Labial attraction and labial blocking of progressive front vowel harmony in Warlpiri

A Serial Harmony approach

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Qualifying Paper
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Warlpiri vowel harmony

- Warlpiri, a Pama-Nyungan language from the Ngumpin-Yapa subgroup
Warlpiri vowel harmony

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  - 3 vowels: /i a u/
Warlpiri vowel harmony

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- 3 vowels: /i a u/
- 3 harmony processes that create /i/ ~ /u/ alternations
Warlpiri vowel harmony

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  - 3 vowels: /i a u/
  - 3 harmony processes that create /i/ ~ /u/ alternations
- We’ll focus on **progressive front harmony**
Warlpiri vowel harmony

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  - 3 vowels: /i a u/
  - 3 harmony processes that create /i/ ~ /u/ alternations

- We’ll focus on **progressive front harmony**
  - Following /i/, /u/ becomes [i],
Warlpiri vowel harmony

- Warlpiri, a Pama-Nyungan language from the Ngumpin-Yapa subgroup
  - 3 vowels: /i a u/
  - 3 harmony processes that create /i/ ~ /u/ alternations
- We’ll focus on **progressive front harmony**
  - Following /i/, /u/ becomes [i], except when a phonological word boundary, /a/, or a labial consonant intervenes.
Vowel harmony in OT
Long-distance alignment and local agreement

- Long-distance alignment uses featural ALIGN constraints to pull the boundary of a feature span toward a morphological or prosodic boundary.
Vowel harmony in OT
Long-distance alignment and local agreement

- Long-distance alignment uses featural ALIGN constraints to pull the boundary of a feature span toward a morphological or prosodic boundary
- Local agreement uses constraints in the AGREE family to make adjacent elements have the same feature value
Vowel harmony in OT

Long-distance alignment and local agreement

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Vowel harmony in OT
Long-distance alignment and local agreement

➤ Long-distance alignment uses featural ALIGN constraints to pull the boundary of a feature span toward a morphological or prosodic boundary
➤ Local agreement uses constraints in the AGREE family to make adjacent elements have the same feature value

➤ Using ALIGN to enforce harmony predicts languages that create harmony by affix repositioning, allomorph selection, segment deletion, or stress shift
Vowel harmony in OT
Long-distance alignment and local agreement

- Long-distance alignment uses featural ALIGN constraints to pull the boundary of a feature span toward a morphological or prosodic boundary
- Local agreement uses constraints in the AGREE family to make adjacent elements have the same feature value

- Using ALIGN to enforce harmony predicts languages that create harmony by affix repositioning, allomorph selection, segment deletion, or stress shift
- Using AGREE to enforce harmony predicts sour grapes
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by *B ≫ AGREE ≫ FAITH in parallel OT:
Sour grapes
Overgeneration problem: Nonmyopic spreading

Language predicted by \(*B \gg AGREE \gg FAITH\) in parallel OT:

- No blocker → total harmony:
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by $*B \gg AGREE \gg FAITH$ in parallel OT:

- No blocker $\rightarrow$ total harmony:

  
  $T \ u \ u \ u \ u$

  $\uparrow$

  $[F]$

  $T \ U \ U \ U \ U$

  $\uparrow$

  $[F]$

  $T|uu$ 1

  $TU|u$ 1

  $TUU$ 0

  $T|ubu$ 1

  $TU|bu$ 1

  $tubu$ 0

$t = \text{trigger}, \ u = \text{undergoer}, \ b = \text{blocker}$

become capital when linked to $[F]$
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by *B ≫ AGREE ≫ FAITH in parallel OT:

- No blocker → total harmony:

  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  \end{array}
  \]

  \[
  [F]
  \]

  t = trigger, u = undergoer, b = blocker

  become capital when linked to [F]
Sour grapes
Overgeneration problem: Nonmyopic spreading

Language predicted by \( *B \gg AGREE \gg FAITH \) in parallel OT:

- No blocker \( \rightarrow \) total harmony:

  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  & & & & [F] \\
  \end{array}
  \]

- Blocker \( \rightarrow \) no harmony:

  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  | & & & & [F] \\
  \end{array}
  \]

\( t \) = trigger, \( u \) = undergoer, \( b \) = blocker

become capital when linked to \( [F] \)
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by \( ^*B \gg \text{AGREE} \gg \text{FAITH} \) in parallel OT:

- No blocker → total harmony:
  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  \downarrow & & & & \\
  [F]
  \end{array}
  \]

- Blocker → no harmony:
  \[
  \begin{array}{cccccc}
  T & u & u & b & u & u \\
  \downarrow & & & & \\
  [F]
  \end{array}
  \]

\( t = \text{trigger}, \ u = \text{undergoer}, \ b = \text{blocker} \)

become capital when linked to [F]
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by $\ast B \gg$ AGREE $\gg$ FAITH in parallel OT:

- No blocker $\rightarrow$ total harmony:
  \[
  T \ U \ U \ U \ U
  \]
  \[
  [F]
  \]

- Blocker $\rightarrow$ no harmony (with $[F]$ deletion):
  \[
  t \ u \ u \ b \ u \ u
  \]

$t =$ trigger, $u =$ undergoer, $b =$ blocker

become capital when linked to $[F]$
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by $^*B \gg$ AGREE $\gg$ FAITH in parallel OT:

- No blocker $\rightarrow$ total harmony:
  
  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  \end{array}
  \]

  $^*[F]$

  \[
  \begin{array}{cccccc}
  T |uu \\
  1
  \end{array}
  \]

- Blocker $\rightarrow$ no harmony (with $[F]$ deletion):
  
  \[
  \begin{array}{cccccc}
  t & u & u & b & u & u \\
  \end{array}
  \]

  $t =$ trigger, $u =$ undergoer, $b =$ blocker

become capital when linked to $[F]$
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by \(*B \gg AGREE \gg FAITH\) in parallel OT:

- No blocker → total harmony:

  $$
  \begin{array}{cccc}
  T & U & U & U \\
  \end{array}
  $$

- Blocker → no harmony (with \([F]\) deletion):

  $$
  t \ u \ u \ b \ u \ u
  $$

\(t = \) trigger, \(u = \) undergoer, \(b = \) blocker

become capital when linked to \([F]\)
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by $*B \gg AGREE \gg FAITH$ in parallel OT:

- No blocker $\rightarrow$ total harmony:
  - $T$ U U U U
  - $[F]$
  - AGREE
  - $T|uu$ 1
  - $TU|u$ 1
  - $TUu$ 0

- Blocker $\rightarrow$ no harmony (with $[F]$ deletion):
  - $t$ u u b u u

$t = \text{trigger}, \ u = \text{undergoer}, \ b = \text{blocker}$

become capital when linked to $[F]$
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by *B ≫ AGREE ≫ FAITH in parallel OT:

