SPANISH 'DEPALATALIZATION':
THE SYNCHRONIC, DIACHRONIC AND PERCEPTION PERSPECTIVES

Ryan M. Bessett & Sonia Colina
University of Arizona

ABSTRACT. Spanish has a restriction on palatal nasals and laterals in the coda so that they are normally realized as dental or alveolar coronals. In the onset position, the palatal point of articulation is retained, *bello (be.[ʎ]o)* 'beautiful-masc.', *beldad (be[l].dad)* 'beauty'; *doña (do.[ɲ]a)* 'Madam', *don (do[n])* 'Mister'. Alternations such as these led phonologists to propose a rule of depalatalization that turns an underlying palatal nasal or lateral into a coronal (Contreras 1977; Harris 1983). More recently, within an optimality-theoretic framework and on the basis of loan word evidence, Lloret and Mascaró (2006) argue again in favor of an active process of depalatalization in the phonology of Modern Spanish. Taking the proposal of Lloret and Mascaró as its point of departure, this paper expands the discussion on depalatalization to consider diachronic data, the role of the underlying representation and the perception grammar, in particular regarding loanword phonology. Historical data support depalatalization as an active phenomenon in Old Spanish and Medieval Spanish; yet the morphophonological alternations cannot be considered active/productive synchronically. Unlike previous serial models of phonology, an OT framework allows for the incorporation of diachronic data into the analysis, through constraints, constraint re-ranking and Lexicon Optimization, thus explaining how the current situation came about and shedding light on apparent synchronic alternations. OT also provides a formalization of the role of the underlying representation in diachronic change and in synchronic loanword evidence, in connection with the perception grammar, thus providing support for depalatalization as an active phonotactic restriction in Spanish.

Keywords: depalatalization, coda neutralization, nasals, laterals, optimality theory, loan words, language change

RESUMEN. El español posee una restricción acerca de la presencia de palatales nasales y laterales, de manera que normalmente emergen como coronales dentales o alveolares. En la posición de ataque, el punto de articulación palatal se retiene – *bello (be.[ʎ]o)*, *beldad (be[l].dad)*; *doña (do.[ɲ]a)*, *don (do[n])*. Tales alternancias llevaron a los fonólogos a proponer una regla de despalatalización que convierte una palatal nasal o lateral subyacente en una coronal (Contreras 1977; Harris 1983). Más recientemente, dentro del marco de la teoría de la optimidad, Lloret y Mascaró (2006) también argumentan, mediante datos de préstamos, a favor de un proceso activo de despalatalización en la fonología del español actual. Partiendo de la propuesta de Lloret y Mascaró, este artículo expande la discusión sobre la despalatalización para considerar datos diacrónicos, el papel de las representaciones subyacentes y la gramática de la percepción, en particular en lo que toca a la fonología de los préstamos. Los datos históricos apoyan la despalatalización como un fenómeno activo en español antiguo y medieval; no obstante, las alternancias morfofonológicas no pueden considerarse activas o productivas sincrónicamente. Frente a los anteriores modelos seriales de la fonología, la teoría de la optimidad permite la incorporación de datos históricos en el análisis, a través de restricciones, re-jerarquización de esas restricciones y optimización del léxico, explicando así cómo surgió la situación actual y arrojando luz sobre las alternancias sincrónicas. La teoría

de la optimidad también proporciona una formalización del papel de la representación subyacente en el cambio diacrónico y los datos sincrónicos de préstamos, en relación con la gramática de la percepción, apoyando así la existencia de la despalatalización como una restricción fonotáctica productiva en español.

Palabras clave: despalatalización, neutralización de coda, nasales, laterlaes, teoría de la optimidad, préstamos, cambio lingüístico

1. Introduction

The existence, or not, of a process of depalatalization of nasals and laterals in Spanish has been long debated in phonology (Contreras, 1977; Harris, 1983; Pensado, 1997; Harris, 1999; Bermúdez-Otero 2006; Lloret & Mascaró, 2006; Eddington 2012). Harris, who originally favored the idea of depalatalization in Spanish, admittedly argued against such a process in his latter work. Harris (1999) set to debunk the depalatalization process in Spanish, and even attempted to discourage future analyses on the topic, concluding with this foreboding statement, "May Harris (1983) and the specter of Nasal Depalatalization not come back to haunt us again" (Harris, 1999, p. 64). However, the discussion did not end with this remark. Lloret & Mascaró (2006) provide an analysis under Optimality Theory that argues in favor of depalatalization. Starting from Lloret & Mascaró's analysis (2006), this paper expands the analysis to consider diachronic data and the role of the underlying representation in language change. It also delves deeper into the loanword evidence presented by Lloret & Mascaró by considering the perception grammar. Historical data supports the view that depalatalization was active in Old Spanish and Medieval Spanish; yet, contra Lloret & Mascaró and in agreement with Bermúdez-Otero (2006) and Eddington (2012), it is argued that the morphophonological alternations cannot be considered active synchronically. Nonetheless, loanword evidence shows that a phonotactic restriction depalatalizes any palatal sonorant in the acoustic input. No morphological alternations exist because of the lack of patrimonial inputs to which depalatalization can apply. An optimality theoretic framework allows for the incorporation of diachronic and synchronic evidence, including loan words and perception data into the same analysis, thus offering a broader view of the problem. It is shown that restricting the analysis to synchronic data, as has been done by previous studies, limits our ability to fully understand the complex phenomenon known as depalatalization.

