Lexically indexed constraints and implicational constraint rankings

Clàudia Pons-Moll
Francesc Torres-Tamarit

Available at: https://works.bepress.com/claudia_pons-moll/50/
Lexically indexed constraints and implicational constraint rankings.
Evidence from Catalan loanword phonology

Clàudia Pons-Moll & Francesc Torres-Tamarit

Universitat de Barcelona & CNRS/Université Paris 8

mfm25
University of Manchester

25-27 May 2017
Introduction and goals

- Word-final posttonic /n/ deletion (ND) and vowel reduction (VR) are two phonological processes that apply in the native lexicon of Catalan.
Introduction and goals

(1)  ND (Mascaró 1976, Bonet & Lloret 1998, Bonet et al. 2005, Faust & Torres-Tamarit accepted)

<table>
<thead>
<tr>
<th>['pla∅']</th>
<th>‘even’</th>
<th>cf. ['plans'], [plə'nisim]</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ku'zi∅]</td>
<td>‘cousin’</td>
<td>cf. [ku'zins], [kuzi'nət]</td>
<td>derivative</td>
</tr>
<tr>
<td>[ʃi'lɛ∅]</td>
<td>‘Chilean’</td>
<td>cf. [ʃi'lɛns], [ʃilə'nizma]</td>
<td></td>
</tr>
<tr>
<td>[upur'tu∅]</td>
<td>‘opportunity’</td>
<td>cf. [upur'tuns], [upurtuni'tat]</td>
<td></td>
</tr>
<tr>
<td>[distriβu'sjo∅]</td>
<td>‘distribution’</td>
<td>cf. [distriβu'sjons], [distriβusju'nal]</td>
<td></td>
</tr>
</tbody>
</table>
Introduction and goals

(2) VR (Mascaró 1976, Bonet & Lloret 1998)

<table>
<thead>
<tr>
<th>Spanish</th>
<th>English</th>
<th>Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>['kazə]</td>
<td>‘house’</td>
<td>[kə'zɛtə] ‘house.DIM’</td>
</tr>
<tr>
<td>['tɛrə]</td>
<td>‘earth’</td>
<td>[tə'restrə] ‘terrestrial’</td>
</tr>
<tr>
<td>['fɛrə]</td>
<td>‘wild animal’</td>
<td>[fə'ros] ‘fierce’</td>
</tr>
<tr>
<td>['pɔrtə]</td>
<td>‘door’</td>
<td>[pur'tal] ‘portal’</td>
</tr>
<tr>
<td>['pɔmə]</td>
<td>‘apple’</td>
<td>[pu'merə] ‘apple tree’</td>
</tr>
</tbody>
</table>
These two processes, though, tend to underapply in loanwords.

(3) Underapplication of ND (Pons-Moll 2015, Faust & Torres-Tamarit accepted)

[di'βan] ‘divan’
[kəj'man] ‘caiman’
[fu'ton] ‘futon’
['klɔn] ‘clon’
[məɣə'zın] ‘magazine’
Introduction and goals

(4) Underapplication of VR (only mid vowels) (Cabré 2009, Mascaró 2002, 2015)

['master] ‘master’
['kuter] ‘cutter’
[tem'purə] ‘tempura’
[rep'sol] ‘Repsol’
['ʒuðo] ‘judo’
['saðo] ‘sado(masochism)’
[ko'laʃ] ‘collage’
[kon'tajner] ‘container’
Loans susceptible to undergo both processes show a consistent behaviour across speakers:

- underapplication of both processes is the most common solution ([toβo'yan] ‘slide’),
- followed by just underapplication of ND ([tuβu'yan]),
- followed by far by application of both processes ([tuβu'ya]).
- Underapplication of VR and application of ND is an unattested outcome ([toβo'ya∅]).
Loans susceptible to undergo both processes show a consistent behaviour across speakers:

- underapplication of both processes is the most common solution (\([\text{to}\beta\text{o'yan}]\) ‘slide’),
- followed by just underapplication of ND (\([\text{tu}\beta\text{u'yan}]\)),
- followed by far by application of both processes (\([\text{tu}\beta\text{u'ya}]\)).
- Underapplication of VR and application of ND is an unattested outcome (\([\text{to}\beta\text{o'ya}\emptyset]\)).
Loans susceptible to undergo both processes show a consistent behaviour across speakers:

- underapplication of both processes is the most common solution ([toβoɣan] ‘slide’),
- followed by just underapplication of ND ([tuβuɣan]),
- followed by far by application of both processes ([tuβuɣa]),
- Underapplication of VR and application of ND is an unattested outcome ([toβoɣaθ]).
Loans susceptible to undergo both processes show a consistent behaviour across speakers:

- underapplication of both processes is the most common solution ([toβo'yan] ‘slide’),
- followed by just underapplication of ND ([tuβu'yan]),
- followed by far by application of both processes ([tuβu'ya]).
- Underapplication of VR and application of ND is an unattested outcome ([toβo'ya∅]).
Loans susceptible to undergo both processes show a consistent behaviour across speakers:

- underapplication of both processes is the most common solution ([toβo'yan] ‘slide’),
- followed by just underapplication of ND ([tuβu'yan]),
- followed by far by application of both processes ([tuβu'ya]).
- Underapplication of VR and application of ND is an unattested outcome ([toβo'ya0]).
Introduction and goals

- The purpose of this talk is to both
  - present the results of two surveys supporting quantitatively these patterns, and
  - claim that if some process $P$ is cancelled in a loanword, the less productive/natural process $Q$ must also be cancelled. (An OT analysis with lexically indexed constraints that enter into implicational constraint rankings will be used to illustrate the generalization.)
Introduction and goals

- The purpose of this talk is to both
  - present the results of two surveys supporting quantitatively these patterns, and
  - claim that if some process P is cancelled in a loanword, the less productive/natural process Q must also be cancelled. (An OT analysis with lexically indexed constraints that enter into implicational constraint rankings will be used to illustrate the generalization.)
The purpose of this talk is to both
  ▶ present the results of two surveys supporting quantitatively these patterns, and
  ▶ claim that if some process P is cancelled in a loanword, the less productive/natural process Q must also be cancelled. (An OT analysis with lexically indexed constraints that enter into implicational constraint rankings will be used to illustrate the generalization.)
Experimental survey

Two tasks were conducted:

1. A picture-naming task containing 16 loans with the relevant structures (PowerPoint presentation); and
2. A judgment test inquiring the grammaticality of the four possible patterns (presented in an audio form) of the same 16 loanwords (16 x 4 patterns = 64 items), which had to be valued in a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).

The participants were 25 Catalan speakers aged 18-23 recruited at the University of Barcelona.

Both tests included 50% of distractors and were presented in a randomized way.
Experimental survey

Two tasks were conducted:

1. A picture-naming task containing 16 loans with the relevant structures (PowerPoint presentation); and

2. A judgment test inquiring the grammaticality of the four possible patterns (presented in an audio form) of the same 16 loanwords (16 x 4 patterns = 64 items), which had to be valued in a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).

The participants were 25 Catalan speakers aged 18-23 recruited at the University of Barcelona.

Both tests included 50% of distractors and were presented in a randomized way.
Experimental survey

Two tasks were conducted:

1. A picture-naming task containing 16 loans with the relevant structures (PowerPoint presentation); and
2. A judgment test inquiring the grammaticality of the four possible patterns (presented in an audio form) of the same 16 loanwords (16 × 4 patterns = 64 items), which had to be valued in a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).

The participants were 25 Catalan speakers aged 18-23 recruited at the University of Barcelona.