- No blocker → total harmony:
  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  \end{array}
  \]
  \[
  [F]
  \]
  \[
  \text{AGREE}
  \]
  \[
  T|uu & 1 \\
  TU|u & 1 \\
  TUU & 0 \\
  \]

- Blocker → no harmony (with [F] deletion):
  \[
  T U U b u u
  \]
  \[
  T|ubu & 1 \\
  \]

\(t = \) trigger, \(u = \) undergoer, \(b = \) blocker

become capital when linked to \([F]\)
Sour grapes
Overgeneration problem: Nonmyopic spreading

Language predicted by \(*B \gg AGREE \gg FAITH\) in parallel OT:

- **No blocker → total harmony:**
  
  \[
  \begin{array}{c}
  T \ U \ U \ U \ U \\
  [F] \\
  \end{array}
  \]

  \[
  \begin{array}{c|c}
  AGREE \\
  T|uu & 1 \\
  TU|u & 1 \\
  TUU & 0 \\
  \end{array}
  \]

- **Blocker → no harmony (with [F] deletion):**
  
  \[
  t \ u \ u \ b \ u \ u
  \]

  \[
  \begin{array}{c|c}
  AGREE \\
  T|ubu & 1 \\
  TU|bu & 1 \\
  \end{array}
  \]

\(t = \text{trigger, } u = \text{undergoer, } b = \text{blocker}\)

become capital when linked to [F]
Sour grapes

Overgeneration problem: Nonmyopic spreading

Language predicted by \( *B \gg AGREE \gg FAITH \) in parallel OT:

- No blocker → total harmony:
  
  \[
  \begin{array}{c}
  T \ U \ U \ U \ U \\
  [F] \\
  \end{array}
  \]

- Blocker → no harmony (with \([F]\) deletion):
  
  \[
  \begin{array}{c}
  t \ u \ u \ b \ u \ u \\
  \end{array}
  \]

\( t = \) trigger, \( u = \) undergoer, \( b = \) blocker

become capital when linked to \([F]\)
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker → total harmony:
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker → total harmony:

  T u u u u
  |
  [F]

\[ t = \text{trigger}, u = \text{undergoer}, b = \text{blocker} \]

become capital when linked to [F]
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker → total harmony:

  \[
  \begin{array}{llllll}
  T & U & U & U & U \\
  \end{array}
  \]

  \[
  \begin{array}{l}
  [F] \\
  \end{array}
  \]

t = trigger, u = undergoer, b = blocker
become capital when linked to [F]
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker $\rightarrow$ total harmony:
  
  ![Diagram](T U U U U)

- Blocker $\rightarrow$ partial harmony:

  ![Diagram](T U U b u u)

\[t = \text{trigger}, \ u = \text{undergoer}, \ b = \text{blocker}\]

become capital when linked to [F]
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker $\rightarrow$ total harmony:
  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  & & & & & [F] \\
  \end{array}
  \]
  
  - Blocker $\rightarrow$ partial harmony:
  \[
  \begin{array}{cccccc}
  T & u & u & b & u & u \\
  & & [F] \\
  \end{array}
  \]

$t =$ trigger, $u =$ undergoer, $b =$ blocker

become capital when linked to $[F]$
Sour grapes

Undergeneration problem: No myopic spreading

Language not predicted under any ranking of *B, AGREE, FAITH in parallel OT:

- No blocker $\rightarrow$ total harmony:
  \[
  \begin{array}{cccccc}
  T & U & U & U & U \\
  & & & [F] & \\
  \end{array}
  \]

- Blocker $\rightarrow$ partial harmony:
  \[
  \begin{array}{cccccc}
  T & U & U & b & u & u \\
  & & [F] & \\
  \end{array}
  \]

$t = \text{trigger}, u = \text{undergoer}, b = \text{blocker}$

become capital when linked to $[F]$
This paper

**Serial Harmony** (McCarthy 2009, 2010), a theory of local assimilation using autosegmental representations within the architecture of Harmonic Serialism

Goals:

- Give a full analysis of progressive front vowel harmony in Warlpiri, a vowel harmony system with blocking, showing how Serial Harmony avoids sour grapes
- Introduce labial attraction as an additional type of assimilation that can be analyzed using Serial Harmony
- Highlight the interaction of labial attraction and progressive front vowel harmony
Outline

Introduction

Theoretical background

Data

Analysis

Sour grapes

Labial attraction and labial blocking

Conclusion

References
Harmonic Serialism

Parallel OT

```
/input/ → GEN → infinite set of output candidates → EVAL → optimum → [output] := optimum
```

Harmonic Serialism (adapted from Mullin 2011: 16)

Limited

Limited set of output candidates

Optimum

Optimum = local input?

Output := optimum

No

Yes

New input := old output
Harmonic Serialism

Parallel OT

[Diagram]

Harmonic Serialism

[Diagram] (adapted from Mullin 2011: 16)
Serial Harmony

- SHARE(F) (McCarthy 2010: 200)
Serial Harmony

▶ SHARE(F) (McCarthy 2010: 200)
Assign one violation mark for every pair of adjacent elements that are not linked to the same token of [F].

<table>
<thead>
<tr>
<th></th>
<th>[F]</th>
<th>[F]</th>
<th>[F]</th>
<th>[F]</th>
<th>[F]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>U U</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>U U</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>c.</td>
<td>u u</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>u U</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>e.</td>
<td>U u</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

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Serial Harmony

- SHARE(F) (McCarthy 2010: 200)
- Features involved in assimilation are privative
Serial Harmony


- SHARE(F) (McCarthy 2010: 200)
- Features involved in assimilation are privative
- Autosegmental operations in GEN:
  (McCarthy 2010: 202 (12), as restated by Mullin 2011: 20)
  - Inserting a feature that remains unlinked to any segment
  - Inserting a feature and linking it to a single pre-existing segment
  - Linking a pre-existing feature to a single pre-existing segment
  - Delinking a single pre-existing segment from a single pre-existing feature
  - Deleting a pre-existing feature that is linked to only a single pre-existing feature
  - Deleting a pre-existing feature that is not linked to any segment
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Progressive front harmony

*icu generalization

(1) *icu generalization (adapted from Nash 1986: 73–75)
An [i] vowel may not be followed by [u] unless [a], a labial consonant, or a phonological word boundary intervenes.

