Overlap, Recursion, and Ternary Constructions

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A number of advantages have been claimed in the recent literature for theories that allow recursive, or internally layered, feet (Bennett 2012, Kager 2012, Martínez-Paricio 2013). The claimed advantages lie in the ability of recursive feet to capture phenomena associated with ternary stress configurations, whether the patterns involve repeating ternary configurations, ternary configurations embedded in otherwise binary patterns, or the ternary configurations found in trisyllabic accent windows.

For the most part, proponents of recursive feet have acknowledged the ability of overlapping feet (Hyde 2001, 2002, 2016) to capture the same types of phenomena. For example, Martínez-Paricio (2013) acknowledges the ability of overlapping feet to account for lengthening affects in Wargamay (Dixon 1981) and Yidiny (Dixon 1977a, b), as first demonstrated in Hyde (2002), and to account for patterns of Dutch vowel reduction (Booij 1977, Kager 1989, van Oostendorp 1995), as first demonstrated in Hyde (2001; see also Hermans 2011). Similarly, Kager (2012) acknowledges the ability of a Relation-Specific Alignment (Hyde 2012a) approach, which relies on overlapping feet (Hyde 2012a, 2015; Hyde Hofmeister, and Husic 2012; Hyde and Husic 2012), to produce all known examples of trisyllabic accent windows.

The claimed empirical advantages of recursive feet, then, are not really advantages at all. At least, they are not advantages over overlapping feet. Overlapping feet can cover the same empirical territory as that covered by recursive feet. As we shall see below, however, the reverse is not true. A number of phenomena that can be captured with overlapping feet cannot be captured with recursive feet. The two phenomena examined here are quantity-insensitive binary stress patterns and trisyllabic accent windows. As we shall see in Section 3, recursive feet cannot be employed to produce a reasonably accurate typology of quantity-insensitive binary stress patterns because they do not offer a way to address the Odd-Parity Input Problem (Hyde 2012b, 2016). As we shall see in Section 4, recursive feet cannot form the basis for a general account of accent windows, since they cannot account for accent windows where a secondary stress accompanies the accent within the window. The reason that overlapping feet can provide successful analyses in these situations, where recursive feet cannot, is that overlapping feet are able to represent a key class of ternary configurations that cannot be represented with recursive feet. Recursive feet cannot effectively account for quantity-insensitive binary stress patterns and trisyllabic accent windows simply because they cannot be used to represent the necessary ternary configurations.

The paper proceeds as follows. Section 1 presents the six different ternary configurations that must be produced by any approach to metrical stress theory, and it illustrates some of the contexts in which these configurations can arise in the stress and accent patterns of natural languages. Section 2 presents the basic assumptions of three different structural approaches to metrical stress theory—Standard Weak Layering (Itô and Mester 1992), the Recursive Foot Approach (Bennett 2012, Kager 2012, Martínez-Paricio 2013), and Weak Bracketing (Hyde 2002, 2016)—and it surveys the options for representing ternary configurations available to each. Section 3 discusses the Odd-Parity

Input Problem, and Section 4 discusses trisyllabic accent windows. Section 5 contains a summary and concluding remarks.

1 Trisyllabic Patterns

Trisyllabic patterns can be divided into two basic types based on the ratio of stressed syllables to syllables. The first type has one stressed syllable out of three, and the second has two stressed syllables out of three. While the ratio of 1 to 3 is the ratio that is typically examined when trisyllabic patterns are discussed in the literature, the theory must also address patterns based on a ratio of 2 to 3.

Three types of patterns with a 1-to-3 ratio can be distinguished by the position of the single stressed syllable relative to the two unstressed syllables. If the stressed syllable precedes the two unstressed syllables, as in (1a), the pattern is a dactyl. If the stressed syllable intervenes between the two unstressed syllables, as in (1b), the pattern is an amphibrach. When the stressed syllable follows the two unstressed syllables, as in (1c), the result is an anapest.

(1) Ternary configurations with a 1-to-3 ratio

a. Dactyl	b. Amphibrach	c. Anapest
σσσ	σσσ	σσσ

Similarly, three patterns with a 2-to-3 ratio can be distinguished by the positions of their two stressed syllables relative to their single unstressed syllable. If the two stressed syllables follow the unstressed syllable, as in (2a), the pattern is a bacchius. If the two stressed syllables bracket the unstressed syllable, as in (2b), the pattern is a cretic. Finally, when the two stressed syllables precede the unstressed syllable, as in (2c), the result is an antibacchius.

(2) Ternary configurations with a 2-to-3 ratio

a. Bacchius	b. Cretic	c. Antibacchius
σσσ	σσσ	σσσ

1.1 One-to-three ratios in attested stress patterns

1-to-3 ratios are the trisyllabic configurations found in the widest range of contexts in attested accent patterns. First, sequences of 1-to-3 configurations can form the basis for secondary stress patterns in ternary stress systems. For example, repeating dactyls can be found in Cayuvava (Key 1967), and repeating amphibrachs can be seen in Chugach (Leer 1985a, 1985b, 1985c).

(3) Cayuvava forms (Key 1967)

a.	dá.pa	‘canoe’
b.	tó.mo.ho	‘small water container’
c.	a.rí.po.ro	‘he already turned around’
d.	a.ri.pí.ri.to	‘already planted’
e.	à.ri.hi.hí.be.e	‘I have already put the top on’
f.	ma.rà.ha.ha.é.i.ki	‘their blankets’
g.	i.ki.tà.pa.re.ré.pe.ha	‘the water is clean’

(4) Repeating ampibrachs in Chugach (Leer 1985a, 1985b, 1985c)

a.	ɑtɑ́kɑ	‘my father’
b.	ɑkú̇tɑmék	‘kind of food (abl. sg.)’
c.	ɑtú̇qunikí	‘if he (refl.) uses them’
d.	pisú̇qutɑqú̇ni	‘if he (refl.) is going to hunt’
e.	mɑngɑ́rsuqutɑ́qunί	‘if he (refl.) is going to hunt porpoise’

Second, 1-to-3 configurations can be found at the periphery of odd-parity forms in otherwise binary stress systems. For example, dactyls can be found in initial position in odd-parity forms in the otherwise trochaic Garawa (Furby 1974) and in final position in odd-parity forms in the otherwise trochaic Pintupi (Hansen & Hansen 1969).

(5) Initial dactyls in Garawa (Furby 1974)

a.	wátjimpàŋu	‘armpit’
b.	kámalařìnji	‘wrist’
c.	yákalàkalàmpa	‘loose’
d.	ŋánkiřikìřimpàya	‘fought with boomerangs’

(6) Final dactyls in Pintupi (Hansen & Hansen 1969)

a.	mál̥awàna	‘through (from) behind’
b.	púl̥iŋkàlatju	‘we (sat) on the hill’
c.	tjámulìmpatjùnku	‘our relation’
d.	ṯíl̥iřìŋulàmpatju	‘the fire for our benefit flared up’

Amphibrachs can be found in final position in odd-parity forms in the otherwise trochaic Piro (Matteson 1965), and they can be found in initial position in odd-parity forms in the ortherwise trochaic Nengone (Tryon 1967).