Both tests included 50% of distractors and were presented in a randomized way.
Experimental survey

- Two tasks were conducted:
  - 1. A picture-naming task containing 16 loans with the relevant structures (PowerPoint presentation); and
  - 2. A judgment test inquiring the grammaticality of the four possible patterns (presented in an audio form) of the same 16 loanwords (16 x 4 patterns = 64 items), which had to be valued in a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).
- The participants were 25 Catalan speakers aged 18-23 recruited at the University of Barcelona.
- Both tests included 50% of distractors and were presented in a randomized way.
Experimental survey

- Two tasks were conducted:
  - 1. A picture-naming task containing 16 loans with the relevant structures (PowerPoint presentation); and
  - 2. A judgment test inquiring the grammaticality of the four possible patterns (presented in an audio form) of the same 16 loanwords ($16 \times 4$ patterns = 64 items), which had to be valued in a Likert scale of 1-5 (very unnatural, quite unnatural, natural enough, quite natural, very natural).
- The participants were 25 Catalan speakers aged 18-23 recruited at the University of Barcelona.
- Both tests included 50% of distractors and were presented in a randomized way.
caiman cancan patxaran xaman xarleston taliban magazine paquistán Carme Chacon Chacon orangutan sedan tobogan Pequín Berlín Vall d’Hebron
Results picture-naming task

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 1</td>
<td>65.2%</td>
</tr>
<tr>
<td>Pattern 2</td>
<td>25%</td>
</tr>
<tr>
<td>Pattern 3</td>
<td>9.8%</td>
</tr>
<tr>
<td>Pattern 4</td>
<td><em>toBo'ya</em></td>
</tr>
</tbody>
</table>
Results judgment test

Pattern 1 (тобо-йан)

- Very unnatural: 6.7%
- Quite unnatural: 11.9%
- Natural enough: 13.3%
- Quite natural: 17.5%
- Very natural: 50.7%
Results judgment test

Pattern 2 (tuβu'yan)

- Very unnatural: 38.4
- Quite unnatural: 18.4
- Natural enough: 23.5
- Quite natural: 15.3
- Very natural: 4.3

Legend:
Results judgment test

Pattern 3 (tuβuˈɣa)

- Very unnatural: 32.4%
- Quite unnatural: 14.8%
- Natural enough: 14.6%
- Quite natural: 25.2%
- Very natural: 13.1%
Results judgment test

Pattern 4 (тобо́ ья)

- Very unnatural: 36.4%
- Quite unnatural: 22.6%
- Natural enough: 16.3%
- Quite natural: 11.7%
- Very natural: 13.0%
Results judgment test

Pattern 1 (toβo'yan)

Pattern 2 (tuβu'yan)

Pattern 3 (tuβu'ya)

Pattern 4 (toβo'ya)
Analysis: regular cases

(5) 

<table>
<thead>
<tr>
<th></th>
<th>/plan/</th>
<th>*'Vn#</th>
<th>MAX-N</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>'pla</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>'plan</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>
## Analysis: regular cases

(6)

<table>
<thead>
<tr>
<th></th>
<th>/fer-os/</th>
<th>VR</th>
<th>IDENT-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>כן fə'ros</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>fe'ros</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>
In order to explain underapplication in loanwords we make use of the following lexically indexed faithfulness constraints (for lexical indexation see Pater 2000, Anttila 2002, Inkelas & Zoll 2003, Pater 2006), which dominate the general $M \gg F$ constraint ranking schema:

(7) Lexically indexed faithfulness constraints

a. $\text{MAX-n_I}$

b. $\text{IDENT-V_I}$
Analysis: exceptional cases

<table>
<thead>
<tr>
<th></th>
<th>Max-n</th>
<th>'\n #</th>
<th>Max-n</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dib\n/</td>
<td>Max-n</td>
<td>*'\n #</td>
<td>Max-n</td>
</tr>
<tr>
<td>a. di'ban</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. di'ba</td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
Analysis: exceptional cases

(9)

<table>
<thead>
<tr>
<th>/'master/</th>
<th>IDENT-V</th>
<th>VR</th>
<th>IDENT-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. leground 'master</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. 'master</td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
As demonstrated by multiple answers during the picture naming task (free variation within individuals) and by the judgment test (more than one output is considered natural), the two lexically indexed faithfulness constraints Max-$n_j$ and Ident-$v_j$ form a set of partially ordered constraint rankings with respect to the markedness constraints they interact with (Anttila 2002).