The *icu generalization holds as a morpheme structure constraint across the lexicon and governs alternations in suffixes and enclitics.
Progressive front harmony

Basic alternation

(2) **No harmony** (no /i/ trigger)

\[
\text{kuɾu-kuɭu-ɭu=ɪku=ɪu} \\
/kuɾu-kuɭu-ɭu=ɪku=ɪu/
\]

child-PROP-ERG=then=1SG.NSBJ=3PL.SBJ

(Nash 1986: 86)
Progressive front harmony

Basic alternation

(2) **No harmony** (no /i/ trigger)

\[ \text{kuɽu-kuɭu-ɭu}=\text{lk}=\text{cu}=\text{lu} \]

/kuɽu-kuɭu-ɭu=lku=cu=lu/

child-PROP-ERG=then=1SG.NSBJ=3PL.SBJ

(Nash 1986: 86)

(3) **Total harmony**

\[ \text{maliki-kiɭi}-\text{i}=\text{lk}=\text{ci}=\text{li} \]

/maliki-kuɭu-ɭu=\text{lku}=\text{cu}=\text{lu}/

dog-PROP-ERG=then=1SG.NSBJ=3PL.SBJ

(Nash 1986: 86)
Progressive front harmony

Blocking by /a/

(4) Harmony blocked by /a/

a. No harmony
minica-kuɭu-ɭu=lku=cu=lu
/minicǎ-kuɭu-ɭu=lku=cu=lu/
cat-PROP-ERG=then=1SG.NSBJ=3PL.SBJ

b. Partial harmony
maliki-kįi-kirə=lku=cu=lu
/maliki-kuɭu-kirə=lku=cu=lu/
dog-PROP-ALL=then=1SG.NSBJ=3PL.SBJ

(Nash 1986: 86, 87)
Progressive front harmony

Blocking by phonological word boundaries

(5) Harmony blocked by phonological word boundary

\[
[piki]_{PrWd}-[[\etauma]_{PrWd}-mi]_{PhWd} \quad (\text{Laughren & Hoogenraad 1996: 121})
\]

\[
/[piki]_{PrWd}-[[\etauma]_{PrWd}-mi]_{PhWd}/
\]

danger-LIE-NPST
Progressive front harmony

Blocking by labial consonants

(6) Harmony blocked by /w/

ηali-wuru

/Nali-wuru/

1DU.INCL-EMPH

(7) Harmony blocked by /p/

a. No harmony

milpiri-p_ruµu

/milpiri-puµu/

cloud-during

b. Partial harmony

ŋamiŋi-ki-puŋaŋka

/Namiŋi-ku-puŋaŋka/

mother’s.brother-DAT-same.generation.kinsman

(Nash 1986: 87)
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References
Which feature is spreading?

- When /u/ becomes [i], it changes in backness and rounding:
Which feature is spreading?

- When /u/ becomes [i], it changes in backness and rounding:

  [+back]  [–back]
  |    |    |
  u    →    i
  |    |    |
  [+round]  [–round]
Which feature is spreading?

> When /u/ becomes [i], it changes in backness and rounding:

\[
\begin{align*}
\text{[+back]} & \quad \text{[–back]} \\
\text{[+round]} & \quad \text{[–round]} \\
\end{align*}
\]

\[
\begin{array}{c|c}
\text{u} & \rightarrow \text{i} \\
\hline
\text{[+round]} & \text{[–round]} \\
\end{array}
\]

> Most previous analyses have used [–round] or [–labial] as the harmonizing feature (Nash 1986; McCarthy 2003; Harvey & Baker 2005; Hall 2006).
Which feature is spreading?

- When /u/ becomes [i], it changes in backness and rounding:
  
  \[
  \begin{array}{cc}
  \text{[+back]} & \text{[–back]} \\
  \uparrow & \uparrow \\
  \text{u} & \rightarrow \text{i} \\
  \downarrow & \downarrow \\
  \text{[+round]} & \text{[–round]}
  \end{array}
  \]

- Most previous analyses have used [–round] or [–labial] as the harmonizing feature (Nash 1986; McCarthy 2003; Harvey & Baker 2005; Hall 2006).

- But, [round] is perhaps the most likely candidate for a privative feature (Steriade 1995).
Which feature is spreading?

- When /u/ becomes [i], it changes in backness and rounding:
  
  \[ [+\text{back}] \quad [+\text{round}] \quad \rightarrow \quad [–\text{back}] \quad [–\text{round}] \]

- Most previous analyses have used [–round] or [–labial] as the harmonizing feature (Nash 1986; McCarthy 2003; Harvey & Baker 2005; Hall 2006).

- But, [round] is perhaps the most likely candidate for a privative feature (Steriade 1995).

- Serial Harmony requires privative features (McCarthy 2009: 7).
Which feature is spreading?

- Following Berry (1998), I will assume that [front] is the spreading feature.
Which feature is spreading?

- Following Berry (1998), I will assume that [front] is the spreading feature.

```
[front]

u → i

[round]
```
Constraints

\textbf{SHARE}

\begin{equation}
(8) \text{SHARE(front, vowels)} \quad \text{(SHARE(fr, V))} \quad \text{(McCarthy 2010: 200)}
\end{equation}

Assign one violation mark for every pair of adjacent vowels that are not linked to the same token of [front].
Constraints

**SHARE**

(8) \[\text{SHARE(front, vowels)} (\text{SHARE}(\text{fr}, V)) \] (McCarthy 2010: 200)

Assign one violation mark for every pair of adjacent vowels that are not linked to the same token of [front].

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th>[front][front]</th>
<th>[front]</th>
<th>[front]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ili</td>
<td>ili</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>ili</td>
<td>ili</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>ulu</td>
<td></td>
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<td>d.</td>
<td>uli</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>e.</td>
<td>ilu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Constraints

Faithfulness

(9)  IDENT(F)  

Assign a violation mark if a token of [F] has been inserted and linked, deleted and delinked, linked, or delinked.
Constraints

Faithfulness

(9) IDENT(F)  
Assign a violation mark if a token of [F] has been inserted and linked, deleted and delinked, linked, or delinked.

(10) INITIAL(F)  
Assign one violation mark if [F] has spread to the left.

(11) FINAL(F)  
Assign one violation mark if [F] has spread to the right.
Constraints

Faithfulness

(9) IDENT(F)  
Assign a violation mark if a token of [F] has been inserted and linked, deleted and delinked, linked, or delinked.

(10) INITIAL(F)  
Assign one violation mark if [F] has spread to the left.

(11) FINAL(F)  
Assign one violation mark if [F] has spread to the right.
Constraints

Faithfulness

(9) \text{IDENT}(F) \quad \text{(McCarthy 2009: 10)}
Assign a violation mark if a token of [F] has been inserted and
linked, deleted and delinked, linked, or delinked.

(10) \text{INITIAL}(F) \quad \text{(McCarthy 2009: 9)}
Assign one violation mark if [F] has spread to the left.

(11) \text{FINAL}(F) \quad \text{(McCarthy 2009: 9)}
Assign one violation mark if [F] has spread to the right.

\[
\begin{array}{cccccc}
\text{S} & \text{S} & \text{S} & \text{S} & \text{S} \\
\text{\underline{[F]}}
\end{array}
\]
Constraints

Faithfulness

(9) IDENT(F)  \hspace{1cm} (McCarthy 2009: 10)
Assign a violation mark if a token of [F] has been inserted and linked, deleted and delinked, linked, or delinked.