(7) Final amphibrachs in Piro (Matteson 1965)

a.	t͡šìyaháta	‘he cries’
b.	sàlwayehkáta	‘they visit each other’
c.	pèt͡šhít͡šìmatlóna	‘they say they stalk it’
d.	rùslunòtinitkána	‘their voices already changed’

(8) Initial amphibrachs in Nengone (Tryon 1967)

a.	mó̩ma	'old man'
b.	newáta	'toe nail'
c.	àčakáze	'sorcerer'
d.	wačàruwíwi	'eel'

Finally, 1-to-3 configurations can be found in trisyllabic accent windows. Dactyls, for example, frequently appear in the final accent window of Macedonian (Comrie 1976), and anapests frequently appear in the initial accent window of Azkoitia Basque (Hualde 1998).

(9) Final Dactyls in Macedonian (Comrie 1976)

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

(10) Initial anapests in Azkoitia Basque (Hualde 1998)

a.	óna	'good'
b.	gizóna	'man'
c.	katedrála	'cathedral'
d.	melokótoye	'peach'
e.	telebísixue	'television'

Trisyllabic configurations with 1-to-3 ratios, then, can be found in three distinct contexts. They can be found in ternary stress patterns, in the odd-parity forms of otherwise binary stress patterns, and in trisyllabic accent windows.

1.2 Two-to-three ratios in attested stress patterns

Configurations based on 2-to-3 ratios appear in a narrower range of contexts than configurations based on 1-to-3 ratios. Unlike 1-to-3 configurations, sequences of 2-to-3 configurations do not appear to form the basis for ternary stress systems. 2-to-3 trisyllabic patterns can be found quite frequently, however, at the periphery in odd-parity forms in otherwise binary stress systems. For example, the antibacchius can be found at the left edge in odd-parity forms in the otherwise trochaic Passamaquoddy (LeSourd 1993), and the cretic can be found at the left edge in odd-parity forms in the otherwise iambic Suruwaha (Everett 1996).

(11) Initial antibacchius in Passamaquoddy (LeSourd 1993)

a.	wìcohkémal	'he helps the other'
b.	wìcòhkekémo	'he helps out'
c.	wìcohkètahámal	'he thinks of helping the other'
d.	tèhsàhkwapàsoltine	'let's walk around on top'

(12) Initial cretic in Suruwaha (Everett 1996)

a.	mosá	'owl'
b.	bàhotá	'to fight'
c.	dakùhurú	'to put in the fire'
d.	bìhawùhurá	'to fly'

Trisyllabic configurations with 2-to-3 ratios can also be found in trisyllabic accent windows. The antibacchius, for example, can be found in the final trisyllabic accent window of Maithili (Jha 1940-1944, 1958).

(13) Final antibacchius in Maithili (Jha 1940-1944, 1958)

a.	ÌĹL	bìndúlə̆	'a fabulous horse'
b.	ȊLĹL	bàːʄ̃ɪtɔ́tʰɪ̃	'speak-3 FUT.'
c.	ÌÌLHĹL	dàhìnə̆báːrɪ̆	'the right one'
d.	ȊHĹL	dèːkʰáːrə̆	'seen'
e.	ÌÌLHĹÌL	ʄ̃ɪmùtə̆báːhɒ̀nə̆	(proper name)
f.	ÌLHĹȊ	àgəráːhìː	'setting fire to a thing'
g.	ÌLÌLHĹ	pʰùləkùməríː	(proper name)

Trisyllabic configurations with 2-to-3 ratios, then, can be found in two contexts. They can be found in the odd-parity forms of otherwise binary stress patterns, and they can be found in trisyllabic accent windows.

2 Representing trisyllabic configurations

In this section, we consider the devices available to three different structural approaches for representing trisyllabic configurations. The three approaches are Standard Weak Layering (Itô and Mester 1992), the Recursive Foot Approach (Bennett 2012, Kager 2012, Martínez-Paricio 2013), and Weak Bracketing (Hyde 2001, 2002, 2016).

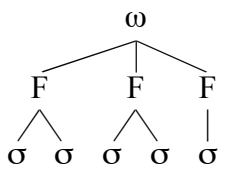
The differences between the three approaches can most easily be seen in relation to the two principles in (14) and (17). The first principle, Strict Succession, requires that parsing not skip category levels.

(14) Strict Succession (adapted from Itô and Mester 1992)

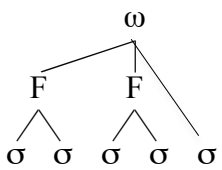
> Every prosodic category of level $n - 1$ is immediately dominated by a prosodic category of level n (i. e. category levels are never skipped).

It requires, for example, that all syllables be parsed into feet before being parsed into a prosodic word, as in (15a). The foot level cannot be skipped, as in (15b).

(15) a. Strict Succession

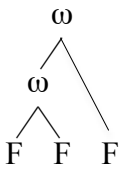


b. Skipping the foot level



Since Strict Succession prohibits the skipping of category levels rather than the existence of multiple sublevels within a category, it does not prevent recursion. Embedding a smaller prosodic word in a larger prosodic word, as in (16), for example, does not skip a category level.

(16) Prosodic word recursion



Most approaches to metrical stress theory, however, confine recursion to the prosodic word and categories of the prosodic hierarchy above the prosodic word, the categories termed *interface categories* by Itô and Mester (2007a,b, 2009a,b, 2012, 2013). They do not countenance recursion in categories of the prosodic hierarchy lower than the prosodic word, the categories termed *rhythmic categories* by Itô and Mester (2007a,b, 2009a,b, 2012, 2013).

The second principle, Proper Bracketing, prohibits prosodic categories of the same level from overlapping.

(17) Proper Bracketing (adapted from Itô and Mester 1992)

> Every prosodic category of level $n - 1$ is dominated by at most one prosodic category of level n. (i. e. prosodic categories of the same level may not overlap).

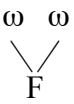
It prohibits, for example, cases where two syllables share a mora, as in (18a), cases where two feet share a syllable, as in (18b), and cases where two prosodic words share a foot, as in (18c).

(18) Prohibited configurations of overlap

a. Syllables and mora

b. Feet and syllable

c. PrWds and Foot

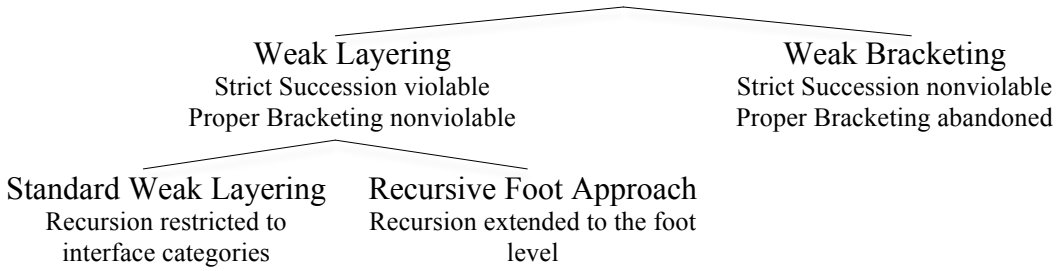


All Weak Layering approaches take Strict Succession to be violable and Proper Bracketing to be nonviolable. Under certain circumstances, then, parsing may skip category levels but it may not create a situation where two categories overlap. A syllable might skip the foot level and be parsed directly into a prosodic word, but it may not be shared between two feet. Both Standard Weak Layering and the Recursive Foot Approach are Weak Layering approaches. The only difference between the two is that the Recursive Foot Approach extends the possibility of recursion to at least one of the rhythmic categories, the foot, where Standard Weak Layering limits recursion to the interface categories.

The Weak Bracketing approach is the reverse of the Weak Layering approach. It takes Strict Succession to be nonviolable, but it abandons Proper Bracketing altogether. Because Strict Succession is nonviolable, it is not possible for a mora to skip the syllable

level and be parsed directly into a foot or for a syllable to skip the foot level and be parsed directly into a prosodic word. Because Proper Bracketing is abandoned, however, it is possible for two syllables to share a mora or for two feet to share a syllable.

