The Inadequacy of a Faithfulness-Based Approach to Spanish Secondary Stress

Brett Hyde and Bethany McCord
Washington University

The secondary stress pattern of Spanish occupies a key position in current debates in metrical stress theory. It is one of the patterns potentially capable of discriminating between accounts where distance-sensitive alignment constraints play a central role (McCarthy and Prince 1993, Gordon 2002, Hyde 2002) and accounts where they play a more restricted role (Alber 2005) or no role at all (Kager 2001, 2005; McCarthy 2003; Buckley 2009).

Distance-insensitive alignment constraints simply distinguish between alignment and misalignment, preferring the former. Distance-sensitive alignment constraints distinguish between different degrees of misalignment, preferring smaller degrees of misalignment to greater degrees of misalignment. To illustrate, consider the constraints ALL-FEET-Left, which is always taken to be distance-sensitive, and PRWD-LEFT, which is often taken to be distance-insensitive.

(1) a. ALL-FEET-LEFT: The left edge of every foot coincides with the left edge of some prosodic word.

b. PRWD-LEFT: The left edge of every prosodic word coincides with the left edge of some foot.

In the tableau in (2), there is a single foot in each candidate exhibiting different degrees of misalignment with the left edge of the prosodic word. ALL-FEET-LEFT is satisfied when the foot occurs at the left edge of the prosodic word, as in (2a), and it is violated as the foot moves away from the left edge, as in (2b-e). As the degree of misalignment increases, however, the number of violation marks assessed also increases. PRWD-LEFT is also satisfied when the foot occurs at the left edge and violated as it moves away from the left edge. In contrast to ALL-FEET-LEFT, however, the violations assessed by PRWD-LEFT do not increase with greater degrees of misalignment. All degrees of misalignment are equal.

(2)

	ALL-FEET-LEFT	PRWD-LEFT
a. [(σσ)σσσσ]		
b. [σ(σσ)σσσ]	*	*
c. [σσ(σσ)σσ]	**	*
d. [σσσ(σσ)σ]	***	*
e. [σσσσ(σσ)]	****	*

Distance-sensitive constraints like ALL-FEET-LEFT are more powerful than distance-insensitive constraints like PRWD-LEFT in that they can make finer-grained distinction. ALL-FEET-LEFT can influence the position of misaligned feet, insisting that a foot occur two syllables away from the left edge rather than three, for example. In contrast, PRWD-LEFT cannot influence the positions of misaligned feet; it can only insist on exact alignment. While it has been influentially argued that the power of distance-sensitive

alignment is unnecessary (Kager 2001, 2005; McCarthy 2003; Buckley 2009), the Spanish secondary stress pattern provides a clear counterexample.

Primary stress in Spanish appears regularly on the penultimate syllable and exceptionally on the antepenult or ultima.[1] Given the position of primary stress, the positions of secondary stress are predictable. In words with two or more syllables preceding the primary stress, a secondary stress will appear on the initial syllable and on every even-numbered syllable counting leftward from the primary stress except the peninitial syllable. In words with an odd number of syllables preceding the primary stress, the result is a lapse just following the initial stress.[2]

(3)
a. 1 syllable before primary
burócrata
histórico
b. 2 syllables before primary
màtemático
nàturál
c. 3 syllables before primary
gèneratívo
gràmaticál
nàturalísta
ràcionalísta
d. 4 syllables before primary
bùrocràtizár
hìstorìcidád
e. 5 syllables before primary
bùrocratìzación
gràmaticàlidád
màtematìcidád
nàturalìzación
ràcionalìzación

The existence of the Spanish "initial dactyl" pattern illustrated in (3) has been the subject of much discussion in the recent literature. The controversy has arisen primarily because the Spanish pattern cannot be produced by two recent influential accounts. Rhythmic Licensing (Kager 2001, 2005; see also McCarthy 2003, Buckley 2009) does not predict initial dactyl patterns where the lapse occurs between secondary stresses, as it often does in Spanish, and Asymmetrical Alignment (Alber 2005) does not predict initial dactyl patterns in longer forms at all. As we shall see below, the cause of the discrepancy is that the two accounts both lack a key distance-sensitive alignment constraint.

