \]

• Mostly larger clusters involve vowel reduction or reduplication
• Rare to find roots with 6, but they exist
  \[ <\text{krtm\text{m}nt\text{s}el}> \quad <\text{knts}\text{m}nt\text{tsug}> \]
  \[ \{\text{k\text{r}t.m\text{a}n.\text{ts}el}\} \quad \{\text{k\text{a}nts.m\text{a}n.\text{ts}ug}\} \]

• Mostly larger clusters involve vowel reduction or reduplication

• Predictably syllabified
  \[ <\text{krtm}\text{mnt}\text{s}el}> \]
  \[ \{\text{krtm}\text{mnt}\text{s}el}\} \]
• Rare to find roots with 6, but they exist

\(<\text{krtmn}\text{t}\text{Sel}>\quad <\text{kntsmt}\text{sug}>\)

[\text{kørt.møn.}\text{t}\text{Sel}]\quad [\text{kønts.møn.}\text{tsug}]

• Mostly larger clusters involve vowel reduction or reduplication

• Predictably syllabified

\(<\text{krtmn}\text{t}\text{Sel}>\)

\{\text{krtmn}\text{t}\text{Sel}\}

\{\text{krtmn}\}.\text{t}\text{Sel}\
- Rare to find roots with 6, but they exist
  
  \(<krtmnt\text{\textael}>, \ <kn\text{tsmantsug}>
  \[k\text{ært.mæn.t\textael}\] \ [k\text{ænts.mæn.tsug}]

- Mostly larger clusters involve vowel reduction or reduplication
- Predictably syllabified

\(<krtmnt\text{\textael}>>
\{krtmnt\text{\textael}\}
\{krtmn}.t\text{\textael}
\{krt}.mæn.t\text{\textael}
• Rare to find roots with 6, but they exist
  \[<\text{krtm}nt\text{\textbar}\text{el}> \quad <\text{kntsmn}t\text{\textbar}sug}>\]
  \[[\text{k\textbar\textbar\textbarrt.m\textbar\textbar\textbarn.t\textbar\textbar\textbarel}] \quad [\text{k\textbar\textbar\textbarnt.m\textbar\textbar\textbarn.t\textbar\textbar\textbarug}]\]

• Mostly larger clusters involve vowel reduction or reduplication

• Predictably syllabified
  \[<\text{krtm}nt\text{\textbar}\text{el}>\]
  \[\{\text{krtm}nt\text{\textbar}\text{el}\}\]
  \[\{\text{krtm}\text{\textbar}\text{el}\}\]
  \[\{\text{krt}\text{\textbar}\text{en}\text{\textbar}\text{el}\}\]
  \[\text{k\textbar\textbar\textbarrt.m\textbar\textbar\textbarn.t\textbar\textbar\textbarel}\]
Going from orthography to pronunciation, we have ‘schwa insertion’

For root-initial clusters, schwa position is predictable from right-to-left parsing

Show that directionality also predicts schwa locations in root-medial and root-final clusters
Medial clusters

- Medial clusters are syllabified directionally and minimally
- 2C <VCCV> and 3C <VCCCV> clusters are heterosyllabic if can form (complex) codas

\[
\begin{align*}
\text{<bargil>} & \quad \text{<abril>} & \quad \text{<antsrev>} & \quad \text{<tarkmanel>} \\
[\text{bar.gil}] & \quad [\text{ab.ril}] & \quad [\text{ants.rev}] & \quad [\text{tark.ma.nel}]
\end{align*}
\]
Medial clusters

- Medial clusters are syllabified directionally and minimally
- 2C <VCCV> and 3C <VCCCV> clusters are heterosyllabic if can form (complex) codas
  
  \[
  \begin{array}{c|c|c|c|c|c}
  \text{<bargil>} & \text{<abril>} & \hat{\text{<antsrev>}} & \text{<tarkmanel>} \\
  [\text{bar.gil}] & [\text{ab.ril}] & [\text{ants.rev}] & [\text{tark.ma.nel}] \\
  \end{array}
  \]

- But leftmost epenthesis [V.CəC.CV] if can’t syllabify
  
  \[
  \begin{array}{c|c|c|c|c|c|c}
  \text{<pedrvar>} & \hat{\text{<maklts-il>}} \\
  [\text{pe.dər.var}] & [\text{ma.kəl.tsil}] \\
  \end{array}
  \]

- Predicted by right-to-left parsing
  
  \[
  \begin{array}{c}
  \text{<pedrvar>} \\
  \{\text{pedrvar}\}
  \end{array}
  \]
Medial clusters are syllabified directionally and minimally.

2C <VCCV> and 3C <VCCCV> clusters are heterosyllabic if can form (complex) codas

\[
\begin{align*}
\text{<bargil>} & \quad \text{<abril>} & \quad \text{<antsrev>} & \quad \text{<tarkmanel>} \\
[\text{bar.gil}] & \quad [\text{ab.ril}] & \quad [\text{ants.rev}] & \quad [\text{tark.ma.nel}] \\
\end{align*}
\]

But leftmost epenthesis [V.CєC.CV] if can’t syllabify

\[
\begin{align*}
\text{<pedrvar>} & \quad \text{<maklts-il>} \\
[\text{pe.dør.var}] & \quad [\text{ma.kəl.tsil}] \\
\end{align*}
\]

Predicted by right-to-left parsing

\[
\begin{align*}
\text{<pedrvar>} \\
\{\text{pedrvar}\} \\
\{\text{pedr}.\text{var}\}
\end{align*}
\]
Medial clusters

- Medial clusters are syllabified directionally and minimally
- 2C <VCCV> and 3C <VCCCV> clusters are heterosyllabic if can form (complex) codas
  
  \[
  \begin{array}{c|c|c|c}
  \text{<bargil>} & \text{<abril>} & \text{<antsrev>} & \text{<tarkmanel>} \\
  \text{[bar.gil]} & \text{[ab.ril]} & \text{[ants.rev]} & \text{[tark.ma.nel]} \\
  \end{array}
  \]

- But leftmost epenthesis [V.CœC.CV] if can’t syllabify
  
  \[
  \begin{array}{c|c}
  \text{<pedrvar>} & \text{<makltś-il>} \\
  \text{[pe.dər.var]} & \text{[ma.kəl.tsil]} \\
  \end{array}
  \]

- Predicted by right-to-left parsing
  
  \[
  \begin{array}{c}
  \text{<pedrvar>} \\
  \{\text{pedrvar}\} \\
  \{\text{pedr}.\text{var}\} \\
  \{\text{pe}.\text{dər}.\text{var}\} \\
  \end{array}
  \]
Medial clusters are syllabified directionally and minimally.

2C <VCCV> and 3C <VCCCV> clusters are heterosyllabic if can form (complex) codas.

\[
\begin{align*}
\langle \text{bargil} \rangle & \quad \langle \text{abril} \rangle & \quad \langle \text{ants}\text{rev} \rangle & \quad \langle \text{tarkmanel} \rangle \\
[\text{bar.gil}] & \quad [\text{ab.ril}] & \quad [\text{ants.rev}] & \quad [\text{tark.mal.nel}] \\
\end{align*}
\]

But leftmost epenthesis [V.C\text@C.CV] if can’t syllabify.

\[
\begin{align*}
\langle \text{pedrvar} \rangle & \quad \langle \text{maklts-il} \rangle \\
[\text{pe.d\text@r.var}] & \quad [\text{ma.k\text@l.tsil}] \\
\end{align*}
\]

Predicted by right-to-left parsing.

\[
\begin{align*}
\langle \text{pedrvar} \rangle & \\
\{\text{pedrvar}\} & \\
\{\text{pedr}\}.\text{var} & \\
\{\text{pe}\}.\text{d\text@r.var} & \\
[\text{pe.d\text@r.var}] & \quad *\text{ped.r\text@v.var} \\
\end{align*}
\]
• Large medial 4C or $<VC_1C_2C_3C_4V>$ clusters are rare but attested

• If $C_2C_3$ can form complex coda, then $[V.C\emptyset CC.CV]$
  \[<\text{absbrel}>\]
  \[a.b\text{esp}.rel]\]

• If $C_2C_3$ can’t form a cluster, get medial epenthesis
  \[<\text{dardynil}>\]
  \[<\text{hankrvan}>\]
  \[\text{dar.d}\text{ey.nil}]\]
  \[\text{han.k}\text{er.van}]\]
• Large medial 4C or \(<VC_1C_2C_3C_4V>\) clusters are rare but attested
• If \(C_2C_3\) can form complex coda, then \([V.C\epsilon CC.CV]\)
  \(<\text{absbrel}>\)
  \([a.b\epsilon\text{sp}.\text{rel}]\)
• If \(C_2C_3\) can’t form a cluster, get medial epenthesis
  \(<\text{dardynil}>\quad <\text{hankrvan}>\)
  \([\text{dar.d}\epsilon\gamma.\text{nil}]\quad [\text{han.k}\epsilon\text{r}.\text{van}]\)
• Getting [dar.d\epsilon\gamma.nil] instead of *[dard.\epsilon\gamma.nil] is predicted by right-to-left parsing
  \(<\text{absbrel}>\quad <\text{dardynil}>\)
Large medial 4C or $<VC_1C_2C_3C_4V>$ clusters are rare but attested