(19)



The stance of an approach with respect to Strict Succession, Proper Bracketing, and recursion is key in metrical stress theory because it determines the options available for dealing with the leftover syllable of odd-parity strings. In other words, it determines what is done with the single syllable in an odd-parity string that cannot be parsed into a single, unique disyllabic foot. Since the class of trisyllabic configurations is just a special case of odd-parity strings generally, it is these same considerations—Strict Succession, Proper Bracketing, and recursion—that determine the options available to an approach for representing ternary patterns.

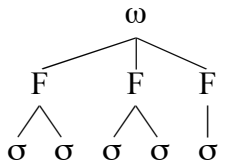
As we shall see in the discussion that follows, neither Standard Weak Layering nor the Recursive Foot Approach have single structural options that can be used to represent both 1-to-3 ratios and 2-to-3 ratios. Weak Bracketing, however, does have such an option. The consequence of this difference is that Standard Weak Layering and the Recursive Foot Approach cannot provide an adequate analysis of either quantity-insensitive binary stress patterns or trisyllabic accent windows. In contrast, Weak Bracketing is able to provide an effective analysis of both.

2.1 Standard Weak Layering

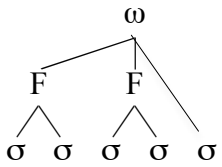
The structural assumptions of Standard Weak Layering (Itô & Mester 1992) are the structural assumptions employed in most recent Optimality Theoretic (Prince and Smolensky 1993/2004) approaches, including the Symmetrical Alignment approach of McCarthy and Prince (1993), the Asymmetrical Alignment approach of Alber (2005), and the Rhythmic Licensing approach of Kager (2005).

Standard Weak Layering has two options for dealing with the leftover syllable of an odd-parity form: it can parse the leftover syllable as a monosyllabic foot, as in (20a), or it can skip the foot level and parse the syllable directly into the prosodic word, as in (20b). These are the two dimensions allowed by the violability of Strict Succession. When Strict Succession is enforced, the leftover syllable is footed. When Strict Succession is not enforced, the leftover syllable remains unfooted. Since Standard Weak Layering insists on Proper Bracketing and does not extend recursion to the foot level, it has no other options.

(20) a. Monosyllabic foot



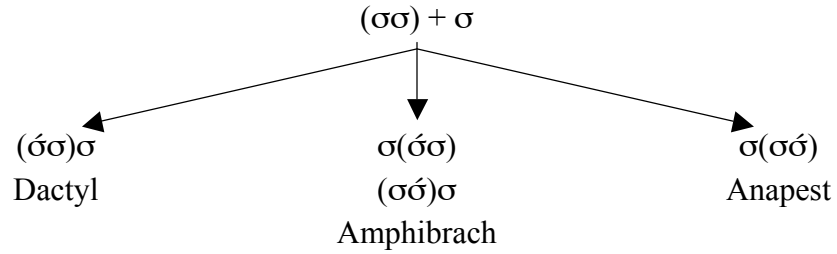
b. Unfooted syllable



The options available for dealing with the leftover syllable of odd-parity strings generally are the same options available for creating ternary configurations. Under Standard Weak Layering, trisyllabic configurations are always obtained by combining a disyllabic foot with one of the irregular structures in (20)—either a monosyllabic foot or an unfooted syllable.

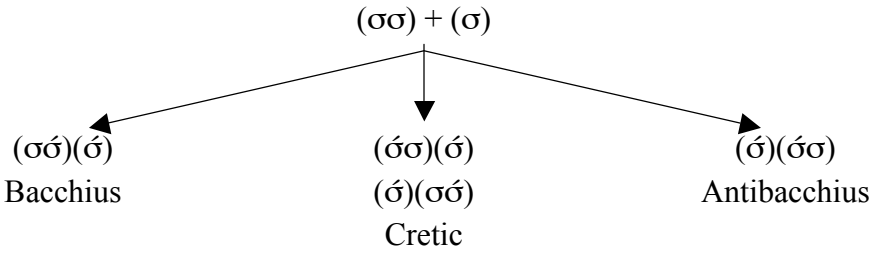
When a single disyllabic foot combines with a single unfooted syllable, as in (21), the result is a ternary configuration with a 1-to-3 ratio. Which particular 1-to-3 configuration emerges depends on whether the disyllabic foot is a trochee or an iamb and whether it precedes or follows the unfooted syllable. A trochee followed by an unfooted syllable yields a dactyl configuration. An unfooted syllable followed by a trochee yields an amphibrach configuration, as does an iamb followed by an unfooted syllable. An unfooted syllable followed by an iamb yields an anapest configuration.

(21) 1-to-3 ratios in Standard Weak Layering: disyllabic foot + unfooted syllable



When a single disyllabic foot combines with a single monosyllabic foot, as in (22), the result is a ternary configuration with a 2-to-3 ratio. Which particular 2-to-3 configuration emerges depends on whether the disyllabic foot is a trochee or an iamb and whether it precedes or follows the monosyllabic foot. An iamb followed by a monosyllabic foot yields a bacchius pattern. A trochee followed by a monosyllabic foot yields a cretic pattern, as does a monosyllabic foot followed by an iamb. A monosyllabic foot followed by a trochee yields an antibacchius pattern.

(22) 2-to-3 ratios in Standard Weak Layering: disyllabic foot + monosyllabic foot



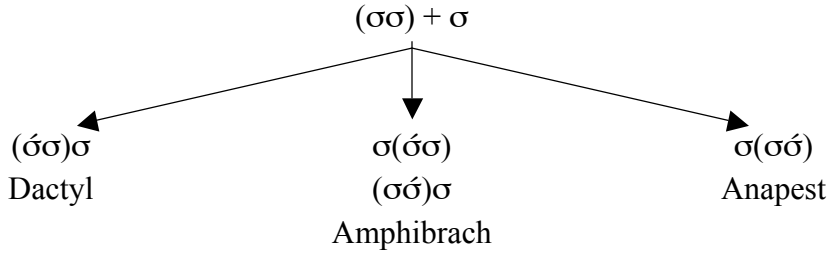
By combining the two structural options in (21) and (22), then, Standard Weak Layering is able to produce the full range of trisyllabic configurations. A disyllabic foot combined with an unfooted syllable produces configurations with a 1-to-3 ratio, and a disyllabic foot combined with a monosyllabic foot produces configurations with a 2-to-3 ratio. There is no single structural option under Standard Weak Bracketing, however, that can capture both ratios.

2.2 The Recursive Foot Approach

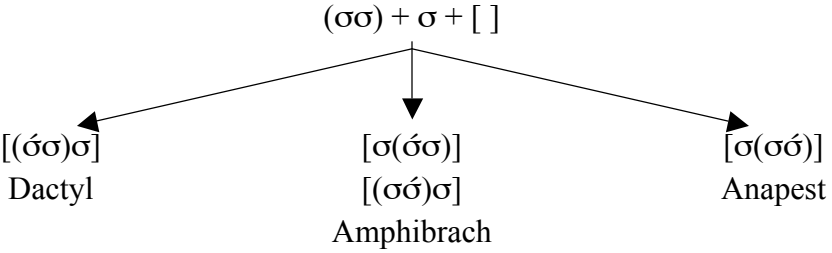
The Recursive Foot Approach (Rice 1992), revived recently by Bennett (2012) and adopted and defended by Kager (2012) and Martínez-Paricio (2013), is essentially a Weak Layering approach. It tolerates departures from Strict Succession, so that syllables can skip the foot level and attach directly to the prosodic word, but it does not allow departures from Proper Bracketing. It does not allow feet or other prosodic categories to overlap. As indicated in (23) and (25), then, the Recursive Foot Approach provides all of the same structural options for producing trisyllabic configurations as those provided by Standard Weak Layering.