- Partially ordered constraint rankings:
  - Max-$n_j$, *'Vn#
  - Ident-$V_j$, VR

From these partially ordered constraint rankings, different outcomes are predicted. (We set frequency aside.)
As demonstrated by multiple answers during the picture naming task (free variation within individuals) and by the judgment test (more than one output is considered natural), the two lexically indexed faithfulness constraints $\text{Max-}n_I$ and $\text{Ident-}V_I$ form a set of *partially ordered constraint rankings* with respect to the markedness constraints they interact with (Anttila 2002).

- Partially ordered constraint rankings:
  - $\text{Max-}n_I$, $\ast'Vn\#$
  - $\text{Ident-}V_I$, VR

- From these partially ordered constraint rankings, different outcomes are predicted. (We set frequency aside.)
As demonstrated by multiple answers during the picture naming task (free variation within individuals) and by the judgment test (more than one output is considered natural), the two lexically indexed faithfulness constraints $\text{Max-}n_i$ and $\text{Ident-}V_i$ form a set of partially ordered constraint rankings with respect to the markedness constraints they interact with (Anttila 2002).

- Partially ordered constraint rankings:
  - $\text{Max-}n_i$, $\text{*}Vn\#$
  - $\text{Ident-}V_i$, $\text{VR}$

From these partially ordered constraint rankings, different outcomes are predicted. (We set frequency aside.)
Analysis: loanwords

From the partially ordered constraint rankings including lexically indexed faithfulness constraints, the following totally ordered constraint rankings are possible:

- \textbf{Max-n} \gg *'Vn\# \gg \textbf{Max-n}: underapplication of ND
- *'Vn\# \gg \textbf{Max-n}, \textbf{Max-n}: application of ND
- \textbf{Ident-V} \gg VR \gg \textbf{Ident-V}: underapplication of VR
- VR \gg \textbf{Ident-V}, \textbf{Ident-V}: application of VR
From the partially ordered constraint rankings including lexically indexed faithfulness constraints, the following totally ordered constraint rankings are possible:

- \[ \text{Max-n}_I \gg *'Vn\# \gg \text{Max-n} : \text{underapplication of ND} \]
- \[ *'Vn\# \gg \text{Max-n}_I , \text{Max-n} : \text{application of ND} \]
- \[ \text{Ident-V}_I \gg \text{VR} \gg \text{Ident-V} : \text{underapplication of VR} \]
- \[ \text{VR} \gg \text{Ident-V}_I , \text{Ident-V} : \text{application of VR} \]
From the partially ordered constraint rankings including lexically indexed faithfulness constraints, the following totally ordered constraint rankings are possible:

- $\text{Max-n}_I \gg \text{'}Vn\# \gg \text{Max-n}$: underapplication of ND
- $\text{'}Vn\# \gg \text{Max-n}_I$, $\text{Max-n}$: application of ND
- $\text{Ident-V}_I \gg \text{VR} \gg \text{Ident-V}$: underapplication of VR
- $\text{VR} \gg \text{Ident-V}_I$, $\text{Ident-V}$: application of VR
From the partially ordered constraint rankings including lexically indexed faithfulness constraints, the following totally ordered constraint rankings are possible:

- **Max-n_I ≫ *'Vn# ≫ Max-n**: underapplication of ND
- ***'Vn# ≫ Max-n_I, Max-n**: application of ND
- **Ident-V_I ≫ VR ≫ Ident-V**: underapplication of VR
- **VR ≫ Ident-V_I, Ident-V**: application of VR
From the partially ordered constraint rankings including lexically indexed faithfulness constraints, the following totally ordered constraint rankings are possible:

- **Max-n\textsubscript{I} \gg \ast'Vn\# \gg Max-n**: underapplication of ND
- \ast'Vn\# \gg Max-n\textsubscript{I}, **Max-n**: application of ND
- **Ident-V\textsubscript{I} \gg VR \gg Ident-V**: underapplication of VR
- **VR \gg Ident-V\textsubscript{I}, Ident-V**: application of VR
However, nothing prevents $\text{IDENT-V}_I$ from dominating VR and $\text{\texttt{*'Vn#}}$ from dominating $\text{MAX-n}_I$, leading to the ungrammatical candidate $\text{*[to\partial{o'}\gammaa]}$, with both application of ND and underapplication of VR.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textit{/to\partial{o'\gamma}an/} & \textit{ID-V}_I & VR & \textit{ID-V} & \textit{\texttt{*'Vn#}} & \textit{MAX-n}_I & \textit{MAX-n} \\
\hline
\textit{a. }\textit{\textit{\textbf{}}} to\partial{o'}\gammaa & * & | & | & * & * & \\
\hline
\textit{b. }\textit{to\partial{o'}\gammaan} & * & | & \textit{W} & L & L & \\
\hline
\textit{c. }\textit{tu\partial{\nu'\gammaa}} & \textit{W} & L & \textit{W} & | & * & * & \\
\hline
\textit{d. }\textit{tu\partial{\nu'\gammaan}} & \textit{W} & L & \textit{W} & \textit{W} & L & L & \\
\hline
\end{tabular}
\end{table}
In general, free variation can affect the same item, which is subject to different rankings from the partially ordered constraint ranking. But sometimes variation is found in the behavior of different items, each of which always obeys distinct constraint rankings from the partially ordered constraint ranking.

In the latter case, we can make use of lexically indexed constraint rankings (Anttila 2002), a model that allows indexation of constraint rankings in which specific lexical items choose a specific ranking from the partial order (/Item1/-B ≫ C; /Item2/-C≫ B).
Analysis: loanwords

- In general, free variation can affect the same item, which is subject to different rankings from the partially ordered constraint ranking. But sometimes variation is found in the behavior of different items, each of which always obeys distinct constraint rankings from the partially ordered constraint ranking.

- In the latter case, we can make use of *lexically indexed constraint rankings* (Anttila 2002), a model that allows *indexation of constraint rankings* in which specific lexical items choose a specific ranking from the partial order (/Item1/-B ≫ C; /Item2/-C≫ B).
We propose a version of the lexically indexed constraint ranking approach in which, *in the context of two distinct lexical indexes associated to the same lexical item, the satisfaction of the constraint associated to one lexical index implies the satisfaction of the constraint associated to the other lexical index.*

In the case at hand, the constraint ranking schema associated with $I (Ident-V \gg VR)$ implies the same constraint ranking schema associated with $I (Max-n \gg ^*Vn#);$ two lexical indexes can enter into an asymmetrical implicational relation of the type $I \Rightarrow I.$

According to this proposal, thus, EVAL is dependent on relations between lexical indexes.

/toβoγan\rightarrow I/ (Ident-V \gg VR \Rightarrow Max-n \gg ^*Vn#); that is, if VR underapplies, ND must also underapply.
We propose a version of the lexically indexed constraint ranking approach in which, in the context of two distinct lexical indexes associated to the same lexical item, the satisfaction of the constraint associated to one lexical index implies the satisfaction of the constraint associated to the other lexical index.

In the case at hand, the constraint ranking schema associated with $I$ ($\text{IDENT-V}_I \gg VR$) implies the same constraint ranking schema associated with $I$ ($\text{MAX-n}_I \gg *'Vn#$); two lexical indexes can enter into an asymmetrical implicational relation of the type $I \Rightarrow I$.

