The Midpoint Pathology: What it is and what it isn't[1]

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The term *Midpoint Pathology*, coined in Hyde (2008), refers to a set of defective predictions, first noticed by Eisner (1997), that arise under the Generalized Alignment (GA; McCarthy and Prince 1993) approach to alignment constraints. The defining characteristic of Midpoint Pathology patterns is that they consistently locate a particular object at or near the midpoint of a string or substring. Since the Midpoint Pathology prevents GA constraints from producing their essential directionality effects in key contexts, it presents a potentially significant problem for analyses where GA constraints play even a minor role. Since GA constraints are pervasive in Optimality Theoretic (Prince and Smolensky 1993/2004) approaches to phonology, the potential difficulties presented by the Midpoint Pathology are also pervasive.

In Hyde (2008, 2012a), I demonstrate that an alternative formulation, Relation-Specific Alignment (RSA), eliminates the Midpoint Pathology and preserves the ability of alignment constraints to produce their essential directionality effects. Given the difficulties presented by the Midpoint Pathology, this would seem to be an important result, but it has not gone unchallenged. Citing a prediction of the RSA approach in the context of the analysis of trisyllabic accent windows, Kager (2012) charges that the RSA formulation itself produces Midpoint Pathology effects and that the problem has not been entirely eliminated. The charge implies, of course, that the types of difficulties encountered under GA are still lurking under RSA.

As we shall see in fuller detail below, the charge is false. The predictions cited are unrelated to the Midpoint Pathology. The mistake is in seeing a Midpoint Pathology effect in an accent's incidental occupation of a middle syllable in patterns where the middle syllable is actually of no particular significance. It is much the same as claiming, for example, that languages with regular antepenultimate stress are examples of Midpoint Pathology patterns because the antepenult just happens to be the middle syllable in five-syllable forms.[2]

To give an initial, brief illustration, the pattern in (1) is an example of a Midpoint Pathology pattern involving a single accent and a string of syllables. The accent's consistent, systematic location at the midpoint of the string is the pattern's defining characteristic. Regardless of the string's length, the accent occurs roughly at its midpoint: it occurs roughly at the midpoint in a string of three syllables, roughly at the midpoint in a string of five syllables, roughly at the midpoint in a string of fifty syllables. (The particular pattern illustrated in (1) is examined in fuller detail in Section 1.)

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[1] Thanks to Jackie Nelligan for numerous helpful comments on an earlier draft of this paper.

[2] Kager's reasoning would not only result in the pathological status of regular antepenultimate and post-peninitial accent but also in the pathological status of regular penultimate and peninitial accent. Just as antepenultimate and post-peninitial accent incidentally occupy the middle syllable in five-syllable forms, penultimate and peninitial accent incidentally occupy the middle syllable in three-syllable forms.

(1) A Midpoint Pathology pattern

a. 1 syllable σ́
b. 2 syllables σ́σ *or* σσ́
c. 3 syllables σσ́σ
d. 4 syllables σσ́σσ *or* σσσ́σ
e. 5 syllables σσσ́σσ
f. 6 syllables σσσ́σσσ *or* σσσσ́σσ
g. 7 syllables σσσσ́σσσ
h. 8 syllables σσσσ́σσσσ *or* σσσσσ́σσσ
i. 9 syllables σσσσσ́σσσσ
j. 10 syllables σσσσσ́σσσσσ *or* σσσσσσ́σσσσ

In contrast, the types of patterns that Kager identifies are illustrated in (2) and (3). As we shall see Section 6, such patterns can emerge when two different RSA constraints establish accent windows at opposite edges of a form. The pattern in (2) emerges when the RSA constraints are distance-insensitive (when evaluation is not sensitive to the distance between misaligned edges). The pattern in (3) emerges when the RSA constraints are distance-sensitive (when evaluation is sensitive to the distance between misaligned edges).

Neither the pattern in (2) nor the pattern in (3) is an example of a Midpoint Pathology pattern. Unlike the accent in the Midpoint Pathology pattern in (1), the accents in the patterns in (2) and (3) do not appear near the strings' midpoints with any consistency. In (2), the accent is final in one-, two-, and three-syllable strings, penultimate in four-syllable strings, antepenultimate in five-syllable strings, and final in all longer strings.

(2) Distance-insensitive constraints

a. 1 syllable σ́
b. 2 syllables σσ́
c. 3 syllables σσσ́
d. 4 syllables σσσ́σ
e. 5 syllables σσσ́σσ
f. 6 syllables σσσσσσ́
g. 7 syllables σσσσσσσ́
h. 8 syllables σσσσσσσσ́
i. 9 syllables σσσσσσσσσ́
j. 10 syllables σσσσσσσσσσ́

In (3), the accent is final in one-, two-, and three-syllable strings, penultimate in four-syllable strings, and antepenultimate in all longer strings.

(3) Distance-sensitive constraints

a. 1 syllable σ́
b. 2 syllables σσ́
c. 3 syllables σσσ́
d. 4 syllables σσσ́σ
e. 5 syllables σσσ́σσ
f. 6 syllables σσσσ́σσ
g. 7 syllables σσσσσ́σσ
h. 8 syllables σσσσσσ́σσ
i. 9 syllables σσσσσσσ́σσ
j. 10 syllables σσσσσσσσ́σσ

While it is true that the accent occurs roughly at the midpoint in four- and five-syllable strings in the pattern in (2) and roughly at the midpoint in four-, five-, and six-syllable strings in the pattern in (3), the accent's incidental occurrence near the midpoint in a few forms does not indicate that these patterns suffer from the Midpoint Pathology (or even that they suffer from any type of pathology at all). In languages with regular antepenultimate accent, as (4) illustrates, accent also occurs near the midpoint in four-, five-, and six-syllable strings. Since regular antepenultimate accent is actually attested, however, it is clearly not pathological.

(4) Regular antepenultimate accent

a. 1 syllable σ́
b. 2 syllables σ́σ
c. 3 syllables σ́σσ
d. 4 syllables σσ́σσ
e. 5 syllables σσσ́σσ
f. 6 syllables σσσσ́σσ
g. 7 syllables σσσσσ́σσ
h. 8 syllables σσσσσσ́σσ
i. 9 syllables σσσσσσσ́σσ
j. 10 syllables σσσσσσσσ́σσ

Though the classification of patterns like those in (2) and (3) as Midpoint Pathology patterns is a mistake, the contrast between these patterns and actual Midpoint Pathology patterns can help us to gain a fuller understanding of what the Midpoint Pathology actually is. Examination of the patterns in (2) and (3) can also help us to better understand similar (attested) patterns where the position of an accent seems to be influenced by accent windows at opposite edges of a form. In the discussion that follows, then, I will first address the basic characteristics of the Midpoint Pathology and the reasons that it emerges under GA. I will then briefly address the ability of RSA constraints to eliminate Midpoint Pathology effects and the role that RSA constraints play in a general account of accent windows. (For a detailed discussion, see Hyde 2012a, forthcoming). Finally, I will address the predictions that Kager mistakenly cites as Midpoint Pathology effects. I will demonstrate in fuller detail how the patterns in (2) and (3) emerge when two high-ranking RSA constraints establish accent windows at opposite edges of a form. While the particular patterns in (2) and (3) are not themselves attested at this point, I will show how similar rankings are crucial in producing patterns that are attested.

Section 1 The Midpoint Pathology

The general definition of Generalized Alignment constraints is given in (5). *ACat1* and *ACat2* are the categories being aligned. *Edge1* and *Edge2* are the relevant edges of the aligned categories. *SCat* is the separator category, the category whose intervention between the relevant edges of the aligned categories constitutes misalignment.

(5) Generalized Alignment

ALIGN (*ACat1*, *Edge1*, *ACat2*, *Edge2*, *SCat*)

The *Edge1* of every *ACat1* coincides with the *Edge2* of some *ACat2*. Assess a violation mark for every *SCat* that intervenes between edges that fail to coincide.

Although alignment constraints have played a central role in Optimality Theoretic approaches to phonology, they have not met with universal acceptance. In one of the more significant challenges to alignment, Eisner (1997) noted a peculiar set of predictions that can arise under the standard GA formulation. In some circumstances, constraints formulated under the definition in (5) can create the peculiar distribution of the aligned categories described in (6).[3]

(6) If a string contains *m* instances of *ACat1* and *n* instances of *ACat2* such that $m \geq n$, then

a. the string of instances of *ACat1* is divided into *n* roughly equal substrings, and

b. an instance *ACat2* occurs roughly at the midpoint of each substring.

To get an initial picture of the types of distributions that the description in (6) is intended to pick out, we can consider the distributions schematically. The examples in (7) illustrate, first, the Midpoint Pathology's division of the string of instances of *ACat1* into a number of substrings equal to the number of instances of *ACat2* and, second, the positioning of an instance of *ACat2* near the midpoint of each substring. If there is one instance of *ACat2*, it will occur near the midpoint of the string of instances of *ACat1*, as in (7a). The Midpoint Pathology pattern illustrated in (1), for example, is an example of the schema in (7a) based on a single accent and a string of syllables. If there are two instances of *ACat2*, the *ACat1* string is divided into two roughly equal substrings with an instance of *ACat2* occurring near the midpoint of each, as in (7b). If there are three instances of *ACat2*, the *ACat1* string is divided into three roughly equal substrings with an instance of *ACat2* occurring near the midpoint of each, as in (7c). If there are four instances of *ACat2*, the *ACat1* string is divided into four roughly equal substrings with an instance of *ACat2* occurring at the midpoint of each, as in (7d). As the number of instances of *ACat2* increases, then, the numbers of substrings increases at the same pace.

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[3] Eisner (1997) characterizes the results of the Midpoint Pathology when one or two instances of *ACat2* are present. The description in (6) is intended to characterize the results for any number of instances of *ACat2*.

(7) a. 1 instance of *ACat2*: 1 substring of *ACat1* with *ACat2* at the midpoint

ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

b. 2 instances of *ACat2*: 2 substrings of *ACat1* with an *ACat2* at the midpoint

ACat2 *ACat2*
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

c. 3 instances of *ACat2*: 3 substrings of *ACat1* with an *ACat2* at the midpoint

ACat2 *ACat2* *ACat2*
[*ACat1*, *ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*, *ACat1*]

d. 4 instances of *ACat2*: 4 substrings of *ACat1* with an *ACat2* at the midpoint

ACat2 *ACat2* *ACat2* *ACat2*
[*ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*][*ACat1*, *ACat1*, *ACat1*]

As the examples in (8) and (9) illustrate, the characteristic distribution is maintained regardless of the number of instances of *ACat1* in the string. The example in (8) illustrates the characteristic distribution when there is only a single instance of *ACat2* accompanying the string: the single instance of *ACat2* occurs near the string's midpoint regardless of its length.

(8) a. 1 instance of *ACat1*:
ACat2
[*ACat1*]

b. 2 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*]

c. 3 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*]

d. 4 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*]

e. 5 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

f. 6 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

g. 7 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

h. 8 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

i. 9 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

j. 10 instances of *ACat1*:
ACat2
[*ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*, *ACat1*]

The example in (9) illustrates the characteristic distribution when there are two instances of *ACat2* accompanying the string: regardless of the string's length, it is divided into two roughly equal substrings with an instance of *ACat2* occurring roughly at the midpoint of each substring.

(9) a. 2 instances of *ACat1*: $\overset{ACat2}{[ACat1]}\overset{ACat2}{[ACat1]}$

b. 3 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1]}\ \overset{ACat2}{[ACat1]}$

c. 4 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1]}\overset{ACat2}{[ACat1, ACat1]}$

d. 5 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1]}\overset{ACat2}{[ACat1, ACat1]}$

e. 6 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1]}\ \overset{ACat2}{[ACat1, ACat1, ACat1]}$

f. 7 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1]}\overset{ACat2}{[ACat1, ACat1, ACat1]}$

g. 8 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1]}\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1]}$

h. 9 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1, ACat1]}\ \overset{ACat2}{[ACat1, ACat1, ACat1, ACat1]}$

i. 10 instances of *ACat1*: $\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1, ACat1]}\overset{ACat2}{[ACat1, ACat1, ACat1, ACat1, ACat1]}$

To get the benefit of a more concrete illustration, we can consider the preferences of the GA constraint Align (σ, L, A, L, σ), given in (10), which aligns the left edge of every syllable with the left edge of an accent.

(10) Align (σ, L, A, L, σ)

The left edge of every syllable coincides with the left edge of some accent. Assess a violation mark for each syllable intervening between misaligned edges.

In Section 1.1, we examine the Midpoint Pathology pattern produced by Align (σ, L) in the simplest case, the case where there is just a single accent (*ACat2*) per string of syllables (*ACat1*). In Section 1.2, we examine the slightly more complex case where two accents (*ACat2*) accompany each string of syllables (*ACat1*).