The structural innovation in the Recursive Foot Approach is the extension of recursion to feet, but the innovation is not nearly as significant at one might think. At least, it is not as significant in the context of the account's ability to produce trisyllabic configurations, since it merely provides a second structural option for producing configurations with 1-to-3 ratios. As (24) illustrates, the extension of recursion to the foot level essentially takes the original sequences of disyllabic foot and unfooted syllable from Standard Weak Layering and encloses them in a trisyllabic foot. The result is a recursive structure where the head syllable of the original disyllabic foot is also the head syllable of the encompassing trisyllabic foot. Though the structure is different, the resulting ternary patterns are not. Enclosing a disyllabic foot and unfooted syllable in a trisyllabic foot does not create patterns any different than the original disyllabic foot and unfooted syllable.

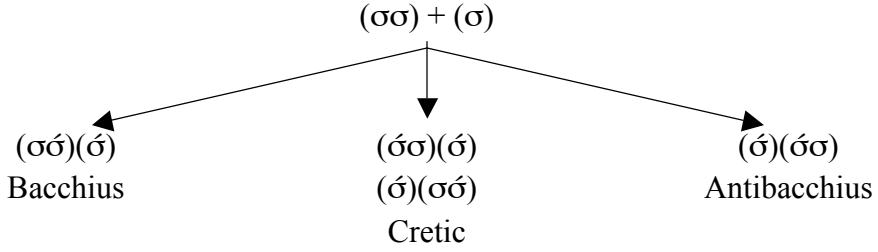
(23) 1-to-3 ratios in Recursive Foot Approach (1st option): disyllabic foot + unfooted syllable



(24) 1-to-3 ratios in Recursive Foot Approach (2nd option): recursive foot



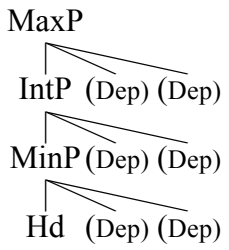
(25) 2-to-3 ratios in Recursive Foot Approach: disyllabic foot + monosyllabic foot



The introduction of recursive feet, then, merely provides a second way for a Weak Layering account to produce trisyllabic configurations with 1-to-3 ratios. It does not provide a second option for producing trisyllabic configurations with 2-to-3 ratios. As we shall see in Sections 4 and 5, it is the inability of recursive feet to provide a second option for 2-to-3 ratios that makes the Recursive Foot Approach inadequate in the context of quantity-insensitive binary stress patterns and in the context of trisyllabic accent windows.

Before turning to the Weak Bracketing approach, it will be helpful to provide a more detailed picture of how the Recursive Foot Approach executes recursion at the foot level. In general, proponents of the Recursive Foot Approach adopt the theory of prosodic recursion advanced by Itô and Mester (2007a,b, 2009a,b, 2012, 2013), though Itô and Mester's proposals themselves do not countenance recursive feet. As indicated in (26), a recursive prosodic category projects from a head formed from an instance of the next category lower in the prosodic hierarchy. In the recursive structure, there is a minimal projection—the smallest, most embedded projection in the structure—and there is a maximal projection—the largest, and unembedded, projection. Any number of intermediate projections can intervene between the minimal projection and the maximal projection. Values for two binary features, [±maximal] and [±minimal], distinguish between the different levels in the recursive structure. The minimal projection is [+min, -max], intermediate projections are [-min, -max], and the maximal projection is [-min, +max].

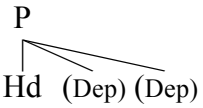
(26) Recursive structure generally (Itô and Mester 2007a,b, 2009a,b, 2012, 2013)



Maximal projection	[-min, +max]
Intermediate projection	[-min, -max]
Minimal projection	[+min, -max]

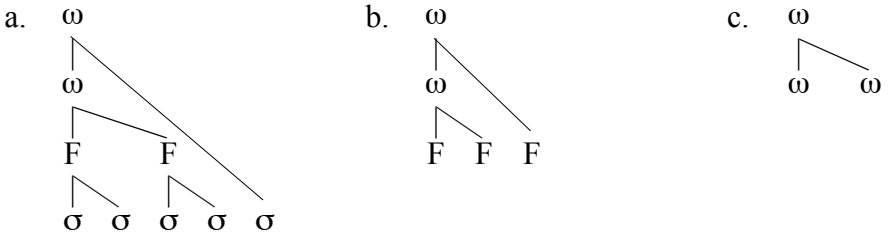
In nonrecursive prosodic categories, as indicated in (27), there is only one projection from the head. Since the single projection is both the minimal projection and the maximal projection, it is [+min, +max].

(27) Non-recursive structure (Itô and Mester 2007a,b, 2009a,b, 2012, 2013)



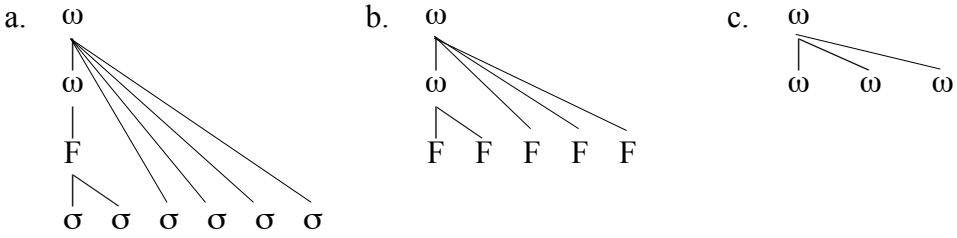
To better understand the possibilities of recursion in Itô and Mester's approach, consider some of the possible recursive prosodic word structures in (28-30). First, recursive prosodic words have a high degree of flexibility in the dependents that they allow. Recursive prosodic words can have syllables as dependents, as in (28a), feet as dependents, as in (28b), or even other prosodic words as dependents, as in (28c).

(28) Potential dependents include syllables, feet, and prosodic words



Recursive prosodic words are also flexible in allowing for an unlimited number of dependents. The example in (29a) illustrates a recursive prosodic word with multiple syllable dependents, the example in (29b) a recursive prosodic word with multiple foot dependents, and the example in (29c) a prosodic word with multiple prosodic word dependents.

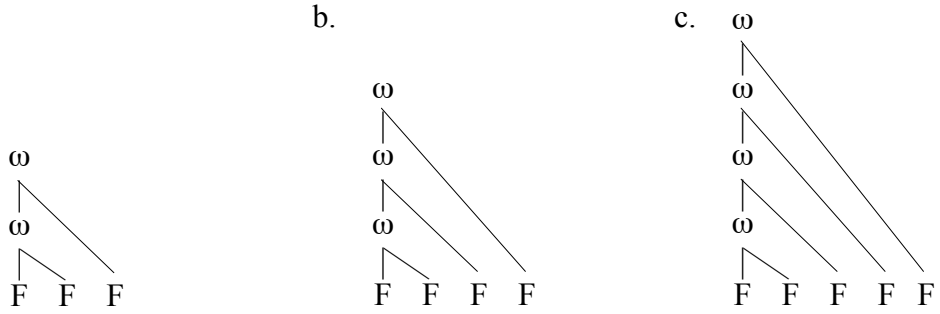
(29) Any number of constituents



Finally, recursive prosodic words are flexible in allowing for an unlimited number of intermediate levels. Recursive prosodic words might have no intermediate levels, as in (30a), one intermediate level, as in (30b), or multiple intermediate levels, as in (30c).