(10) INITIAL(F)  \hspace{1cm} (McCarthy 2009: 9)
Assign one violation mark if [F] has spread to the left.

(11) FINAL(F)  \hspace{1cm} (McCarthy 2009: 9)
Assign one violation mark if [F] has spread to the right.
Constraints

Feature co-occurrence

(12)  *ROUNDFRONT (*Rofro)  (Kaun 2004: 105)

Assign one violation mark for every segment that is linked to a token of [front] and a token of [round].
Basic harmony pattern

Derivation of /tuɾi=cu/ → [tuɾi=ci]

\[
\begin{align*}
&\text{[tuɾi=cı]} \\
&/tuɾi=cu/ \\
&\text{small.club=TOP} \\
&\text{(Swartz 2012: turdi)}
\end{align*}
\]

\[
\begin{align*}
&\text{[fr]} \\
&\text{[ro]} \quad \text{[ro]}
\end{align*}
\]
Basic harmony pattern

Derivation of /tuɾi=cu/ → [tuɾi=ci]

\[
\begin{align*}
[tuɾi=ci] \\
/tuɾi=cu/ \\
\text{small.club}=\text{TOP} \\
\end{align*}
\]

(Swartz 2012: turdi)
Basic harmony pattern

Derivation of /tuɾi=cu/ → [tuɾi=ci]

\[
\begin{align*}
  & [t\ddot{u}ɾi=ci] \\
  & /t\ddot{u}ɾi=cu/ \\
  & \text{small.club=TOP} \quad \text{(Swartz 2012: turdi)}
\end{align*}
\]

\[
\begin{align*}
  \ [fr] \\
  \ \ \ [t \ddot{u} \ddot{r}i=ci] \\
  \ \ \ \ \ | \\
  \ \ \ \ \ [ro]
\end{align*}
\]
# Basic harmony pattern

## Step 1 of /tuɾi=cu/ → [tuɾi=ci]

(13) \[ \text{SHARE}(fr, V) \gg \text{FINAL}(fr), \text{IDENT}(fr), \ast \text{ROUNDFRONT}; \text{INITIAL}(fr) \gg \text{FINAL}(fr) \]

<table>
<thead>
<tr>
<th>Pass 1</th>
<th>Initial (front)</th>
<th>Share (fr, V)</th>
<th>Final (front)</th>
<th>Ident (front)</th>
<th>*Round Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>tuɾi=cu</td>
<td>[fr]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tuɾi=cu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[ro]</td>
<td>[ro]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>[fr]</td>
<td>[fr]</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>b.</td>
<td>[fr]</td>
<td>[fr]</td>
<td>2! W</td>
<td>(0 L)</td>
<td>(0 L)</td>
</tr>
<tr>
<td>c.</td>
<td>[fr]</td>
<td>[fr]</td>
<td>1! W</td>
<td>1</td>
<td>(0 L)</td>
</tr>
</tbody>
</table>

Pass 1:
- tuɾi=cu
  - [fr]
  - tuɾi=cu
  - [ro]
  - [ro]

**Analysis**

- SHARE(fr, V) >> FINAL(fr), IDENT(fr), *ROUNDFRONT; INITIAL(fr) >> FINAL(fr)
Basic harmony pattern

Step 2 of /tuɾʲi=cu/ → [tuɾʲi=ci]

(14)  *ROUNDFRONT ⇒ IDENT(round); INITIAL(front) ⇒ SHARE(front, V)

<table>
<thead>
<tr>
<th>Step 2</th>
<th>[fr]</th>
<th>INITIAL (front)</th>
<th>SHARE (fr, V)</th>
<th>FINAL (front)</th>
<th>IDENT (front)</th>
<th>*ROUNDFRONT</th>
<th>IDENT (round)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[fr]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t u [i = c i]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>b.</td>
<td>[fr]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t u [i = c y]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 ! W</td>
</tr>
<tr>
<td></td>
<td>[ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 L</td>
</tr>
<tr>
<td>c.</td>
<td>[fr]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t y [i = c y]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 ! W</td>
<td>0 L</td>
</tr>
<tr>
<td></td>
<td>[ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 W</td>
<td>2 W</td>
</tr>
</tbody>
</table>
Basic harmony pattern

Ranking summary

```
INITIAL(fr)
  /   \
 SHARE(fr, V)
   /    \        /    \    /   \    /  \  
FINAL(fr) IDENT(fr) *ROFRO IDENT(ro)
```
Blocking by phonological word boundaries

Derivation of /ɾawɪn-luwa-ŋi/ → [ɾawɪn-ɻuwa-ŋi]

[ɾawɪn-[luwa-ŋi]_{PhWd}
/ɾawɪn-[luwa-ŋi]_{PhWd}/
sever-HIT.WITH.MISSILE-NPST

(Swartz 2012: rdawirn-luwarni)
Blocking by phonological word boundaries

Derivation of /ʁawiŋ-luwa-ɲi/ → [ʁawiŋ-luwa-ɲi]

[ʁawiŋ-[luwa-ɲi]_{PhWd}

/ʁawiŋ-[luwa-ɲi]_{PhWd}/

sever-HIT.WITH.MISSILE-NPST

(Swartz 2012: rdawirn-luwarni)
Blocking by phonological word boundaries

Derivation of /ɾawɨŋ-ɭuwa-ɳi/ → [ɾawɨŋ-ɭuwa-ɳi]

\[ \text{ɾawɨŋ-}{[\text{ɭuwa-ɳi}]_{\text{PhWd}}} \]
\[ /\text{ɾawɨŋ-}{[\text{ɭuwa-ɳi}]_{\text{PhWd}}}/ \]
\[ \text{sever-HIT.WITH.MISSILE-NPST} \]

(Swartz 2012: rdawirn-ɭuwarni)

\[ [\text{fr}] \quad [\text{fr}] \]
\[ | \quad | \]
\[ [\text{ɾawɨŋ-} \text{-} \text{ɭuwa-} \text{-} \text{ɳi}] \]
\[ | \]
\[ [\text{ro}] \]
Blocking by phonological word boundaries

Blocking constraint

\[(15) \text{CRISPEDGE(PhWd, front)} (\text{CRISPEDGE})\]

\[(\text{Itô & Mester 1999; Kawahara 2008; McCarthy 2007})\]

Assign a violation mark for every token of [front] that is linked to two segments separated by a phonological word boundary.
### Blocking by phonological word boundaries

#### Step 1 of /ʁawiɳ-luwa-ŋi/ → [ʁawiɭ-luwa-ŋi]

\[(16) \; \text{CRISPEDGE(PhWd, front)} \gg \text{SHARE(front, V)}\]