In examining these more concrete cases, two additional points should become clear. The first is that the Midpoint Pathology is a pathology arising from the preferences of single constraints; it is not a pathology arising from the interactions of two or more constraints. The second is that the midpoint is the key position in Midpoint Pathology patterns is because occupation of the midpoint in a string or substring allows for fewer violations of the relevant constraint than occupation of other positions.

Section 1.1 First illustration: A single accent with a string of syllables

The simplest case in which the preferences of Align (σ, L) result in a Midpoint Pathology pattern is the case where a single accent accompanies a string of syllables. In this situation, the single accent occurs roughly at the midpoint of the string. Even in this simple case, the qualification *roughly* is important, because it is not always possible for the accent to occur exactly at the midpoint.[4] Whether or not the accent can occur exactly at the midpoint depends on the number of syllables in the string.

When a string contains an odd number of syllables, Align (σ, L) can position the accent over the middle syllable so that it occurs exactly at the midpoint. In (11), the form

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[4] In previous discussions of the Midpoint Pathology, I have used the phrase *towards the center of a form* rather than *to the center of a form* for the same reason that the qualification *roughly* is employed here.

consists of seven syllables. ALIGN (σ, L) positions the accent on the fourth syllable, as in (8d), so that there are three syllables to either side. The reason is simply that overall misalignment is minimized when the misaligned syllables are distributed evenly to either side of the accent.

(11)

	ALIGN (σ, L, A, L, σ)
a. $\overset{A}{\sigma}$ σ σ σ σ σ σ	* ** *** **** ***** ****** (21)
b. σ $\overset{A}{\sigma}$ σ σ σ σ σ	* * ** *** **** ***** (16)
c. σ σ $\overset{A}{\sigma}$ σ σ σ σ	** * * ** *** **** (13)
☞ d. σ σ σ $\overset{A}{\sigma}$ σ σ σ	*** ** * * ** *** (12)
e. σ σ σ σ $\overset{A}{\sigma}$ σ σ	**** *** ** * * ** (13)
f. σ σ σ σ σ $\overset{A}{\sigma}$ σ	***** **** *** ** * * (16)
g. σ σ σ σ σ σ $\overset{A}{\sigma}$	****** ***** **** *** ** * (21)

When form contains an even number of syllables, however, there is no middle syllable on which the accent might appear, and it is impossible to distribute the misaligned syllables evenly to either side of the accent. In such cases, the accent must still be positioned as close to the center as possible, in order to minimize overall misalignment, but there will always be two options that qualify as being as close to the center as possible. In (12), for example, the form contains six syllables. ALIGN (σ, L) prefers that the accent occur either over the third syllable, as in (9c), or over the fourth syllable, as in (9d), so that there are two syllables to one side and three to the other. The overall number of violations is smallest when the accent occupies one of these two positions and grows larger if it shifts to any other position.

(12)

	ALIGN (σ, L, A, L, σ)
a. $\overset{A}{\sigma}$ σ σ σ σ σ	* ** *** **** ***** (15)
b. σ $\overset{A}{\sigma}$ σ σ σ σ	* * ** *** **** (11)
☞ c. σ σ $\overset{A}{\sigma}$ σ σ σ	** * * ** *** (9)
☞ d. σ σ σ $\overset{A}{\sigma}$ σ σ	*** ** * * ** (9)
e. σ σ σ σ $\overset{A}{\sigma}$ σ	**** *** ** * * (11)
f. σ σ σ σ σ $\overset{A}{\sigma}$	***** **** *** ** * (15)

The table in (13) summarizes the preferences of ALIGN (σ, L) in the circumstance where a single accent accompanies a string of syllables. As (13) indicates, ALIGN (σ, L) always positions the accent roughly at the string's midpoint. The accent's position is not incidental to the string's length: ALIGN (σ, L) draws the accent towards the center of a string regardless of how many syllables the string contains.

(13) Preferences of ALIGN (σ, L, A, L, σ)

a.	1 syllable	σ́
b.	2 syllables	σ́σ *or* σσ́
c.	3 syllables	σσ́σ
d.	4 syllables	σσ́σσ *or* σσσ́σ
e.	5 syllables	σσσ́σσ
f.	6 syllables	σσσ́σσσ *or* σσσσ́σσ
g.	7 syllables	σσσσ́σσσ
h.	8 syllables	σσσσ́σσσσ *or* σσσσσ́σσσ
i.	9 syllables	σσσσσ́σσσσ
j.	10 syllables	σσσσσ́σσσσσ *or* σσσσσσ́σσσσ

Section 1.2 Second illustration: Two accents accompanying a string of syllables

We now consider the preferences of ALIGN (σ, L) in the slightly more complex situation where a string of syllables (*ACat1*) is accompanied by two accents (*ACat2*). In general, when there are multiple instances of *ACat2*, a GA constraint will prefer to divide the *ACat1* string into a number of substrings matching the number of instances of *ACat2*. The substrings should not be thought of as anything like a phonological or morphological domain, however. The substring is just the particular set of instances of *ACat1* whose misalignment is measured with respect to a given instance of *ACat2*. Overall misalignment is minimized when the *ACat1* string is divided into substrings of equal length for each *ACat2* so that the violations of misaligned instances of *ACat1* are assessed with respect to a particular, relatively locally positioned, instance of *ACat2*.

In the case of ALIGN (σ, L), in particular, when there are multiple accents accompanying a string of syllables, the string is divided into a number of substrings matching the number of accents. Overall misalignment is minimized when the substrings are of equal length and the accent associated with each substring occurs at the midpoint. Of course, it is not always possible to divide the string of instances of *ACat1* equally into the matching number of substrings, nor is it always possible for each instance of *ACat2* to occur exactly at the midpoint of each substring. In such cases, there will be multiple ways to minimize misalignment, and multiple optimal candidates.

When multiple accents accompany a string of syllables, to what degree ALIGN (σ, L) can narrow the candidate set depends on how many of the roughly equal substrings containing the accents are odd-parity. Consider, first, cases in which a string of syllables is accompanied by two accents and the syllable string can be divided equally into two odd-parity substrings. Since the substrings are odd-parity, there is just one way to minimize the number of violations: an accent must occur over the middle syllable of each substring. To illustrate, in the candidates in (14), the string consists of six syllables. Violations of ALIGN (σ, L) are fewest when the accents occur on the second and fifth syllables, as in (14h). With this distribution, the string is effectively split into two substrings of three syllables each, and an accent occurs on the second syllable of each substring. Violations for the misaligned first and third syllables are assessed with respect to the first accent, and violations for the misaligned fourth and fifth syllables are assessed with respect to the second accent. Each misaligned syllable contributes just a single violation mark for a total of four. If the accents occupy any other syllables, the number of violations increases. In (14m), for example, the accents occupy the fourth and fifth syllables, effectively dividing the string into a four-syllable substring followed by a two-syllable substring. The first accent occurs at the right edge of the first substring, and the second occurs at the left edge of the second. The misaligned first syllable, evaluated with respect to the first accent, contributes three violation marks. The misaligned second and third syllables, both also evaluated with respect to the first accent, contribute two and one violation marks, respectively. The misaligned sixth syllable, evaluated with respect to the second accent, contributes a single violation marks. The number of violations assessed overall, then, is seven.

(14)

	ALIGN (σ, L, A, L, σ)
a. $\overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** **** (10)
b. $\overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* * ** *** (7)
c. $\overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* * * ** (5)
d. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* ** * * (5)
e. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* ** ** * (6)
f. $\sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* * ** *** (7)
g. $\sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* * * ** (5)
☞ h. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* * * * (4)
i. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* * ** * (5)
j. $\sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma$	** * * ** (6)
k. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma$	** * * * (5)
l. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}$	** * * * (5)
m. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma$	*** ** * * (7)
n. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}$	*** ** * * (7)
o. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}$	**** *** ** * (10)

When one of the substrings is odd-parity and the other is even-parity, the accent will appear exactly at the midpoint in the odd-parity substring, but there will be two options for occurring as near as possible to the midpoint in the even-parity substring. Given the optionality in the order of the odd-parity substring and the even-parity substring and the optionality of the accent's position in the latter, ALIGN (σ, L) can only narrow the candidate set to three in such cases. In (15), for example, each candidate is a string of seven syllables accompanied by two accents. ALIGN (σ, L) prefers that the string be divided into a substring of three syllables and a substring of four syllables in either order. One of the accents must always occur on the second syllable of the three-syllable substring; the other accent may occur on either the second or third syllable of the four-syllable substring. In (15i), a three-syllable substring with an accent on the second syllable precedes a four-syllable substring with an accent on the second syllable. In (15n), a four-syllable substring with an accent on the third syllable precedes a three-syllable substring with an accent on the second syllable. The candidate in (15j) can be analyzed in two ways. It might be analyzed as a configuration where a three-syllable substring with an accent on the second syllable precedes a four-syllable substring with an accent on the third syllable, or it might be analyzed as a configuration where a four-syllable substring with an accent on the second syllable precedes a three-syllable substring with an accent on the second syllable. Any configuration other than the three in (15i,j,n) yields additional violations.

(15)

	ALIGN (σ, L, A, L, σ)
a. $\overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** **** ***** (15)
b. $\overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* * ** *** **** (11)
c. $\overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* * * ** *** (8)
d. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* ** * * ** (7)
e. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* ** ** * * (7)
f. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* ** *** ** * (9)
g. $\sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* * ** *** **** (11)
h. $\sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* * * ** *** (8)
☞ i. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* * * * ** (6)
☞ j. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* * ** * * (6)
k. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* * ** ** * (7)
l. $\sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	** * * ** *** (9)
m. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	** * * * ** (7)
☞ n. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	** * * * * (6)
o. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	** * * ** * (7)
p. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma$	*** ** * * ** (9)
q. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma$	*** ** * * * (8)
r. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}$	*** ** * * * (8)
s. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma$	**** *** ** * * (11)
t. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}$	**** *** ** * * (11)
u. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}$	***** **** *** ** * (15)

Finally, when both of the substrings are even-parity, the accent can appear exactly at the midpoint in neither substring, and ALIGN (σ, L) can only narrow the candidate set to four. In (16), each candidate is a string of eight syllables accompanied by two accents.

ALIGN (σ, L) prefers that the string be divided into two substrings of four syllables each. One of the accents must occur on either the second syllable of the first substring, as in (16k,l), or the third syllable, as in (16p,q). The other accent must occur on either the second syllable of the second substring, as in (16k,p), or the third syllable, as in (16l,q). Any configuration other than the four in (16k,l,p,q) yields additional violations.

(16)

	ALIGN (σ, L, A, L, σ)
a. $\overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** **** ***** ****** (21)
b. $\overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* * ** *** **** ***** (16)
c. $\overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* * * ** *** **** (12)
d. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* ** * * ** *** (10)
e. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* ** ** * * ** (9)
f. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* ** *** ** * * (10)
g. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* ** *** *** ** * (12)
h. $\sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* * ** *** **** ***** (16)
i. $\sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* * * ** *** **** (12)
j. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* * * * * ** *** (9)
☞ k. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* * ** * * * ** (8)
☞ l. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	* * ** ** * * (8)
m. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	* * ** *** ** * (10)
n. $\sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	** * * ** *** **** (13)
o. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	** * * * ** *** (10)
☞ p. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	** * * * * ** (8)
☞ q. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	** * * ** * * (8)
r. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	** * * ** ** * (9)
s. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	*** ** * * ** *** (12)
t. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	*** ** * * * ** (10)
u. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	*** ** * * * * (9)
v. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	*** ** * * ** * (10)
w. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma\ \sigma$	**** *** ** * * ** (13)
x. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}\ \sigma$	**** *** ** * * * (12)
y. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \overset{A}{\sigma}$	**** *** ** * * * (12)
z. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}\ \sigma$	***** **** *** ** * * (16)
aa. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \overset{A}{\sigma}$	***** **** *** ** * * (16)
bb. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \overset{A}{\sigma}$	****** ***** **** *** ** * (21)

The table in (17) summarizes the preferences of ALIGN (σ, L) in cases where two accents accompany a string of syllables. As (17) indicates, ALIGN (σ, L) always positions the accents roughly at the midpoints of two roughly equal substrings. Once again, the effect is not incidental to the length of the string: ALIGN (σ, L) draws the accents towards the centers of the two substrings regardless of how many syllables the string contains.