If $C_2C_3$ can form complex coda, then $[V.C\emptyset C.C.CV]$

- $<\text{absbrel}>$
- $[\text{a.b\emptyset sp.rel}]$

If $C_2C_3$ can’t form a cluster, get medial epenthesis

- $<\text{dar.d\emptyset y.nil}>$
- $<\text{hankrvan}>$
- $[\text{dar.d\emptyset y.nil}]$
- $[\text{han.k\emptyset r.van}]$

Getting $[\text{dar.d\emptyset y.nil}]$ instead of $*[\text{dard.y\emptyset nil}]$ is predicted by right-to-left parsing

- $<\text{absbrel}>$
- $<\text{dardynil}>$
- $\{\text{absbrel}\}$
- $\{\text{dardynil}\}$
• Large medial 4C or \(<V C_1 C_2 C_3 C_4 V>\) clusters are rare but attested

• If \(C_2 C_3\) can form complex coda, then \([V.C_3 C.C.C.V]\)
  \(<\text{absbrel}>\)
  \([a.b\text{esp}.rel]\)

• If \(C_2 C_3\) can’t form a cluster, get medial epenthesis
  \(<\text{dardynil}>\quad <\text{hankrvan}>\)
  \([\text{dar.dǝy.nil}]\quad [\text{han.kǝr.van}]\)

• Getting \([\text{dar.dǝy.nil}]\) instead of \(*[\text{dard.yǝ.nil}]\) is predicted by right-to-left parsing
  \(<\text{absbrel}>\quad <\text{dardynil}>\)
  \{\text{absbrel}\} \quad \{\text{dardynil}\}
  \{\text{absb}.\text{rel}\} \quad \{\text{dardy}.\text{nil}\}
• Large medial 4C or <VC₁C₂C₃C₄V> clusters are rare but attested
• If C₂C₃ can form complex coda, then [V.CəCC.CV]
  
  <absbrel>
  [a.bəsp.rel]

• If C₂C₃ can’t form a cluster, get medial epenthesis
  
  <dardynil>  <hankrvan>
  [dar.dəy.nil]  [han.kər.van]

• Getting [dar.dəy.nil] instead of *[dard.yə.nil] is predicted by right-to-left parsing
  
  <absbrel>  <dardynil>
  {absbrel}  {dardynil}
  {absb}.rel  {dardy}.nil
  {a}.bəsp.rel  {dar}.dəy.nil
• Large medial 4C or \(<VC_1C_2C_3C_4V>\) clusters are rare but attested

• If \(C_2C_3\) can form complex coda, then \([V.C\emptyset CC.CV]\)

  \(<\text{absbrel}>\)

  \([a.\emptyset\text{sp.rel}]\)

• If \(C_2C_3\) can’t form a cluster, get medial epenthesi

  \(<\text{dardynil}>\quad <\text{hankrvan}>\)

  \([\text{dar.d}\emptyset\text{y.nil}]\quad [\text{han.k}\emptyset\text{r.van}]\)

• Getting \([\text{dar.d}\emptyset\text{y.nil}]\) instead of \(*[\text{dard.y}\emptyset\text{.nil}]\) is predicted by right-to-left parsing

  \(<\text{absbrel}>\quad <\text{dardynil}>\)

  \{\text{absbrel}\} \quad \{\text{dardynil}\}

  \{\text{absb}.\text{rel}\} \quad \{\text{dardy}.\text{nil}\}

  \{a}.\emptyset\text{sp.rel} \quad \{\text{dar}.d\emptyset\text{y.nil}\}

  a.\emptyset\text{sp.rel} \quad \text{dar.d}\emptyset\text{y.nil}\)
Final clusters

- Few roots have final clusters, mostly 2C and 3C.
- Most clusters can form complex codas

\[
\begin{array}{ccc}
<park> & <pand> & <paxt> \\
[park] & [pand] & [paxt]
\end{array}
\]
Final clusters

- Few roots have final clusters, mostly 2C and 3C.
- Most clusters can form complex codas
  
  <park>  <pand>  <paxt>
  [park]  [pand]  [paxt]

- 2C clusters that are rising sonority undergo epenthesis
  
  <ipr>  <uremn>  <godʒy>
  [i.pær]  [u.re.mən]  [go.dʒəɣ]
Final clusters

- Few roots have final clusters, mostly 2C and 3C.
- Most clusters can form complex codas
  \[
  \text{park} \quad \text{pand} \quad \text{paxt} \\
  [\text{park}] \quad [\text{pand}] \quad [\text{paxt}] 
  \]
- 2C clusters that are rising sonority undergo epenthesis
  \[
  \text{ipr} \quad \text{uremn} \quad \text{godzγ} \\
  [\text{i.pər}] \quad [\text{u.re.mən}] \quad [\text{go.dzəɣ}] 
  \]
- /Cr/ clusters can optionally block epenthesis for some speakers, lexemes, and subdialects
  \[
  \text{vakr} \quad \text{meyr} \quad \text{dakr} \\
  [\text{va.kər}] \quad [\text{me.yər}] \quad [\text{da.kər}] \\
  [\text{vakr}] \quad [\text{meyr}] \quad [\text{dakr}] 
  \]
- Variation for /Cr/ is potentially due to appendix formation
• Final 3C clusters are rarer but exist
• Take medial epenthesis [VC.ĆeĆ], rarely [V.ĆeĆĆ]
  \[\text{<partsr> <ajsinkn> <argy> <asty> <gozrn>}\]
• Final 3C clusters are rarer but exist
• Take medial epenthesis [VC.CəC], rarely [V.CəCC]

\[
\begin{array}{cccc}
\langle \text{partsr} \rangle & \langle \text{ajsinkn} \rangle & \langle \text{argy} \rangle & \langle \text{asty} \rangle \\
[\text{par.} \text{tsər}] & [\text{aj.sin.kən}] & [\text{ar.gəy}] & [\text{as.təy}] \\
\end{array}
\]
Final 3C clusters are rarer but exist

Take medial epenthesis [VC.CəC], rarely [V.CəCC]

or optional epenthesisis if final r or y/x in some roots

Putting aside variable final appendix, epenthesis location is predictable by right-to-left parsing
• Final 3C clusters are rarer but exist
• Take medial epenthesis [VC.CₑC], rarely [V.CₑCC]
  \[\text{<partsr> <ajsinkn> <argy> <asty> <gozrn>}\]
  \[\text{[par.tsər] [aj.sin.kən] [ar.gəy] [as.təy] [go.zərn]}\]
  \[\text{[partsr] [astx]}\]
• or optional epenthesis if final \(r\) or \(\gamma/x\) in some roots
• Putting aside variable final appendix, epenthesis location is predictable by right-to-left parsing
  \[\text{<vakr> <partsr> <gozrn>}\]
  \[\text{\{vakr\} \{partsr\} \{gozrn\}}\]
• Final 3C clusters are rarer but exist
• Take medial epenthesis [VC.CəC], rarely [V.CəCC]

\[
\begin{align*}
&\text{<partsr>} & \text{<ajsinkn>} & \text{<argy>} & \text{<asty>} & \text{<gozrn>}
\end{align*}
\]

\[
\begin{align*}
&\text{[par.tsər]} & \text{[aj.sin.ken]} & \text{[ar.goγ]} & \text{[as.təγ]} & \text{[go.zərn]}
\end{align*}
\]

\[
\begin{align*}
&\text{[partsrg]} & \text{[astx]}
\end{align*}
\]

• or optional epenthesis if final \(r\) or \(γ/x\) in some roots
• Putting aside variable final appendix, epenthesis location is predictable by right-to-left parsing

\[
\begin{align*}
&\text{<vakr>} & \text{<partsrg>} & \text{<gozrn>}
\end{align*}
\]

\[
\begin{align*}
&\text{\{vakr\}} & \text{\{partsrg\}} & \text{\{gozrn\}}
\end{align*}
\]

\[
\begin{align*}
&\text{\{va\}.kər} & \text{\{par\}.tsər} & \text{\{go\}.zərn}
\end{align*}
\]
• Final 3C clusters are rarer but exist
• Take medial epenthesis [VC.CₑC], rarely [V.CₑCC]
  
  \[\text{par.ₜsₑr} \quad \text{ajsinkₙ} \quad \text{argy} \quad \text{asty} \quad \text{gozrn}\]
  
  \[\text{par.ₜsₑr} \quad \text{aj.sin.kǝn} \quad \text{ar.gǝy} \quad \text{as.tǝy} \quad \text{go.zǝrn}\]
  
  \[\text{par.ₜsₑr} \quad \text{astx}\]