1.1 The data

Before discussing the previous studies, it is important to consider the distribution of the data. Example (1) shows that palatal nasals and laterals in the onset (a) surface as coronals in word-final position in patrimonial Spanish words.

(1) Depalatalization of [ʎ] and [ɲ] in word-final position in patrimonial words

    a. Onset [ʎ]   Coda [l]

        ello 'that'   el 'he'

        aquello 'that-pro'   aquel 'that-adj'

        doncella 'fem. virgin'   doncel 'male virgin'

        clavellina 'carnation-like plant' clavel 'carnation'

      b. Onset [ɲ]   Coda [n]
        doña 'Madam'   don 'Mister'
        desdeñar 'disdain (v)'   desdén 'disdain (n)'

      (Pensado, 1997, p. 595-596; Lloret & Mascaró 2006, p. 77-78)

The examples in (2) show that the ban on palatals is not limited to word-final position, but takes place also in the coda position in which it adopts the point of articulation of the following consonant, rather than a default one (i.e. alveolar).[1] Each term listed in (2a) shows a palatal consonant in onset position, while (2b) contains a morphologically related form with the lateral in the coda position. In preconsonantal coda position (vs. absolute word-final position) palatals share the point of articulation of the following consonant as a way to license point of articulation, rather than adopting a default coronal point of articulation. This allows for the complete articulation of the lateral, while also avoiding a palatal one in the coda.

(2) Depalatalization of [ʎ] and [ɲ] in the coda position in patrimonial words
        a. Onset [ʎ]   coda [l] + C
          bello 'beautiful'   beldad 'beauty'
          caballo 'horse'   cabalgar 'to ride'
          castillo 'castle'   Castilblanco (place)
          valle 'valley'   Valdejimena (place)

        b. Onset [ɲ]   coda [n] + C
          ceñir 'to tighten'   cinto 'girdle'
          plañir 'to cry (v)'   planto 'cry (n)'
          teñir 'to tint (v)'   tinte 'tint (n)'
      (Pensado, 1997, p. 595-596; Lloret & Mascaró 2006, p. 77-78)

Additionally, the process is not limited to patrimonial words, but also affects loans, as can be seen in the examples in (3) which keep an orthographic spelling similar to the language from which there are adapted, but are produced with an alveolar consonant.

(3) Depalatalization in loan words
        a. 'ny' [ɲ] to [n][2]
          Montseny   (all proper names)
          Capmany
          Fortuny
          Montmany
          Jubany
          Montrony

---

[1] Notice that, without the examples in (1), the data in (2) does not necessarily support depalatalization, as it could be the result of place assimilation.

[2] A common alternative to [n] in Catalan borrowings is [ni]. This is reflective of the spelling 'ny'.

b. 'll' [ʎ] to [l]
    Sabadell   (all proper names)
    Maragall
    Coll
    Moll
    Urgell

(Lloret & Mascaró 2006, p. 79)

The examples in (3) demonstrate that palatal nasals and laterals are not permitted in the coda in Spanish. The palatal/alveolar alternation seen in (1) and (2) seems to indicate that at one point the words went through a process of depalatalization. The contrast between *bello* 'beautiful' and *beldad* 'beauty', for instance, shows that when in the coda, the palatal [ʎ] is realized as alveolar [l]. Whether or not the connection can be clearly made between morphologically related words is also a matter of debate (see Harris, 1999 and Lloret & Mascaró, 2006 for differing opinions).

1.2 Previous studies

As previously mentioned, the existence of a depalatalization process as the explanation for the data in section 1.1 has been a matter of debate in Spanish phonology for more than three decades with prominent studies in favor (Contreras 1977, Harris 1983, Lloret & Mascaró 2006) and against (Pensado 1977, Harris 1999).

Contreras (1977) argues that the data in (1)-(3) can be explained through a series of depalatalization rules whereby a palatal nasal or lateral is converted into an alveolar at the end of a word or when followed by a consonant (4a) and (4b).

(4) Nasal and lateral depalatalization (Contreras 1977)
    a. /ɲ/ —> [n] / __ C
      /ɲ/ —> [n] / __]word

    b. /ʎ/ —> [l] / __ C
      /ʎ/ —> [l] / __]word

Following the analysis of Contreras, Harris (1983) also argues in favor of a depalatalization rule. He incorporates syllabic conditions (i.e., the syllable rhyme) in the context of the rule in (5).