(17) Preferences of ALIGN (σ, L, A, L, σ)

a. 2 syllables σ́σ́
b. 3 syllables σ́σ́σ, σ́σσ́, *or* σσ́σ́
c. 4 syllables σ́σσ́σ, σ́σσσ́, σσ́σ́σ, *or* σσ́σσ́
d. 5 syllables σσ́σσ́σ, σσ́σσσ́, *or* σ́σσσ́σ
e. 6 syllables σσ́σσσ́σ
f. 7 syllables σσ́σσσ́σσ, σσ́σσσσ́σ, *or* σσσ́σσσ́σ
g. 8 syllables σσ́σσσσ́σσ, σσ́σσσσσ́σ, σσσ́σσσ́σσ, *or* σσσ́σσσσ́σ
h. 9 syllables σσσ́σσσσ́σσ, σσσ́σσσσσ́σ, *or* σσ́σσσσσ́σσ
i. 10 syllables σσσ́σσσσσ́σσ

Midpoint Pathology patterns, then, are patterns where a string of instances of one category are divided roughly evenly into a number of substrings matching the number of instances of a second category and each instance of the second category occurs roughly at the midpoint of one of the substrings of the first category. While this is the basic pattern, there can be some variation. For example, with opposite-edge alignment constraints instances of *ACat2* consistently occur slightly offset from the midpoints of the substrings of *ACat1*. We will see an example of this variation in Section 5. Also, as we shall see next in Section 2, there are several ways in which the effects of an underlying Midpoint Pathology can be restricted or disguised. This typically occurs when the constraint that is responsible for the Midpoint Pathology effect is relatively low-ranked.

Section 2 The significance of the problem

The examples discussed in Section 1 are toy examples in the sense that the constraint that produced them, ALIGN (σ, L, A, L, σ), is not a constraint that is likely to be employed in an actual phonological analysis. It is a simple matter, however, to construct scenarios where GA constraints that have frequently been employed in phonological analyses misbehave due to the effects of the Midpoint Pathology.

Consider, for example, the GA constraint ALIGN (F, L, ω, L, σ).

(18) ALIGN (F, L, ω, L, σ)

> The left edge of every foot coincides with the left edge of some prosodic word. Assess a violation mark for each syllable intervening between misaligned edges.

ALIGN (F, L) is typically employed to create a general leftward orientation for feet in forms consisting of a single prosodic word. In an odd-parity prosodic word with a single unfooted syllable, for example, ALIGN (F, L) produces a simple pattern of left to right parsing. Producing such simple general directional orientations is one of the essential roles of alignment constraints. (In the examples in (19-23), parentheses indicate foot boundaries, and square brackets indicate prosodic word boundaries.)

(19)

	Align (F, L, ω, L, σ)
☞ a. [(σσ)(σσ)(σσ)σ]	** **** (6)
b. [(σσ)(σσ)σ(σσ)]	** ***** (7)
c. [(σσ)σ(σσ)(σσ)]	*** ***** (8)
d. [σ(σσ)(σσ)(σσ)]	* *** ***** (9)

Unfortunately, the ability of Align (F, L) to correctly produce the desired general directional orientation depends upon two factors: the presence of just a single prosodic word in the form and the immobility of the prosodic word's edges. While the edges of prosodic words are typically fixed due to the requirement that they coincide with the edges of morphological words, consider the result if the left edge of the prosodic word were free to move. As (20) indicates, Align (F, L) prefers that left prosodic word edge move to roughly the midpoint of the string of feet. The feet cluster around the left prosodic word edge, roughly half of the feet on one side and roughly half on the other. Since the candidates contain three feet in (20), one foot occurs to the left of the left prosodic word edge and two occur to the right of the left prosodic word edge. The unparsed syllable can either follow the cluster of feet, as in (20b), or precede the cluster of feet, as in (20o).

(20)

	ALIGN (F, L, ω, L, σ)
a. [(σσ)(σσ)(σσ)σ]	** **** (6)
☞ b. (σσ)[(σσ)(σσ)σ]	** ** (4)
c. (σσ)(σσ)[(σσ)σ]	**** ** (6)
d. (σσ)(σσ)(σσ)[σ]	****** **** ** (12)
e. [(σσ)(σσ)σ(σσ)]	** ***** (7)
f. (σσ)[(σσ)σ(σσ)]	** *** (5)
g. (σσ)(σσ)[σ(σσ)]	**** ** * (7)
h. (σσ)(σσ)σ[(σσ)]	***** *** (8)
i. [(σσ)σ(σσ)(σσ)]	*** ***** (8)
j. (σσ)[σ(σσ)(σσ)]	** * *** (6)
k. (σσ)σ[(σσ)(σσ)]	*** ** (5)
l. (σσ)σ(σσ)[(σσ)]	***** ** (7)
m. [σ(σσ)(σσ)(σσ)]	* *** ***** (9)
n. σ[(σσ)(σσ)(σσ)]	** **** (6)
☞ o. σ(σσ)[(σσ)(σσ)]	** ** (4)
p. σ(σσ)(σσ)[(σσ)]	**** ** (6)

The fact that the edges of prosodic words typically do not have the mobility necessary to produce the pattern of the optimal candidates in (20) does not mean that midpoint pathology effects are not a significant problem. Consider the situation where prosodic word edges are fixed in a form that contains multiple prosodic words. In (21), a fourteen-syllable form is divided into two seven-syllable prosodic words. ALIGN (F, L) produces the desired simple leftward orientation only in the final prosodic word. In the first prosodic word, ALIGN (F, L) prefers a conflicting directional orientation. In the optimal (21e), roughly half of the feet are drawn towards the left edge of the first prosodic word and roughly half of the feet are drawn towards the left edge of the second.

(21)

	ALIGN (F, L, ω, L, σ)
a. [(σσ)(σσ)(σσ)σ][(σσ)(σσ)(σσ)σ]	[** ***][** ****] (11)
b. [(σσ)(σσ)(σσ)σ][(σσ)(σσ)σ(σσ)]	[** ***][** *****] (12)
c. [(σσ)(σσ)(σσ)σ][(σσ)σ(σσ)(σσ)]	[** ***][*** *****] (13)
d. [(σσ)(σσ)(σσ)σ][σ(σσ)(σσ)(σσ)]	[** ***][* *** *****] (14)
☞ e. [(σσ)(σσ)σ(σσ)][(σσ)(σσ)(σσ)σ]	[** **][** ****] (10)
f. [(σσ)(σσ)σ(σσ)][(σσ)(σσ)σ(σσ)]	[** **][** *****] (11)
g. [(σσ)(σσ)σ(σσ)][(σσ)σ(σσ)(σσ)]	[** **][*** *****] (12)
h. [(σσ)(σσ)σ(σσ)][σ(σσ)(σσ)(σσ)]	[** **][* *** *****] (13)
i. [(σσ)σ(σσ)(σσ)][(σσ)(σσ)(σσ)σ]	[*** **][** ****] (11)
j. [(σσ)σ(σσ)(σσ)][(σσ)(σσ)σ(σσ)]	[*** **][** *****] (12)
k. [(σσ)σ(σσ)(σσ)][(σσ)σ(σσ)(σσ)]	[*** **][*** *****] (13)
l. [(σσ)σ(σσ)(σσ)][σ(σσ)(σσ)(σσ)]	[*** **][* *** *****] (14)
m. [σ(σσ)(σσ)(σσ)][(σσ)(σσ)(σσ)σ]	[* *** **][** ****] (12)
n. [σ(σσ)(σσ)(σσ)][(σσ)(σσ)σ(σσ)]	[* *** **][** *****] (13)
o. [σ(σσ)(σσ)(σσ)][(σσ)σ(σσ)(σσ)]	[* *** **][*** *****] (14)
p. [σ(σσ)(σσ)(σσ)][σ(σσ)(σσ)(σσ)]	[* *** **][* *** *****] (15)

In general, ALIGN(F, L) produces the expected left-oriented unidirectional pattern in final prosodic words, but it produces an unusual type of bidirectional pattern in nonfinal prosodic words. The effect varies, however, in nonfinal prosodic words depending on the number of syllables they contain. In nonfinal three-syllable prosodic words, the effect does not emerge. In larger nonfinal prosodic words, the effect emerges in slightly different ways. In those that have an odd-number of feet (those with 4*n* + 3 syllables), all feet to the right of the medial foot orient themselves towards the left edge of the following prosodic word. In those that have an even-number of feet (those with 4*n* + 5 syllables), the final half orient themselves toward the left edge of the following prosodic word, but the leftmost of these does so only optionally.

(22) Effects of ALIGN(F, L, ω, L, σ) in non-final prosodic words

a. 3 syllables

[σσσ][σσ … → [(σσ)σ] [(σσ) …

b. 4*n* + 3 syllables (*n* ≥ 1)

[σσσσσσσ][σσ … → [(σσ)(σσ)σ(σσ)][(σσ) …

[σσσσσσσσσσσ][σσ … → [(σσ)(σσ)(σσ)σ(σσ)(σσ)][(σσ) …

c. 4*n* + 5 syllables

[σσσσσ][σσ … → [(σσ)(σσ)σ][(σσ) … *or* [(σσ)σ(σσ)][(σσ) …

[σσσσσσσσσ][σσ … → [(σσ)(σσ)(σσ)σ(σσ)][(σσ) … *or* [(σσ)(σσ)σ(σσ)(σσ)][(σσ) …

In cases involving multiple prosodic words, the immobility of prosodic word edges obscures to some degree the Midpoint Pathology effect created by ALIGN (F, L). Depending on the sizes of the individual prosodic words involved, it may not be possible to divide the overall string of feet into roughly equal substrings, and it may not be possible for left prosodic word edges always to occur roughly at the midpoint of the substrings. As the results illustrated in (21) and (22) indicate, however, even a partially suppressed Midpoint Pathology effect is sufficient to prevent ALIGN (F, L) from establishing the appropriate general directional orientation for feet within prosodic words.

For the sake of comparison, consider what the optimal candidates would be when a form contains multiple prosodic words but prosodic word edges are allowed to move. In (23), the number of instances of each category is the same as it is in (21). Each candidate is a fourteen-syllable form containing six disyllabic feet and two prosodic words. The only difference between (23) and (21) is that the positions of the left edges of the prosodic words can vary between candidates. The midpoint pathology effect is now rather obvious. The optimal candidates group the six feet into two substrings of three feet each with a left prosodic word edge occurring at the left edge of the second foot in each substring. The only restriction on the position of unparsed syllables is that they cannot intervene between feet in the same substring. (Due to the size of the full tableau, only the optimal candidates are shown in (23).)

(23)

	ALIGN (F, L, ω, L, σ)
☞ a. σσ(σσ)[(σσ)(σσ)(σσ)][(σσ)(σσ)]	** [** **][**] (8)
☞ b. σ(σσ)[(σσ)(σσ)σ(σσ)][(σσ)(σσ)]	** [** **][**] (8)
☞ c. σ(σσ)[(σσ)(σσ)(σσ)][(σσ)(σσ)σ]	** [** **][**] (8)
☞ d. (σσ)[(σσ)(σσ)σσ(σσ)][(σσ)(σσ)]	** [** **][**] (8)
☞ e. (σσ)[(σσ)(σσ)σ(σσ)][(σσ)(σσ)σ]	** [** **][**] (8)
☞ f. (σσ)[(σσ)(σσ)(σσ)][(σσ)(σσ)σσ]	** [** **][**] (8)

Results such as those illustrated in (21) and (23), of course, are not limited to ALIGN (F, L); similarly problematic situations could be identified for most any commonly used GA constraint. In the next section, we examine the two characteristics of GA that give rise to the Midpoint Pathology.

GA constraints are *distance-sensitive*. Rather than simply distinguishing between alignment and misalignment, GA constraints distinguish between different degrees of misalignment. As the distance between misaligned edges increases, the number of violations assessed also increases. GA constraints are also *relation-general*. They assess violations for misalignment regardless of the configuration in which the misaligned edges occur. Violations are assessed regardless of whether one of the misaligned categories contains the other, the first aligned category precedes the second, or the first aligned category follows the second. These two characteristics—distance-sensitivity and relation-generality—are the characteristics that give rise to the Midpoint Pathology under GA. Both characteristics are necessary; neither is sufficient on its own.

To illustrate, consider the preferences of ALIGN (F, L, A, L, σ), given in (24), which aligns the left edges of feet with the left edges of accents.

(24) ALIGN (F, L, A, L, σ)

The left edge of every syllable coincides with the left edge of some accent. Assess a violation mark for each syllable intervening between misaligned edges.

When a string of feet contains a single accent, the preferences of ALIGN (F, L, A, L, σ) result in a straightforward Midpoint Pathology effect. In (25), each candidate consists of three disyllabic feet and a single accent. The optimal candidate positions the accent at the left edge of the medial foot.