• or optional epenthesis if final \(r\) or \(y/x\) in some roots
• Putting aside variable final appendix, epenthesis location is predictable by right-to-left parsing

  \[\text{vakr} \quad \text{par.ₜsₑr} \quad \text{gozrn}\]
  
  \[\text{vakr} \quad \text{par.ₜsₑr} \quad \text{gozrn}\]
  
  \[\text{va.ₜǝr} \quad \text{par.ₜsₑr} \quad \text{go.zǝrn}\]
  
  \[\text{va.ₜǝr} \quad \text{par.ₜsₑr} \quad \text{go.zǝrn}\]
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- **Conclusion**
Epenthesis is largely governed by right-to-left parsing

Schematically, right-to-left parsing maximizes two types of constructions:

1. Open-First: open schwa-syllables are word-initial
   \[ m\text{@.g@.r.del} \quad \ast m\text{@.g.r@.del} \]

2. Maximize Codas: create as larger syllables as possible
   \[ p\text{@.n@d.del} \quad \ast p\text{@.n@d.del} \]
Unexpected schwas

- Epenthesis is largely governed by right-to-left parsing
- Schematically, right-to-left parsing maximizes two types of constructions:
  1. Open-First: open schwa-syllables are word-initial
     \[ m\tilde{e}\,g\tilde{e}\,r\tilde{e}\,d\tilde{e} \] * \[ m\tilde{e}\,g\tilde{e}\,r\tilde{e}\,d\tilde{e} \]
  2. Maximize Codas: create as larger syllables as possible
     \[ p\tilde{e}\,n\tilde{e}\,d\tilde{e}\,l\tilde{e} \] * \[ p\tilde{e}\,n\tilde{e}\,d\tilde{e}\,l\tilde{e} \]
- Sometimes get violations due to other constraints
- Will talk about morpheme boundaries effects, but others exist (appendix)
Boundary alignment

- All previous examples were root or root + suffix
- In more complex morphology, schwa epenthesis respects morphological left-edges in
  1. Prefixes
  2. Compounds (appendix)
  3. Reduplication (appendix)
Prefixed

- Armenian is primarily suffixing but it does have some productive prefixes
- Negative prefix *an-* is cognate to English *un-*
- Affixed to adjectives
  
  \[
  \begin{align*}
  &\text{hamper} & \text{‘patient’} \\
  &\text{an-hamper} & \text{‘impatient’}
  \end{align*}
  \]
- And to nouns/verbs to change them to adjectives
  
  \[
  \begin{align*}
  &\text{ham} & \text{‘taste’} \\
  &\text{an-ham} & \text{‘tasteless’}
  \end{align*}
  \]
Prefixation

- Schwa epenthesis applies in roots and ignores the prefix.
- If a schwa appears in isolation, then also appears in prefixed form.

CCV:  \(<\text{tram}>\quad <\text{antram}>\)
\[\text{[təram]}\quad \text{[an-təram]}\]
‘money’ ‘money-less’
• Schwa epenthesis applies in roots and ignores the prefix
• If a schwa appears in isolation, then also appears in prefixed form

CCV: 
<tram> <antram>
[təram] [an-təram]
‘money’ ‘money-less’

CCCV: 
<nʃmar> <annʃmar>
[nəʃmar] [an-nəʃmar]
‘mark’ ‘unperceived’
Prefixation

- Schwa epenthesis applies in roots and ignores the prefix
- If a schwa appears in isolation, then also appears in prefixed form

CCV: \(<\text{tram}>\) \(<\text{antram}>\)
\([\text{təram}]\) \([\text{an-təram}]\)
‘money’ ‘money-less’

CCCV: \(<\text{nʃmar}>\) \(<\text{annʃmar}>\)
\([\text{nəʃmar}]\) \([\text{an-nəʃmar}]\)
‘mark’ ‘unperceived’

CCCCV: \(<\text{trtveli}>\) \(<\text{antrtveli}>\)
\([\text{tərtveli}]\) \([\text{an-tərtveli}]\)
‘excitable’ ‘unshakeable’
Prefixation

- Capture schwa epenthesis either with cyclicity, or with alignment constraints
  
  CCV:  <tram>  <antram>
         [təram]  [an-təram]
         ‘money’  ‘moneyless’

- Use alignment for now because there are some problems with cyclicity (appendix)

- ALIGN-M: align a morpheme to left-edge of syllable

<table>
<thead>
<tr>
<th></th>
<th>ALIGN-M</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ant.ram</td>
<td>*!</td>
</tr>
<tr>
<td>b.</td>
<td>a.nət.ram</td>
<td>*!</td>
</tr>
<tr>
<td>c.</td>
<td>an-tə.ram</td>
<td></td>
</tr>
</tbody>
</table>
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  - Parallel allomorphy
- **Conclusion**
So far, whenever a schwa was epenthesized, it is never deleted
This is the case for initial-cluster schwas in prefixation
But things get complicated for final-cluster schwas
Final clusters

- In citation form, final CC take schwas prescriptively
  
  ‘tiger’  ‘basis’
  
  <vakr>  <himn>
  
  [vakər]  [himən]
Final clusters

- In citation form, final CC take schwas prescriptively
  - ‘tiger’  ‘basis’
  - <vakr>  <himn>
  - [vakər]  [himən]

- But when add V-initial suffixes, the schwa disappears
  - ‘tiger skin’  ‘primary’
  - <vakreni>  <himnagan>
  - [vakr-eni]  [himn-agan]
  - *[vakər-eni]  *[himən-agan]
• Similarly for final CCC clusters in isolation
  ‘emperor’  ‘him’
  <gajsr>    <inkn>
  [gajsər]   [inkən]
Similarly for final CCC clusters in isolation

- ‘emperor’ ‘him’
  - <gajsr> <inkn>
  - [gajsər] [inkən]

Versus suffixation

- ‘empress’ ‘spontaneously’
  - <gajsrui> <inknin>
  - [gajs.ru.hi] [ink.nin]
  - *[gaj.sə.ru.hi] *[in.kə.nin]

Larger clusters aren’t attested
• Basic facts: schwa when unsuffixed, no schwa before suffix
  
  \[
  \begin{array}{cc}
  \text{[vakør]} & \text{[gajsr]} \\
  \text{[vakreni]} & \text{[gajsr-uh]} \\
  \end{array}
  \]

• Two initial hypothetical analysis

1. Post-cyclic insertion in final clusters

= epentheses in final CC# after the morphology is over

<table>
<thead>
<tr>
<th>‘tiger’</th>
<th>‘tiger-skin’</th>
</tr>
</thead>
<tbody>
<tr>
<td>(&lt;vakr&gt;)</td>
<td>(&lt;vakreni&gt;)</td>
</tr>
</tbody>
</table>

Insert: \[[vakør] [vakreni]\]
Analysis

- Basic facts: schwa when unsuffixed, no schwa before suffix
  
  \[
  \begin{array}{ll}
  \text{vakər} & \text{gajsər} \\
  \text{vakreni} & \text{gajsr-uhi}
  \end{array}
  \]

- Two initial hypothetical analysis

1. Post-cyclic insertion in final clusters
   = epenthesi s in final CC# after the morphology is over

   \[
   \begin{array}{ll}
   \text{‘tiger’} & \text{‘tiger-skin’} \\
   \text{vakr} & \text{vakreni}
   \end{array}
   \]

   **Insert:** \[
   \begin{array}{ll}
   \text{vakər} & \text{vakreni}
   \end{array}
   \]

2. Cyclic insertion + deletion

   \[
   \begin{array}{ll}
   \text{‘tiger’} & \text{‘tiger-skin’} \\
   \text{vakr} & \text{vakreni}
   \end{array}
   \]

   **Cycle 1:**
   
   Insert \[
   \begin{array}{ll}
   \text{vakər} & \text{vakər}
   \end{array}
   \]

   **Insert**
Analysis

- Basic facts: schwa when unsuffixed, no schwa before suffix

  \[\text{vakər} \quad \text{gajsr-uhi}\]
  \[\text{vakreni} \quad \text{gajsr}\]

- Two initial hypothetical analysis

1. Post-cyclic insertion in final clusters
   = epenthesis in final CC# after the morphology is over

   \[
   \begin{array}{l|l}
   \text{‘tiger’} & \text{‘tiger-skin’} \\
   \langle \text{vakr} \rangle & \langle \text{vakreni} \rangle \\
   \text{Insert:} & [\text{vakər}] [\text{vakreni}] \\
   \end{array}
   \]

2. Cyclic insertion + deletion

   \[
   \begin{array}{l|l|l}
   \text{‘tiger’} & \text{‘tiger-skin’} \\
   \langle \text{vakr} \rangle & \langle \text{vakreni} \rangle \\
   \hline
   \text{Cycle 1:} & \text{vakr} & \text{vakr} \\
   \text{Insert} & \text{vakər} & \text{vakər} \\
   \text{Cycle 2:} & \text{vakər-eni} & \text{vakr-eni} \\
   \end{array}
   \]
Inconclusive hypotheses