(5) Nasal and lateral depalatalization (Harris 1983)

/ɲ, ʎ /→ [n, l]
|
|
R (R = syllable rhyme)

The first to argue against a depalatalization rule was Pensado (1997). She conducted a psycholinguistic study on the realization of palatal nasals and laterals in Spanish in which subjects were given a series of nonce words and asked to derive morphologically related forms. Subjects were presented with a verb or a noun (e.g., *enapillar, enapil*) and were asked to form the plural by adding *–es,* an

adjective by adding the suffix *-oso*, and a past participle by adding *–ado*. Pensado concluded that the results of the study demonstrate that there is no process of depalatalization in modern day Spanish because there are enough cases where the palatal in the base is not depalatalized in the derived nonce form. She explains that while depalatalization may be "surface true", appearing in isolated nonce words and being influenced by previous word forms, it is not morpho-phonologically true (p. 605). However, when considered carefully, the results do not necessarily go against the idea of depalatalization. When given the verb form of the nonce word *enapillar* followed by the noun form *enapil*, subjects were divided on whether the adjective formed by *-oso* should be *enapilloso* (which received 14 responses) or *enapiloso* (which received 17) (601). Furthermore, it appears that the responses were influenced by the last form of the nonce word participants were given. For instance, if the last form presented was *enapilar*, the adjective tended to be *enapiloso*, but if it was *enapillar* the most common answer was *enapilloso*. Another interesting finding was that when participants were asked to create a word for *tratar de don* 'address as sir', *doñear* was chosen by twelve participants, a possible indication that for those participants there is still a clear association between *don* and *doña*.

In the wake of the evidence provided by Pensado, Harris (1999) sets out to debunk his original depalatalization rule. His evidence comes from the fact that, according to him, *desdén* 'disdain (n. sgl.)', *desdenes* 'disdains (n. pl.)', and *desdeñes* 'disdains (v. 2nd sing.)' is the only good example of depalatalization in Spanish. The other clear examples are also what he denotes as "xenonyms" and claims they cannot be part of the analysis. He defines "xenonyms" as loan words (from Latin or other languages) and argues that they must not be included in an analysis because they vary from speaker to speaker and "come and go at the whim of popular culture" (p. 57). Once the vast majority of modern day Spanish examples (the entire set found in example (3) above) have been removed for being xenonyms, Harris contends that depalatalization is not an active process. He explains that *desdén/desdenes* both have an underlying /n/. Examination of the word classes of Spanish reveals that words ending in ill-formed coda consonant or consonant cluster are followed by epenthetic *–e* (e.g., *nub-e* 'cloud', *part-e* 'part'). Therefore, Harris concludes that if the stem-final nasal were palatal, the stem would have an epenthetic *-e*, in which case, the singular should be *desdeñe* and plural *desdeñes*. Since this is not the case, Harris argues that there is no depalatalization rule at work. In order to account for the verb form *desdeñes*, Harris invokes readjustment rules, which he explains "are called upon when a few vocabulary items have similar but phonologically distinct underlying forms the differences among which cannot be attributed to independently motivated phonological rules" (p. 63). His rule for *desdeñes* can be seen in (6) below.

(6) /ɲ/ → /n/ / [[desde___]√]N (cf. desdeñ + a-

                                        desdeñ + os-)

           [[do_____]√]x (cf. doña Elvira)

Within a generative framework, Bermúdez-Otero (2006) also argues that the alternations above are "lexically listed rather than synchronically derived" (288) and sees depalatalization as a principle of allomorph selection in which there is

no common underlier for the allomorphs. This is also the position taken by Eddington (2012) who contends that palatalization is not productive word-internally.

The latest in the series of fully-fledged analyses of depalatalization in Spanish comes from Lloret & Mascaró (2006) who provide a counter argument to Haris (1999) and argue for depalatalization. They base their argument on the fact that /ʎ/ and /ɲ/ are absolutely not allowed in coda or word final position in Spanish, and that the treatment of loan words (to follow the pattern of depalatalization) is enough evidence to suggest that depalatalization is an active process in Spanish. Lloret & Mascaró proceed to provide an Optimality Theory account that is based on the constraints presented in Baković (2001) on neutralization of nasals in Spanish. The key constraints presented are explained in (7).

(7) Main constraints in Lloret & Mascaró (2006)

       a. Identity-Base(Place) (ID-BA (PL)): The place of articulation of the base form should correspond with the place of articulation of the affixed form.

       b. Identity-Onset(Place) (ID-ONS(PL)): The place of articulation of an onset in the input should match the place of articulation of this onset in the output.

       c. Identity-Sonorant(Place) (ID-SON(PL)): The place of articulation of a sonorant in the input should match the place of articulation of this sonorant in the output.

       d. *-COR: based on hierarchy of place markedness, *Labial, *Dorsal >> *Coronal; avoid non-coronal consonants in the coda.

On the basis of Kager (1999), Lloret & Mascaró define the base as "a free-standing output form -- a word", that "...contains a subset of the grammatical features of the derived form" (p. 87). We further define the base as a fully-inflected, independent, morphological word to which no inflectional or derivational morphemes can be added other than those shown to attach at the word level (i.e. plural and adverbial *-mente*). In other words, the base is the output of the lexical phonology (in serial terms).

Through the constraints listed in (7) Lloret & Mascaró account for the data presented in (1)-(3). Their final constraint hierarchy is: ID-BA (PL) >> ID-ONS(PL) >> *-COR >> ID-SON(PL). An example of how this constraint hierarchy functions is provided in (8).