(25)

	ALIGN (F, L, A, L, σ)
a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	** **** (6)
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	* * *** (5)
☞ c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	** ** (4)
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	*** * * (5)
e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	**** ** (6)
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	***** *** * (9)

The result in (25) depends on distance-sensitive evaluation. ALIGN (F, L, A, L, σ) prefers that the accent occur at the left edge of one of the three feet in order to minimize the number of misaligned edges. Since there is only one accent and three feet, however, two of the feet are necessarily misaligned. This is where distance-sensitivity comes into play. The two necessarily misaligned feet draw the accent towards the center of the form because the overall distance between their left edges and the left edge of the accent—as reflected in the number of violation marks assessed—is shortest when it occurs in this position.

Contrast the result in (25) to the result that would be obtained if ALIGN (F, L, A, L, σ) had distance-insensitive assessment. Rather than assessing a violation for each syllable that intervenes between misaligned edges, a distance-insensitive version of ALIGN (F, L, A, L, σ) would only assesses violations for the misaligned edges themselves. Each pair of misaligned edges would yield a single violation mark. The result, as in indicated in (26), would be a simple preference for the accent to occur at the left edge of whichever foot happens to contain it. Since the distance between misaligned edges does not contribute to the number of violations assessed, there is no pressure to reduce the overall distance between left edge of the accent and the left edges of the necessarily misaligned feet and, therefore, no preference for the accent to occur at the left edge of the middle foot. If ALIGN (F, L, A, L, σ) had distance-insensitive assessment, then, there would be no Midpoint Pathology effect.

(26)

	ALIGN (F, L, A, L, σ) *(distance-insensitive)*
☞ a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	* * (2)
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	* * * (3)
☞ c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	* * (2)
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	* * * (3)
☞ e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	* * (2)
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	* * * (3)

In addition to distance-sensitivity, relation-generality is necessary for the Midpoint Pathology to emerge. To help make clear how relation-generality contributes to Midpoint Pathology effects, the tableau in (25) is repeated in (27) with distinctive violation marks that indicate the different types of configurations in which the violations are produced. A “p” indicates a violation assessed when a misaligned foot precedes the accent; a “c” indicates a violation assessed when a misaligned foot contains the accent; an “f” indicates a violation assessed when a misaligned foot follows the accent.

(27)

	ALIGN (F, L, A, L, σ)
a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	ff ffff (6)
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	c f fff (5)
☞ c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	pp ff (4)
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	ppp c f (5)
e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	pppp pp (6)
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	ppppp ppp c (9)

Contrast the preferences of the relation-general ALIGN (F, L, A, L, σ) in (25/27) to relation-specific versions in (28–30). In (25/27), every misaligned foot contributes to the overall number of violation marks assessed, regardless of its structural relationship to the accent. Whether a misaligned foot precedes, contains, or follows the accent, it contributes to the number of overall violation marks. The result is a Midpoint Pathology effect: the accent occurs at the left edge of the medial foot. In (28), however, where violations are assessed only for misaligned feet that contain the accent, there is no Midpoint Pathology effect. In fact, the results are much the same as they are for distance-insensitive alignment: the preference is for the accent to occur at the left edge of whichever foot happens to contain it.

(28)

	Align (F, L, A, L, σ) *(foot contains high tone)*
☞ a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	c
☞ c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	c
☞ e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	c

In (29), where violations are assessed only for misaligned feet that precede the accent, the accent is confined to the two syllables that make up the initial foot. Similarly, in (30), where violations are assessed only for misaligned feet that follow the accent, the accent is confined to the two syllables that make up the final foot. No Midpoint Pathology affect emerges in either case. Note that the confinement of one aligned category to a window established by the second aligned category is a common result of prohibitions against misalignment in the context of precedence configurations. As discussed in the next section, such window restrictions can be quite useful.

(29)

	Align (F, L, A, L, σ) *(foot precedes high tone)*
☞ a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	
☞ b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	
c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	pp (2)
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	ppp (3)
e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	pppp pp (6)
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	ppppp ppp (8)

(30)

	Align (F, L, A, L, σ) *(foot follows high tone)*
a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	ff ffff (6)
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	f fff (4)
c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	ff (2)
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	f (1)
☞ e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	
☞ f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	

We have seen in this part of the discussion, then, that both distance-sensitivity and relation-generality are necessary for the Midpoint Pathology to emerge. Since neither is sufficient on its own, abandoning either feature excludes the Midpoint Pathology from the possible effects produced by alignment constraints. Since the case for distance-sensitivity is quite strong (see Hyde 2012, forthcoming), the Relation-Specific Alignment approach maintains distance-sensitivity and abandons relation-generality.

Section 4 RSA constraints

Relation-Specific Alignment constraints consist of two parts: a definition of a locus of violation and a prohibited configuration of misalignment. In the three RSA schemas in (31), the categories in the locus of violation, defined to the left of the slash, are prohibited from occurring in the configuration of misalignment specified to the right of the slash.

(31) Relation-Specific Alignment constraint schemas

a. Left-Edge: $*\langle ACat1, ACat2, (SCat)\rangle \,/\, [\ \ldots\ SCat \ldots ACat2\ \ldots\ ]_{ACat1}$
"Assess a violation mark for every ⟨*ACat1*, *ACat2*, (*SCat*)⟩ such that *SCat* precedes *ACat2* within *ACat1*."

b. Right-Edge: $*\langle ACat1, ACat2, (SCat)\rangle \,/\, [\ \ldots\ ACat2 \ldots SCat\ \ldots\ ]_{ACat1}$
"Assess a violation mark for every ⟨*ACat1*, *ACat2*, (*SCat*)⟩ such that *ACat2* precedes *SCat* within *ACat1*."

c. Opposite-Edge: $*\langle ACat1, ACat2, (SCat)\rangle \,/\, ACat1 \ldots SCat \ldots ACat2$
"Assess a violation mark for every ⟨*ACat1*, *ACat2*, (*SCat*)⟩ such that *ACat1* precedes *SCat* and *SCat* precedes *ACat2*."

The locus of violation always includes the two aligned categories, *ACat1* and *ACat2*. Whether the locus of violation also includes the separator category, *SCat*, determines whether violation assessment is distance-sensitive or distance-insensitive. When *SCat* is present in the locus of violation, assessment is distance-sensitive; when *SCat* is absent, assessment is distance-insensitive.

The prohibited configuration of misalignment is defined in terms of containment and precedence relations between *ACat1*, *ACat2*, and *SCat*. Constraints based on a given schema assess violation marks for the particular configuration targeted by that schema and no others. By prohibiting *SCat* from preceding *ACat2* within *ACat1*, for example, (31a) prohibits misalignment between the left edges of *ACat2* and *ACat1*, but only when *ACat1* contains *ACat2*. Similarly, by prohibiting *SCat* from following *ACat2* within *ACat1*, (31b) prohibits misalignment between the right edges of *ACat2* and *ACat1*, but only when *ACat1* contains *ACat2*. Finally, by prohibiting *ACat1* from preceding *ACat2* with *SCat* intervening, (31c) prohibits misalignment between the right edge of *ACat1* and the left edge of *ACat2*, but only when *ACat1* precedes *ACat2*.

To confirm the absence of Midpoint Pathology effects under RSA, we can consider how some of the Generalized Alignment constraints discussed above would have to be reformulated using the RSA schemas. First, consider the GA constraint ALIGN (F, L, A, L, σ), discussed in Section 3, which aligns the left edges of feet with the left edge of accents. Since ALIGN (F, L, A, L, σ) aligns left edges, it would have to be reformulated using the RSA schema in (31a). A syllable would be prohibited from preceding an accent within a foot, as in FOOT-ACCENT-LEFT in (32).

(32) FOOT-ACCENT-LEFT: $*\langle F, A, \sigma\rangle \,/\, [\ \ldots\ \sigma \ldots A\ \ldots\ ]_{F}$
"Assess a violation mark for every ⟨*F*, *A*, *σ*⟩ such that *σ* precedes *A* within *F*."

As we saw in (25/27), the GA constraint ALIGN (F, L, A, L, σ) produces a Midpoint Pathology effect in locating a single accent at the left edge of a medial foot. In the same context, the RSA constraint FOOT-ACCENT-LEFT simply prefers that the accent occur at the left edge of whichever foot happens to contain it. Since FOOT-ACCENT-LEFT only prohibits misalignment between a foot and an accent when the foot actually contains the accent, it does not have the relation-generality necessary to insist that the accent occur over the medial foot. No Midpoint Pathology effect emerges.

(33)

	FOOT-ACCENT-LEFT
☞ a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	*
☞ c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	
d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	*
☞ e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	
f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	*

Next, consider the reformulation of ALIGN (F, L, *ω*, L, σ), discussed in Section 2, which aligns the left edges of feet with the left edges of prosodic words. Since ALIGN (F, L, *ω*, L, σ) aligns left edges, it would also have to be formulated as an RSA constraint using the schema in (31a). ALL-FEET-LEFT, given in (34), prohibits a syllable from preceding a foot within a prosodic word.

(34) ALL-FEET-LEFT: $*\langle \omega, F, \sigma \rangle$ / $[\ \ldots\ \sigma \ldots\ F \ldots\ ]_\omega$

“Assess a violation mark for every $\langle \omega, F, \sigma \rangle$ such that σ precedes F within ω.”

As we saw in (21) and (22), when a form contains multiple prosodic words whose edges are fixed in particular locations, the GA constraint ALIGN (F, L, *ω*, L, σ) produces the expected uniform leftward orientation for feet in final prosodic words, but it produces an unexpected conflicting directional orientation for feet in nonfinal prosodic words. The effect arises because some feet can improve their performance by aligning with the left edge of an adjacent prosodic word rather than the left edge of the prosodic word that contains them. In contrast, since the RSA constraint ALL-FEET-LEFt only prohibits misalignment between feet and the prosodic words that actually contain them, a candidate can never improve its performance by orienting one or more of its feet towards the left edge of an adjacent prosodic word. The tableau in (35) indicates the preferences of ALL-FEET-LEFT when evaluating multiple prosodic words. All three feet in the first prosodic word orient themselves towards the left edge of the first prosodic word, and all three feet in the second prosodic word orient themselves towards the left edge of the second. ALL-FEET-LEFT consistently produces the expected unidirectional pattern. No Midpoint Pathology effect emerges. (In the example in (35), square brackets indicate prosodic word boundaries.)

(35)

	ALL-FEET-LEFT
☞ a. [(σσ)(σσ)(σσ)σ][(σσ)(σσ)(σσ)σ]	[** ****][** ****] (12)
b. [(σσ)(σσ)(σσ)σ][(σσ)(σσ)σ(σσ)]	[** ****][** *****] (13)
c. [(σσ)(σσ)(σσ)σ][(σσ)σ(σσ)(σσ)]	[** ****][*** *****] (14)
d. [(σσ)(σσ)(σσ)σ][σ(σσ)(σσ)(σσ)]	[** ****][* *** *****] (15)
e. [(σσ)(σσ)σ(σσ)][(σσ)(σσ)(σσ)σ]	[** *****][** ****] (13)
f. [(σσ)(σσ)σ(σσ)][(σσ)(σσ)σ(σσ)]	[** *****][** *****] (14)
g. [(σσ)(σσ)σ(σσ)][(σσ)σ(σσ)(σσ)]	[** *****][*** *****] (15)
h. [(σσ)(σσ)σ(σσ)][σ(σσ)(σσ)(σσ)]	[** *****][* *** *****] (16)
i. [(σσ)σ(σσ)(σσ)][(σσ)(σσ)(σσ)σ]	[*** *****][** ****] (14)
j. [(σσ)σ(σσ)(σσ)][(σσ)(σσ)σ(σσ)]	[*** *****][** *****] (15)
k. [(σσ)σ(σσ)(σσ)][(σσ)σ(σσ)(σσ)]	[*** *****][*** *****] (16)
l. [(σσ)σ(σσ)(σσ)][σ(σσ)(σσ)(σσ)]	[*** *****][* *** *****] (17)
m. [σ(σσ)(σσ)(σσ)][(σσ)(σσ)(σσ)σ]	[* *** *****][** ****] (15)
n. [σ(σσ)(σσ)(σσ)][(σσ)(σσ)σ(σσ)]	[* *** *****][** *****] (16)
o. [σ(σσ)(σσ)(σσ)][(σσ)σ(σσ)(σσ)]	[* *** *****][*** *****] (17)
p. [σ(σσ)(σσ)(σσ)][σ(σσ)(σσ)(σσ)]	[* *** *****][* *** *****] (18)

The RSA approach is able to produce the essential directionality effects, then, even in forms containing multiple prosodic words. As a result, it actually produces the essential directionality effects more reliably than GA itself. For a more thorough discussion of how RSA constraints create essential directionality effects, see Hyde (2012, forthcoming).

Section 5 An RSA approach to accent windows

Like its same-edge constraints, GA's opposite-edge constraints produce Midpoint Pathology effects. Instead of drawing an instance of *ACat2* to the exact midpoint of a string or substring, however, opposite-edge constraints draw an instance of *ACat2* to a point just offset from the midpoint.