- Attested examples don’t distinguish the two analyses
- For example for CCC, both analyses work:

1. Post-cyclic insertion

<table>
<thead>
<tr>
<th>‘emperor’</th>
<th>‘empress’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;gajsr&gt;</td>
<td>&lt;gajsr.ruhi&gt;</td>
</tr>
<tr>
<td>Insert</td>
<td>[gajsr]</td>
</tr>
</tbody>
</table>
Inconclusive hypotheses

- Attested examples don’t distinguish the two analyses
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1. Post-cyclic insertion

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</thead>
<tbody>
<tr>
<td>&lt;gajsr&gt;</td>
<td>&lt;gajsr-ruhi&gt;</td>
</tr>
<tr>
<td>Insert</td>
<td>[gajsər]</td>
</tr>
</tbody>
</table>

2. Cyclic insertion + deletion

<table>
<thead>
<tr>
<th>‘emperor’</th>
<th>‘empress’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;gajsr&gt;</td>
<td>&lt;gajsr-ruhi&gt;</td>
</tr>
<tr>
<td>Cycle 1:</td>
<td>gajsr</td>
</tr>
<tr>
<td>Insert</td>
<td>gajsər</td>
</tr>
<tr>
<td>Cycle 2:</td>
<td>gajsər-uhir</td>
</tr>
</tbody>
</table>
ACCIDENTAL GAPS AND WUGS

- There is however an important gap (checked 70k dictionary)
- For CCC# words, C1C2 is always an okay complex coda

  `<gajsr>`  `[gajsər]`  ‘emperor’
  `<gajsruhi>`  `[gajs.r-uhi]`  ‘empress’

- Insightful gap: hypotheses diverge when C1C2 is not a good complex coda
- Like nonce spelled-word `paptr` and its derivative `paptr-uhi`

Base

  `<paptr>`  `[pap.t@r]
  `<paptruhi>`  `[pa.p@t.ru.hi]`  Posy-cyclic insertion

- Mini-survey results from my own personal elicitations and a friend:
  → `pap.t@r-uhi`

- Potentially a poverty of stimulus effect
  → cyclicity

37
ACCIDENTAL GAPS AND WUGS

- There is however an important gap (checked 70k dictionary)
- For CCC# words, C1C2 is always an okay complex coda

\[
\begin{align*}
\langle gajs\rangle & \quad [\text{gajsør}] \quad \text{‘emperor’} \\
\langle gajsruhi\rangle & \quad [\text{gajs.r-uhi}] \quad \text{‘empress’} \\
\ast\langle paptr\rangle &
\end{align*}
\]
ACCIDENTAL GAPS AND WUGS

- There is however an important gap (checked 70k dictionary)
- For CCC# words, C1C2 is always an okay complex coda

\[
\begin{align*}
<\text{gajsr}> & \quad [\text{gajsər}] \quad \text{‘emperor’} \\
<\text{gajsrhuhi}> & \quad [\text{gajs.r-uhі}] \quad \text{‘empress’} \\
*<\text{paptr}> & \\
\end{align*}
\]

- Insightful gap: hypotheses diverge when C1C2 is not a good complex coda
- Like nonce spelled-word \textit{paptr} and its derivative \textit{paptr-uhi}

<table>
<thead>
<tr>
<th>Base</th>
<th>\textit{paptr}</th>
<th>\textit{pap.tər}</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{paptruhi}</td>
<td>Cyclic insertion + deletion</td>
<td>\textit{pap.tə.ru.hi}</td>
</tr>
</tbody>
</table>
ACCIDENTAL GAPS AND WUGS

- There is however an important gap (checked 70k dictionary)
- For CCC# words, C1C2 is always an okay complex coda

  $\langle gajsr \rangle$  [gajsər]  ‘emperor’
  $\langle gajsruhi \rangle$  [gajs.r-uhi]  ‘empress’
  $*\langle \text{paptr} \rangle$

- Insightful gap: hypotheses diverge when C1C2 is not a good complex coda
- Like nonce spelled-word paptr and its derivative paptr-uhi

<table>
<thead>
<tr>
<th>Base</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\langle \text{paptr} \rangle$</td>
<td></td>
</tr>
<tr>
<td>[pap.tər]</td>
<td></td>
</tr>
<tr>
<td>$\langle \text{paptruhi} \rangle$</td>
<td></td>
</tr>
<tr>
<td>Cyclic insertion + deletion[pa.pət.ru.hi]</td>
<td>Posy-cyclic insertion [pa.pət.ru.hi]</td>
</tr>
</tbody>
</table>
Accidental gaps and wugs

- There is however an important gap (checked 70k dictionary)
- For CCC# words, C1C2 is always an okay complex coda

\[
\begin{align*}
\langle gajsr \rangle & \quad [gajsər] \quad \text{‘emperor’} \\
\langle gajsruhi \rangle & \quad [gajs.r-uhi] \quad \text{‘empress’}
\end{align*}
\]

- Insightful gap: hypotheses diverge when C1C2 is not a good complex coda
- Like nonce spelled-word \textit{paptr} and its derivative \textit{paptr-uhi}

<table>
<thead>
<tr>
<th>Base</th>
<th>Posy-cyclic insertion</th>
</tr>
</thead>
<tbody>
<tr>
<td>\langle paptr \rangle</td>
<td>[pa.pət.ru.hi]</td>
</tr>
<tr>
<td>[pap.tər]</td>
<td></td>
</tr>
<tr>
<td>\langle paptruhi \rangle</td>
<td>Cyclic insertion + deletion</td>
</tr>
<tr>
<td>[pap.tə.ru.hi]</td>
<td></td>
</tr>
</tbody>
</table>

- Mini-survey results from my own personal elicitations and a friend:
  \[\text{→ } \textit{pap.tər-uhi}\]
- Potentially a poverty of stimulus effect \[\rightarrow\text{cyclicity}\]
**Cyclic deletion**

- Delete a schwa if deletable: doesn’t violate syllable structure or boundary-alignment

<table>
<thead>
<tr>
<th><code>&lt;gajsruhi&gt;</code> [gajsœr]</th>
<th>*CC</th>
<th>*ə</th>
<th>BD-MAX-ə</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. gaj.sə.ru.hi</td>
<td>*!</td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>b. gajs.ru.hi</td>
<td></td>
<td>*</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>c. ga.jəs.ru.hi</td>
<td>*!</td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

- No deletion if creates bad clusters

<table>
<thead>
<tr>
<th><code>&lt;paptruhi&gt;</code> [pap.təɾ]</th>
<th>*CC</th>
<th>*ə</th>
<th>BD-MAX-ə</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pap.tə.ru.hi</td>
<td>*</td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>b. papt.ru.hi</td>
<td>*!</td>
<td></td>
<td>*</td>
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</tr>
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</table>
Cyclic deletion also explains variation in colloquial speech

<table>
<thead>
<tr>
<th>‘honey’</th>
<th>Prescriptive</th>
<th>Colloquial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>&lt;meyr&gt;</td>
<td>&lt;meyr&gt;</td>
</tr>
<tr>
<td>meγer</td>
<td>meγer</td>
<td>meγer</td>
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In Standard speech, Cyclic Deletion applies before all non-lexical morphemes → stem-level, word-level, post-lexical within PWord’

But in low-class colloquial Beiruti, it mostly applies in derivation (stem-level) → Curious interaction with allomorphy
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</tr>
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<tbody>
<tr>
<td>Base</td>
<td>Derivation</td>
<td>&lt;meyr&gt;</td>
<td>&lt;meyr&gt;</td>
</tr>
<tr>
<td>meyər</td>
<td>meyər od</td>
<td>meyər</td>
<td>meyər od</td>
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<td>&lt;meyr&gt; meyər</td>
<td>meyər</td>
</tr>
<tr>
<td>‘honeyed’</td>
<td>meyр-od</td>
<td>meyр-od</td>
</tr>
<tr>
<td>‘honey-INST’</td>
<td>meyр-ov</td>
<td>meyər-ov</td>
</tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>meyər</td>
<td>meyər</td>
</tr>
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<td>meyər-od</td>
<td>meyər-od</td>
</tr>
<tr>
<td>‘honey-INST’</td>
<td>Inflection</td>
<td>meyər-ov</td>
<td>meyər-ov</td>
</tr>
<tr>
<td>‘honey=is’</td>
<td>Clitics</td>
<td>meyər=e</td>
<td>meyər=e</td>
</tr>
<tr>
<td>‘honey took’</td>
<td>Word+Word</td>
<td>meyər arav</td>
<td>meyər arav</td>
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<td>meyɾ-od</td>
<td>meyɾ-od</td>
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<td>‘honey-INST’ Inflection</td>
<td>meyɾ-ov</td>
<td>meyəɾ-ov</td>
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<td>‘honey=is’ Clitics</td>
<td>meyɾ=e</td>
<td>meyəɾ=e</td>
</tr>
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<td>meyəɾ arav</td>
<td>meyəɾ arav</td>
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→ stem-level, word-level, post-lexical within PWord’