Proponents of Asymmetrical Alignment and Rhythmic Licensing have sought to justify the discrepancy. The main line of argument is that the Spanish initial dactyl pattern is dependent on morphology. Kager (2001) claims, for example, citing Roca (1986), that initial dactyls arise only when a word that would otherwise have initial secondary stress occurs after a clitic (e.g. *èl constantìnopléño*; cf. *cònstantìnopléño*). The existence of the forms in (3) refute this claim, of course, but it might still be argued that the initial dactyl pattern arises only under the influence of affixation—in other words, that the pattern arises only though preservation of a base stress pattern or through minimal modification of the base pattern in order to accommodate an affix. There are several reasons that this line of argument would also be unsuccessful. First, the distribution of secondary

[1] Though primary stress is typically penultimate, it can appear on the antepenult or ultima due to the influence of syllable weight, morphology, and other considerations. These issues need not concern us here.

[2] According to Harris (1983), Spanish has two stress patterns: a unidirectional 'rhetorical' pattern where secondary stresses occur on alternate syllables preceding the primary stress, and a bidirectional 'colloquial' pattern that results in initial dactyls in odd-parity forms. The forms in (3), as well as the toponyms mentioned below, are examples of the latter. They were either confirmed or supplied by native speakers from Mexico City and surrounding areas.

stress in Spanish is completely predictable based on the number of syllables preceding the primary stress. As we shall see in examining the standard Symmetrical Alignment (McCarthy and Prince 1993) account below, the pattern can easily be produced with basic directional parsing mechanisms. Appealing to a morphological influence only makes the analysis unnecessarily complex and opaque. Second, the initial dactyl pattern emerges in morphologically simple forms, such as the toponyms *Tègucigálpa*, *Tròmpipendécuaro*, and *Tlàtlauquìtepéc*. (In *Tlàtlauquìtepéc*, the adjacent /a/ and /u/ are heterosyllabic: *Tlà.tla.u.quì.te.péc*.). There can be no appeal to the influence of affixation in these cases. Finally, even for morphologically complex forms, it appears that no coherent account based on affixation is possible.[3] The purpose of this paper is to illustrate this final point.

The paper proceeds as follows. In Section 1, we examine the ability of three accounts—Symmetrical Alignment, Asymmetrical Alignment, and Rhythmic Licensing—to produce the Spanish secondary stress pattern. While Symmetrical Alignment employs the distance-sensitive constraints necessary to produce the initial dactyl pattern in all appropriate forms, Asymmetrical Alignment and Rhythmic Licensing are only capable of producing the pattern in shorter forms. In Section 2, we examine an Output-Output Faithfulness (Benua 1997) account that takes the potential influence of affixation into account. While the Faithfulness approach works in many contexts, it fails to produce the desired pattern in key cases.

1 Three Directional Parsing Approaches

In this Section, we compare the ability of the Symmetrical Alignment, Asymmetrical Alignment, and Rhythmic Licensing accounts to produce the Spanish initial dactyl pattern. All three accounts are Weak Layering (Itô and Mester 1992) approaches in that they allow the same two options for dealing with the leftover syllable of odd-parity forms. The leftover syllable can remain unparsed, as in (4a), or it can be parsed as a monosyllabic foot, as in (4b).

(4) a. Unparsed syllable (σσ)(σσ)(σσ)σ b. Monosyllabic foot (σσ)(σσ)(σσ)(σ)

Whether the leftover syllable remains unparsed or is parsed as a monosyllabic foot is determined by the relative ranking of the PARSE-SYLLABLE and FOOT-BINARITY constraints, given in (5).

(5) a. PARSE-SYLLABLE: Every syllable is parsed into a foot.
b. FOOT-BINARITY: Every foot is binary (either disyllabic or bimoraic).

When FT-BIN dominates PARSE-SYLL, the leftover syllable remains unparsed. When PARSE-SYLL dominates FT-BIN, the leftover syllable is parsed as a monosyllabic foot.