Consider, for example, the opposite-edge GA constraint ALIGN (σ, L, A, R, σ), given in (36), which requires alignment between the left edges of syllables and the right edge of an accent.

(36) ALIGN (σ, L, A, R, σ): The left edge of every syllable coincides with the right edge of some accent. Assess a violation mark for each syllable intervening between misaligned edges.

As (37) and (38) illustrate, ALIGN (σ, L, A, R, σ) produces a Midpoint Pathology effect where the key position is just to the left of the string's center. As with its same-edge counterparts, the preferences of the opposite-edge ALIGN (σ, L, A, R, σ) exhibit no optionality when the string contains a middle syllable. When the string consists of seven syllables, for example, as in (37), the fourth syllable is the middle syllable, and ALIGN (σ, L, A, R, σ) positions the accent just to the left of the fourth syllable. This minimizes the overall distance between the right edge of the accent and the left edges of *all* misaligned syllables.

(37)

	ALIGN (σ, L, A, R, σ)
a. $\overset{A}{\sigma}$ σ σ σ σ σ σ	* * ** *** **** ***** (16)
b. σ $\overset{A}{\sigma}$ σ σ σ σ σ	** * * ** *** **** (13)
☞ c. σ σ $\overset{A}{\sigma}$ σ σ σ σ	*** ** * * ** *** (12)
d. σ σ σ $\overset{A}{\sigma}$ σ σ σ	**** *** ** * * ** (13)
e. σ σ σ σ $\overset{A}{\sigma}$ σ σ	***** **** *** ** * * (16)
f. σ σ σ σ σ $\overset{A}{\sigma}$ σ	****** ***** **** *** ** * (21)
g. σ σ σ σ σ σ $\overset{A}{\sigma}$	******* ****** ***** **** *** ** * (28)

Also like its same-edge counterparts, ALIGN (σ, L, A, R, σ) tolerates a degree of optionality when the string does not contain a middle syllable. When the string consists of eight syllables, for example, as in (38), ALIGN (σ, L, A, R, σ) positions the accent on either the third syllable or the fourth syllable. In other words, it positions the accent either on or immediately preceding the syllable just to the left of the string's center.

(38)

	ALIGN (σ, L, A, R, σ)
a. $\overset{A}{\sigma}$ σ σ σ σ σ σ σ	* * ** *** **** ***** ****** (22)
b. σ $\overset{A}{\sigma}$ σ σ σ σ σ σ	** * * ** *** **** ***** (18)
☞ c. σ σ $\overset{A}{\sigma}$ σ σ σ σ σ	*** ** * * ** *** **** (16)
☞ d. σ σ σ $\overset{A}{\sigma}$ σ σ σ σ	**** *** ** * * ** *** (16)
e. σ σ σ σ $\overset{A}{\sigma}$ σ σ σ	***** **** *** ** * * ** (18)
f. σ σ σ σ σ $\overset{A}{\sigma}$ σ σ	****** ***** **** *** ** * * (22)
g. σ σ σ σ σ σ $\overset{A}{\sigma}$ σ	******* ****** ***** **** *** ** * (28)
h. σ σ σ σ σ σ σ $\overset{A}{\sigma}$	******** ******* ****** ***** **** *** ** * (36)

The table in (39), then, summarizes the preferences of ALIGN (σ, L, A, R, σ) in cases where a single accent accompanies a string of syllables. As (39) indicates, ALIGN (σ, L, A, R, σ) always draws the accent towards a position just offset from the center of the string. If there is a middle syllable, the accent occurs just to the left of the middle syllable. If there is no middle syllable, the accent occurs either on or immediately preceding the syllable just to the left of the string's center.

(39) Preferences of ALIGN (σ, L, A, R, σ)

a. 1 syllable σ́
b. 2 syllables σ́σ
c. 3 syllables σ́σσ
d. 4 syllables σ́σσσ *or* σσ́σσ
e. 5 syllables σσ́σσσ
f. 6 syllables σσ́σσσσ *or* σσσ́σσσ
g. 7 syllables σσσ́σσσσ
h. 8 syllables σσσ́σσσσσ *or* σσσσ́σσσσ
i. 9 syllables σσσσ́σσσσσ
j. 10 syllables σσσσ́σσσσσσ *or* σσσσσ́σσσσσ

RSA's opposite-edge constraints avoid the Midpoint Pathology just like their same-edge counterparts. Rather than creating Midpoint Pathology effects, opposite-edge RSA constraints have the effect of confining instances of one of the aligned categories to a window at an edge of a form established by an instance of the other aligned category. Consider, for example, how an opposite-edge constraint like ALIGN (σ, L, A, R, σ) would have to be formulated under Relation-Specific Alignment. In the prohibited configuration in RSA's opposite-edge alignment schema, (31c), one aligned category precedes the other with the separator category intervening. To require alignment between the right edge of an accent and the left edge of a syllable, then, the prohibited configuration would be one where an accent precedes a syllable with a syllable intervening. The result is the FINAL-WINDOW-σ constraint, given in (40).

(40) FINAL-WINDOW-σ: $*\langle A, \sigma, \sigma\rangle \,/\, A\ \ldots\ \sigma \ldots\ \sigma$
'Assess a violation mark for every $\langle A, \sigma, \sigma\rangle$ such that A precedes σ with σ intervening.'

Though FINAL-WINDOW-σ is like ALIGN (σ, L, A, R, σ) in that it is distance-sensitive and promotes alignment between the left edges of syllables and the right edge of the accent, it differs from its GA counterpart in being relation-specific. Where ALIGN (σ, L, A, R, σ) prohibits misalignment whether the misaligned syllable precedes, follows, or contains the accent, FINAL-WINDOW-σ prohibits misalignment only when the misaligned syllable follows the accent. As (41) illustrates, FINAL-WINDOW-σ draws the accent, not to the syllable adjacent to the middle syllable, but to the syllable adjacent to the final syllable, (41f), or to final syllable itself, (41g). The constraint is satisfied when the accent occurs in these positions because any misaligned syllable either precedes the accent or contains it and, therefore, fails to produce violation marks.

(41)

	Final-Window-σ
a. $\overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** **** ***** (15)
b. $\sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** **** (10)
c. $\sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma\ \sigma$	* ** *** (6)
d. $\sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma\ \sigma$	* ** (3)
e. $\sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma\ \sigma$	* (1)
☞ f. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}\ \sigma$	
☞ g. $\sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \sigma\ \overset{A}{\sigma}$	

The RSA approach to accent windows is based on the type of effect illustrated in (41). Final-Window-σ creates a final disyllabic accent window by prohibiting an accent from preceding a syllable with a syllable intervening. A final trisyllabic accent window is established by prohibiting an accent from preceding a foot with a syllable intervening, as in the Final-Window-F constraint, (42a).

(42) a. Final-Window-F: $*\langle A, F, \sigma\rangle / A\ \ldots\ \sigma \ldots\ F$

'Assess a violation mark for every $\langle A, F, \sigma\rangle$ such that A precedes F with σ intervening.'

b. Initial-Window-F: $*\langle F, A, \sigma\rangle / F \ldots\ \sigma \ldots\ A$

'Assess a violation mark for every $\langle F, A, \sigma\rangle$ such that F precedes A with σ intervening.'

As (43) illustrates, Final-Window-F draws the accent to the syllable adjacent to the final foot, (43d), or to one of the two syllables that make up the final foot, (43e,f). The constraint is satisfied when the accent occurs in these positions because any misaligned foot either precedes the accent or contains it and, therefore, fails to produce violation marks. The result is that Final-Window-F confines the accent to a three-syllable window at the right edge of the form.

(43)

	Final-Window-F
a. $(\overset{A}{\sigma}\sigma)(\sigma\sigma)(\sigma\sigma)$	* *** (4)
b. $(\sigma\overset{A}{\sigma})(\sigma\sigma)(\sigma\sigma)$	** (2)
c. $(\sigma\sigma)(\overset{A}{\sigma}\sigma)(\sigma\sigma)$	* (1)
☞ d. $(\sigma\sigma)(\sigma\overset{A}{\sigma})(\sigma\sigma)$	
☞ e. $(\sigma\sigma)(\sigma\sigma)(\overset{A}{\sigma}\sigma)$	
☞ f. $(\sigma\sigma)(\sigma\sigma)(\sigma\overset{A}{\sigma})$	

In a similar fashion, Initial-Window-F, given in (42b), confines accent to a three-syllable window at the left edge. Initial-Window-F prohibits a foot from preceding an accent with a syllable intervening. It is satisfied when the accent occurs either on the syllable immediately following the initial foot or on one of the two syllables within the initial foot. I omit the additional tableau.

In place of the Midpoint Pathology, then, opposite-edge RSA constraints have the effect of creating peripheral windows in which aligned categories must appear. In the case of FINAL-WINDOW-F and INITIAL-WINDOW-F, accent is confined to a trisyllabic window at the edge of the word.[5] The result is quite useful, since languages that confine accent to a three-syllable window at either the right edge or the left edge of a word are fairly common. Among the languages that confine accent to the first three syllables are Azkoitia Basque (Hualde 1998) and Kashaya (Buckley 1992, 1994). Among the Languages that confine accent to the final three syllables are Latin, Macedonian (Comrie 1976), Maithili (Jha 1940-1944, 1958; Hayes 1995), and Pirahã (Everett and Everett 1984; Everett 1988).

To illustrate, consider the effect of the trisyllabic window in the regular and irregular accent patterns of Macedonian. In the regular Macedonian pattern, accent occupies the leftmost of the final three syllables.

(44) Macedonian regular pattern

a.	zbór	‘word’	b.	vodéničar	‘miller’
	zbórot			vodeníčarot	
	zbórovi			vodeníčari	
	zboróvite			vodeničárite	

In the irregular pattern, accent occurs on a lexically specified syllable as long as it is one of the final three. If suffixation pushes the lexically specified syllable further to the left, accent returns to the antepenult by default.

(45) Macedonian irregular pattern

a.	citát	‘quotation’	b.	romántik	‘romantic’
	citátot			romántikot	
	citáti			romántici	
	citátite			romantícite	

To produce the regular antepenultimate accent of the regular pattern, FINAL-WINDOW-F creates a three-syllable window at the right edge of the word and ACCENT-LEFT, given in (46), aligns the accent as far to the left within the window as possible.

(46) ACCENT-LEFT: $*\langle \omega, A, \sigma \rangle \,/\, [\ \dots\ \sigma \dots A \dots\ ]_{\omega}$

‘Assess a violation mark for every $\langle \omega, A, \sigma \rangle$ such that σ precedes A within ω.’

---

[5] The RSA analysis assumes a theory in which parsing is exhaustive (Hyde 2002, forthcoming). Allowing syllables to remain unparsed, as in Weak Layering (Itô and Mester 1992) accounts, results in unattested four-syllable windows, as Kager (2012) points out. Aside from the necessity of assuming exhaustive parsing in the RSA analysis of accent windows, there are a number of other reasons to doubt the structural assumptions of Weak Layering accounts. See Hyde 2012b, forthcoming, for discussion.

As (47) illustrates, the ranking Final-Window-F >> Accent-Left locates the accent just to the left of a final stressless foot. Final-Window-F excludes (47a-c), where the accent fails to occur either within the final foot or adjacent to the final foot. Accent-Left excludes the final accent of (47f) and the penultimate accent of (47e), because the accent occurs further to the left in (47d). Though parsing is assumed to be exhaustive (see note 5), only the final foot, the foot that plays the key role in establishing the accent window, is shown in (47), (49), (50).

(47)

	Final-Window-F	Accent-Left
a. $\overset{A}{\sigma}\sigma\sigma\sigma(\sigma\sigma)$	*!**	
b. $\sigma\overset{A}{\sigma}\sigma\sigma(\sigma\sigma)$	*!*	*
c. $\sigma\sigma\overset{A}{\sigma}\sigma(\sigma\sigma)$	*!	**
☞ d. $\sigma\sigma\sigma\overset{A}{\sigma}(\sigma\sigma)$		***
e. $\sigma\sigma\sigma\sigma(\overset{A}{\sigma}\sigma)$		****!
f. $\sigma\sigma\sigma\sigma(\sigma\overset{A}{\sigma})$		****!*

When we insert a constraint that requires faithfulness to a lexically specified accent into the ranking between Final-Window-F and Accent-Left, the analysis also establishes the appropriate restrictions on the irregular Macedonian pattern.

(48) Faith-Accent: An accent in the input occurs on the same syllable in the output.

As (49) illustrates, Final-Window-F must dominate Faith-Accent to prevent faithfulness to a lexical accent that occurs outside the three-syllable window. Final-Window-F excludes the faithful candidate in such cases and, in conjunction with the low-ranked Accent-Left, returns stress to its default position over the antepenult.