But in low-class colloquial Beiruti, it mostly applies in derivation (stem-level)

→ Curious interaction with allomorphy
Plural suffix -er for monosyllables, -ner elsewhere

- pag
- pag-er
- ‘yard’

- panag
- panag-ner
- ‘army’
• Plural suffix -er for monosyllables, -ner elsewhere
  pag pag-er ‘yard’
  panag panag-ner ‘army’
• Schwa of initial clusters contributes to allomorphy
  <srah> sərah sərah-ner ‘hall’
Allomorphy

- Plural suffix -er for monosyllables, -ner elsewhere
  
  \[\text{pag} \quad \text{pag-er} \quad \text{‘yard’}\]
  
  \[\text{panag} \quad \text{panag-ner} \quad \text{‘army’}\]

- Schwa of initial clusters contributes to allomorphy
  
  \[\langle srah \rangle \quad \text{sərah} \quad \text{sərah-ner} \quad \text{‘hall’}\]

- Register-level variation for final CC clusters
  
  \[\langle vakr \rangle\]
  
  Standard \quad \text{vakər}
• Plural suffix -er for monosyllables, -ner elsewhere
  
  \[
  \begin{align*}
  \text{pag} & \quad \text{pag-er} \quad \text{‘yard’} \\
  \text{panag} & \quad \text{panag-ner} \quad \text{‘army’}
  \end{align*}
  \]

• Schwa of initial clusters contributes to allomorphy
  
  \[
  \text{<srah> } s\text{brah} \quad s\text{brah-ner} \quad \text{‘hall’}
  \]

• Register-level variation for final CC clusters
  
  \[
  \text{<vакр> }
  \]

  Standard \quad \text{vak} \text{er} \quad \text{vакr-er}
Allomorphy

- Plural suffix -er for monosyllables, -ner elsewhere
  
  pag  pag-er  ‘yard’
  panag  panag-ner  ‘army’

- Schwa of initial clusters contributes to allomorphy
  
  <srah>  sərah  sərah-ner  ‘hall’

- Register-level variation for final CC clusters

  <vakr>
  
  Standard  vakər  vakr-er
  Colloquial  vakər  vakər-ner
  ‘tiger’  ‘tigers’

- Let’s look at grammars per register
In standard speech, schwa in initial clusters feed allomorphy

\[ \text{[sərah]} \quad \text{‘hall’} \]
\[ \text{[sərah-ner]} \quad \text{‘hall-PL’} \]
In standard speech, schwa in initial clusters feed allomorphy

[sərah]  ‘hall’
[sərah-ner]  ‘hall-PL’

Final CC schwa is always deleted before V-initial inflection

[vakər]  ‘tiger’
[vakr-ov]  ‘tiger-INST’

On the surface, absence of schwa feeds and is fed by plural allomorphy

[vakr-er]  ‘tiger-PL’
In standard speech, schwa in initial clusters feed allomorphy

\[ [\text{sərah}] \quad \text{‘hall’} \]
\[ [\text{sərah-ner}] \quad \text{‘hall-PL’} \]

Final CC schwa is always deleted before V-initial inflection

\[ [\text{vakər}] \quad \text{‘tiger’} \]
\[ [\text{vakr-ov}] \quad \text{‘tiger-INST’} \]

On the surface, absence of schwa feeds and is fed by plural allomorphy

\[ [\text{vakr-er}] \quad \text{‘tiger-PL’} \]

Post-cyclic insertion straightforwardly handles allomorphy

<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>‘halls’</th>
<th>‘tiger’</th>
<th>‘tigers’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial epenthesis</td>
<td>sərah + PL</td>
<td>vakr</td>
<td>vakr + PL</td>
</tr>
<tr>
<td>Input:</td>
<td>sərah</td>
<td>vakr</td>
<td>vakr</td>
</tr>
</tbody>
</table>
Standard allomorphy

- In standard speech, schwa in initial clusters feed allomorphy
  \[ \text{[sərah]} \quad \text{‘hall’} \]
  \[ \text{[sərah-ner]} \quad \text{‘hall-PL’} \]

- Final CC schwa is always deleted before V-initial inflection
  \[ \text{[vakər]} \quad \text{‘tiger’} \]
  \[ \text{[vakr-ov]} \quad \text{‘tiger-INST’} \]

- On the surface, absence of schwa feeds and is fed by plural allomorphy
  \[ \text{[vakr-er]} \quad \text{‘tiger-PL’} \]

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</thead>
<tbody>
<tr>
<td>Initial epenthesation</td>
<td>srah + PL</td>
<td>vakr</td>
<td>vakr + PL</td>
</tr>
<tr>
<td>Cycle 2</td>
<td>Add PL:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sərah-ner</td>
<td>vakr-er</td>
<td>vakər</td>
</tr>
</tbody>
</table>

- But doesn’t explain schwa retention facts from the \textit{paptə.r-uhi} accidental gaps
Cyclic deletion and allomorphy

- With cyclic deletion, allomorphy requires a degree of parallelism
  - ‘tiger’ ‘tigers’
  - <vakr> vakər vakr-er

- In Standard speech:
  1. PL has strict Subcat requirements: -er for σ, -ner elsewhere
  2. Cyclic deletion deletes deletable schwas
  3. Two feed each other

<table>
<thead>
<tr>
<th>vakər - PL</th>
<th>*CC</th>
<th>Subcat</th>
<th>*ə</th>
<th>BD-Max-ə</th>
<th>Align-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. va.kər-ner</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>b. vak.r-er</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>c. va.kə.r-er</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>6</td>
</tr>
<tr>
<td>d. vakr-ner</td>
<td>*!</td>
<td></td>
<td>*!</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
Colloquial allomorphy

In contrast in colloquial speech, cyclic deletion is turned off (low ranked) in inflection

‘tiger’ ‘tigers’
<vakr> vakər vakər-ner

Base’s schwa feeds allomorphy

<table>
<thead>
<tr>
<th>[vakər] - PL</th>
<th>*CC</th>
<th>Subcat</th>
<th>BD-Max-ə</th>
<th>*ə</th>
<th>Align-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. va.kər-ner</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>7</td>
</tr>
<tr>
<td>b. vak.r-er</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>3</td>
</tr>
<tr>
<td>c. va.kə.r-er</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
<td>6</td>
</tr>
<tr>
<td>d. vakr-ner</td>
<td>*!</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>4</td>
</tr>
</tbody>
</table>
Table of Contents

- **Introduction**

- **Orthography of schwas**

- **Distribution of inserted schwas**
  - Initial cluster
  - Medial cluster
  - Final cluster

- **Morphological Deviations**

- **Cyclic deletion**
  - Insertion vs. deletion
  - Parallel allomorphy

- **Conclusion**
CONCLUSION

- Looked at schwa epenthesis from OR to SRs:
- Sensitive to:
  1. Directional syllabification
  2. Slew of phonotactic constraints
  3. Morpheme alignment
  4. Cyclic insertion and deletion
  5. Parallel list allomorphy
- Main take-away: OR->SR is a morphophonological process
- Does the OR reflect the URs? Probably.
REFERENCES


[Dolatian 2021] DOLATIAN, Hossep: The role of heads and cyclicity in bracketing paradoxes in Armenian compounds. In: Morphology 31 (2021), Nr. 1, S. 1–43


Appendix guide

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  - Cyclic contiguity in the passive 56
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- Psychological reality of epenthesis 78
Underlying schwas

- Schwas in OR are always pronounced but are very few
- Some are functionally loaded like inflectional morphemes
  
  `<mart> ‘man’ <kiʃer-van> ‘night-GEN’
  `<mart-ɔ> ‘man-DEF <kiʃer-vən-e> ‘night-ABL’

- Or prepositions, derivational prefixes, and few words

  `<əst> <ənt-> <əmb-el>
  ‘according to’ ‘inter-’ ‘to imbibe’

- Can find in proper nouns and borrowings where schwa is ‘unpredictably there’ and cannot be deleted

  `<pitər> ‘Peter’
  `<pitər-ov> ‘Peter-INST’

- Easiest analysis: present in UR + idiosyncratically marked to never delete, unlike cyclically added schwas
Sibilant-stop prothesis

- Initial 2C clusters generally undergo medial epenthesis to satisfy ONSET:
  
  \[
  \begin{align*}
  \langle h\text{bard} \rangle & \quad \langle t\text{tum} \rangle & \quad \langle d\text{gar} \rangle \\
  [h\varepsilon.\text{bard}] & \quad [t\varepsilon.\text{tum}] & \quad [d\varepsilon.\text{gar}] 
  \end{align*}
  \]

- Systematic exceptions are sT clusters with initial epenthesis:
  
  \[
  \begin{align*}
  \langle s\text{basel} \rangle & \quad \langle s\text{dor} \rangle & \quad \langle z\text{kal} \rangle \\
  [\varepsilon s.\text{pa.sel}] & \quad [\varepsilon s.\text{tor}] & \quad [\varepsilon s.\text{kal}] 
  \end{align*}
  \]