(8)

    a.

desdeɲ (N) *Base*: ---	ID-BA (PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
desdéɲ			*!	
☞ desdén				*

b.

desdeɲ-es (N) *Base*: desdén	ID-BA (PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
desdeɲes	*!		*	
☞ desdenes		*		*

c.

desdeɲes (V) *Base*: ---	ID-BA (PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
☞ desdeɲes			*	
desdenes		*!		*

In (8a) an input with a palatal surfaces as coronal (i.e., depalatalized) because the candidate with a coronal nasal is better than the one with the palatal, since the latter contains a violation of the higher-ranked constraint against palatals (*-COR). ID-BA (PL) is vacuously satisfied because there is no base. In (8b), the top ranked constraint ID-BA (PL), which seeks identity in place with the singular base, prevents the palatal nasal from surfacing in the plural form of the noun, even though the palatal would otherwise be allowed in the onset of a syllable. In (8c), since *desdeñes* (V) does not have *desdén* as its base, ID-BA (PL) is vacuously satisfied and the form with the palatal is selected as the winner. It must be noted that an input with a palatal nasal needs to be considered, since in OT no restrictions can be imposed on the form of the input, according to the postulate known as Richness of the Base (McCarthy 2002). Positing an input with a coronal would of course still result in the selection of the same output (cf. 8a-b and 14 below).

Additional clarification regarding the nature of the base and derivational morphology may be useful here. A denominal verb form such as *desdeñes* does not have a base with a palatal (i.e. it is not derived from a base with a palatal). Although it seems possible that *desdén* could be posited as the base for a denominal verb such as *desdeñ-ar*/*desden-ar*, denominal verbs are not formed on independent words, but on a derivational base without any class markers or suffixes (i.e., *forr-o* 'lining' *forr-ar* 'to cover with lining'; nata 'cream', des-nat-ar 'to remove the cream'[3]). *Desdén* is homophonous with a complete word because it is a class three, consonant-final noun (Harris 1999), thus it needs no word-marker/derivational suffix added to the base to form a complete word; yet, the morphological constituent/level to which -ar is attached is not a word, but a derivational base. The same can be said of morphophonological alternations, such as *mil, millar, piel, pelar*, etc. and therefore ID-BA is satisfied vacuously.

In section 3 we will take the optimality-theoretical proposal and the constraints in Lloret & Mascaró (2006), as defined here, as a point of departure for the diachronic and synchronic analysis proposed.

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[3] In fact, all derivational suffixes in Spanish are attached to the derivational base (Hualde et. al 2010).

2. The historical data

In this section, historical data of the distribution of nasal and lateral palatal consonants is revisited. The data is divided up into two main periods of time, Old Spanish and Medieval Spanish.

2.1 Old Spanish

In Old Spanish there was an alternation between palatals in onset position, and coronals in the coda, as seen in (9).

(9) Old Spanish depalatalization in the coda
    Coda Onset
    mi[l] mi[ʎ]es 'thousand/s'
    pie[l] pie[ʎ]es 'skin/s'
    ca[l]   ca[ʎ]es 'lime/s'
    va[l]   va[ʎ]es 'valley/s'

<div align="right">(Penny, 2002, p.82)</div>

The palatal would also surface across words: when a word-final palatal was followed by a vowel-initial world, it was resyllabified in the onset, giving such examples as *mill omnes (mi[ʎom]nes)* (Penny, 2002, p. 82). However, when the following word began with a consonant, the palatal was depalatalized, e.g., *mil cavallos (mi[l-k]avallos)* (Penny, 2002, p. 82).

The alternations in (9), and most certainly, the patterns of resyllabification explained above, suggest that in Old Spanish depalatalization was an active phonological process. The alternations in the surface form of singular and plural forms of the noun will be revisited in section 3.

2.2 Medieval Spanish

The pattern in Old Spanish gives way in Medieval Spanish to a more generalized depalatalized system: instead of an alternation between palatal and alveolar forms, the singular and plural forms of a noun always agreed in point of articulation, as does a word-final palatal when resyllabified into the onset of a following word. Example (10) shows this new distribution.

(10) Medieval Spanish depalatalization
          Coda   Onset
          mi[l]   mi[l]es 'thousand/s'
          pie[l]   pie[l]es 'skin/s'
          ca[l]   ca[l]es 'lime/s'

  but: ca[ʎ]e   ca[ʎ]es 'street/s'
          va[ʎ]e   va[ʎ]es 'valley/s'

<div align="center">(Penny, 2002, p.82)</div>

It is important to note here that, while the singular and plural form of the noun always agree in point of articulation (both contain a palatal or alveolar), there is disagreement in which allophone was selected. In cases like *piel -- pieles* the alveolar always surfaced; however, in cases like *valle -- valles* the palatal always

surfaced. This is an important piece of evidence that further suggests a depalatalization process. If the singular form was taken to include the *-e* like in *valle*, then the palatal consonant was allowed to remain, and did so in both singular and plural forms. However, if the singular was formed without the *-e*, then the resulting form became alveolar and this was then generalized to the plural as well.