<table>
<thead>
<tr>
<th>Step 1</th>
<th>[fr]</th>
<th>[fr]</th>
<th>CRISP EDGE</th>
<th>SHARE (fr, V)</th>
<th>FINAL (front)</th>
<th>IDENT (front)</th>
<th>*ROUND FRONT</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ʁawiɭ-luwa-ŋi]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|  | | | | 2 | | | |
| a. | | | | | | | |
|  | | | | | | | |

|  | | | | 1 W | 1 L | 1 W | 1 W |
| b. | | | | | | | |
|  | | | | | | | |

28 / 59
Blocking by /a/  
Derivation of /ɲija-ɭu/ → [ɲija-ɭu]

[ɲija-ɭu]  
/ɲija-ɭu/  
what-ERG  
(Laughren & Hoogenraad 1996: 87)

[fr] [lo]  
|   |  
ɲ i j a -ɭ u  
|  
[ro]
Blocking by /a/

Derivation of /ɲija-ɭu/ → [ɲi-œ-ɭu]

(Laughren & Hoogenraad 1996: 87)
Blocking by /a/

Derivation of /ɲija-ɭu/ → [ɲija-ɭu]

(Laughren & Hoogenraad 1996: 87)
Blocking by /a/

Blocking constraint

(17) *FRONTLOW (*FROLO)  
Assign one violation mark for every pair of [front] and [low] tokens that are linked to the same segment.
### Blocking by /a/

Step 1 of /ɲija-ɭu/ → [ɲija-ɭu]

\[(18) \ *\text{FRONTLOW} \gg \text{SHARE(front, V)}\]

<table>
<thead>
<tr>
<th>Step 1</th>
<th>[fr] [lo]</th>
<th>*FRONT LOW</th>
<th>SHARE (fr, V)</th>
<th>FINAL (front)</th>
<th>IDENT (front)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[ɲ i j a-ɭ u]</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>[ɲ i j æ-ɭ u]</td>
<td>1 W</td>
<td>1 L</td>
<td>1 W</td>
<td>1 W</td>
</tr>
</tbody>
</table>
Harmony with and without blocking

Ranking summary

```
INITIAL(fr)  *FROLO  CRISP
            /    \
       /      \
SHARE(fr, V)
          /   \
   FINAL(fr)  IDENT(fr)  *RoFRO
              /    \      |
       IDENT(ro)
```
Sour grapes

Overgeneration problem: Nonmyopic spreading

*FRONTLOW ⇒ AGREE(fr, V) ⇒ IDENT(fr), IDENT(ro) in parallel OT:
Sour grapes
Overgeneration problem: Nonmyopic spreading

*FRONTLOW ≫ AGREE(fr, V) ≫ IDENT(fr), IDENT(ro) in parallel OT:
  ➤ No blocker → total harmony:
Sour grapes

Overgeneration problem: Nonmyopic spreading

*FRONTLow \(\gg\) AGREE(fr, V) \(\gg\) IDENT(fr), IDENT(ro) in parallel OT:

- No blocker → total harmony:

\[
\begin{array}{cccccc}
\text{i} & \text{u} & \text{u} & \text{u} & \text{u} \\
\text{[fr]} \\
\end{array}
\]
Sour grapes

Overgeneration problem: Nonmyopic spreading

\[ *\text{FRONTLOW} \gg \text{AGREE}(\text{fr}, \text{V}) \gg \text{IDENT}(\text{fr}), \text{IDENT}(\text{ro}) \text{ in parallel OT:} \]

\[ \text{No blocker} \rightarrow \text{total harmony:} \]

\[ \text{[fr]} \]

\[ \begin{array}{ccccccc}
  & i & i & i & i & i & i \\
\end{array} \]
Sour grapes

Overgeneration problem: Nonmyopic spreading

*FRONTLOW ∪ AGREE(fr, V) ∪ IDENT(fr), IDENT(ro) in parallel OT:

- No blocker → total harmony:

  ![Diagram showing total harmony]

- Blocker → no harmony:
Sour grapes

Overgeneration problem: Nonmyopic spreading

*FRONTLOW $\gg$ AGREE(fr, V) $\gg$ IDENT(fr), IDENT(ro) in parallel OT:

- No blocker $\rightarrow$ total harmony:
  
  ![Diagram of total harmony]

- Blocker $\rightarrow$ no harmony:
  
  ![Diagram of no harmony]
Sour grapes

Overgeneration problem: Nonmyopic spreading

*FRONTLOW ⇒ AGREE(fr, V) ⇒ IDENT(fr), IDENT(ro) in parallel OT:

▶ No blocker → total harmony:

\[
\begin{align*}
    i & i i i i i \\
    \text{[fr]} & \\
\end{align*}
\]

▶ Blocker → no harmony (with [F] deletion):

\[
V u u a u u
\]
Sour grapes

Undergeneration problem: No myopic spreading

No ranking of *FRONTLOW, AGREE(front, V), IDENT(front), IDENT(round) in parallel OT will predict Warlpiri:
Sour grapes
Undergeneration problem: No myopic spreading

No ranking of *FRONTLOW, AGREE(front, V), IDENT(front),
IDENT(round) in parallel OT will predict Warlpiri:

- No blocker $\rightarrow$ total harmony:
Sour grapes

Undergeneration problem: No myopic spreading

No ranking of *FRONTOLOW, AGREE(front, V), IDENT(front), IDENT(round) in parallel OT will predict Warlpiri:

► No blocker → total harmony:

\[
\begin{array}{cccccc}
i & u & u & u & u & u \\
\end{array}
\]

\[\text{[fr]}\]
**Sour grapes**

Undergeneration problem: No myopic spreading

No ranking of *FRONTLOW, AGREE(front, V), IDENT(front), IDENT(round)* in parallel OT will predict Warlpiri:

- No blocker → total harmony:

  ![Diagram](attachment:image.png)

  
  ![Diagram](attachment:image.png)
Sour grapes

Undergeneration problem: No myopic spreading

No ranking of *FRONTLOW, AGREE(front, V), IDENT(front), IDENT(round) in parallel OT will predict Warlpiri:

- No blocker → total harmony:

```
  i i i i i
  /     /
 /     /
 [fr]
```

- Blocker → partial harmony:
Sour grapes

Undergeneration problem: No myopic spreading

No ranking of *FRONTLOW, AGREE(front, V), IDENT(front), IDENT(round) in parallel OT will predict Warlpiri:

- No blocker $\rightarrow$ total harmony:
  \[
  \begin{align*}
  &i\ i\ i\ i\ i \\
  &\text{[fr]}
  \end{align*}
  \]

- Blocker $\rightarrow$ partial harmony:
  \[
  \begin{align*}
  &i\ u\ u\ a\ u\ u \\
  &\text{[fr]}
  \end{align*}
  \]
Sour grapes

Undergeneration problem: No myopic spreading

No ranking of *FRONTLow, AGREE(front, V), IDENT(front), IDENT(round) in parallel OT will predict Warlpiri:

- No blocker → total harmony:

  \[
  \text{i i i i i}
  \]

  \[
  \text{[fr]}
  \]