- **Cont-#sTV**: root-initial stV clusters must stay adjacent:

<table>
<thead>
<tr>
<th>&lt;zkal&gt;</th>
<th>Cont-sTV</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [ alongside ] \varepsilon s.kal</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. s\varepsilon.kal</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>
Lack of prothesis

- For initial epenthesis, $C_2$ has to be a stop, not a sonorant
  
  \[
  \begin{array}{c}
  \langle sxal \rangle \quad \langle slak \rangle \quad \langle zrutjets \rangle \\
  [sɛ.xal] \quad [sɛ.lak] \quad [zɛ.rutjets]
  \end{array}
  \]

- Besides $s/z$, $ft$ shows prothesis but not other types of fricative+stop combinations
  
  \[
  \begin{array}{c}
  \langle ʔbid \rangle \quad \langle xdiγ \rangle \quad \langle ʔpot \rangle \quad \langle ʔtap \rangle \\
  [ʒɛ.bid] \quad [xɛ.diγ] \quad [ʃɛ.pot] \quad [ʃɛ.tap]
  \end{array}
  \]
Prefixation and sibilants

- for sTV-initial roots, prothesis survives in prefixation:
  \[ \text{sTV: } <zkuS> \quad <anzkuS> \quad [\text{̃skuS}] \quad [\text{an-̃skuS}] \]
- Crucially, need to assume [nz] is a bad coda (which it generally is)
- With *CC, no-epenthesis harmonically binds the winner
- Contiguity » Alignment

<table>
<thead>
<tr>
<th>an-zkuʃ</th>
<th>*CC</th>
<th>Cont-sTV</th>
<th>Align-M</th>
<th>Align-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. anz.kuʃ</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>b. a.nəs.kuʃ</td>
<td></td>
<td></td>
<td>*</td>
<td>5</td>
</tr>
<tr>
<td>c. an.zə.kuʃ</td>
<td></td>
<td>*!</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

- Appendix: see variation for how to syllabify after vowels + okay codas
LARGER SIBILANT CLUSTERS

- In larger sTC*V clusters, prothesis applies only if T is coronal
  \[\text{<sprit> <sdrug> <sklil>}\]
  \[\text{[səp.rit] [əst.rug] [sək.lil]}\]

- Same generalization applies in larger clusters
  \[\text{<sbrt}l< <sdrt\text{ʃum} > <sgrdel>\]
  \[\text{[sə.bər.til] [əst.ə.r.ʃum] [sə.gər.del]}\]

- Effect of Cont-st for \(s+\{t,d\}\)

<table>
<thead>
<tr>
<th></th>
<th>&lt;sdrug&gt;</th>
<th>CONT-sTV</th>
<th>CONT-st</th>
<th>ONSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>øst.rug</td>
<td></td>
<td></td>
<td>⚫</td>
</tr>
<tr>
<td>b.</td>
<td>səd.rug</td>
<td></td>
<td>*!</td>
<td>⚫</td>
</tr>
</tbody>
</table>
**Coda restrictions**

- Stop- or affricate-final complex codas can appear after non-schwas
  
  /NT/  /nts/  /rt/
  [ant.ra.nig]  [ants.rev]  [mart.ga.jin]

- And after schwas
  
  /NT/  /nts/  /rt/
  <gntrug>  <gntsni>  <grd.ser>
  [gɛrd.rug]  [gənts.ni]  [gərd.ser]
Coda restrictions

- But other complex codas only exist for non-schwases
  \[
  \text{/Vrs/} \quad \text{/Vrf/} \quad \text{/Vrm/} \\
  \text{[hars.nig]} \quad \text{[gafʃ.neʃ]} \quad \text{[arm.dik]} \\
  \]
- Not schwases
  \[
  \text{<Crs>} \quad \text{<Crf>} \quad \text{<Crm>} \\
  \text{<srsgel>} \quad \text{<prʃ dal>} \quad \text{<trmpal>} \\
  \text{[sərəs.kel]} \quad \text{[pərəʃ.tal]} \quad \text{[tərəm.pal]} \\
  *\text{[sərs.kel]} \quad *\text{[pərʃ.tal]} \quad *\text{[tərm.pal]} \\
  \]
- *əXY: schwa can’t head some complex codas
- Could be generalized with projection constraints (van Oostendorp, 2011)
Affix-specific epenthesis

- Previous cases involved and prefixes undergoing epenthesis to syllabify clusters
- Some affixes arbitrarily require epenthesis even though unneeded for syllable structure
Active verbs are formed from root + theme vowel + inflection

\[ xos-i-l \] ‘to speak’
\[ xos-v-i-l \] ‘to be spoken’

Passive verbs add the suffix -v- before the theme vowel

A lot of dialectal variation on what happens when -v- is after a CC-root

FYI: intensive suffix -t- behaves the same
• In Western Armenian, -v- triggers schwa after any CC-cluster
• Whether CC is pronounceable complex coda
  \[\text{[kant-\text{e-l}]}\]
  \(\text{‘to destroy’}\)
  \[\text{[kant\text{o-v-i-l}]}\]
  \(\text{‘to be destroyed’}\)
• Or not
  \[\text{[madn-\text{e-l}]}\]
  \(\text{‘to betray’}\)
  \[\text{[madn\text{o-v-i-l}]}\]
  \(\text{‘to be betrayed’}\)
Western Armenian

- Output constraint: *CC-Pass
- But the location of schwa isn’t predicted by directional syllabification because creates open syllable

<table>
<thead>
<tr>
<th></th>
<th>*CC-Pass</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. madn.vil</td>
<td>*!</td>
<td>4</td>
</tr>
<tr>
<td>b. ma.dən-vil</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>c. mad.nə-vil</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

- Somewhat resembles Contiguity-effects in Chukchee (Kenstowicz, 1994)
**Cyclicity**

- Idea: add the schwa in a location that maximizes similarity of the stems between derived (passive) and base (active)
- Cyclic-contiguity:

<table>
<thead>
<tr>
<th></th>
<th>[mad.nel]</th>
<th>*CC-Pass</th>
<th>BD-CONT</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>madn.vil</td>
<td>⋆</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>b.</td>
<td>ma.dən-vil</td>
<td>⋆</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>c.</td>
<td>mad.nə-vil</td>
<td>⋆</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

- BD-CONT looks equivalent to use MAX-ə for cyclic-deletion effects
Rhotics

- When CC ends in a rhotic, usually find an internal schwa
  
  [pəndr-e-l] ‘to find’
  [pəndər-v-i-l] ‘to be found’

- For some lexemes and speaker, can have have schwa at morpheme boundary
  
  [avr-e-l] ‘to ruin’
  [avər-v-i-l, avrə-v-i-l] ‘to be ruined’

- General dis-preference for medial open rə syllables

<table>
<thead>
<tr>
<th>&lt;avr-v-i-l&gt; [avr-el]</th>
<th>*CC-PASS</th>
<th>*…rə….</th>
<th>BD-CONT</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. avr.vil</td>
<td>*!</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>b. a.vər-vil</td>
<td></td>
<td>*</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>c. av.rə-vil</td>
<td>*!</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
Eastern Armenian

- Eastern Armenian is more nuanced
- Only difference from Western is that there’s no epenthesis when CC is an okay complex coda
  
  \['to reject' 'to be rejected' (E) (W)\]
  
  \[\text{mer}3\text{-el}] \ [\text{mer}3\text{-vel}] \ [\text{mer}3\omega\text{-vil}]\]
- Though lots of lexeme-based variation
- EA doesn’t have the *CC-Pass constraint

<table>
<thead>
<tr>
<th>(&lt;\text{mer}3\text{-v-e-l}&gt; \ [\text{mer}3\text{-el}])</th>
<th>*CC</th>
<th>BD-CONT</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\text{mer}3\text{.vel})</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>b. (\text{mer}3\omega\text{.vel})</td>
<td>(!)</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>c. (\text{mer}3\omega\text{-vel})</td>
<td></td>
<td></td>
<td>8!</td>
</tr>
</tbody>
</table>

- Contiguity handles the epenthesis cases
Odd effects for causative suffix <\(\text{tsn}\)>

In Western, always surfaces as \(\text{tsn}\) even after a vowel

\[
\text{‘to sing’} \quad \text{‘to flee’} \\
[jerk-e-l] \quad [pax-i-l] \\
[jerk-e-\(\text{tsn}\)-e-l] \quad [paxtsn-e-l]
\]

But in EA, generally no schwa after a vowel (+ lots of variation)

\[
[jerk^h-e-\(\text{ts}\_n\)-e-l] \quad [p\_hax\text{t}s^h\_n\_e-l]
\]

Makes some diachronic sense: reduced from Classical \(-ts_h\ u\text{ts}_h\ an\)-e-l

Two equivalent(?) approaches:

1. Allomorphy: WA has \(/\text{tsn}\)/, while EA has \(/\text{tsn},\text{tsn}\)/ with subcat frames
2. Epenthesis: morpheme-specific constraint on causative syllabification

Will try out an epenthesis approach and see how far it takes us
In Western, the schwa is always used even in [...a-ːsə...]