According to this proposal, thus, EVAL is dependent on relations between lexical indexes.

(toBoGan) ($\text{IDENT-V}_I \gg VR \Rightarrow \text{MAX-n}_I \gg *'Vn#$); that is, if VR underapplies, ND must also underapply.
We propose a version of the lexically indexed constraint ranking approach in which, in the context of two distinct lexical indexes associated to the same lexical item, the satisfaction of the constraint associated to one lexical index implies the satisfaction of the constraint associated to the other lexical index.

In the case at hand, the constraint ranking schema associated with \( I(\text{IDENT-V}_I \gg VR) \) implies the same constraint ranking schema associated with \( I(\text{MAX-n}_I \gg *'Vn#) \); two lexical indexes can enter into an asymmetrical implicational relation of the type \( I \Rightarrow I \).

According to this proposal, thus, EVAL is dependent on relations between lexical indexes.

\( /\text{to\bog\text{a}n}/ \Rightarrow I (I(\text{IDENT-V}_I \gg VR \gg \text{MAX-n}_I \gg *'Vn#)); \) that is, if VR underapplies, ND must also underapply.
We propose a version of the lexically indexed constraint ranking approach in which, *in the context of two distinct lexical indexes associated to the same lexical item, the satisfaction of the constraint associated to one lexical index implies the satisfaction of the constraint associated to the other lexical index.*

In the case at hand, the constraint ranking schema associated with I (IDENT-V ≫ VR) implies the same constraint ranking schema associated with I (MAX-nI ≫ *'Vn#); two lexical indexes can enter into an asymmetrical implicational relation of the type I ⇒ I.

According to this proposal, thus, EVAL is dependent on relations between lexical indexes.

/toβoγan/ ≡_I (IDENT-V ⇒ VR ⇒ MAX-nI ⇒ *'Vn#); *that is, if VR underapplies, ND must also underapply.*
The question is why underapplication of VR leads to underapplication of ND and not the other way around.
Analysis: loanwords

- The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).
- The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:
  - existence of exceptions,
  - underapplication in loanword phonology,
  - existence of morphology-induced underapplication,
  - lack of transfer to L2
  - underapplication by interaction with another process (opacity) (o.a.).
The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).

The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:

- existence of exceptions,
- underapplication in loanword phonology,
- existence of morphology-induced underapplication,
- lack of transfer to L2
- underapplication by interaction with another process (opacity) (o.a.).
The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).

The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:

- existence of exceptions,
- underapplication in loanword phonology,
- existence of morphology-induced underapplication,
- lack of transfer to L2
- underapplication by interaction with another process (opacity) (o.a.).
The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).

The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:

- existence of exceptions,
- underapplication in loanword phonology,
- existence of morphology-induced underapplication,
- lack of transfer to L2
- underapplication by interaction with another process (opacity) (o.a.).
Analysis: loanwords

- The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).
- The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:
  - existence of exceptions,
  - underapplication in loanword phonology,
  - existence of morphology-induced underapplication,
  - lack of transfer to L2
  - underapplication by interaction with another process (opacity) (o.a.).
The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).

The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:

- existence of exceptions,
- underapplication in loanword phonology,
- existence of morphology-induced underapplication,
- lack of transfer to L2
- underapplication by interaction with another process (opacity) (o.a.).
The phonological processes of a language can be organized along a scale according to their productivity (see Pons-Moll 2015).

The productivity of phonological processes can be measured according to a series of factors such as the following, which can be correlated with phonetic groundedness:

- existence of exceptions,
- underapplication in loanword phonology,
- existence of morphology-induced underapplication,
- lack of transfer to L2
- underapplication by interaction with another process (opacity) (o.a.).
Analysis: loanwords

(11)

+ **prod**
+ **phon-grounded**

<table>
<thead>
<tr>
<th></th>
<th>underappl. in loanwords</th>
<th>no transfer L2</th>
<th>opacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>VR</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>ND</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

– **prod**
– **phon-grounded**

▶ Obstruent final devoicing (FD) is more productive and more phonetically-grounded than VR, and VR is more productive and phonetically-grounded than ND.