The position of the unparsed syllable or monosyllabic foot in an odd-parity form is determined by the constraints that the three accounts use to produce directional parsing

[3] Roca (1986) argues that primary stress is lexical and secondary stress postlexical. Suffixation directly affects the position of primary stress, then, but not the position of secondary stress. The grammar does not position secondary stresses until after suffixation is already complete.

effects. It is in this respect that the accounts differ. As we shall see in the discussion that follows, Symmetrical Alignment's reliance on distance-sensitive alignment allows it to produce the Spanish initial dactyl pattern. The absence of the key distance-sensitive constraint in Asymmetrical Alignment and Rhythmic Licensing prevents them from producing the Spanish pattern in longer forms.

1.1 Symmetrical Alignment

In addition to PARSE-SYLL and FT-BIN, the Symmetrical Alignment account employs the two distance-sensitive alignment constraints in (6) and the two distance-insensitive alignment constraints in (7) to produce directional parsing effects.

(6) a. ALL-FEET-LEFT: The left edge of every foot coincides with the left edge of some prosodic word.

b. ALL-FEET-RIGHT: The right edge of every foot coincides with the right edge of some prosodic word.

(7) a. PRWD-LEFT: The left edge of every prosodic word coincides with the left edge of some foot.

b. PRWD-RIGHT: The right edge of every prosodic word coincides with the right edge of some foot.

The distance-sensitive ALL-FEET-LEFT and ALL-FEET-RIGHT are responsible for establishing general directional orientations for feet. When high-ranked, ALL-FEET-LEFT draws every foot in a form towards the left edge of the prosodic word, and ALL-FEET-RIGHT draws every foot towards the right edge. The distance-insensitive PRWD-LEFT and PRWD-RIGHT are responsible for creating exceptions to general directional orientations. PRWD-LEFT anchors a single foot at the left edge of the form, and PRWD-RIGHT anchors a single foot at the right edge.

To produce the Spanish pattern, Symmetrical Alignment employs both the distance-insensitive PRWD-LEFT and the distance-sensitive ALL-FEET-RIGHT. As (8) indicates, the higher-ranked PRWD-LEFT anchors a single foot at the left edge of the form, while the lower-ranked ALL-FEET-RIGHT draws the remaining feet to the right edge. The resulting configuration yield the desired initial dactyl pattern.

(8)

	PRWD-LEFT	ALL-FEET-RIGHT
☞ w. (ὸσ)σ(ὸσ)(ό́σ)		7
a. (ὸσ)(ὸσ)σ(ό́σ)		8 W
b. (ὸσ)(ὸσ)(ό́σ)σ		9 W
c. σ(ὸσ)(ὸσ)(ό́σ)	1 W	6 L

Notice that the distance-sensitivity of ALL-FEET-RIGHT is crucial in (8) in determining the position of the medial foot. If ALL-FEET-RIGHT could not minimize the medial foot's degree of misalignment, insisting that it occur two syllables away from the right edge, as in (8w), rather than three syllables away, as in (8a), the desired optimal candidate would not emerge as the winner.

To locate primary stress in its default penultimate position, Symmetrical Alignment need only align the head foot to the right, ensuring that the head foot is the final foot. To locate primary stress in exceptional positions, additional constraints would be required, but these need not concern us here.

1.2 Asymmetrical Alignment

The Asymmetrical Alignment account employs the alignment constraints in (9) and the rhythmic well-formedness constraints in (10) to create directional parsing effects.

(9) a. ALL-FEET-LEFT: The left edge of every foot coincides with the left edge of some prosodic word.

b. LEFTMOST: The left edge of every prosodic word coincides with the left edge of some head foot.

c. RIGHTMOST: The right edge of every prosodic word coincides with the right edge of some head foot.

(10) a. *CLASH: Stressed syllables are not adjacent.

b. *LAPSE: Stressless syllables are not adjacent.

One key difference between Asymmetrical Alignment and Symmetrical Alignment in this context is that the distance-insensitive constraints responsible for creating exceptions to general directional orientations, LEFTMOST and RIGHTMOST, apply only to head feet. While Asymmetrical Alignment can anchor a single foot at either edge of the prosodic word, it must be the head foot. Asymmetrical Alignment cannot anchor a non-head foot, as required for Spanish. A second key difference is the absence of ALL-FEET-RIGHT from the constraint set. While ALL-FEET-LEFT is present, ALL-FEET-RIGHT is not. This prevents Asymmetrical Alignment from drawing medial feet towards the right edge to create the configuration that results in initial dactyls in longer forms.