Coda-ban: the causative suffix disprefers being in a coda

<table>
<thead>
<tr>
<th>&lt;jerk-e-ːsn-e-l&gt;</th>
<th>*CAUS</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. jer.kēts.nel</td>
<td>✗</td>
<td>9</td>
</tr>
<tr>
<td>b. jer.ke.ːsə.nel</td>
<td>✗</td>
<td>14</td>
</tr>
</tbody>
</table>

This is high-ranking and generalized in Western
Coda-ban

- In Eastern Armenian, epenthesis generally blocked after vowels, but triggered for other consonants
- Coda-ban is refined for whether causative is part of complex coda or not

<table>
<thead>
<tr>
<th></th>
<th>jerk-e-.snp-e-l</th>
<th><em>Caus</em></th>
<th>Align-ŋ-L</th>
<th><em>Vcaus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>jer.kets.nel</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>jer.ke.tsə.nel</td>
<td></td>
<td>14!</td>
<td>*</td>
</tr>
</tbody>
</table>
• But after consonants, it triggers internal epenthesis instead of epenthesis at morpheme boundaries

• Not predicted by directional syllabification

• Could argue that causative can’t follow schwa

<table>
<thead>
<tr>
<th>&lt;pax-\text{tsn-e-l}&gt;</th>
<th>*\text{\textipa{e}CAUS}</th>
<th>*\text{\textipa{C}CAUS}</th>
<th>\text{ALIGN-σ-L}</th>
<th>*\text{\textipa{V}CAUS}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pax\textipa{ts}.\textipa{n}el</td>
<td></td>
<td>*!</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>b. pax\textipa{x~{}}\textipa{ts}.\textipa{n}el</td>
<td>*!</td>
<td>7</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. pax.\textipa{ts~{}}\textipa{nel}</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Can’t use cyclicity to help because base form has $x$ be an onset $pax-e-l$

• Allomorphy is probably better on the long-run
Epenthesis in prefixes

- Besides roots, prefixes can also undergo epenthesis
- Productive C prefix:
  
<table>
<thead>
<tr>
<th>‘I take’</th>
<th>‘I love’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjunctive</td>
<td>&lt;arnem&gt;</td>
</tr>
</tbody>
</table>
Epenthesis in prefixes

- Besides roots, prefixes can also undergo epenthesis
- Productive C prefix:

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<th>‘I take’</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Subjunctive</td>
<td>&lt;arnem&gt;</td>
<td>[arnem]</td>
</tr>
<tr>
<td>Negative</td>
<td>&lt;tʃarnem&gt;</td>
<td>[tʃ-arnem]</td>
</tr>
</tbody>
</table>
**Epenthesis in prefixes**

- Besides roots, prefixes can also undergo epenthesis
- **Productive C prefix:**
  
<table>
<thead>
<tr>
<th>Subjunctive</th>
<th>‘I take’</th>
<th>‘I love’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;arnem&gt;</td>
<td>[arnem]</td>
<td>&lt;sirem&gt;</td>
</tr>
<tr>
<td>&lt;tsarnem&gt;</td>
<td>[ts-arnem]</td>
<td>&lt;tsirem&gt;</td>
</tr>
<tr>
<td>&lt;garnem&gt;</td>
<td>[g-arnem]</td>
<td>&lt;gsirem&gt;</td>
</tr>
</tbody>
</table>

- **Negative**
<table>
<thead>
<tr>
<th>Subjunctive</th>
<th>‘I take’</th>
<th>‘I love’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;tsarnem&gt;</td>
<td>[ts-arnem]</td>
<td>&lt;tsirem&gt;</td>
</tr>
<tr>
<td>&lt;garnem&gt;</td>
<td>[g-arnem]</td>
<td>&lt;gsirem&gt;</td>
</tr>
</tbody>
</table>

- **Indicative**
<table>
<thead>
<tr>
<th>Subjunctive</th>
<th>‘I take’</th>
<th>‘I love’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;arnem&gt;</td>
<td>[arnem]</td>
<td>&lt;sirem&gt;</td>
</tr>
<tr>
<td>&lt;tsarnem&gt;</td>
<td>[ts-arnem]</td>
<td>&lt;tsirem&gt;</td>
</tr>
<tr>
<td>&lt;garnem&gt;</td>
<td>[g-arnem]</td>
<td>&lt;gsirem&gt;</td>
</tr>
</tbody>
</table>

- **Unproductive CC- prefix:**

  | <kujn>       | [kujn]         | ‘color’         |
  | <koh>        | [koh]          | ‘content’       |
**Epenthesis in prefixes**

- Besides roots, prefixes can also undergo epenthesis
- **Productive C prefix:**
  
<table>
<thead>
<tr>
<th>Subjunctive</th>
<th>‘I take’</th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt;arnem&gt;</td>
<td>[arnem]</td>
<td>&lt;sirem&gt;</td>
</tr>
<tr>
<td>Negative</td>
<td>&lt;tʃ-arnem&gt;</td>
<td>[tʃ-arnem]</td>
</tr>
<tr>
<td>Indicative</td>
<td>&lt;garnem&gt;</td>
<td>[g-arnem]</td>
</tr>
</tbody>
</table>

- **Unproductive CC- prefix:**

<table>
<thead>
<tr>
<th>&lt;kujn&gt;</th>
<th>[kujn]</th>
<th>‘color’</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;dʒkujn&gt;</td>
<td>[dʒ-kujn]</td>
<td>‘discolored’</td>
</tr>
<tr>
<td>&lt;koh&gt;</td>
<td>[koh]</td>
<td>‘content’</td>
</tr>
<tr>
<td>&lt;dʒkoh&gt;</td>
<td>[dʒ-koh]</td>
<td>‘discontent’</td>
</tr>
</tbody>
</table>
Epenthesis in prefixes

- Multiple schwas can be seen

  ‘I hear’
  Subjunctive  <lsem>  [lə.sem]  <tnem>  [tə.nem]

  ‘I put’
Epenthesis in prefixes

- Multiple schwas can be seen

  'I hear'
  Subjunctive: \(<\text{lsem}>\quad [\text{læ.sem}]\)  
  Negative: \(<\text{tʃlsem}>\quad [\text{tʃæ-læ.sem}]\)  

  'I put'
  Subjunctive: \(<\text{tnem}>\quad [\text{tæ.nem}]\)  
  Negative: \(<\text{tʃtnem}>\quad [\text{tʃæ-tæ.nem}]\)
Multiple schwas can be seen

- ‘I hear’
  - Subjunctive: <lsem> [lə.sem]  
  - Negative: ;topf\lsem> [tʃə-lə.sem]  
  - Indicative: <glsem> [gə-lə.sem]

- ‘I put’
  - Subjunctive: <tnem> [tə.nem]  
  - Negative: ;topf\tnem> [tʃə-tə.nem]  
  - Indicative: <gtnem> [gə-tə.nem]
Epenthesis in prefixes

- Multiple schwas can be seen

<table>
<thead>
<tr>
<th>‘I hear’</th>
<th>‘I put’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjunctive</td>
<td>&lt;lsem&gt;</td>
</tr>
<tr>
<td>Negative</td>
<td>&lt;tʃlsem&gt;</td>
</tr>
<tr>
<td>Indicative</td>
<td>&lt;gʃlsem&gt;</td>
</tr>
</tbody>
</table>

- Schwa location is predicted by respect to morpheme left-boundaries

<table>
<thead>
<tr>
<th></th>
<th>&lt;glsem&gt;</th>
<th>*CC</th>
<th>ALIGN-M</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>glsem</td>
<td>*!</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>gəlsem</td>
<td></td>
<td>*!</td>
<td>3</td>
</tr>
<tr>
<td>c.</td>
<td>gə-ləsem</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
Compounds

- Compounds are formed by concatenating roots/stems with -a-

  don + ṭzar  ‘holiday + tree’  ṭfar + sird  ‘evil + heart’
  don-a-ṭzar  ‘Christmas tree’  ṭfar-a-sird  ‘evil-hearted’
Compounds

- Compounds are formed by concatenating roots/stems with -a-
  
  don + džar  ‘holiday + tree’  tʃar + sird  ‘evil + heart’
  
  don-a-džar  ‘Christmas tree’  tʃar-a-sird  ‘evil-hearted’

- Compounds behave same as prefixed words wrt schwa epenthesis
  
  dʒaf + sərah  ‘food + hall’  vart + zəbid  ‘rose + smile’
  
  dʒaf-a-sərah  ‘dining-hall’  vart-a-zəbid  ‘smiley (person)’

- Doesn’t matter if compound is endocentric or exocentric

- Appendix: some funny business with sT + Cr
• Interim summary: no resyllabification over root left-boundaries
• Reduplication also enforces root left-alignment
• Enforced via:
  • morphological boundaries (morphology)
  • pseudo-reduplication (phonology)
Different types of reduplication in Armenian

Focus on verbal reduplication

Canonical type: CVC(C) root is reduplicated faithfully

\(\text{joy-al} \quad \text{‘to shine’} \quad \text{joy-joy-al} \quad \text{to dazzle}\)

Canonical function is intensity + word-coinage

Relatively rare + ancient + often have semantic opacity

\(\text{tʃar} \quad \text{‘evil’} \quad \text{tʃar-tʃar-al} \quad \text{to torture}\)
Reduplication with schwa

- More common are reduplicated roots with a schwa
- Orthographically, no schwas are present
  
  ‘to rub’ (intense) ‘to cluck’ (id.)
  