(30) Any number of intermediate levels

a. b. c.



While the Recursive Foot Approach is intended to fit within Itô and Mester's general approach to prosodic recursion, the extension of recursion to the foot level is not straightforward: it involves several stipulations—with respect to the number of recursive levels allowed, the number of dependents allowed, and the types of dependents allowed—that do not apply to the higher prosodic categories. First, as indicated in (31), feet can have only one recursive level: they can have a minimal projection and a maximal projection but no intermediate projections. Second, each level can have at most one dependent. Third, the dependent cannot be the same category as the recursive category in which it is embedded, as it can with other prosodic levels. The dependent must be a syllable; it cannot be a foot.

The same featural specifications that accompany other prosodic categories also accompany feet. The minimal foot projection is [+min, -max], and the maximal foot projection is [-min, +max]. Since the single projection of a nonrecursive foot is both the minimal projection and the maximal projection, as indicated in (32), it is [+min, +max].

(31) Recursive feet

Ft_{Min}	Maximal Foot	[-Min, +Max]
Ft_{Min} (σ_{Dep})	Minimal Foot	[+Min, -Max]
σ_{Hd} (σ_{Dep})		

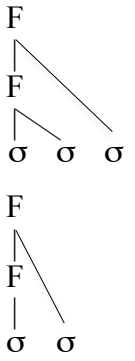
(32) Non-recursive feet

Ft	Minimal/Maximal Foot	[+Min, +Max]
σ_{Hd} (σ_{Dep})		

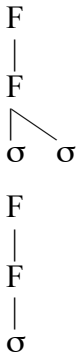
To give a clearer picture of the limited nature of recursion at the foot level, the types of recursive feet allowed under the Recursive Foot Approach are illustrated in (33). Notice that legal recursive feet have at most one recursive level: none of the structures in (33) have intermediate levels. Note also that legal recursive feet can have no more than one dependant: none of the structures in (33) have multiple dependents. Finally, note that the only type of dependent allowed is the syllable: none of the structures in (33) has a dependent of any other type.

(33) Legal recursive feet: no intermediate levels

a. Single dependent syllable



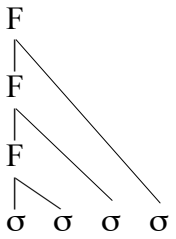
b. No dependent



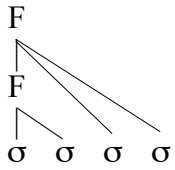
The types of recursive feet that are disallowed—feet with multiple recursive levels, feet with multiple dependents, and feet with dependents other than syllables—are illustrated in (34). The example in (34a) illustrates a recursive foot with an intermediate level and, thus, multiple recursive levels. The example in (34b) illustrates a recursive foot with multiple syllable dependents. The example in (34c) illustrates a foot with a dependent that is not a syllable—in this case, a dependent that is another foot.

(34) Illegal recursive feet

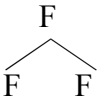
a. Intermediate levels



b. Multiple syllable dependants



c. Foot dependants



While the Recursive Foot Approach differs from Standard Weak Layering, then, in extending recursion to the foot level, the recursion extended to feet is extremely limited. It does not have nearly the flexibility of the recursion possible at the level of the prosodic word, for example.

2.3 Overlapping disyllabic feet

The Weak Bracketing approach is a significant departure from Weak Layering of either the Standard variety or the Recursive Foot variety. Where Weak Layering makes Strict Succession violable, Weak Bracketing makes it non-violable. Under Weak Bracketing, all syllables must be parsed into feet. Where Weak Layering makes Proper Bracketing

non-violable, Weak Bracketing dispenses with the Proper Bracketing condition altogether. There is no specific prohibition against overlapping prosodic categories, though several constraints have the effect of limiting their occurrence indirectly. Under Weak Bracketing, feet may overlap so that they share a syllable.

The Weak Bracketing approach also maintains a distinction between prosodic structure and grid structure. Prosodic categories, including feet, must have heads. While the grid entries that indicate stress must be associated with prosodic heads, prosodic heads need not correspond to grid entries. This allows for a somewhat more flexible relationship between feet and stress. A foot can remain stressless, as in (35), and it is even possible for two overlapping feet to share stress, as in (36). (Note that the position of heads in Weak Bracketing examples is indicated with vertical association lines.)

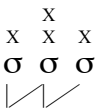
(35) Stressless feet

a. Stressless trochee

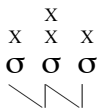
b. Stressless iamb

(36) Gridmark sharing

a. Overlapping trochees



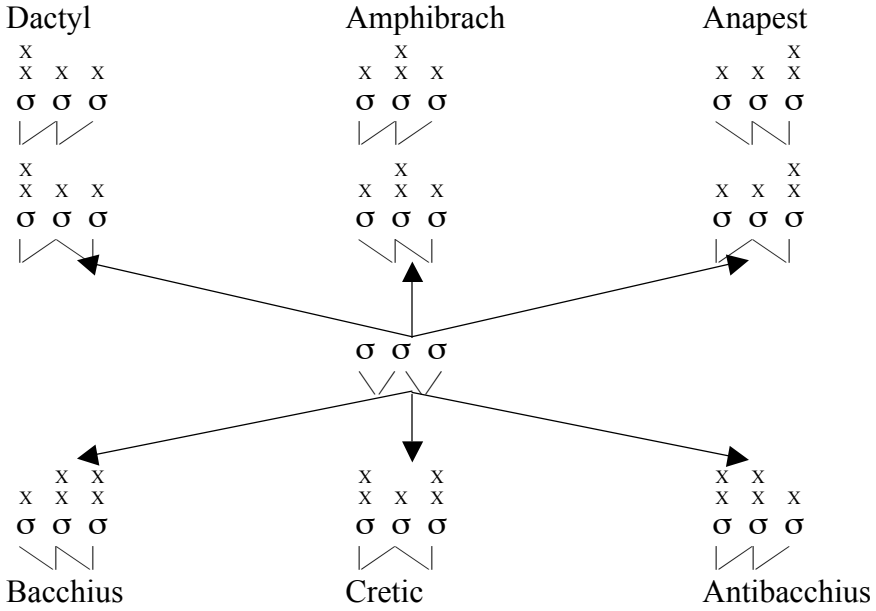
b. Overlapping iambs



Both of these configurations, as well as configurations where each individual foot corresponds to a stress, can be found in the trisyllabic constructions in (37).

As (37) illustrates, structures based on overlapping feet can be used to produce the full range of trisyllabic configurations. They can be used to produce configurations with 2-to-3 ratios as well as configurations with 1-to-3 ratios. First consider patterns with 1-to-3 ratios, where a single stress accompanies two overlapping feet. First, a stressed trochee that overlaps a stressless foot, whether trochaic or iambic, yields a dactyl pattern. Second, two overlapping feet in a gridmark sharing configuration, whether iambic or trochaic, yield an amphibrach pattern. Finally, a stressed iamb that overlaps a stressless foot, whether iambic or trochaic, yields in an anapest.