As (11) demonstrates, Asymmetrical Alignment is capable of producing the initial dactyl pattern in five-syllable forms with the ranking RIGHTMOST >> ALL-FEET-LEFT >> *LAPSE. The higher ranked RIGHTMOST anchors the head foot at the right edge of the form, and the lower-ranked ALL-FEET-LEFT draws the remaining foot to the left.

(11)

	RIGHTMOST	ALL-FEET-LEFT	*LAPSE
☞ w. (ὸσ)σ(ό́σ)		3	1
a. σ(ὸσ)(ό́σ)		4 W	L
b. (ὸσ)(ό́σ)σ	1 W	2 L	1

Notice, however, that the constraints employed in (11) have the opposite directional specifications of the constraints employed by Symmetrical Alignment. As might be expected, they produce the wrong result in longer forms. In a seven-syllable form, as (12) demonstrates, it becomes necessary to correctly position a medial foot, and ALL-FEET-LEFT draws it towards the left edge, rather than towards the right as required for Spanish. The desired optimum fails to emerge as the winner.

(12)

	RIGHTMOST	ALL-FEET-LEFT	*LAPSE
w. (ὸσ)σ(ὸσ)(ό́σ)		8	1
☞ a. (ὸσ)(ὸσ)σ(ό́σ)		7 L	1
b. σ(ὸσ)(ὸσ)(ό́σ)		9 W	L
c. (ὸσ)(ὸσ)(ό́σ)σ	1 W	6 L	1

To correctly position the medial foot in this circumstance, the Asymmetrical Alignment approach would have to include the distance-sensitive ALL-FEET-RIGHT in the constraint set. Since it lacks ALL-FEET-RIGHT, it cannot produce the Spanish initial dactyl pattern in longer forms.

1.3 Rhythmic Licensing

The Rhythmic Licensing account abandons distance-sensitive alignment constraints altogether, employing only the distance-insensitive PRWD-LEFT and PRWD-RIGHT from the Symmetrical Alignment account. Like Asymmetrical Alignment, it employs the rhythmic well-formedness constraints, *CLASH and *LAPSE, but it also employs the constraints in (13), which license lapse in prominent positions.

(13) a. *LAPSE-IN-TROUGH: No lapse occurs between secondary stresses.

b. LAPSE-AT-END: Lapse must be adjacent to the right edge.

With its distance-insensitive alignment constraints, Rhythmic Licensing can produce an initial dactyl pattern in five-syllable forms. As (14) demonstrates, it can use PRWD-LEFT to ensure that one foot occurs at the left edge and PRWD-RIGHT to ensure that another foot occurs at the right edge. The result is a lapse resulting in an initial dactyl.

(14)

	PRWD-L	PRWD-R	*LAPSE	LAPSE-AT-END
☞ w. (ὸσ)σ(ό́σ)			1	1
a. σ(ὸσ)(ό́σ)	1 W		L	L
b. (ὸσ)(ό́σ)σ		1 W	1	L

In longer forms, however, where it is necessary to correctly position a medial foot, Rhythmic Licensing can only create an initial dactyl pattern if the head foot is initial. As (15) demonstrates using a seven-syllable form, if the head foot is initial, *LAPSE-IN-TROUGH ensures that the lapse occurs next to the primary stress. This has the effect of pushing medial feet to the right, resulting in an initial dactyl. Note that the ranking of *LAPSE-IN-TROUGH is not crucial to achieve this result. It just has to be present in the constraint set.

(15)

	PrWd-L	PrWd-R	*Lapse	Lps-End	*Lps-Trgh
☞ w. (σ́σ)σ(σ̀σ)(σ̀σ)			1		1
a. (σ́σ)(σ̀σ)σ(σ̀σ)			1		1 W
b. σ(σ́σ)(σ̀σ)(σ̀σ)	1 W		L	1 L	
c. (σ́σ)(σ̀σ)(σ̀σ)σ		1 W	1	1 L	

As (16) demonstrates, however, if the head foot is final, as it must be for Spanish, the initial dactyl pattern fails to emerge. *Lapse-in-Trough again ensures that the lapse occurs next to the primary stress. In this case, it has the effect of pushing medial feet to the left. The lapse occurs in the wrong position, and desired optimum fails to emerge as the winner.