In sum, the evidence provided in this section supports the view that depalatalization was an active phonological process in Old Spanish exhibiting a surface alternation between a palatal and an alveolar allophone within and across the word (i.e., singular/plural and across-the-word resyllabification). The data from Medieval Spanish mimics modern day Spanish, in that the allomorphy between the singular and plural form and in across-the-word resyllabification was levelled in favor of the non-palatal. In section 3 we show that, despite the lack of alternation in patrimonial forms, depalatalization continues to be an active process as revealed by the data and the optimality-theoretic analysis.

3. OT analysis
3.1 Diachronic analysis in OT

For Optimality Theory, the history of a language consists of a diachronic series of synchronic grammars and language change involves a series of re-rankings of the constraint hierarchy (Holt 2003, 2006). Any given sound change can be described as the promotion or demotion of one or more constraints. Once these constraints are re-ranked, the surface form (the output in OT) of a word can also change. Given an absence of surface alternations, speakers may then posit a different underlying form (the input in OT) through a process of Lexicon Optimization which selects as the input the form that most closely resembles the output. With change in the underlying form, additional re-ordering of constraints may take place. Newer listeners are not aware of the changes that were made in the hierarchy; they only learn the new one.

An optimality-theoretic view of language change offers new insights and justification for considering historical data. If there is evidence that depalatalization was an active process at one point in the history of the Spanish language, an account of how the constraints and constraint ranking evolved into the current hierarchy of constraints in present day Spanish may shed light on the current process.

3.2 Old Spanish

The analyses contained in this section builds off the constraints provided by Lloret & Mascaró (2006) (cf. (7) for definitions) for Modern Spanish. As was seen in section 2, the data from Old Spanish suggests that depalatalization happened regularly (i.e. the vacillation between singular *pie[l]* and plural *pie[ʎ]es* forms), and that the constraint ID-BA(PL) was violated, allowing for palatals in the onset of plural forms and in prevocalic word-final position, and alveolars in the coda and preconsonantal word-final position. This suggests that, as it will be shown in (12), in Old Spanish ID-BA(PL)—the antiallomorphy constraint—was lower in the constraint hierarchy than ID-ONS(PL), the constraint responsible for retaining the palatal in the onset. We propose that the constraint ranking responsible for depalatalization in Old Spanish was ID-ONS(PL) >> *-COR >> ID-SON(PL). The singular form of *piel* is shown in (11). ID-BA(PL) is irrelevant at this point.

(11) Word-final depalatalization in Old Spanish (singular)

pieʎ Base: ---	ID-ONS(PL)	*-COR	ID-SON(PL)
pieʎ		*!	
☞ piel			*

The underlying representation of [piel] would have been /pieʎ/, as input /piel/ would make the wrong prediction for the plural (*[pieles]). The resulting output in (11) [piel] exhibits depalatalization due to the need to satisfy the high ranking of the *-COR constraint. Due to the fact that ID-BA(PL) is ranked lower in the hierarchy than ID-ONS(PL) (i.e, dominated by), the plural form seen in (12) does not depalatalize. Note that although ID-BA(PL) is shown at the bottom of the hierarchy in (12), it could also be ranked above *-COR or in between *-COR and ID-SON(PL), as its ranking is lower than ID-ONS(PL), but undetermined with respect to the other three constraints.

(12) No depalatalization in the plural in Old Spanish: antiallomorphy constraint low ranked

pieʎ-es Base: piel	ID-ONS(PL)	*–COR	ID-SON(PL)	ID-BA(PL)
pieles	*!		*	
☞ pieʎes		*		*

3.3 Medieval Spanish

In section 2 it was shown that the allomorphy in singular and plural forms was lost in Medieval Spanish, where the singular and the plural form both began to match in terms of place of the nasal or lateral. This leads to the conclusion that the constraint ID-BA(PL) moved up in the constraint hierarchy to dominate ID-ONS(PL), forming the new hierarchy of ID-BA(PL) >> ID-ONS(PL) >> *-COR >> ID(Son-PL). Example (13) shows that the singular form of /piel/ was unaffected at this stage.

(13) Depalatalization in Medieval Spanish: Highly-ranked antiallomorphy constraint

pieʎ Base: ---	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
pieʎ			*!	
☞ piel				*

On the other hand, the plural form of *piel* was affected by the change in hierarchy found in Medieval Spanish. Example (14) shows this change.

(14) Plural depalatalization in Medieval Spanish

pieʎ-es *Base*: piel	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
☞ pieles		*		*
pieʎes	*!		*	

The high ranking of the ID-BA(PL) constraint caused the depalatalized form [pie-les] to surface in order to match the point of articulation of the singular form, which provided the base for the plural form. This new output of [pieles] entailed a change in the input in the new generations who would not have heard the palatal lateral from other speakers, through a process of Lexicon Optimization. Lexicon Optimization dictates that the learner will eventually opt for the underlying representation that most closely resembles the output (Prince & Smolensky 1993 Inkelas 1995, Jarosz 2006, Krämer 2012, Tesar 2013). In this case, due to the re-ranking of ID-BA(PL), learners would have no evidence of a palatal lateral, because it did not surface in the output, and would therefore posit an alveolar in the underlying representation, thus restructuring it from a palatal to an alveolar. This change in the input can be seen (15).