(37) Overlapping disyllabic feet capture both 1 to 3 and 2-to-3 ratios



In patterns with 2-to-3 ratios, each foot corresponds to a unique stress. First, when a stressed iamb overlaps another independently stressed iamb, the result is a bacchius. Second, when a stressed trochee overlaps a stressed iamb, the result is a cretic. Finally, when a stressed trochee overlaps another independently stressed trochee, the result is an antibacchius.

Having seen the devices that the three different approaches have for representing trisyllabic configurations, we turn now to the consequences that arise as a result of the particular options selected. We begin by considering the Odd-Parity Input Problem in Section 3.

3 The Odd-Parity Input Problem

The Odd-Parity Input Problem (OPIP; Hyde 2008b, 2012b, 2016) is a set of pathological predictions that emerge in binary systems from the combined preferences of the parsing requirement—the requirement that all syllables be parsed into feet—and the foot minimality requirement—the requirement that all feet have at least two moras (Prince 1980, McCarthy and Prince 1986). In Optimality Theoretic accounts, the parsing requirement is typically implemented with the familiar PARSE-SYLLABLE constraint. The formulation in (38a) is fairly standard, though other formulations are possible. Similarly, the minimality requirement is typically implemented with the familiar FOOT-BINARITY constraint. The formulation in (38b) is fairly standard, though other formulations are also possible.

(38) a. PARSE-SYLLABLE:
Every σ is parsed into a *F*.

b. FOOT-BINARITY:
Every foot is binary (either disyllabic or bimoraic).

Although it seems impossible at first glance, there are actually several ways to satisfy the parsing and minimality requirements simultaneously in odd-parity forms. The first is to parse an odd-numbered heavy syllable, if one is available, as a monosyllabic foot, as in (39a), allowing the remaining syllables to be evenly divided into disyllabic feet. The second is to convert the odd-parity string into an even-parity string, as in (39b), either through insertion or deletion of a single syllable. The even-parity string can then be evenly divided into disyllabic feet. The third option is to parse three syllables into two overlapping disyllabic feet, as in (39c), allowing the remaining syllables to be evenly divided into (non-overlapping) disyllabic feet. The fourth and final option is to parse three syllables into a recursive foot, as in (39d), so that the remaining syllables can be evenly divided into disyllabic feet. The recursive foot in (39d) can be considered binary because both the minimal foot and the maximal foot have two constituents.

(39) Exhaustive binary parsing for odd-parity inputs

a. Odd-numbered H foot
σσHσσσσ → (σσ)(H)(σσ)(σσ)

b. Convert to even-parity
σσσσσσσ → (σσ)(σσ)(σσ)(σσ) *or* (σσ)(σσ)(σσ)

c. Overlapping feet
σσσσσσσ → σ σ σ σ σ σ σ
\/ \/ \/\/

d. Internally Layered Foot
σσσσσσσ → (σσ)(σσ)[(σσ)σ]

The OPIP arises in accounts where circumstances can make it necessary to employ the options in (39a) or (39b) to achieve exhaustive binary parsing for odd-parity inputs. The OPIP can usefully be divided into two sub-problems. The Odd Heavy Problem (OHP) emerges when the option in (39a) is employed, and the Even Output Problem (EOP) emerges when the option in (39b) is employed. Below, we briefly consider the OHP in connection to Standard Weak Layering, the Recursive Foot Approach, and Weak Bracketing. For discussion of the EOP in connection to Standard Weak Layering and Weak Bracketing, and for additional discussion of the OHP, see Hyde (2012b, 2016).

The OHP is essentially a pathological type of quantity-sensitivity that emerges in what are otherwise quantity-insensitive systems. While manifestations of the OHP can vary significantly among the different accounts in which they arise (due, primarily, to differences in how these accounts create directional parsing effects), all OHP patterns have the same basic characteristics. In all OHP patterns, as indicated in (40), a single odd-numbered heavy syllable is parsed as a monosyllabic foot in odd-parity forms only.

(40) The Odd Heavy Problem

A single heavy syllable *H* is parsed as a monosyllabic foot if and only if
a. *H* occurs in an odd-parity form
b. *H* is located in an odd-numbered position

The examples of right-aligned trochaic systems in (41-43) help to illustrate the differences between OHP patterns and other types of patterns. (41) illustrates what is expected in a truly quantity-insensitive pattern: stress occurs in the same position regardless of whether a form is even-parity or odd-parity, regardless of the presence or absence of heavy syllables, and regardless of the position of heavy syllables. In this case, stress occurs on every even-numbered syllable counting from the right. It occurs on every even-numbered syllable counting from the right whether the form is even-parity, as in (41a-c), or odd-parity, as in (41d-f). It occurs on every even-numbered syllable from the right whether the form contains only light syllables, (41a,d), or includes heavy syllables, as in (41b,c,e,f). It occurs on every even-numbered syllable from the right whether the form has heavy syllables in even-numbered positions, as in (41b,e), or has heavy syllables in odd-numbered positions, as in (41c,f).

(41) True quantity-insensitivity: syllabic trochees

a.	Even-parity, L syllables only	(Ĺ L)(Ĺ L)(Ĺ L)
b.	Even-parity, even-numbered H syllable	(Ĺ L)(Ĺ H)(Ĺ L)
c.	Even-parity, odd-numbered H syllable	(Ĺ L)(Ĥ L)(Ĺ L)
d.	Odd-parity, L syllables only	L(Ĺ L)(Ĺ L)(Ĺ L)
e.	Odd-parity, even-numbered H syllable	L(Ĺ L)(Ĥ L)(Ĺ L)
f.	Odd-parity, odd-numbered H syllable	L(Ĺ H)(Ĺ L)(Ĺ L)

Using a right-to-left moraic trochee pattern, (42) illustrates what is expected in a true quantity-sensitive system: heavy syllables are always stressed, even if it means that the basic directional parsing pattern is perturbed. Heavy syllables are stressed regardless of whether they occur in even-parity forms, as in (42b,c), or in odd-parity forms, as in (42e,f). They are stressed regardless of whether they occur in an even-numbered position, (42b,e), or odd-numbered position, (42c,f). While forms containing only light syllables position stress on every even-numbered syllable from the right, just like the quantity-insensitive trochaic pattern in (41), the requirement that heavy syllables be stressed may perturb this basic pattern in the forms that contain them.

(42) True quantity-sensitivity: moraic trochees

a.	Even-parity, L syllables only	(Ĺ L)(Ĺ L)(Ĺ L)
b.	Even-parity, even-numbered H syllable	L(Ĺ L)(Ĥ)(Ĺ L)
c.	Even-parity, odd-numbered H syllable	(Ĺ L)(Ĥ)L(Ĺ L)
d.	Odd-parity, L syllables only	L(Ĺ L)(Ĺ L)(Ĺ L)
e.	Odd-parity, even-numbered H syllable	L(Ĺ L)(Ĥ)L(Ĺ L)
f.	Odd-parity, odd-numbered H syllable	(Ĺ L)(Ĥ)(Ĺ L)(Ĺ L)

The examples in (43) illustrate that the patterns induced by the OHP are different than either true quantity-insensitivity or true quantity-sensitivity. OHP patterns are not quantity-insensitive, because they do not always locate stress in the same positions regardless of a form's length, the presence of heavy syllables, or the position of heavy

syllables. Neither are they truly quantity-sensitive, howver, because they do not always stress heavy syllables. In most situations, OHP patterns resemble quantity-insensitive patterns. Like the true quantity-insensitive pattern in (41), the forms in (43) locate stress on every even-numbered syllable from the right. The exception is when a heavy syllable occurs in an odd-numbered position in an odd-parity form, as in (43f). In this situation only, the heavy syllable is parsed as a monosyllabic foot, ensuring that it is stressed and perturbing the basic pattern.