(16)

	PrWd-L	PrWd-R	*Lapse	Lps-End	*Lps-Trgh
w. (σ̀σ)σ(σ̀σ)(σ́σ)			1		1
☞ a. (σ̀σ)(σ̀σ)σ(σ́σ)			1		L
b. σ(σ̀σ)(σ̀σ)(σ́σ)	1 W		L	1 L	L
c. (σ̀σ)(σ̀σ)(σ́σ)σ		1 W	1	1 L	L

Like Asymmetrical Alignment, then, Rhythmic Licensing lacks the distance-sensitive alignment constraints necessary to produce the Spanish initial dactyl pattern in longer forms.

1.4 Interim Summary

To this point, then, we have examined the ability of three accounts to produce the Spanish initial dactyl pattern. The Symmetrical Alignment account, which employs the key distance-sensitive alignment constraint, All-Feet-Right, successfully produces the Spanish pattern. The Asymmetrical Alignment and Rhythmic Licensing accounts, which lack the key distance-sensitive constraint, fail to produce the Spanish pattern in longer forms.

For Asymmetrical Alignment and Rhythmic Licensing to remain viable alternatives to Symmetrical Alignment, then, it is necessary to show that the Spanish pattern can be produced by means other than basic directionality effects. We consider a type of cyclic approach based on Output-Output Faithfulness in the next section.

2 A Faithfulness Approach

At first glance, Output-Output Faithfulness appears to be a good candidate for producing the Spanish initial dactyl pattern in longer forms, as it clearly plays a role in certain contexts. In the case of *–mente* affixation, for example, the stress pattern of the base is clearly preserved at the expense of clash avoidance. When *–mente* attaches to a base, the primary stress shifts to the initial syllable of the affix, but the stress pattern of the base is otherwise preserved. This is true even if the result is a clash configuration, as in (17).

(17)

Base Output	Derived Output
(nàtu)(rál)	(nàtu)(rál)(ménte)

We can account for this situation if OO-FAITH-X_F, given in (18), and the constraints that position primary stress dominate *CLASH.

(18) OO-FAITH-X_F: Every foot-level grid entry present in the base output occurs in the same position in the derived output.

In (19), we use primary PRIMARY STRESS to represent the constraints that result in the correct placement of primary stress in Spanish. PRIMARY STRESS excludes the candidate where primary stress fails to shift to penult, and OO-FAITH-X_F eliminates the candidate where the final stress of the base is omitted. Candidate (19w), where a clash arises between the primary stress and the stress on the base-final syllable, correctly emerges as the winner.

(19) Base output: *nàturál* Derived output: *nàturàlménte*

natural + mente	PRIMARY STRESS	OO-FAITH-X_F	*CLASH
x x x ☞ w. (natu)(ral)(mente)			1
x x a. (natu)ral(mente)		W 1	L
x x b. (natu)(ral)mente	W 1		L

Despite its initial promise, however, a closer examination reveals that Output-Output Faithfulness is inadequate as a replacement for distance-sensitive alignment for producing the Spanish pattern. As we shall see next, OO-FAITH-X_F can preserve initial dactyls that are already present in the base in some contexts. In other contexts, however, it is necessary to modify the stress pattern of the base in violation of OO-FAITH-X_F to produce the desired pattern. Sometimes alternatives to distance-sensitive alignment, such distance-insensitive alignment or clash avoidance, are adequate to produce the necessary modifications. In key cases, however, they prove to be inadequate. It is also worth noting that clash is not tolerated with most affixes as it is under *–mente* affixation, making it necessary to assume distinct rankings for the two different contexts.