(49)

$\sigma\sigma\overset{A}{\sigma}\sigma\sigma\sigma$	Final-Wind-F	Faith-Accent	Accent-Left
a. $\overset{A}{\sigma}\sigma\sigma\sigma(\sigma\sigma)$	*!**	*	
b. $\sigma\overset{A}{\sigma}\sigma\sigma(\sigma\sigma)$	*!*	*	*
c. $\sigma\sigma\overset{A}{\sigma}\sigma(\sigma\sigma)$	*!		**
☞ d. $\sigma\sigma\sigma\overset{A}{\sigma}(\sigma\sigma)$		*	***
e. $\sigma\sigma\sigma\sigma(\overset{A}{\sigma}\sigma)$		*	****!
f. $\sigma\sigma\sigma\sigma(\sigma\overset{A}{\sigma})$		*	****!*

As (50) illustrates, Faith-Accent must dominate Accent-Left to allow the lexically specified syllable to retain the accent when it is penultimate or final. In such cases, Faith-Accent prevents Accent-Left from pushing the accent to the left edge of the three-syllable window.

(50)

$\sigma\sigma\sigma\sigma\overset{A}{\sigma}\sigma$	FINAL-WIND-F	FAITH-ACCENT	ACCENT-LEFT
a. $\overset{A}{\sigma}\sigma\sigma\sigma(\sigma\sigma)$	*!**	*	
b. $\sigma\overset{A}{\sigma}\sigma\sigma(\sigma\sigma)$	*!*	*	*
c. $\sigma\sigma\overset{A}{\sigma}\sigma(\sigma\sigma)$	*!	*	**
d. $\sigma\sigma\sigma\overset{A}{\sigma}(\sigma\sigma)$		*!	***
☞ e. $\sigma\sigma\sigma\sigma(\overset{A}{\sigma}\sigma)$			****
f. $\sigma\sigma\sigma\sigma(\sigma\overset{A}{\sigma})$		*!	*****

In this part of the discussion, then, we have seen that opposite-edge RSA constraints provide a fairly simple analysis of accent windows. As Kager (2012) acknowledges, the RSA approach is able to produce every type of attested accent window. His objection to the RSA approach is that it over-generates in a pathological way: lingering Midpoint Pathology effects cause RSA to predict unattested, pathological patterns. We examine this claim more carefully in Sections 6 and 7.

Section 6 Dual window patterns

The types of patterns that Kager (2012) claims to be examples of Midpoint Pathology effects arise when there are two high-ranking window constraints that establish accent windows at opposite edges of a form. The pattern in (3), for example, repeated in (51a), could emerge when the distance-sensitive FINAL-WINDOW-F and INITIAL-WINDOW-F are both high-ranked. The pattern in (2), repeated in (51b), could emerge when distance-insensitive versions of FINAL-WINDOW-F and INITIAL-WINDOW-F are both high-ranked. For comparison, a pattern of regular antepenultimate accent is given in (51c).

(51)

a. Distance-sensitive	b. Distance-insensitive	c. Antepenultimate
σ́	σ́	σ́
σσ́	σσ́	σ́σ
σσσ́	σσσ́	σ́σσ
σσσ́σ	σσσ́σ	σσ́σσ
σσσ́σσ	σσσ́σσ	σσσ́σσ
σσσσ́σσ	σσσσσσ́	σσσσ́σσ
σσσσσ́σσ	σσσσσσσ́	σσσσσ́σσ
σσσσσσ́σσ	σσσσσσσσ́	σσσσσσ́σσ
σσσσσσσ́σσ	σσσσσσσσσ́	σσσσσσσ́σσ
σσσσσσσσ́σσ	σσσσσσσσσσ́	σσσσσσσσ́σσ

It should be clear at this point that neither (51a) nor (51b) is actually an example of a Midpoint Pathology effect. Though the single accent does occur near the midpoint in four- and five-syllable forms in (51b) and in four-, five-, and six-syllable forms in (51a), the same is true of the pattern of regular antepenult stress in (51c). None of the patterns in (51) exhibit the general attraction of accent to the midpoint that would be indicative of a Midpoint Pathology effect.

The significant positions in the patterns in (51a,b) are the positions preferred by FINAL-WINDOW-F—ultimate, penultimate, and antepenultimate—and the positions preferred by INITIAL-WINDOW-F—initial, peninitial, and post-peninitial. In shorter forms, where the initial and final windows overlap, accent is confined to the points of overlap. In four- and five-syllable forms, the points of overlap incidentally occur near the form's center, but the center of the form is not a significant position in the overall pattern.

To illustrate, the pattern in (51a) would emerge under the ranking FINAL-WINDOW-F >> INITIAL-WINDOW-F >> ACCENT-RIGHT. ACCENT-RIGHT, the counterpart of ACCENT-LEFT, is given in (52).

(52) ACCENT-RIGHT: $*\langle \omega, A, \sigma \rangle \,/\, [\, \ldots A \ldots \sigma \ldots\,]_{\omega}$

'Assess a violation mark for every $\langle \omega, A, \sigma \rangle$ such that A precedes σ within ω.'

Since FINAL-WINDOW-F is high-ranked, it establishes a final accent window that is respected in all cases. The interactions of the lower ranked INITIAL-WINDOW-F and ACCENT-RIGHT result in a sort of conflicting directionality observable in the comparison of forms of different lengths. In the shortest forms—three and four syllables—the lower-ranked ACCENT-RIGHT has an observable effect: it draws the accent towards the form's right edge. In longer forms, the preferences of ACCENT-RIGHT give way completely to those of INITIAL-WINDOW-F, which draws the accent to the antepenult, the leftmost position within the final accent window. INITIAL-WINDOW-F can affect the position of the accent even when the accent must occur outside the initial accent window because INITIAL-WINDOW-F is distance-sensitive.

In forms with three syllables or fewer, as (53) demonstrates, the final accent window, established by FINAL-WINDOW-F, and the initial accent window, established by INITIAL-WINDOW-F, overlap completely, both extending the length of the form. The window constraints are both satisfied regardless of where the accent occurs, so ACCENT-RIGHT is free to position the accent over the final syllable. (In all tableaux in this section, the word-initial foot is indicated with parentheses and the word-final foot with square brackets. Other feet are omitted. Accent windows are underlined. Overlap of accent windows is indicated with double underlining.)

(53)

σσσ	FINAL-WIND-F	INITIAL-WIND-F	ACCENT-RIGHT
a. $(\,\underline{\underline{\overset{A}{\sigma}\,[\,\sigma\,)\,\sigma}}\,]$			*!*
b. $(\,\underline{\underline{\sigma\,[\,\overset{A}{\sigma}\,)\,\sigma}}\,]$			*!
☞ c. $(\,\underline{\underline{\sigma\,[\,\sigma\,)\,\overset{A}{\sigma}}}\,]$			

In forms with four syllables, the initial and final accent windows only partially overlap. The area of overlap includes just the second and third syllables. The window constraints can both be satisfied, then, when the accent occurs over either. The lower-ranked ACCENT-RIGHT ensures that it occurs over the third.

(54)

σσσσ	FINAL-WIND-F	INITIAL-WIND-F	ACCENT-RIGHT
a. ($\underline{\overset{A}{\sigma}\underline{\sigma)[\sigma}\sigma}$]	*!		***
b. ($\underline{\sigma\underline{\overset{A}{\sigma})[\sigma}\sigma}$]			*!*
☞ c. ($\underline{\sigma\underline{\sigma)[\overset{A}{\sigma}}\sigma}$]			*
d. ($\underline{\sigma\underline{\sigma)[\sigma}\overset{A}{\sigma}}$]		*!	

In forms with five syllables, the area of overlap includes just the third syllable, which also happens to be the middle syllable. The window constraints can both be satisfied, then, but only when the accent occurs over the third syllable. Since the window constraints fix the position of the accent at this length, the lower-ranked ACCENT-RIGHT has no influence over the accent's location.

(55)

σσσσσ	FINAL-WIND-F	INITIAL-WIND-F	ACCENT-RIGHT
a. ($\underline{\overset{A}{\sigma}\sigma\,)\,\underline{\sigma}\,[\,\sigma\sigma}$]	*!*		****
b. ($\underline{\sigma\overset{A}{\sigma}\,)\,\underline{\sigma}\,[\,\sigma\sigma}$]	*!		***
☞ c. ($\underline{\sigma\sigma\,)\,\underline{\overset{A}{\sigma}}\,[\,\sigma\sigma}$]			**
d. ($\underline{\sigma\sigma\,)\,\underline{\sigma}\,[\,\overset{A}{\sigma}\sigma}$]		*!	*
e. ($\underline{\sigma\sigma\,)\,\underline{\sigma}\,[\,\sigma\overset{A}{\sigma}}$]		*!*	

Finally, in forms with six syllables or more, the accent windows no longer overlap, so it is only possible to satisfy one of the window constraints. Since FINAL-WINDOW-F is higher-ranked, FINAL-WINDOW-F is the constraint that must be satisfied, and it restricts the accent to the final three syllables. Since INITIAL-WINDOW-F is distance-sensitive, however, it can still draw the accent as far to the left within the final window as possible, fixing it over the antepenult. Since the window constraints fix the position of the accent, the lower-ranked ACCENT-RIGHT has no influence over the accent's location.

(56)

σσσσσσ	FINAL-WIND-F	INITIAL-WIND-F	ACCENT-RIGHT
a. ($\underline{\overset{A}{\sigma}\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\sigma}$]	*!**		*****
b. ($\underline{\sigma\overset{A}{\sigma}\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\sigma}$]	*!*		****
c. ($\underline{\sigma\sigma\,)\,\overset{A}{\sigma}}\,\underline{\sigma\,[\,\sigma\sigma}$]	*!		***
☞ d. ($\underline{\sigma\sigma\,)\,\sigma}\,\underline{\overset{A}{\sigma}\,[\,\sigma\sigma}$]		*	**
e. ($\underline{\sigma\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\overset{A}{\sigma}\sigma}$]		**!	*
f. ($\underline{\sigma\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\overset{A}{\sigma}}$]		**!*	

Though the (51a) pattern is clearly not an example of a Midpoint Pathology effect, it does happen to be unattested. It should be noted, however, that (51a) is very similar to patterns that are attested, and it cannot reasonably be taken to constitute a pathology of any variety. As we shall see in Section 7, the (51a) pattern is quite similar to the pattern described by Abrahamson (1968) for Içuã Tupi. In fact, the addition of a Nonfinality constraint to the ranking that produces (51a) is all that is needed for the Içuã Tupi pattern to emerge.

The situation is somewhat different for the pattern in (51b). Though (51b) is not an example of a Midpoint Pathology effect, it is different enough from attested patterns that it might be argued to represent a pathology of some type. Flipping from final position in shorter forms to penultimate or antepenultimate position in four- and five-syllable forms and back to final position in longer forms is a fairly exotic pattern. This is not an argument against the RSA approach generally, however. The flipping effect is one common to conflicting pairs of high-ranking alignment constraints, the higher-ranked of the pair being distance-insensitive, in contexts where it is not always possible to satisfy the higher-ranked constraint.[6] It is simply an argument that window constraints should be distance-sensitive, like those that produce the (51a) pattern, rather than distance-insensitive.

To illustrate, the pattern in (51b) would emerge with distance-insensitive versions of the Final-Window-F and Initial-Window-F constraints under the same ranking that produces the pattern in (51a). The distance-insensitive versions are given in (57).

(57) a. Final-Window-DI: $*\langle A, F\rangle \,/\, A \;\ldots\; \sigma \ldots\; F$
‘Assess a violation mark for every $\langle A, F\rangle$ such that A precedes F with σ intervening.’

b. Initial-Window-DI: $*\langle F, A\rangle \,/\, F \ldots\; \sigma \ldots\; A$
‘Assess a violation mark for every $\langle F, A\rangle$ such that F precedes A with σ intervening.’

As indicated in (58-61), the results for forms with one to five syllables are identical to the results obtained using the distance-sensitive versions of the window constraints. In forms with three syllables or fewer, the final accent window and the initial accent window both extend the length of the form. The window constraints are both satisfied regardless of where the accent occurs, so Accent-Right positions the accent over the final syllable.