(15) Depalatalization in Spanish: Input restructuring through Lexicon Optimization

piel-es *Base*: piel	ID-BA(PL)	IDONS(PL)	*-COR	ID(SONPL)
☞ pieles				
pieʎes	*!	*		*

As explained in section 2.2, the *-e* in some plural forms like *calles* was considered part of the base of the singular noun form by speakers of Medieval Spanish when creating the new correspondence relationship between singular and plural forms of nouns. Candidate evaluation for the singular and plural of *calle* can be seen in (16a) and (16b) respectively. Deletion of input /e/ is ruled out by the high-ranking of the anti-deletion constraint MAX.

(16) Plural *-e* reanalyzed as part of the input/ UR

a.

kaʎe *Base*: ---	MAX-IO	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
kaʎ	*!			*	
kal	*!				
☞ kaʎe					

b.

kaʎ-es *Base*: kaʎe	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
☞ kaʎ-es				
kales	*!	*		*

The current account explains the alternations that gave rise to the controversy previously outlined in (1) as morphologically related, lexically listed forms that do not share a common input (e.g. *él 'he', ello 'that'; desdén 'disdain (n)', desdenes 'disdains (n)', desdeñes '(you) disdain, pres. subj.'),* in agreement with previous proposals such as Bermúdez-Otero (2006). The base identity constraint is vacuosly satisfied in these forms, since there is no base-output correspondence, i.e., the verb *desdeñes* is not the base for the noun *desdén* (8c), contrary to what happens with *piel* and *pieles. Desdén* and *desdeñes* have two separate, independent inputs, namely /desDen/ /desDeɲes/; in other words, /desDen/ is not the base for *desdeñes*.

3.4. Synchronic depalatalization

After discussing Spanish depalatalization in Old Spanish and Medieval Spanish, this section revisits synchronic depalatalization. As seen in sections 3.2 and 3.3, depalatalization results in a change in the underlying representation in the subsequent generation. This means that once a form is depalatalized, the subsequent generations have no phonological intuition that the word used to consist of a palatal, and conceptually only interpret the alveolar form. As mentioned above, this also explains the discrepancy seen between the *desdén – desdenes* noun forms and the *desdeñes* verb form. The noun forms underwent the change from Old Spanish where *desdén – desdeñes* (n.sg. – n. pl.) would have existed as noun forms*,* to the new *desdén – desdenes* (n.sg. – n. pl.) in Medieval Spanish. Since the verb does not relate to the singular noun form in the same way that the plural noun form does, the ID-BA(PL) constraint did not apply, allowing for the alternation between *desdenes* (n. pl.) and *desdeñes* (v.).

Along the same lines, newly borrowed and foreign words should follow a similar pattern. This is borne out by the examples in (3) (i.e. *Sabade[ʎ] > Sabade[l]*) where loan words that end in a palatal nasal or lateral that are adapted to Spanish are depalatalized. Using Harris's argument in reverse, we can postulate that if depalatalization did not exist, loan words would be adapted using an epenthetic *-e*; however, this is not the case. In fact, there is solid evidence to support the view that depalatalization is one of several repair mechanisms employed by Modern Spanish to avoid illegal consonants and consonant clusters and that *-e* epenthesis is no longer productive in word-final position in Spanish (Colina 2003, Bonet 2006). Colina (2003, 2009) and Bonet (2006), among others, explain that in earlier stages of the history of Spanish, an ill-formed consonant or consonant cluster was repaired through epenthesis (e.g., *bote* 'boat', *nube* 'cloud', *parte* 'part'), indicating that final epenthesis was active. In Modern Spanish, however, epenthesis is no longer an active process and final *-e* has been restructured as underlying. The current repair mechanism for parsing unsyllabifiable word-final consonants or consonant clusters is deletion or neutralization of various coda features (place of articulation for sonorants and continuancy and voice for obstruents, cf. Colina 2009), as seen in (17) (see Bonet (2006) for additional examples).

(17) a. No word-final epenthesis: obstruents

club	[klú] ~ [klub/β]	*[klube]	'club'
stop	[estó] ~ [stop/β] ~ [estok]	*[estope]	'stop'
chalet	[tʃalé] ~ [tʃaléθ/ð]	*[tʃaléte]	'chalet'
carnet	[karné]~ [karnéθ/ð]	*[karnéte]	'ID'
bistec	[bisté] ~ [bisték]	*[bisteke]	'steak'
frac	[fra] ~ [frak/ɣ]		

b. No word-final epenthesis: sonorants

imam	[imán]	'imam'
album	[álbun]	'album'
Bekham	[békan]	proper name
Maragall	[maraɣál]	proper name

In order to better understand how loan words ending in a palatal nasal or lateral are incorporated into Spanish today, the hierarchy discussed in 3.3 can be applied. To illustrate the process, consider the word *Sabadell [sə.bə.déʎ]* as it is pronounced by a Catalan speaker. The way in which the Spanish speaker goes from the auditory cues to an input that is then used for production is not a trivial matter (related to the formalization of the processing grammar). For now, let us posit that there exist in principle two possible inputs for the loan word *Sabadell*, one with a palatal lateral and one with an alveolar. If the input consists of the palatal lateral in word-final position */sa-ba-deʎ/*, the Spanish speaker would produce the depalatalized alveolar [l], showing the effects of the *-COR constraint. This stage is represented in (18).[4]

(18) Depalatalization in loan words with a palatal input: Singular forms

saBaDeʎ *Base*:---	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
saBaDeʎ			*!	
☞ saBaDel				*

The singular depalatalized form becomes the base for the plural. ID-BA(PL), being high in the hierarchy, forces the plural form to agree with singular form in terms of palatalization, (19).