2.1 Three Cases where the Faithfulness Analysis Succeeds

There are three types of cases where a Faithfulness-based analysis is sufficient to produce the Spanish pattern in longer, morphologically complex forms. In the first type, illustrated in (20a), OO-FAITH-X_F merely preserves an initial dactyl created by distance-insensitive constraints in shorter bases. In the remaining types, however, the stress pattern of the base must be modified to produce the desired pattern. Since these types do not involve influencing the position of a medial foot, distance-sensitive alignment is unnecessary. In the second type, illustrated in (20b), a medial foot is simply omitted for the purposes of clash avoidance. In the third type, illustrated in (20c), a peripheral foot is shifted leftward.

(20)

	Base Output	Derived Output
a.	(gràma)ti(cál)	(gràma)ti(càli)(dád)
b.	(nàtu)(rál)	(nàtu)ra(lísta)
c.	his(tóri)co	(hìsto)(rìci)(dád)

We consider each of these cases in fuller detail in the discussion that follows.

As noted in Section 1, distance-insensitive alignment is sufficient to create an initial dactyl in Spanish when only three syllables precede the primary stress, as in *gràmaticál*. When affixation positions the primary stress where it would not result in clash with the base-final stress, as in *gràmaticàlidád*, all that is needed to produce the desired initial dactyl in the derived form is to position primary stress correctly and otherwise preserve the base's stress pattern. In this case, as (21, 22) demonstrate, a high-ranking PRIMARY STRESS and OO-FAITH-x_F are sufficient to achieve the desired result. In the Asymmetrical Alignment account, as indicated in (21), PRIMARY STRESS and OO-FAITH-x_F would have to dominate ALL-FEET-LEFT to prevent the medial foot from being drawn to the left.

(21) Base output: *gràmaticál* Derived output: *gràmaticàlidád*

gramatical + idad	PRIM STRESS	OO-FAITH-x_F	ALL-FEET-LEFT
x x x ☞ w. (grama)ti(cali)(dad)			8
x x x a. (grama)(tica)li(dad)		W 1	L 7
x x b. (grama)ti(cali)dad	W 1		L 3

In the Rhythmic Licensing account, as indicated in (22), PRIMARY STRESS and OO-FAITH-x_F would have to dominate *LAPSE-IN-TROUGH to prevent the lapse from occurring next to the primary stress.

(22) Base output: *gràmaticál* Derived output: *gràmaticàlidád*

gramatical + idad	PRIM STRESS	OO-FAITH-x_F	*LAPSE-TROUGH
x x x ☞ w. (grama)ti(cali)(dad)			1
x x x a. (grama)(tica)li(dad)		W 1	L
x x b. (grama)ti(cali)dad	W 1		L

The second case in which distance-sensitive alignment is unnecessary is when OO-FAITH is minimally violated for clash avoidance, resulting in the omission of a medial foot. When primary stress falls on the initial syllable of an affix, such *–ista*, that has been attached to a three-syllable base with final stress, such as *nàturál*, removing the

base-final stress results in the desired initial dactyl pattern in the derived form. In the case of *nàturalísta*, as (23) demonstrates, the base output, *nàturál*, has only two syllables before the primary stress, so it emerges without an initial dactyl. To produce the desired initial dactyl in the derived output, *CLASH and PRIMARY STRESS must both dominate OO-FAITH-X_F and PARSE-SYLL so that the final stress of the base output, and the foot that supports it, are omitted.

(23) Base output: *nàturál* Derived output: *nàturalísta*

natural + ista	PRIM STRESS	*CLASH	OO-FAITH-X_F	PARSE
x x x x ☞ w. (natu)ra(lista)			1	1
x x x a. (natu)(ra)(lista)		W 1	L	L
x x x x b. (natu)(ra)lista	W 1		L	W 2

While the ranking *CLASH >> OO-FAITH-X_F produces the desired result in this case, note that in the case of *–mente* affixation, discussed above, the opposite ranking is required. In the worst case, this means that there is a ranking conflict, and the analysis is simply impossible. In the best case, it means that different rankings are necessary for different types of affixes.

The final case where distance-sensitive alignment is not required is when it is only necessary to influence the position of a peripheral foot to produce the desired pattern. In the base form *histórico*, for example, primary stress occurs exceptionally on the antepenult, leaving both the initial and final syllables unparsed. When the affix *–idad* is attached in the derived *hìstorìcidád*, the primary stress must shift, making it possible for a constraint that dominates OO-FAITH-X_F to influence the position of the foot in the base. In the Asymmetrical Alignment account, the higher-ranked constraint could only be PARSE-SYLL. In the Rhythmic Licensing account, the higher-ranked constraint could be either PARSE-SYLL or PRWD-LEFT.