(58)

σσσ	Fin-Wind-DI	Init-Wind-DI	Accent-Right
a. $(\,\underline{\underline{\overset{A}{\sigma}\,[\,\sigma\,)\,\sigma}}\,]$			*!*
b. $(\,\underline{\underline{\sigma\,[\,\overset{A}{\sigma}\,)\,\sigma}}\,]$			*!
☞ c. $(\,\underline{\underline{\sigma\,[\,\sigma\,)\,\overset{A}{\sigma}}}\,]$			

---

[6] Note that the flipping effect is not always problematic. Sometimes it is actually desirable. The standard OT analysis (McCarthy and Prince 1993) of bidirectional patterns like Polish (Rubach & Booij 1985), Garawa (Furby 1974) and Spanish (Harris 1983), for example, is based on what is essentially a flipping effect. One high-ranked alignment constraint anchors a single foot at one edge of the prosodic word, a lower-ranked alignment constraint aligns all other feet to the opposite edge. Since the higher-ranked constraint cannot influence the position of more than one foot, the lower-ranked constraint can “flip” the remaining feet in the opposite direction.

In forms with four syllables, the initial and final accent windows overlap, but the area of overlap includes just the second and third syllables. ACCENT-RIGHT ensures that the accent occurs over the third.

(59)

σσσσ	FIN-WIND-DI	INIT-WIND-DI	ACCENT-RIGHT
a. $(\,\overset{A}{\sigma}\sigma)[\sigma\sigma\,]$	*!		***
b. $(\,\sigma\overset{A}{\sigma})[\sigma\sigma\,]$			*!*
☞ c. $(\,\sigma\sigma)[\overset{A}{\sigma}\sigma\,]$			*
d. $(\,\sigma\sigma)[\sigma\overset{A}{\sigma}\,]$		*!	

In forms with five syllables, the area of overlap includes just the third syllable. The window constraints fix the position of the accent over the third syllable, then, and the lower-ranked ACCENT-RIGHT has no influence over the accent's location.

(60)

σσσσσ	FIN-WIND-DI	INIT-WIND-DI	ACCENT-RIGHT
a. $(\,\overset{A}{\sigma}\sigma\,)\,\sigma\,[\,\sigma\sigma\,]$	*!		****
b. $(\,\sigma\overset{A}{\sigma}\,)\,\sigma\,[\,\sigma\sigma\,]$	*!		***
☞ c. $(\,\sigma\sigma\,)\,\overset{A}{\sigma}\,[\,\sigma\sigma\,]$			**
d. $(\,\sigma\sigma\,)\,\sigma\,[\,\overset{A}{\sigma}\sigma\,]$		*!	*
e. $(\,\sigma\sigma\,)\,\sigma\,[\,\sigma\overset{A}{\sigma}\,]$		*!	

The distance-insensitive constraints yield different results for forms with six or more syllables. As (61) illustrates, the high-ranked FINAL-WINDOW-DI still restricts the accent to the final three syllables. Since INITIAL-WINDOW-DI is distance-insensitive, however, it cannot influence the position of the accent within the final window, as the distance-sensitive INITIAL-WINDOW-F did in producing the (51a) pattern above. This means that the right-oriented ACCENT-RIGHT, rather than the left-oriented INITIAL-WINDOW-DI, positions the accent. ACCENT-RIGHT locates it over the final syllable.

(61)

σσσσσσ	FIN-WIND-DI	INIT-WIND-DI	ACCENT-RIGHT
a. $(\,\overset{A}{\sigma}\sigma\,)\,\sigma\sigma\,[\,\sigma\sigma\,]$	*!		*****
b. $(\,\sigma\overset{A}{\sigma}\,)\,\sigma\sigma\,[\,\sigma\sigma\,]$	*!		****
c. $(\,\sigma\sigma\,)\,\overset{A}{\sigma}\sigma\,[\,\sigma\sigma\,]$	*!		***
d. $(\,\sigma\sigma\,)\,\sigma\overset{A}{\sigma}\,[\,\sigma\sigma\,]$		*	*!*
e. $(\,\sigma\sigma\,)\,\sigma\sigma\,[\,\overset{A}{\sigma}\sigma\,]$		*	*!
☞ f. $(\,\sigma\sigma\,)\,\sigma\sigma\,[\,\sigma\overset{A}{\sigma}\,]$		*	

While the types of patterns identified by Kager (2012) can be produced by RSA constraints, then, they are clearly not examples of Midpoint Pathology effects. In fact, only the patterns produced by distance-insensitive window constraints are plausibly pathologies of any type. This is not an argument against the RSA approach generally; it is simply an argument that window constraints must be distance-sensitive. As we shall see next, patterns produced with two high-ranking distance-sensitive window constraints actually are attested.

Section 7 Içuã Tupi and North Kyungsang Korean

While patterns that crucially rely on two-high ranking window constraints appear to be rare, they are not unattested. In the discussion that follows, we will examine two. The accent pattern of Içuã Tupi (Abrahamson 1968) requires two high-ranking constraints that establish trisyllabic accent windows at opposite edges of a form. The accent pattern of North Kyungsang Korean (NKK; Kenstowicz and Sohn 2001) requires two high-ranking constraints that establish accent windows of different sizes. One constraint must establish an initial trisyllabic window, and the other must establish a final disyllabic window. (Stanton (2014) discusses the similarity of the Içuã Tupi and NKK patterns to the patterns cited by Kager (2012) in the context of discussing the learnability of patterns where the position of accent varies depending on the overall length of the form.)

First consider the Içuã Tupi pattern. Abrahamson (1968) describes the accent pattern of Içuã Tupi as follows:

> In the predominant word patterns accent occurs on the penult in two, three, and four syllable words…and on the antepenult in five or more syllable words…[7]

(62) Içuã Tupi accent pattern

a.	σ́σ	ˈiʧĩŋ	‘it is white’
b.	σσ́σ	tajˈtitu	‘wild pig’
c.	σσσ́σ	patiˈwapɛ	‘bark pan’
d.	σσσ́σσ	abiˈdabidab^{m}	*no gloss*
e.	σσσσ́σσ	*no example given*	
f.	σσσσσ́σσ	*no example given*	

As illustrated in (62), then, the accent pattern of Içuã Tupi is quite similar to the pattern in (51a), differing only in two- and three-syllable forms. For the most part, the Içuã Tupi pattern can be produced with the same ranking used to produce the (51a) pattern: FINAL-WINDOW-F >> INITIAL-WINDOW-F >> ACCENT-RIGHT. All that is needed to account for the difference in two- and three-syllable forms is to introduce NONFINALITY (Prince and Smolensky 1993/2004; Hyde 2003, 2007), given in (63), to the constraint set, so that it dominates ACCENT-RIGHT, as in (64).

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[7] Abrahamson does not actually provide examples of accent in the predominant word patterns for forms with more than five syllables. Although Abrahamson notes a less frequent word pattern where the accent occurs over the third syllable in six-syllable forms, providing the form [ahɛˈabɛbui], ‘his lung’, as an example, he clearly states that antepenultimate stress in six-syllable forms is the predominant pattern.

(63) Nonfinality: No accent occurs over the final syllable of the prosodic word.

(64) Içuã Tupi ranking

Final-Window-F >> Initial-Window-F >> Accent-Right; Nonfinality >> Accent-Right

Since the accent is restricted to the final three syllables in Içuã Tupi, Final-Window-F must dominate Initial-Window-F. The role of Nonfinality and Accent-Right is to influence the position of the accent in shorter forms. Accent-Right gives the accent a basic rightward orientation, subject to the restriction that it not occupy the final syllable. The role of Initial-Window-F is to gradually restrict the influence of Accent-Right as forms grow longer and then finally to supplant Accent-Right in establishing the accent's directional orientation.

In two- and three-syllable forms, the accent windows established by Final-Window-F and Initial-Window-F overlap completely, extending through the entire form. Since neither of the window constraints actually restricts the accent's location in forms of this length, the position of the accent is determined by Nonfinality and the low-ranked Accent-Right. In producing the (51a) pattern in Section 6, Accent-Right was able to draw the accent to the final syllable in two- and three-syllable forms. Under the Içuã Tupi ranking, however, Nonfinality prevents Accent-Right from drawing the accent any further to the right than the penult.

(65)

σσ	Fin-Wind-F	Init-Wind-F	Nonfinal	Accent-R
☞ a. $(\underline{\underline{\overset{A}{\sigma}\ \ \sigma}})$				*
b. $(\underline{\underline{\sigma\ \ \overset{A}{\sigma}}})$			*!	

(66)

σσσ	Fin-Wind-F	Init-Wind-F	Nonfinal	Accent-R
a. $(\underline{\underline{\overset{A}{\sigma}[\sigma)\sigma}}]$				*!*
☞ b. $(\underline{\underline{\sigma[\overset{A}{\sigma})\sigma}}]$				*
c. $(\underline{\underline{\sigma[\sigma)\overset{A}{\sigma}}}]$			*!	

In four syllable forms, as (67) indicates, the windows established by Initial-Window-F and Final-Window-F overlap at the second and third syllables. Although higher-ranked window constraints confine the accent to the area of overlap, the lower-ranked Accent-Right determines where within the area of overlap the accent occurs. Accent-Right draws the accent to the third syllable, which also happens to be the penultimate syllable. Since the area of overlap excludes the final syllable, Nonfinality does not play a crucial role in the evaluation.

(67)

σσσσ	Fin-Wind-F	Init-Wind-F	Nonfinal	Accent-R
a. $(\,\underline{\overset{A}{\sigma}\,\underline{\sigma)[\sigma}\,\sigma}\,]$	*!			***
b. $(\,\underline{\sigma\,\underline{\overset{A}{\sigma})[\sigma}\,\sigma}\,]$				*!*
☞ c. $(\,\underline{\sigma\,\underline{\sigma)[\overset{A}{\sigma}}\,\sigma}\,]$				*
d. $(\,\underline{\sigma\,\underline{\sigma)[\sigma}\,\overset{A}{\sigma}}\,]$		*!	*	

In five-syllable forms, the area of overlap of the two windows includes only the third syllable, which also happens to be the antepenult. The combined preferences of the high-ranked Final-Window-F and Initial-Window-F restrict the accent to the area of overlap, then, locating the accent on the antepenult. Since the high-ranked window constraints fix the position of the accent in five-syllable forms, Nonfinality and the low-ranked Accent-Right play no crucial role in the evaluation.

(68)

σσσσσ	Fin-Wind-F	Init-Wind-F	Nonfinal	Accent-R
a. $(\,\underline{\overset{A}{\sigma}\sigma\,)\,\underline{\underline{\sigma}}\,[\,\sigma\sigma}\,]$	*!*			****
b. $(\,\underline{\sigma\overset{A}{\sigma}\,)\,\underline{\underline{\sigma}}\,[\,\sigma\sigma}\,]$	*!			***
☞ c. $(\,\underline{\sigma\sigma\,)\,\underline{\underline{\overset{A}{\sigma}}}\,[\,\sigma\sigma}\,]$				**
d. $(\,\underline{\sigma\sigma\,)\,\underline{\underline{\sigma}}\,[\,\overset{A}{\sigma}\sigma}\,]$		*!		*
e. $(\,\underline{\sigma\sigma\,)\,\underline{\underline{\sigma}}\,[\,\sigma\overset{A}{\sigma}}\,]$		*!*	*	

Finally, in forms with six or more syllables, the two trisyllabic accent windows no longer overlap. Since Final-Window-F is the higher ranked constraint, the window at the right edge is the one that must be respected, and the accent is confined to the final three syllables. Since Initial-Window-F is distance-sensitive, however, it still exerts its directional preferences in a way that influences the position of the accent within the final window. It draws the accent to the leftmost position within the window, locating it on the antepenult. Nonfinality and the low-ranked Accent-Right do not play a crucial role in the evaluation.

(69)

σσσσσσ	Fin-Wind-F	Init-Wind-F	Nonfinal	Accent-R
a. $(\,\underline{\overset{A}{\sigma}\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\sigma}\,]$	*!**			*****
b. $(\,\underline{\sigma\overset{A}{\sigma}\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\sigma}\,]$	*!*			****
c. $(\,\underline{\sigma\sigma\,)\,\overset{A}{\sigma}}\,\underline{\sigma\,[\,\sigma\sigma}\,]$	*!			***
☞ d. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\overset{A}{\sigma}\,[\,\sigma\sigma}\,]$		*		**
e. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\overset{A}{\sigma}\sigma}\,]$		**!		*
f. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\sigma\,[\,\sigma\overset{A}{\sigma}}\,]$		**!*	*	

In the accent pattern of Içuã Tupi, then, the accent is always confined to the final three syllables due to the preferences of the high-ranked FINAL-WINDOW-F. In two- and three-syllable forms, NONFINALITY and the low-ranked ACCENT-RIGHT are responsible for positioning the accent within the final three-syllable window, locating it on the penult. In four-syllable forms, the combined preferences of the second window constraint, INITIAL-WINDOW-F, and ACCENT-RIGHT are sufficient to locate the accent within the final trisyllabic window, again locating it on the antepenult. In forms containing five or more syllables, INITIAL-WINDOW-F alone is responsible for fixing the position of the accent within the final trisyllabic window. It fixes the location of the accent at the antepenult.