- Blocker → partial harmony:

  \[
  \text{i i i a u u}
  \]

  \[
  \text{[fr]}
  \]
Partial harmony with /a/ blocking

Example of /wati-kuļaŋu/ → [wati-kiļaŋu]

/wati-kuļaŋu/
man-POSS (Laughren & Hoogenraad 1996: 188)

[wati-kiļaŋu]

[fr] [ro] [ro]
| | |
wa t i-k u l a ŋ u
| |
[lo] [lo]
Partial harmony with /a/ blocking

Example of /wati-kuɭaŋu/ → [wati-kiɭaŋu]

\[
\begin{align*}
\text{wati-kiɭaŋu} \\
/wati-kuɭaŋu/ \\
\text{man-POSS} \\
\text{(Laughren & Hoogenraad 1996: 188)}
\end{align*}
\]

\[
\begin{array}{c|c|c|c}
\text{[fr]} & \text{[ro]} \\
\hline
\text{w a t i - k i } & \text{[a ŋ u]} \\
\text{[lo]} & \text{[lo]} \\
\end{array}
\]
Sour grapes

Harmonic bounding of partial harmony candidate

(19) **Attested winner cannot win under any ranking**

<table>
<thead>
<tr>
<th>Parallel</th>
<th>[fr] [ro] [ro]</th>
<th>*FRONT LOW</th>
<th>AGRE (fr, V)</th>
<th>IDENT (front)</th>
<th>IDENT (round)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 😞 wat i-ku</td>
<td>aŋu</td>
<td></td>
<td>2</td>
<td>1!</td>
<td>1</td>
</tr>
<tr>
<td>b. (📅) wat i-ku</td>
<td>aŋu</td>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c. wat i-ki</td>
<td>æŋi</td>
<td></td>
<td>1!</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
## Agree vs. Share

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th></th>
<th>[front]</th>
<th>[front]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\wedge)</td>
<td>iti</td>
<td></td>
<td>utu</td>
</tr>
<tr>
<td>a.</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>❌</td>
</tr>
<tr>
<td>Agree</td>
<td>✔️</td>
<td>❌</td>
<td></td>
<td>❌</td>
</tr>
<tr>
<td>SHARE</td>
<td>✔️</td>
<td>❌</td>
<td></td>
<td>❌</td>
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</tbody>
</table>
**AGREE vs. SHARE**

<table>
<thead>
<tr>
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<th>[front]</th>
<th>[front]</th>
<th>[front]</th>
<th>[front]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a.</td>
<td>b.</td>
<td>c.</td>
<td>d.</td>
</tr>
<tr>
<td></td>
<td>iti</td>
<td>utu</td>
<td>uti</td>
<td>itu</td>
</tr>
<tr>
<td>AGREE</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>SHARE</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

**AGREE**(fr, V)   **SHARE**(fr, V)

i|uu     1   i|u|u     2
## Agree vs. Share

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th>[front]</th>
<th>[front]</th>
<th>[front]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a.</td>
<td>b.</td>
<td>c.</td>
<td>d.</td>
</tr>
<tr>
<td></td>
<td>iti</td>
<td>utu</td>
<td>uti</td>
<td>itu</td>
</tr>
<tr>
<td>Agree</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Share</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

### Agree(fr, V) vs. Share(fr, V)

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>uu 1</td>
<td>i</td>
</tr>
<tr>
<td>ii</td>
<td>u 1</td>
<td>ii</td>
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</tbody>
</table>
**AGREE vs. SHARE**

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th></th>
<th>[front]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>it i</td>
<td>b.</td>
<td>utu</td>
<td>c.</td>
</tr>
<tr>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>AGREE</td>
<td>✔</td>
<td></td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>SHARE</td>
<td>✔</td>
<td></td>
<td>✗</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>AGREE(fr, V)</th>
<th>SHARE(fr, V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>uuu</td>
<td>1</td>
</tr>
<tr>
<td>ii</td>
<td>u</td>
<td>1</td>
</tr>
<tr>
<td>iii</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>i</td>
<td>u</td>
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<tr>
<td></td>
<td>ii</td>
<td>u</td>
</tr>
<tr>
<td></td>
<td>iii</td>
<td>0</td>
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---
**AGREE vs. SHARE**

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th>[front]</th>
<th>[front]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\wedge)</td>
<td>a. (\text{iti})</td>
<td>b. (\text{utu})</td>
</tr>
<tr>
<td><strong>AGREE</strong></td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td><strong>SHARE</strong></td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>AGREE(fr, V)</th>
<th>SHARE(fr, V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>uu</td>
<td>1</td>
</tr>
<tr>
<td>ii</td>
<td>u</td>
<td>1</td>
</tr>
<tr>
<td>iii</td>
<td>0</td>
<td>iii</td>
</tr>
<tr>
<td>i</td>
<td>uau</td>
<td>1</td>
</tr>
</tbody>
</table>
**AGREE vs. SHARE**

<table>
<thead>
<tr>
<th></th>
<th>[front]</th>
<th></th>
<th>[front]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>iti</td>
<td>b.</td>
<td>utu</td>
<td>c.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGREE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>SHARE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**AGREE**(fr, V) | **SHARE**(fr, V)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>uu</td>
<td>1</td>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>ii</td>
<td>u</td>
<td>1</td>
<td>ii</td>
<td>u</td>
</tr>
<tr>
<td>iii</td>
<td>0</td>
<td>iii</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>uau</td>
<td>1</td>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>ii</td>
<td>au</td>
<td>1</td>
<td>ii</td>
<td>a</td>
</tr>
</tbody>
</table>
**SHARE in parallel OT**

Overgeneration problem: Spontaneous feature insertion and spreading

(20) *Spontaneous fronting with SHARE(front, V) in parallel OT*

<table>
<thead>
<tr>
<th>Parallel</th>
<th>Cu Cu Cu</th>
<th>SHARE(fr, V)</th>
<th>IDENT(front)</th>
</tr>
</thead>
</table>
| a.       | ≔\vtop{\hbox{[fr]}\vspace{2pt}\hbox{Cu Cu Cu}  
           \vspace{2pt}\hbox{Cy Cy}  
           \vspace{2pt}\hbox{[ro] [ro]} }  
          \vspace{2pt}\hbox{[ro] [ro]} | 2             |              |
| b.       | Cu Cu Cu | 1 W          | 0 L          |
SHARE in Harmonic Serialism

No spontaneous feature insertion and spreading

\[(21) \quad \text{No spontaneous fronting with SHARE(front, V) in Harmonic Serialism} \]

<table>
<thead>
<tr>
<th>Step 1</th>
<th>C u C u</th>
<th>SHARE(fr, V)</th>
<th>IDENT(front)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C u C u</td>
<td>SHARE(fr, V)</td>
</tr>
<tr>
<td>a.</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td>1</td>
</tr>
<tr>
<td>b.</td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
<td>1</td>
</tr>
</tbody>
</table>
Partial harmony with /a/ blocking