As (24) demonstrates, once it is established that the primary stress cannot remain in its base position, a PARSE-SYLL constraint that dominates OO-FAITH-X_F is free to adjust the footing of the base to achieve exhaustive parsing.

(24) Base output: *histórico* Derived output: *hìstorìcidád*

historic + idad	PRIMARY STRESS	PARSE-SYLL	OO-FAITH-X_F
x x x ☞ w. (histo)(rici)(dad)			1
x x a. his(tori)ci(dad)		W 2	L
x x b. his(tori)cidad	W 1	W 3	L

In the Rhythmic Licensing account, as (25) demonstrates, a high-ranked PRWD-LEFT might draw the base foot to the left edge, leaving the penult and ultima free to form a new foot at the insistence of PARSE-SYLL. Note that the ranking of PARSE-SYLL with respect to OO-FAITH-X_F is not crucial in this case.

(25) Base output: *histórico* Derived output: *hìstorìcidád*

historic + idad	PRIM STRESS	PRWD-L	OO-FAITH-X_F	PARSE
x x x ☞ w. (histo)(rici)(dad)			1	
x x a. (histo)rici(dad)			1	W 2
x x b. his(tori)ci(dad)		W 1	L	W 2
x x c. his(tori)cidad	W 1	W 1	L	W 3

There are several cases then when a faithfulness analysis is adequate to produce the Spanish secondary stress pattern, either through preservation of the base pattern or minimal modification of the base pattern under the influence of clash avoidance or distance-insensitive alignment. We turn now to a case where faithfulness is inadequate and distance-sensitive alignment is necessary to produce the desired result.

2.2 A Case where the Faithfulness Analysis Fails

Distance-alignment was not necessary with the use of OO-FAITH-X_F in the cases discussed above, since it was not necessary to influence the position of a medial foot. The case we turn to next, however, does require the analysis to influence the position of a medial foot. In the base form *màtemático*, for example, primary stress occurs exceptionally on the antepenult and the there is an initial secondary stress. There is no initial dactyl. In the derived form *màtematìcidád*, however, the medial foot has shifted to the right from its base position, and there is an initial dactyl.

As (26, 27) demonstrate, OO-FAITH-X_F is not the answer here. The stress pattern of the base is not preserved. Neither is minimal modification of the base through the constraints of Asymmetrical Alignment or Rhythmic Licensing the answer. Each of these constraints is best satisfied when the base feet occupy their original positions in the derived output. The faithful candidate would harmonically bound the desired candidate, making it impossible for Asymmetrical Alignment or Rhythmic Licensing to produce the desired result.

As the tableau in (26) demonstrates for the Asymmetrical Alignment account, the faithful candidate performs better than the desire candidate with respect to both OO-FAITH-X_F and ALL-FEET-LEFT. The faithful candidate performs better than the desired candidate on OO-FAITH-X_F because it maintains the positions of stress from the base output. It performs better on ALL-FEET-LEFT because the medial foot occurs closer to the left edge.

(26) Base output: *màtemático* Derived output: *màtematìcidád*

matematic + idad	OO-FAITH-x_F	ALL-FEET-LEFT
x x x w. (mate)ma(tici)(dad)	1	8
x x x ☞ l. (mate)(mati)ci(dad)	L 7	L

As the tableau in (27) demonstrates for the Rhythmic Licensing account, the faithful candidate performs better than the desired candidate with respect to both OO-FAITH-x_F and *LAPSE-IN-TROUGH. The faithful candidate performs better than the desired candidate on OO-FAITH-x_F because it maintains the positions of stress from the base output. It performs better on *LAPSE-IN-TROUGH because its lapse does not occur between secondary stresses.