(43) OHP-induced quantity-sensitivity

a.	Even-parity, L syllables only	(ĹL)(ĹL)(ĹL)
b.	Even-parity, even-numbered H syllable	(ĹL)(ĹH)(ĹL)
c.	Even-parity, odd-numbered H syllable	(ĹL)(ḾL)(ĹL)
d.	Odd-parity, L syllables only	L(ĹL)(ĹL)(ĹL)
e.	Odd-parity, even-numbered H syllable	L(ĹL)(ḾL)(ĹL)
f.	Odd-parity, odd-numbered H syllable	(ĹL)(Ḿ)(ĹL)(ĹL)

The OHP is a significant problem for any account in which it arises. Languages with OHP patterns are unattested, and they are sufficiently different from patterns that are attested that they can reasonably be considered pathological. In accounts where OHP effects emerge, they emerge under a large portion of the rankings previously thought to produce quantity-insensitive patterns. In fact, they emerge under such a large portion of the rankings that accounts exhibiting OHP effects simply cannot produce a reasonably accurate typology of quantity-insensitive stress patterns.

3.1 The OHP in Standard Weak Layering

Most current approaches to metrical stress theory adopt the assumptions of Weak Layering. As discussed above, Standard Weak Layering provides just two options for dealing with the leftover syllable of odd-parity strings, including trisyllabic strings: the syllable can remain unfooted, or it can be parsed as a monosyllabic foot. If the syllable remains unfooted, regardless of its weight, it incurs a violation of PARSE-SYLLABLE. If it is parsed as a monosyllabic foot and it happens to be light, it incurs a violation of FOOT-BINARITY. If it is parsed as a monosyllabic foot and it happens to be heavy, however, it violates neither constraint.

Parsing a heavy syllable as a monosyllabic foot does not automatically lead to overall satisfaction of both constraints in all cases, however. Consider the trisyllabic string in (44). If the heavy syllable occurs in an odd-numbered position—first position, as in (44a), or third position, as in (44c)—the remaining syllables form an even-parity string that can easily be parsed into disyllabic feet. Exhaustive binary parsing is achieved, and FOOT-BINARITY and PARSE-SYLLABLE are satisfied simultaneously. If the heavy syllable occurs in an even-numbered position, however, as in (44b), parsing the heavy syllable as a monosyllabic foot merely leaves an odd-parity string to either side. Since these strings themselves have a leftover syllable that must either be left unfooted or parsed as a monosyllabic foot, the overall result is that either FOOT-BINARITY or PARSE-SYLLABLE must still be violated.

(44) a. (H)(LL) b. L(H)L c. (LL)(H)
(L)(H)(L)

Now consider the four-syllable string in (45). If a heavy syllable in any position is parsed as a monosyllabic foot, the remaining strings are odd-parity. The remaining strings have leftover syllables that must themselves be left unfooted or parsed as monosyllabic feet. The overall result, then, is that either FOOT-BINARITY or PARSE-SYLLABLE must be violated and exhaustive binary parsing is still not achieved.

(45) a. (H)(LL)L b. L(H)(LL) c. (LL)(H)L d. (LL)L(H)
(H)L(LL) (L)(H)(LL) (LL)(H)(L) L(LL)(H)
(H)(LL)(L) (LL)(L)(H)
(H)(L)(LL) (L)(LL)(H)

In a very specific, limited context, then—when a heavy syllable occurs in an odd-numbered position in an odd-parity form—parsing a heavy syllable as a monosyllabic foot can help to achieve exhaustive binary parsing. This means, of course, as (46) illustrates, that the demands of FOOT-BINARITY and PARSE-SYLLABLE can conspire to require that heavy syllables be parsed as monosyllabic feet in just this specific, limited situation. This conspiracy is what creates the OHP in Weak Layering accounts.

(46)

LLHLHLL	F-BIN	PARSE-σ
☞ a. (LL)(H)(LH)(LL)		
☞ b. (LL)(HL)(H)(LL)		
c. (LL)(HL)(HL)L		*!
d. L(LH)(LH)(LL)		*!
e. (LL)(HL)(HL)(L)	*!	
f. (L)(LH)(LH)(LL)	*!	

All Standard Weak Layering Accounts—including Symmetrical Alignment (McCarthy and Prince 1993), Iterative Foot Optimization (Pruitt 2010), Asymmetrical Alignment (Alber 2005), and Rhythmic Licensing (Kager 2005)—exhibit the effects of the OHP and other manifestations of the OPIP. Though I will not repeat the discussion here, the variety of OPIP effects that emerge in the various Standard Weak Layering accounts are discussed in detail in Hyde (2012b, 2016).

3.2 The OHP in the Recursive Foot Approach

Although the Recursive Foot approach is also a Weak Layering approach, the ability of recursive feet to achieve exhaustive binary parsing for odd-parity forms seems like it should allow the approach to avoid the OHP and other OPIP effects. It doesn't. The reason is simply that recursive feet cannot *always* provide an alternative to the options that produce OPIP effects. Because the grammar must be able to produce ternary configurations with 2-to-3 ratios in order to produce the full range of binary stress patterns, and because recursive feet cannot represent patterns with 2-to-3 ratios, the Recursive Foot Approach must actually have a specific constraint or set of constraints that prohibit recursion. Only by suppressing recursion can the Recursive Foot Approach

capture patterns with 2-to-3 ratios. When recursion is suppressed, OPIP effects emerge.

For example, an approach must be able to produce 2-to-3 ratios in order to account for the initial antibacchius pattern in the odd-parity forms of the trochaic Passamaquoddy, the final cretic in the odd-parity forms of trochaic Maranungku, or the initial cretic pattern in the odd-parity forms of iambic Suruwaha.

(47) Initial antibacchius in Passamaquoddy (LeSourd 1993)

a.	wì̀cohkémal	'he helps the other'
b.	wì̀cò̀hkekémo	'he helps out'
c.	wì̀cohkè̀tahámal	'he thinks of helping the other'
d.	tè̀hsà̀hkwapà̀soltíne	'let's walk around on top'

(48) Final cretic in Maranungku (Tryon 1970)

a.	tíralk	'saliva'
b.	mǽræpæ̀t	'beard'
c.	yáŋarmà̀ta	'the Pleiades'
d.	láŋkarà̀tatì̀	'prawn'

(49) Initial cretic in Suruwaha (Everett 1996)

a.	mosá	'owl'
b.	bà̀hotá	'to fight'
c.	dakù̀hurú	'to put in the fire'
d.	bì̀hawù̀hurá	'to fly'

Since 2-to-3 ratios cannot be represented with recursive feet, the Recursive Foot Approach must still rely on the familiar Weak Layering combination of a disyllabic foot and a monosyllabic foot. As (50) illustrates, the combination allows the approach to produce the ternary sequences necessary for capturing the odd-parity forms of languages like Passamaquoddy, Maranungku, and Suruwaha.