Step 1 of /wati-kuɭaŋu/ → [wati-kiɭaŋu]

(22) **Candidate with partial harmony emerges as winner**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>[fr] [ro] [ro]</th>
<th>[ro]</th>
<th>[ro]</th>
<th>[ro]</th>
<th>*FRONT</th>
<th>SHARE (fr, V)</th>
<th>FINAL (front)</th>
<th>IDENT (front)</th>
<th>*ROUND FRONT</th>
<th>IDENT (round)</th>
</tr>
</thead>
<tbody>
<tr>
<td>wat</td>
<td>i-k u</td>
<td>aŋ u</td>
<td>[lo]</td>
<td>[lo]</td>
<td>LOW</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>[fr]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>w a t</td>
<td>i-k y</td>
<td>aŋ u</td>
<td>[lo]</td>
<td>[lo]</td>
<td>[ro] [lo]</td>
<td>4! W</td>
<td>0 L</td>
<td>0 L</td>
<td>0 L</td>
</tr>
<tr>
<td>b.</td>
<td>[fr] [ro]</td>
<td>[ro]</td>
<td>[ro]</td>
<td>[ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Partial harmony with /a/ blocking

Step 2 of /wati-ku|aŋu/ → [wati-ki|aŋu]

(23) *Candidate with partial harmony emerges as winner*

<table>
<thead>
<tr>
<th>Step 2</th>
<th>[fr]</th>
<th>*FRONT LOW</th>
<th>SHARE (fr, V)</th>
<th>FINAL (front)</th>
<th>IDENT (front)</th>
<th>*ROUND FRONT</th>
<th>IDENT (round)</th>
</tr>
</thead>
<tbody>
<tr>
<td>w a t i-k y</td>
<td>a n u</td>
<td>[lo]</td>
<td>[ro]</td>
<td>[lo]</td>
<td>[ro]</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>a. ेर</td>
<td>w a t i-k i</td>
<td>a n u</td>
<td>[lo]</td>
<td>[lo]</td>
<td>[ro]</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>b.</td>
<td>w a t i-k y</td>
<td>a n u</td>
<td>[lo]</td>
<td>[ro]</td>
<td>[lo]</td>
<td>[ro]</td>
<td>3</td>
</tr>
<tr>
<td>c.</td>
<td>w a t i-k y</td>
<td>æ n u</td>
<td>[lo]</td>
<td>[ro]</td>
<td>[lo]</td>
<td>[ro]</td>
<td>1! W</td>
</tr>
</tbody>
</table>
Outline

Introduction

Theoretical background

Data

Analysis

Sour grapes

Labial attraction and labial blocking

Conclusion

References
Labial attraction

Labial attraction (Campbell 1974): processes creating sequences of labial consonants and round vowels
Labial attraction

Constraints

(24) $\text{SHARE(labial, segment)}$ ($\text{SHARE(lab, seg)}$)
Assign one violation mark for every pair of adjacent segments that are not linked to the same token of [labial].

(25) Faithfulness: IDENT(lab), INITIAL(lab), FINAL(lab), IDENT(fr)

(26) *LABIALFRONT (*LABFRO) (Rubach 2003: 620; Bateman 2007: 236)
Assign one violation mark for every segment that is linked to a token of [labial] and a token of [front].
Labial attraction

Hypothetical language: /pi/ $\rightarrow$ [pu]
Labial attraction

Hypothetical language: /pi/ → [pu]
Labial attraction

Hypothetical language: /pi/ → [pu]
Labial attraction
Hypothetical language: /pi/ → [pu]

\[
\text{SHARE}(\text{lab, seg})
\]

\[
\text{FINAL}(\text{lab}) \quad \text{IDENT}(\text{lab}) \quad ^*\text{LABFRO}
\]

\[
\quad \text{IDENT}(\text{fr})
\]
Labial attraction

In Warlpiri

Labial attraction applies to *Pu* sequences, but not to *Pi* sequences:
Labial attraction
In Warlpiri

Labial attraction applies to $Pu$ sequences, but not to $Pi$ sequences:

```
[ro]
|   p u
V   [lab]
```
Labial attraction

In Warlpiri

Labial attraction applies to *Pu* sequences, but not to *Pi* sequences:

\[
\begin{array}{c|c|c|c}
\text{[ro]} & \ast & \text{[fr]} \\
\text{p} & \text{u} & \text{p} & \text{i} \\
\text{[lab]} & \text{[lab]} \\
\end{array}
\]
Labial attraction and labial blocking

Derivation of /miji-kupuɽa/ → [miji-kipuɽa]

\[
\begin{align*}
\text{miji-kipuɽa} \\
/miji-kupuɽa/ \\
\text{food-DESID}
\end{align*}
\]

(Nash 1986: 87)

\[
\begin{array}{c}
\text{[fr]} \quad \text{[fr]} \quad \text{[ro]} \\
\mid \quad \mid \quad \mid \\
\text{m} \quad \text{i} \quad \text{j} \quad \text{i-κ} \quad \text{u} \quad \text{p} \quad \text{u} \quad \text{ɽ} \quad \text{a} \\
\mid \quad \mid \\
\text{[lab]} \quad \text{[ro]} \quad \text{[lab]}
\end{array}
\]
Labial attraction and labial blocking

Derivation of /miji-kupuɽa/ → [miji-kipuɽa]

miji-kipuɽa
/miji-kupuɽa/
food-DESID

[f] [f] [r]
\[lab] [ro][lab]

(Nash 1986: 87)
Labial attraction and labial blocking

Derivation of /miji-kupuɾa/ → [miji-kiɾuɾa]

miji-kiɾuɾa
/miji-kupuɾa/
food-DESID (Nash 1986: 87)

[fr] [fr]    [ro]
|   |      |
mi  ji  i-k u p u r a

/ / /
[lab] [ro][lab]
Labial attraction and labial blocking

Derivation of /miji-kupuɽa/ → [miji-kipuɽa]

\[
\text{miji-ki}p_uɽa
\]

\[
/miji-k\text{upuɽa}/
\]

\[
\text{food-DESID}
\]

(Nash 1986: 87)

\[
\begin{array}{c}
\text{[fr]} \quad [\text{fr}] \quad [\text{ro}] \\
\text{[lab]} \quad [\text{ro}][\text{lab}] \\
\end{array}
\]
Labial attraction and labial blocking

Derivation of /miji-kupuɽa/ → [miji-kipuɽa]

miji-ki\textsuperscript{puɽa}
/miji-kupuɽa/
food-DESID

(Nash 1986: 87)
Labial attraction and labial blocking

Derivation of /miji-kupuřa/ → [miji-kipuřa]

miji-kiₚuřa
/miji-kupuřa/
food-DESID

[Nash 1986: 87]
Labial attraction and labial blocking

Derivation of /miji-kupuɽa/ → [miji-ki pueblo]

miji-ki pueblo
/miji-kupuɽa/
food-DESID

[Nash 1986: 87]
Labial attraction and labial blocking of harmony

Ranking summary

```
*LABFRO  *LABCOR  *LABDOR  INITIAL(lab)

SHARE(lab, seg)

SHARE(fr, V)  IDENT(lab)  FINAL(lab)
```
Labial attraction