(27) Base output: *màtemático* Derived output: *màtematìcidád*

matematic + idad	OO-FAITH-x_F	*LAPSE-IN-TROUGH
x x x w. (mate)ma(tici)(dad)	1	1
x x x ☞ l. (mate)(mati)ci(dad)	L	L

In this case, as (28) demonstrates, the key distance-sensitive alignment constraint from the Symmetrical Alignment account, ALL-FEET-RIGHT, is still required. Only a distance-sensitive constraint like ALL-FEET-RIGHT can insist that the medial foot occur one syllable away from the right edge rather than two, a result necessary to produce the desired pattern.

(28) Base output: *màtemático* Derived output: *màtematìcidád*

matematic + idad	PRWD-LEFT	ALL-FEET-RIGHT	OO-FAITH-x_F
x x x ☞ w. (mate)ma(tici)(dad)		7	1
x x x l. (mate)(mati)ci(dad)		W 8	L

Even with the assistance of OO-FAITH-x_F in morphological complex forms, then, the constraints of Asymmetrical Alignment and Rhythmic Licensing are inadequate to produce the Spanish secondary stress pattern. A key distance-sensitive alignment constraint, ALL-FEET-RIGHT, is still required. Of course, with ALL-FEET-RIGHT in the constraint set, it is unnecessary to consider morphological complexity or the involvement of OO-FAITH-x_F in the first place.

3 Summary and Conclusions

The secondary stress pattern of Spanish occupies a key position in current debates in metrical stress theory, as it is one of the patterns that discriminates between accounts where distance-sensitive alignment constraints play a central role and accounts where they play a more restricted role or no role at all. In this paper, we examined the ability of three accounts to produce the Spanish initial dactyl pattern. Because it employs the key distance-sensitive alignment constraint, ALL-FEET-RIGHT, Symmetrical Alignment successfully produces the Spanish pattern. Because they lack the key distance-sensitive alignment constraint, Asymmetrical Alignment and Rhythmic Licensing fail to produce the Spanish pattern in longer forms.

For Asymmetrical Alignment and Rhythmic Licensing to remain viable alternatives to Symmetrical Alignment, then, it is necessary to show that the Spanish pattern can be produced by means other than basic directionality effects. One possible option is to produce the pattern by taking the influence of affixation into account through a type of cyclic derivational process. Although this option does not appear to be viable either—the Spanish initial dactyl pattern emerges in morphologically simple forms—we considered the possibility of an Output-Output Faithfulness analysis for morphologically complex forms. Although the Output-Output analysis is successful in a number of circumstances, it fails in the key case where it is necessary to influence the position of medial foot. Even with the assistance of OO-FAITH-X_F, then, Asymmetrical Alignment and Rhythmic Licensing are inadequate for producing the Spanish secondary stress pattern in morphologically complex forms.

References

Alber, Birgit. 2005. Clash, lapse, and directionality. *NLLT* 23, 485-542

Benua, Laura. 1997. Transderivational identity: phonological relations between words. Doctoral dissertation, University of Massachusetts, Amherst. ROA-259.

Buckley, Eugene. 2009. Locality in metrical typology. *Phonology* 26, 389-435.

Gordon, Matthew. 2002. A factorial typology of quantity-insensitive stress. *NLLT* 20, 491-552.

Harris, James. 1983. *Syllable structure and stress in Spanish: a nonlinear analysis*. Linguistic Inquiry Monograph 8. MIT Press, Cambridge, Massachusetts.

Hyde, Brett. 2002. A restrictive theory of metrical stress. *Phonology* 19, 313-339.

Itô, Junko and Armin Mester. 1992. Weak layering and word binarity. Ms., University of California, Santa Cruz.

Kager, René. 2001. Rhythmic directionality by positional licensing. Handout from the Fifth Holland Institute of Linguistics Phonology Conference, University of Potsdam. ROA-514.

Kager, René. 2005. Rhythmic licensing theory: an extended typology. *Proceedings of the 3rd Seoul International Conference on Phonology*, 5-31.

McCarthy, John. J. 2003. OT constraints are categorical. *Phonology* 20, 75-138.

McCarthy, John and Alan Prince. 1993. Generalized alignment. In Geert Booij and Jaap van Marle (eds.) *Yearbook of Morphology* 1993. Dordrecht: Kluwer.

Roca, Iggy. 1986. Secondary stress and metrical rhythm. *Phonology Yearbook* 3: 341-370.