(19) Depalatalization in loan words a palatal input: Plural forms

saBaDeʎ - es *Base*: saBaDel	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
saBaDeʎes	*!			
☞ saBaDeles		*		*

---

[4] This paper tries to account for auditory input because it is concerned with the phonological grammar (phonological competence). However, one could argue that loans may also enter a language via the written form. Thus, *Sabadell* would likely have *Sabadelles* as its plural. In this case, it is likely that speakers would base their pronunciation on the two separate written forms that reflect the most common pronunciation for the relevant graphemes and contexts, *Sabadell* [saBaDel] *Sabadelles* [saBaDeɟes]. The pronunciation [saBaDeɟes] is likely to reflect the influence of spelling.

Lexicon Optimization would then change the underlying form for speakers that hear the loan word through other speakers of Spanish, and for subsequent generations. This distinction is an important part of the argument here. The newly optimized form for the singular can be seen in (20) and the plural in (21).
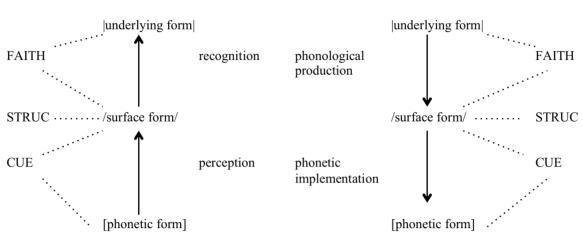
(20) Depalatalization in loan words with an alveolar input: Singular forms

saBaDel *Base*: ---	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
saBaDeʎ			*!	*
☞ saBaDel				

(21) Depalatalization in loan words with an alveolar input: Plural forms

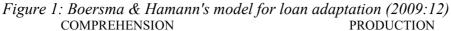| saBaDel - es *Base*: saBaDel	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
saBaDeʎes	*!	*		*
☞ saBaDeles				

As mentioned above, an alternative input to consider is one with an alveolar (rather than a palatal), i.e., /saBaDel/. Positing /saBaDel/ as the input has no bearing on the selection of the output, which would still contain an alveolar lateral in the singular and in the plural. Evaluation would proceed as in (20-21) without Lexicon Optimization.

While the analysis proposed works regardless of the form of the input, input selection is not a trivial matter and it has not been addressed in existing analyses of depalatalization. Positing a palatal input is problematic from the point of view of the learner because of the futility of selecting an input (18-19) that will be immediately changed (i.e, 'optimized') (20-21) on the grounds of lack of surface evidence. On the other hand, an alveolar input requires an explanation as to how the Spanish speaker sets up an alveolar lateral as the input for a palatal form, which requires a more developed analysis of the perception component of depalatalization.

Following Boersma and Hamann (2009), we argue that the underlying representation used for production is related to perception, which is in turn formalized as a bidirectional optimality-theoretic grammar (Figure 1). Boersma and Hamann see loanword adaptation as a mapping of sensory data to an abstract mental representation. In a parallel fashion to production, in which the grammar is the result of the interaction between faithfulness and structural (markedness) constraints, perception is described as the interaction between structural and cue constraints. Cue constraints evaluate the relation between the input of perception (the auditory/phonetic form) and the output of the perception process (the phonological form that represents what is heard), while structural constraints evaluate only the output of the phonological process. Cue constraints play a similar role to that of faithfulness constraints in production in that they evaluate the relation between the input and output of perception.

Figure 1: Boersma & Hamann's model for loan adaptation (2009:12)

Applying the model above to the current analysis, the relevant cue constraint is one that states that "the auditory cues for a palatal should not be heard as alveolar" (*[palatal]/+COR/). Spanish has a coronal/palatal contrast in the onset, but not in the coda, thus the structural constraint against palatal sonorants in the coda (*-COR, cf. 7d) would dominate the cue constraint (*[palatal]/+COR/). In the case of an onset palatal, *Lloret*, the constraint *-COR, which only affects coda sonorants in the coda, is vacuously satisfied and thus a palatal lateral can surface in the onset, [ʎ]*oret*.[5] Selection of the optimal phonological output of perception from the percept [səBəDeʎ] proceeds as shown in (22).

(22) Spanish perception of Catalan palatal sonorants (nasal or lateral)[6]

[səBəDeʎ]	*-COR	*[palatal]/+COR/
/saBaDeʎ/	*!	
☞ /saBaDel/		*

According to (22), the final consonant in *Sabadell* is heard as alveolar and the output of the phonology selected by the perception grammar is (b) /saBaDel/. /saBaDel/ then becomes the input to the production module (23).

(23) Loan adaptation: Output of perception is input for production

a. Singular

/saBaDel/ *Base*: ---	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
[saBaDeʎ]			*!	*
☞ [saBaDel]				

---

[5] It is usually replaced by a palatal obstruent [j] in 'yeista' dialects.