  [ʃəp-el] [ʃəp-ʃə.pel] [kərt-al] [kərt-kər.tal]
  
  <ʃpel> <ʃpʃpel> <krtal> <krtkrtal>

- Epenthesis respects the reduplication-morpheme boundary

<table>
<thead>
<tr>
<th></th>
<th>*CC</th>
<th>ALIGN-M</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ʃpʃpel&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. ʃpʃpel</td>
<td>*!</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. ʃə.pəʃ.pel</td>
<td></td>
<td>*!</td>
<td>7</td>
</tr>
<tr>
<td>c. ʃəp-ʃəpel</td>
<td></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>
SyncopatedReduplication

- Besides canonical type, there’s a lot of other forms
- For syncopated Red, second copy uses a schwa
- Unsycopated forms existed before (Abrahamyan, 1959)

<table>
<thead>
<tr>
<th>‘to run’</th>
<th>(intensive)</th>
<th>‘to measure’</th>
<th>‘to measure out’</th>
</tr>
</thead>
<tbody>
<tr>
<td>[vaz-el]</td>
<td>vaz-vəz-el</td>
<td>[kaʃ-el]</td>
<td>kaʃ-kəʃ-el</td>
</tr>
<tr>
<td>&lt;vazel&gt;</td>
<td>&lt;vazvzel&gt;</td>
<td>&lt;kaʃel&gt;</td>
<td>&lt;kaʃkʃel&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>kaʃ-kʃ-el</th>
<th>*CC</th>
<th>ALIGN-M</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>kaʃkʃel</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>kaʃəkʃel</td>
<td></td>
<td>*!</td>
<td>7</td>
</tr>
<tr>
<td>c.</td>
<td>kaʃ-kəʃel</td>
<td></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>
In ‘corrupted’ Red, second onset underwent diachronic lenition to a bilabial
The copies are no longer identical
‘to draw’  ‘to scribble’  ‘to scrape’  (intense)
[\text{xaz-el}]  [\text{xaz-pæz-el}]  [\text{kəs-el}]  [\text{kəs-məs-el}]
<\text{xazel}>  <\text{xazpzel}>  <\text{ksel}>  <\text{ksmsel}>
But schwa-placement still respects the morpheme boundary
In some cases, there is no unreduplicated base but the copies are identical

\(<krkral> \quad [kɛr-kɛ.ral \quad ‘to croak’]
\<dndnal> \quad [dən-də.nal \quad ‘to loiter’]

Other cases, there is coda lenition and there is no independent base

\(<gzgdel> \quad [gəz-gəd-el \quad ‘to coil up’]
\<tnttʃel> \quad [tən-tətʃ-el \quad ‘to murmur’]

These words are arguably underived and not cases of semantically meaningful reduplication

Two ways of analyzing the pseudo-reduplication

1. Morphological: word is morphologically made up semi-identical morphs \(gz\text{-}gd\text{-}el\)

2. Phonology: single morph with a constraint for phonological identity in similarly-enough substrings (Zuraw, 2002)
Sibilants

- Recall that sT triggers prothesis in isolation and in prefixed forms:

  \[
  \begin{align*}
  &<zku>f & <an\text{-}zku>f \\
  &[\text{zku}f] & [an\text{-}\text{zku}f] \\
  &{\text{‘careful’}} & \text{‘un-careful’}
  \end{align*}
  \]

- For prefixed form, nz is bad coda thus the schwa appears

<table>
<thead>
<tr>
<th></th>
<th>an-zkuʃ</th>
<th>*CC</th>
<th>CONT-sTV</th>
<th>ALIGN-M</th>
<th>ALIGN-σ-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>anz.kuʃ</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>b.</td>
<td>a.nəz.kuʃ</td>
<td></td>
<td></td>
<td>*</td>
<td>5</td>
</tr>
<tr>
<td>c.</td>
<td>an.zə.kuʃ</td>
<td></td>
<td>*!</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

- But what happens if there’s a vowel before sibilant?
- Answer is in compounds
SIBILANTS IN COMPOUNDS

- Recall that compounds use a linking vowel -a-
- They are classified into endocentric vs. exocentric
  
  \[ \text{don} + \text{dzar} \quad \text{‘holiday + tree’} \quad \text{tfar} + \text{sird} \quad \text{‘evil + heart’} \]
  
  \[ \text{don-a-dzar} \quad \text{‘Christmas tree’} \quad \text{tfar-a-sird} \quad \text{‘evil-hearted’} \]
- When Stem2 has sT, schwa prothesis applies/survives only in endocentrics!
  
  \[ \text{østeýdz-e-l} \quad \text{‘to create’} \quad [\text{øskisp} \quad \text{‘beginning’} \]
  
  \[ \text{pán + østeýdz-e-l} \quad \text{‘thing + ...’} \quad \text{dari + øskisp} \quad \text{‘black + ...’} \]
  
  \[ \text{pan-a-s.téýdz} \quad \text{‘poet’} \quad \text{dar-e-øsgísp} \quad \text{‘start of the year’} \]
- Based on other facts on compounds, the endocentric head is parsed into its own prosodic constituents PStem (Dolatian, 2021)
- Epenthesis overapplies in endocentrics because of the prosodic boundary
**No Schwa in Exocentric**

- In exocentric compound, schwa does not surface, whether via cyclic dialection or via never epenthesizing it in the first place

<table>
<thead>
<tr>
<th></th>
<th>AL-H</th>
<th>Cont-</th>
<th>V.V</th>
<th>Al-M</th>
<th>*ə</th>
<th>MAX-ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;panasteydz&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[əsteydz-el]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| a. | pa.nas.teydz |      |     | *   |    | *     |
| b. | pa.na.əs.teydz |     | *!  | *   |    | *     |
| c. | pa.na.sə.teydz |     | !   | *   |    | *     |

- But in endocentric, Align-H requires that the head is aligned with a prosodic boundary (ignoring any epenthesized segments)

<table>
<thead>
<tr>
<th></th>
<th>AL-H</th>
<th>Cont-</th>
<th>V.V</th>
<th>Al-M</th>
<th>*ə</th>
<th>MAX-ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>daresgisp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[əskisp]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| a. | da.(res.kisp) | *!  |     | *   |    | *     |
| b. | da.re.(əs.kisp) |     | *   | *   |    | *     |
| c. | da.re.(sə.kisp) | *!  |     | *   |    | *     |
Interim summary

- Looked at relationship between orthography and pronunciation
- OR->SR: widespread and systematic process of schwa epenthesis
  - Directional syllabification
  - Sibilant-stop contiguity
  - Complex-coda licensing
  - Boundary-alignment (prefix, compound, Red)
  - Cyclic contiguity (for idiosyncratic suffixes)
  - Cyclic deletion (for final clusters)
  - Parallel allomorphy
- Give all above, epenthesis looks like a grammatical process
- Q1: Is it part of mental grammars, or just a consciously learned process?
- Q2: If part of grammar, is it part of orthography or also phonology?
- Q3: Does it say anything about URs?
• Q1: Is it part of mental grammars, or just a consciously learned process?
• It’s not consciously learned
• Textbooks and teaching grammars often provide ‘general rules’ for schwa-epentheses based
• But the rules are simple
  ▪ "If CCCCV, sometimes schwa after C1 and/or C3"
• Does this mean that speakers don’t learn a schwa-epentheses process?
Q2: If part of grammar, is it part of orthography or also phonology?

It has to at least be part of orthography as a ‘grammar’

Given a nonce word or low-frequency word, a speaker will pronounce this word as expected based all the relevant phonological/morphological constraints.

Vaux tested a speaker on a list of 100 words

The speaker only recognized 20% of the words.

For the remaining 80%, he correctly pronounced all but 7 of them.

For the 7 ‘errors’, he had given the ‘wrong’ morphological parse.
So there is a grammatical process of schwa epenthesis from orthography to SR

Q3: Does it say anything about URs?

Inconclusive yes

Armenian script was created for Classical Armenian in 3/4th century (Sanjian, 1996)

The grapheme was used for schwas, but not inside consonant clusters

Both Classical and Modern Armenian had ORs with clusters that are broken up in pronunciation

Virtually the same epenthesis process in Classical and Modern (Pierce, 2007)

What this means? The original creators of the script must have thought that their own surface schwas were predictable to skip writing