Note that the influence of two window constraints is crucial in the Içuã Tupi case. One window constraint, FINAL-WINDOW-F, is necessary to restrict accent to the final three syllables, and the second window constraint, INITIAL-WINDOW-F, is necessary to gradually restrict and then supplant the lower-ranked ACCENT-RIGHT constraint in establishing the accent's basic directional orientation. A non-window alignment constraint like ACCENT-LEFT could not replace INITIAL-WINDOW-F in this context. While it could establish a leftward orientation for the accent, it could not do so gradually as forms grow longer. If ACCENT-LEFT dominated ACCENT-RIGHT, the accent would always be left-oriented within the final window, regardless of the length of the form.

We turn now to the "single-accent" pattern of North Kyungsang Korean (Kenstowicz and Sohn 2001), which also exhibits the effects of two accent windows.[8] In HKK's single-accent pattern, according to Kenstowicz and Sohn, accent can occupy a wider range of positions in forms consisting of two or three syllables than it can in forms containing four or more syllables. In forms consisting of two or three syllables, accent can occur over either the penult or the ultima. In cases where the penult is light and the ultima is heavy, accent tends to occur on the ultima. In cases where the penult is heavy or the ulitma light, accent tends to occur on the penult. In contrast, in forms containing four or more syllables, the accent occurs only on the penult.[9]

(70) North Kyungsang Korean accent pattern

a.	ĹL	héphi	'happy'
b.	H́L	théksi	'taxi'
c.	LH́	chenə́l	'channel'
d.	σĹL	sinéma	'cinema'
e.	σH́L	kharénta	'calendar'
f.	σLH́	allatín	'Aladdin'
g.	σσĹL	ameríkha	'America'
h.	σσH́L	hellikhóptha	'helicopter'
i.	σσĹH	phesɨtípal	'festival'
j.	σσσĹL	khelliphonía	'California'
k.	σσσH́L	inphulluénca	'influenza'

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[8] According to Kenstowicz and Sohn (2001), North Kyungsang Korean has two distinct accent patterns: a doubled-accent pattern and a single-accent pattern. In the doubled-accent pattern, a pitch peak occurs over the first two syllables of a form. In the single-accent pattern, a pitch peak occurs over one of the final two syllables. The discussion here focuses on the single-accent pattern.

[9] Epenthetic vowels appear to resist being accented, so accent will sometimes occur on the antepenult when the final two vowels are both epenthetic.

Since the accent never occurs outside of the final two syllables in HKK, the final accent window must be disyllabic, and the constraint that establishes it must be high-ranked. To produce a final disyllabic accent window, the RSA approach would simply prohibit an accent from preceding a syllable with a syllable intervening, as in the Final-Window-σ constraint, repeated in (71).

(71) Final-Window-σ: $*\langle A, \sigma, \sigma\rangle \,/\, A\ \ldots\ \sigma \ldots\ \sigma$
‘Assess a violation mark for every $\langle A, \sigma, \sigma\rangle$ such that A precedes F with σ intervening.’

In shorter forms, the position of the accent within the final disyllabic window is determined by the interactions of Weight-to-Stress (Prince 1980), given in (72), and Accent-Left. The necessary ranking is Weight-to-Stress >> Accent-Left. This allows the accent to occur over the heavier syllable, either the penult or ultima, when there is a difference between them. When there is no difference in syllable weight, the lower-ranked Accent-Left locates stress on the penult.

(72) Weight-to-Stress: Heavy syllables are accented.

The preferences of the constraint that establishes an initial trisyllabic window can be seen only in longer forms. In forms with four syllables or more, it provides a leftward directional orientation that overrides the demands of Weight-to-Stress. The initial trisyllabic window in HKK can be established by the same Initial-Window-F constraint employed in the analysis of Içuã Tupi above. As indicated in (73), Initial-Window-F must rank between Final-Window-σ and Weight-to-Stress.

(73) North Kyungsang Korean ranking
Final-Window-σ >> Initial-Window-F >> Weight-to-Stress >> Accent-Left

To illustrate how the ranking in (73) produces the HKK pattern, consider, first, forms consisting of two syllables. In forms containing only two syllables, the initial and final windows overlap, both extending the length of the form. The decision concerning the accent’s location falls to the lower ranked Weight-to-Stress and Accent-Left. When there is a difference in weight between the two syllables, as in (74), Weight-to-Stress locates the accent over the heavy syllable. When there is no difference in weight, as in (75), Accent-Left positions the accent over the initial syllable.

(74)

L H	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
a. $(\underline{\underline{\underline{\overset{A}{L}\quad H}}})$			*!	
☞ b. $(\underline{\underline{\underline{L\quad \overset{A}{H}}}})$				*

(75)

L L	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
☞ a. $(\underline{\underline{\underline{\overset{A}{L}\quad L}}})$				
b. $(\underline{\underline{\underline{L\quad \overset{A}{L}}}})$				*!

In forms consisting of three syllables, the initial and final windows still overlap. The area of overlap for three-syllable forms, however, contains just the final two syllables. The decision about where to place the accent within the area of overlap falls to the lower ranked Weight-to-Stress and Accent-Left. If there is a difference in weight between the final two syllables, as in (76), Weight-to-Stress locates the accent over the heavy syllable. If there is no difference in weight between the final two syllables, as in (77), Accent-Left positions the accent over the penult, the leftmost position in the area of overlap.

(76)

σ L H	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
a. $(\,\underline{\overset{A}{\sigma}}\;\;\underline{\underline{L}}\,)\,\underline{\underline{H}}$	*!			
b. $(\,\underline{\sigma}\;\;\underline{\underline{\overset{A}{L}}}\,)\,\underline{\underline{H}}$			*!	*
☞ c. $(\,\underline{\sigma}\;\;\underline{\underline{L}}\,)\,\underline{\underline{\overset{A}{H}}}$				**

(77)

σ L L	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
a. $(\,\underline{\overset{A}{\sigma}}\;\;\underline{\underline{L}}\,)\,\underline{\underline{L}}$	*!			
☞ b. $(\,\underline{\sigma}\;\;\underline{\underline{\overset{A}{L}}}\,)\,\underline{\underline{L}}$				*
c. $(\,\underline{\sigma}\;\;\underline{\underline{L}}\,)\,\underline{\underline{\overset{A}{L}}}$				**!

In forms consisting of four syllables, the initial and final windows overlap once again, but the area of overlap contains just the penultimate syllable. Since Initial-Window-F and Final-Window-σ are the highest-ranked constraints, accent is restricted to the penult. The lower ranked Weight-to-Stress and Accent-Left play no role in the evaluation. Note, in particular, that Weight-to-Stress cannot shift the accent to the ultima when it happens to be heavy, as in (78).

(78)

σσ L H	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
a. $(\,\underline{\overset{A}{\sigma}\sigma}\,)\,\underline{\underline{L}}\underline{H}$	*!*			
b. $(\,\underline{\sigma\overset{A}{\sigma}}\,)\,\underline{\underline{L}}\underline{H}$	*!			*
☞ c. $(\,\underline{\sigma\sigma}\,)\,\underline{\underline{\overset{A}{L}}}\underline{H}$			*	**
d. $(\,\underline{\sigma\sigma}\,)\,\underline{\underline{L}}\underline{\overset{A}{H}}$		*!		***

(79)

σσ L L	Fin-Wind-σ	Init-Wind-F	W2Stress	Accent-L
a. $(\,\underline{\overset{A}{\sigma}\sigma}\,)\,\underline{\underline{L}}\underline{L}$	*!*			
b. $(\,\underline{\sigma\overset{A}{\sigma}}\,)\,\underline{\underline{L}}\underline{L}$	*!			*
☞ c. $(\,\underline{\sigma\sigma}\,)\,\underline{\underline{\overset{A}{L}}}\underline{L}$				**
d. $(\,\underline{\sigma\sigma}\,)\,\underline{\underline{L}}\underline{\overset{A}{L}}$		*!		***

In forms consisting of five or more syllables, the initial trisyllabic window and the final disyllabic window no longer overlap. Since FINAL-WINDOW-σ is the higher ranked constraint, it is the final window that must be respected, and accent is confined to the final two syllables. Since INITIAL-WINDOW-F is distance-sensitive, however, it can still influence the location of the accent within final window. INITIAL-WINDOW-F draws the accent to the penult, the leftmost position within the final disyllabic window, and the lower-ranked WEIGHT-TO-STRESS and ACCENT-LEFT play no role in the evaluation. Note, in particular, that WEIGHT-TO-STRESS cannot shift the accent to the ultima when the ultima happens to be heavy, as in (80).

(80)

σσσLH	FIN-WIND-σ	INIT-WIND-F	W2STRESS	ACCENT-L
a. $(\,\underline{\overset{A}{\sigma}\sigma\,)\,\sigma}\,\underline{\underline{LH}}$	*!**			
b. $(\,\underline{\sigma\overset{A}{\sigma}\,)\,\sigma}\,\underline{\underline{LH}}$	*!*			*
c. $(\,\underline{\sigma\sigma\,)\,\overset{A}{\sigma}}\,\underline{\underline{LH}}$	*!			**
☞ d. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\underline{\overset{A}{L}H}}$		*	*	***
e. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\underline{L\overset{A}{H}}}$		*!*		****

(81)

σσσLL	FIN-WIND-σ	INIT-WIND-F	W2STRESS	ACCENT-L
a. $(\,\underline{\overset{A}{\sigma}\sigma\,)\,\sigma}\,\underline{\underline{LL}}$	*!**			
b. $(\,\underline{\sigma\overset{A}{\sigma}\,)\,\sigma}\,\underline{\underline{LL}}$	*!*			*
c. $(\,\underline{\sigma\sigma\,)\,\overset{A}{\sigma}}\,\underline{\underline{LL}}$	*!			**
☞ d. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\underline{\overset{A}{L}L}}$		*		***
e. $(\,\underline{\sigma\sigma\,)\,\sigma}\,\underline{\underline{L\overset{A}{L}}}$		*!*		****

Though patterns that crucially rely on two high-ranking window constraints are rare, then, they are attested, and the RSA approach easily accounts for such patterns. It should also be noted before concluding, however, that patterns that are *compatible* with two high-ranking window constraints are not rare at all. They are actually fairly common. (See Stanton 2014 for discussion). Though it only requires a high-ranking FINAL-WINDOW-F constraint, for example, the pattern of regular antepenultimate stress in (51c) can emerge under rankings where FINAL-WINDOW-F and INITIAL-WINDOW-F are both high-ranked, with INITIAL-WINDOW-F being dominated only by FINAL-WINDOW-F.

Section 8 Conclusion

Midpoint Pathology patterns are a particular type of configuration involving two different categories, *ACat1* and *ACat2*. The defining characteristic of Midpoint Pathology patterns is that they consistently (regardless of a form's length) divide the string of elements of *ACat1* into a number of substrings matching the number of elements of *ACat2* with an element of *ACat2* being drawn to the midpoint of each substring.

(82) If a string contains *m* instances of *ACat1* and *n* instances of *ACat2* such that *m* ≥ *n*, then

  a. the string of instances of *ACat1* is divided into *n* roughly equal substrings, and
  b. an instance *ACat2* occurs roughly at the midpoint of each substring.

As we saw in Sections 2 and 5, there can be some variation. Opposite-edge GA constraints, for example, will draw instances of *ACat2* to a position just offset from the midpoint of a substring of instances of *ACat1*. Midpoint Pathology effects can also be partially obscured when the positions of instances of *ACat1* and *ACat2* are restricted by other considerations, such as higher-ranked constraints.

While Midpoint Pathology effects are substantial under the GA formulation, and perhaps even pervasive, they do not arise under the RSA formulation. Kager's (2012) charge that Midpoint Pathology effects do arise under RSA is false. Two properties, distance-sensitivity and relation-generality, are necessary in order for the Midpoint Pathology to emerge. GA has both, but RSA only has distance-sensitivity. Since RSA lacks relation-generality, RSA constraints cannot produce Midpoint Pathology effects.

The types of dual accent window patterns that Kager (2012) identifies are not examples of Midpoint Pathology effects. In fact, they are not examples of pathological effects of any type. At least two dual accent window patterns are attested: the Içuã Tupi (Abrahamson 1968) pattern and the North Kyungsang Korean (Kenstowicz and Sohn 2001) pattern. While the RSA approach produces both patterns, a recursive foot approach (Bennett 2012, Kager 2012, Martínez-Paricio 2013) does not, as Kager (2012) very convincingly demonstrates. Unfortunately, this means that the recursive foot approach undergenerates with respect to attested accent windows. RSA, then, is the superior approach not only for the formulation of alignment constraints but also for the analysis of accent windows.

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