▶ ND is counterfed by a process of simplification of NT♯ clusters: /pɔnt/ → ['pɔn]; VR does not enter into any counterfeeding or counterbleeding relation with any other phonological process.
Conclusions

- The general idea is that *in loanwords susceptible of showing underapplication of two distinct process, the underapplication of the more productive, more phonetically-grounded process necessarily implies the underapplication of the less productive, less phonetically-grounded process.*

- Modelling such cases cannot be done with the phonological lexicon theory by Itô & Mester (1999), in which the lexicon of a language can be stratified in a way that obeys a set of “concentric” grammars in which $G_1 \subseteq G_2$ and $G_2 \subseteq G_3$ ($G_1$ is a subset of $G_2$ and $G_2$ is a superset of $G_1$, and so on).
Conclusions

- The general idea is that in loanwords susceptible of showing underapplication of two distinct processes, the underapplication of the more productive, more phonetically-grounded process necessarily implies the underapplication of the less productive, less phonetically-grounded process.

- Modelling such cases cannot be done with the phonological lexicon theory by Itô & Mester (1999), in which the lexicon of a language can be stratified in a way that obeys a set of “concentric” grammars in which $G_1 \subseteq G_2$ and $G_2 \subseteq G_3$ ($G_1$ is a subset of $G_2$ and $G_2$ is a superset of $G_1$, and so on).
In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

- Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
- Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

- $A_I \gg B$ and $C_I \gg D$ is OK,
- but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
Conclusions

- In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:
  - Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
  - Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

- but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:
  - $A_I \gg B$ and $C_I \gg D$ is OK,
  - but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

- The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
Conclusions

▶ In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

▶ Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
▶ Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

▶ but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

▶ $A_I \gg B$ and $C_I \gg D$ is OK,
▶ but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

▶ The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

- Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
- Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

- $A_I \gg B$ and $C_I \gg D$ is OK,
- but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

- Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
- Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

But the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

- $A_I \gg B$ and $C_I \gg D$ is OK,
- but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
Conclusions

In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

- Constraint ranking 1: $A_I \gg B$ or $B \gg A_I$
- Constraint ranking 2: $C_I \gg D$ or $D \gg C_I$

but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

- $A_I \gg B$ and $C_I \gg D$ is OK,
- but $A_I \gg B$ and $D \gg C_I$ is not if the lexically indexed constraint $A$ blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint $D$.

The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process $B$ is cancelled in a loanword, the less productive process $D$ must also be cancelled.
In the analysed case, however, the same lexical item can in fact display two distinct constraint rankings involving lexical indexation:

- Constraint ranking 1: \( A_I \gg B \) or \( B \gg A_I \)
- Constraint ranking 2: \( C_I \gg D \) or \( D \gg C_I \)

but the crucial aspect of our data is that one specific co-occurrence of the two independently-possible rankings 1 and 2 involving lexical indexation is prohibited:

- \( A_I \gg B \) and \( C_I \gg D \) is OK,
- but \( A_I \gg B \) and \( D \gg C_I \) is not if the lexically indexed constraint \( A \) blocks a process which is more productive and more phonetically-grounded than the process triggered by the markedness constraint \( D \).

The implicational relation between lexical constraint rankings involving indexed constraints preserves relations of naturalness between phonological processes: if some process \( B \) is cancelled in a loanword, the less productive process \( D \) must also be cancelled.
Thank you for your attention!


Faust, Noam & Francesc Torres-Tamarit. Accepted. Stress and final /n/ deletion in Catalan: combining Strict CV and OT. *Glossa*.