[6] For reasons of space and relevance, we disregard here the issue of the perception of all other segments in the input, i.e., the central vowels in the Catalan input, normally pronounced in Spanish adaptations as low central vowels, and the voiced obstruents.

b. Plural

/saBaDel - es/ *Base*: [saBaDel]	ID-BA(PL)	ID-ONS(PL)	*-COR	ID-SON(PL)
[saBaDeʎes]	*!	*		*
☞ [saBaDeles]				

To summarize, depalatalization is shown to be active in Spanish as a phonological restriction in the adaptation of loan words. The analysis of the historical developments presented reveals that due to input restructuring and constraint re-ranking, there exist no native inputs that depalatalization can apply to and therefore there are no active morphophonological alternations in patrimonial words. The high ranking of ID-BA(PL) has the same effect for singular/plural alternations in borrowed words (23)[7]. New words ending in a palatal nasal or lateral consonant will follow the pattern outlined in (22-23).

4. Conclusion

This article argues in favor of depalatalization in Spanish by incorporating into the analysis data from the history of Spanish and loan word adaptation, including a formalization of perception data. Depalatalization is analyzed in terms of a phonotactic restriction on coda palatals and of Base Identity in the production and perception grammar (pro Lloret & Mascaró 2006; contra Pensado 1997, Harris 1999, Bermúdez-Otero 2006 and Eddington 2012). In the perception grammar, a cue constraint is also relevant. Depalatalization has been active since Old Spanish when palatals were only depalatalized in the coda or word-final position, except before a word beginning in a vowel, in which case the palatal would be resyllabified to the onset of the following syllable and maintained. A change occurred in the ranking of the constraints affecting depalatalization in Medieval Spanish, where ID-BA(PL), rose in the hierarchy. Consequently, all allomorphs agree in place of articulation. In the case of words like *piel*, the alveolar form became the base and singular and plural forms both were realized as alveolar. The resyllabified consonant was also realized as an alveolar. Another outcome was the maintenance of the palatal, which can be found in words like *valle* where the base form included the -*e* and therefore allowed the palatal to be maintained. The underlying representations of these words were restructured by subsequent generations, given that these generations no longer had the phonological knowledge that the consonant was at one point a palatal. As a result, there are no morphophonological alternations involving palatal vs. alveolar sonorants (yet there is an active process of depalatalization in the coda). Harris (1999) was correct: there are no input palatals *in the native lexicon* to which depalatalization can apply because if there were, they would have been followed by –*e*, like *calle*. In other words, forms like *desdén* (n) and *desdeñes* (v.) are morphophonogically related, but listed separately in the lexicon (i.e. are not derived from a common input/base) and thus Base Identity has no relevance for them (contra Pensado 1997, Harris 1999, Bermúdez-Otero 2006, Lloret and Mascaró 2006 and Eddington 2012).

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[7] Lloret & Mascaró (2006) list the gentilic *sabadellense* 'from Sabadell'. Note that this cannot be taken as evidence of an underlying palatal since many gentilic forms are suppletive. Furthermore, *sabadellense* indicates a written source for the loan and its pronunciation is likely influenced by the spelling (cf. also footnote 4).

Despite the absence of active morphophonological alternations, the effects of depalatalization can be observed in loan words, formalized in the perception grammar as the domination of a phonotactic restriction on coda palatals (*-COR) over a cue constraint *[palatal]/+COR/.

Optimality theory highlights the relevance of a historical analysis to support and complement the synchronic analysis. It is well known that diachronic change consists of a set of synchronic grammars, each differing slightly from the last; in optimality-theoretic terms, grammars change through constraint re-ranking and input restructuring (Holt 2003; Holt 2006, among many others). An optimality-theoretic framework can shed light on how past re-ranking and restructuring of inputs led to the synchronic constraint hierarchy and underlying representations. This paper exemplifies the value of optimality-theoretical historical analysis in understanding the synchronic phenomenon of palatal/alveolar apparent alternations. OT also allows for a formalization of the perception grammar, crucial for understanding the relevance of loan word evidence and how loans are incorporated by native speakers into their grammar. Loan word evidence has been rejected by some phonologists as irrelevant to depalatalization (Harris 1999) and used as an argument for it by others (Lloret & Mascaró 2006); however, proposals that include loanwords do not offer a discussion of how the native grammar treats these loans and or how speakers decide what the input should be for a loan. The current study offers a contribution in that area, integrating loan word adaptation into the analysis and offering a way to formalize within a theoretic perception grammar. The optimality-theoretic analysis highlights why depalatalization appears inactive when considering only patrimonial words and demonstrates that the modern loan words are subject to the same constraint ranking as native forms.

Ryan M. Bessett
University of Arizona
1423 E. University Blvd.
Modern Languages Building Rm. 545
Tucson, AZ 85721
(520)621-3123
rbessett@email.arizona.edu

Sonia Colina
University of Arizona
1423 E. University Blvd.
Modern Languages Building Rm. 554
Tucson, AZ 85721
(520)621-3798
scolina@email.arizona.edu

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