Step 1 of /miji-kupuɽa/ → [miji-kipuɽa]

(27) \( \text{SHARE(labial, seg)} \Rightarrow \text{FINAL(labial), IDENT(labial), SHARE(front, V)} \)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>SHARE(lab, seg)</th>
<th>FINAL(lab)</th>
<th>IDENT(lab)</th>
<th>SHARE(fr, V)</th>
<th>FINAL(fr)</th>
<th>IDENT(fr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>m i j i-k u p u [ a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>SHARE(lab, seg)</td>
<td>FINAL(lab)</td>
<td>IDENT(lab)</td>
<td>SHARE(fr, V)</td>
<td>FINAL(fr)</td>
<td>IDENT(fr)</td>
</tr>
<tr>
<td>a. m i j i-k u p u [ a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[fr] [fr] [ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. m i j i-k u p u [ a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[fr] [fr] [ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. m i j i-k u p u [ a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[fr] [fr] [ro]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Blocking of labial attraction by [front]

Step 2 of /miji-kupuɽa/ → [miji-kipuɾa]

(28) *LABIALFRONT $\gg$ SHARE(labial, segment)

<table>
<thead>
<tr>
<th>Step 2</th>
<th>[fr]</th>
<th>[fr]</th>
<th>[ro]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m i j i - k u p uɽ a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[ro] [lab]</td>
<td>*LABFRO</td>
<td>SHARE(lab, seg)</td>
</tr>
<tr>
<td>a.</td>
<td>[fr]</td>
<td>[fr]</td>
<td>[ro]</td>
</tr>
<tr>
<td></td>
<td>m i j i - k u p uɽ a</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>[lab] [ro] [lab]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>[fr]</td>
<td>[fr]</td>
<td>[ro]</td>
</tr>
<tr>
<td></td>
<td>m i j i - k u p uɽ a</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>[lab] [ro] [lab]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Progressive front harmony

Step 3 of /miji-kupuɾa/ → [miji-kipuɾa]

(29) \[ \text{SHARE(front, V)} \gg \text{FINAL(fr), IDENT(fr), *ROUNDFRONT} \]

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Step 3} & \text{SHARE} \text{(lab, seg)} & \text{SHARE} \text{(fr, V)} & \text{FINAL} \text{(fr)} & \text{IDENT} \text{(fr)} & \text{*ROUNDFRONT} \\
\hline
\text{a.} & \frac{\text{[fr]} \text{[fr]} \text{[ro]}}{\text{[lab]} \text{[ro]} \text{[lab]}} & \frac{\text{[fr]} \text{[fr]} \text{[ro]}}{\text{[lab]} \text{[ro]} \text{[lab]}} & 8 & 2 & 1 & 1 & 1 \\
\hline
\text{b.} & \frac{\text{[fr]} \text{[fr]} \text{[ro]}}{\text{[lab]} \text{[ro]} \text{[lab]}} & \frac{\text{[fr]} \text{[fr]} \text{[ro]}}{\text{[lab]} \text{[ro]} \text{[lab]}} & 8 & 3! \text{W} & 0 \text{L} & 0 \text{L} & 0 \text{L} \\
\hline
\end{array}
\]
Blocking of progressive front vowel harmony by [labial]

Step 4 of /miji-kupuɾa/ → [miji-kipta]

(30) \[ *LABIALFRONT \Rightarrow SHARE(front, V) \]

<table>
<thead>
<tr>
<th>Step 4</th>
<th>[fr] [fr] [ro]</th>
</tr>
</thead>
<tbody>
<tr>
<td>m i j i-k y p u ɾ a</td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[ro] [lab]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th>SHARE</th>
<th>SHARE</th>
<th>FINAL</th>
<th>IDENT</th>
<th>*ROFRO</th>
<th>IDENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>m i j i-k y p u ɾ a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lab]</td>
<td>[ro] [lab]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>1 W</td>
<td>1 L</td>
<td>1 W</td>
<td>2 W</td>
<td>0 L</td>
<td></td>
</tr>
</tbody>
</table>
Labial attraction and progressive front vowel harmony

Final ranking summary

Labial attraction and labial blocking
Labial attraction as a DEB effect?

Unlike previous analyses, this analysis does not treat labial attraction and its interaction with progressive front harmony as a derived environment blocking effect.

<table>
<thead>
<tr>
<th></th>
<th>Pu</th>
<th>Pi</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>McCarthy 2003</strong></td>
<td><img src="labial_attractionPuMcCarthy2003.png" alt="Diagram" /></td>
<td><img src="labial_attractionPiMcCarthy2003.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Hall 2006</strong></td>
<td><img src="labial_attractionPuHall2006.png" alt="Diagram" /></td>
<td><img src="labial_attractionPiHall2006.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>This analysis</strong></td>
<td><img src="labial_attractionPuThisAnalysis.png" alt="Diagram" /></td>
<td><img src="labial_attractionPiThisAnalysis.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>
Conclusion

- SHARE(F) can be used to model both C-V and V-V assimilation.
Conclusion

- SHARE(F) can be used to model both C-V and V-V assimilation.
- Serial Harmony offers a successful alternative to AGREE-based analyses of Warlpiri progressive front harmony because it predicts myopic spreading.
Conclusion

- SHARE(F) can be used to model both C-V and V-V assimilation.
- Serial Harmony offers a successful alternative to AGREE-based analyses of Warlpiri progressive front harmony because it predicts myopic spreading.
- Labial attraction may be analyzed within Serial Harmony using an independently motivated family of constraints; there is no need for a dedicated LABATTR constraint.
Conclusion

- SHARE(F) can be used to model both C-V and V-V assimilation.
- Serial Harmony offers a successful alternative to AGREE-based analyses of Warlpiri progressive front harmony because it predicts myopic spreading.
- Labial attraction may be analyzed within Serial Harmony using an independently motivated family of constraints; there is no need for a dedicated LABATTR constraint.
- Unifying labial attraction and front harmony in this way highlights why they should interact: the same mechanism that blocks labial attraction in Pi sequences is responsible for blocking Pu sequences from harmonizing, namely the ranking of *LABIALFRONT above a SHARE constraint.


Wilson, Colin. 2003. Unbounded spreading in OT (or, Unbounded spreading is local spreading iterated unboundedly). Paper presented at Southwest Optimality Theory (SWOT) Workshop 8, Tuscon, AZ.


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- Audiences at the Yale Linguistics department and at the CUNY Conference on the Phonology of Endangered Languages
Labial attraction and all three types of vowel harmony

Progressive round, regressive round, and progressive front