(50)

a.	Passamaquoddy:	(σ́)(σσ́)(σσ́)(σσ́)
b.	Maranungku:	(σσ́)(σσ́)(σσ́)(σ́)
c.	Suruwaha:	(σ́)(σσ́)(σσ́)(σσ́)

For monosyllabic feet to emerge in the Recursive Foot Approach, there must be a particular constraint or set of constraints that prohibits recursion. As (51-53) illustrate, when the anti-recursion constraint and PARSE-σ both dominate F-BIN, the anti-recursion constraint excludes candidates with recursive feet, and PARSE-σ excludes candidates with unfooted syllables. This leaves candidates with monosyllabic feet as optimal. The anti-recursion constraint is represented below by *RECURSION. The tableau in (51) illustrates the emergence of the Passamaquoddy pattern, the tableau in (52) the emergence of the Maranungku pattern, and the tableaux in (53) the emergence of the Suruwaha pattern. Note that the different directional parsing patterns in the three tableaux would be

produced by different rankings of additional constraints. We need not consider them here. The key point in each case is the emergence of a monosyllabic foot under a high-ranking *RECURSION.

(51)

	*RECURSION	PARSE-σ	F-BIN
☞ w. (σ́)(σ́σ)(σ́σ)(σ́σ)			1
a. [(σ́σ)σ](σ́σ)(σ́σ)	1 W		L
b. σ(σ́σ)(σ́σ)(σ́σ)		1 W	L

(52)

	*RECURSION	PARSE-σ	F-BIN
☞ w. (σ́σ)(σ́σ)(σ́σ)(σ́)			1
a. (σ́σ)(σ́σ)[(σ́σ)σ]	1 W		L
b. (σ́σ)(σ́σ)(σ́σ)σ		1 W	L

(53)

	*RECURSION	PARSE-σ	F-BIN
☞ w. (σ́)(σσ́)(σσ́)(σσ́)			1
a. [(σσ́)σ](σσ́)(σσ́)	1 W		L
b. σ(σσ́)(σσ́)(σσ́)		1 W	L

The necessary existence of an anti-recursion constraint (or constraints) in the recursive foot approach makes it inevitable that the grammar will be able to require exhaustive binary parsing without recursion. This, in turn, makes it inevitable that OHP (and other OPIP) effects will emerge. As (54) indicates, when an odd-numbered heavy syllable appears in an odd parity form, parsing it as a monosyllabic foot allows F-BIN, PARSE-σ, and *RECURSION to be satisfied simultaneously. The result is the pathological quantity-sensitivity of the OHP.

(54)

LLHLHLL	F-BIN	PARSE-σ	*RECURSION
☞ w_1. (LL)(H)(LH)(LL)			
☞ w_2. (LL)(HL)(H)(LL)			
a. (LL)(HL)(HL)L		1 W	
b. L(LH)(LH)(LL)		1 W	
c. (LL)(HL)(HL)(L)	1 W		
d. (L)(LH)(LH)(LL)	1 W		
e. (LL)(HL)[(HL)L]			1 W
f. [(LL)H](LH)(LL)			1 W

The Recursive Foot Approach, then, can be added to the list of Weak Layering approaches that suffer from the OHP and other OPIP effects. Just as it does with the other Weak Layering approaches, the OPIP prevents the Recursive Foot Approach from predicting a reasonably accurate typology of quantity-insensitive binary stress patterns.

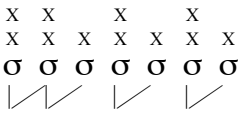
3.3 Weak Bracketing

Under Weak Bracketing, the two options for accommodating the leftover syllable of odd-parity outputs are either to parse the leftover syllable as a monosyllabic foot or to parse it into a disyllabic foot that overlaps another disyllabic foot. Although both of these options are available, at least in principle, the latter has the advantage that it allows the parsing and minimality requirements to be satisfied simultaneously, regardless of the weight of the syllables involved. Since there is never a need to parse a heavy syllable as a monosyllabic foot to achieve exhaustive binary parsing, the OHP simply does not emerge.

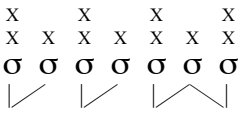
Weak Bracketing avoids the OHP because overlapping feet can capture both 1-to-3 and 2-to-3 ratios. As (55) illustrates, overlapping feet easily produce the ternary configurations necessary to capture the odd-parity forms of languages like Passamaquoddy, Maranungku, and Suruwaha. Since there is never any reason to prefer monosyllabic feet to overlapping feet, there need not be any specific prohibition against overlapping feet.

(55)

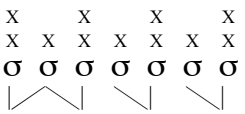
a. Passamaquoddy:



b. Maranungku:



c. Suruwaha:



The possibility of disyllabic feet overlapping makes both the existence and position of heavy syllables irrelevant to a form's ability to achieve exhaustive binary parsing, a result sufficient to eliminate the OHP. As (56) illustrates, F-BIN and PARSE-σ are satisfied simultaneously in candidates with overlapping feet, such as (56a), just as they are in candidates where odd-numbered heavy syllables are parsed as monosyllabic feet, such as (56b,c). Note that leaving a syllable unparsed, as in (56f,g), is not actually an option under Weak Bracketing, and PARSE-σ is not actually a violable constraint. Given Strict Layering, all syllables must be parsed into feet. PARSE-σ and under-parsing candidates are included in (56) and (58) below simply to show that even if the Strict Layering requirement were relaxed overlapping feet would still be optimal.

(56)

LLHLHLL	F-BIN	PARSE-σ
☞ a. L L H L H L L		
☞ b. L L H L H L L		
☞ c. L L H L H L L		
d. L L H L H L L	*!	
e. L L H L H L L	*!	
f. L L H L H L L		*!
g. L L H L H L L		*!

Since configurations with overlapping feet achieve exhaustive binary parsing without having to parse odd-numbered heavy syllables as monosyllabic feet, they satisfy F-BIN and PARSE-σ simultaneously. As a result, directional constraints are free both to prefer configurations with overlapping feet and to position the overlapping feet at the edges where they would occur in forms without heavy syllables.

As (58) demonstrates—using ALL-σ_{HD}-LEFT, defined in (57), as the directional constraint—parsing an odd-numbered heavy syllable as a monosyllabic foot, when one is available, never presents a better alternative to overlapping feet.

(57) ALL-σ_{HD}-LEFT: *$\langle \omega, \sigma_{HD}, \sigma \rangle$ / [… σ … σ_{HD} …]$_\omega$

'Assess a violation mark for every $\langle \omega, \sigma_{Hd}, \sigma \rangle$ such that σ precedes σ_{Hd} within ω.'

PARSE-σ and F-BIN can be satisfied simultaneously by parsing an odd-numbered heavy syllable as a monosyllabic foot, but they can also be satisfied simultaneously by parsing three syllables of any weight into two overlapping feet. Since the overlapping feet can be freely positioned by alignment and other relevant constraints without the interference of weight-based restrictions—and will be preferred to forms with a heavy monosyllabic foot as a result—syllable weight affects neither parsability nor parsing directionality. When odd-numbered heavy syllables are present, then, exactly the same pattern emerges as when they are absent. In this case, ALL-σ_{HD}-LEFT locates the overlapping feet at the left edge of the prosodic word, the position in which they would be located for the Passamaquoddy pattern illustrated in (55a). In fact, the pattern with overlapping feet in (58a) harmonically bounds the patterns with monosyllabic feet, including the patterns exhibiting OHP effects, the patterns in (58b,c).

(58)

LLHLHLL	F-BIN	PARSE-σ	ALL-σ_{HD}-LEFT
☞ a. L L H L H L L			9
b. L L H L H L L			10 W
c. L L H L H L L			11 W
d. L L H L H L L	1 W		9
e. L L H L H L L	1 W		11 W
f. L L H L H L L		1 W	9
g. L L H L H L L		1 W	6 L

The OHP, then, simply does not arise under the structural assumptions of Weak Bracketing. Similar considerations allow the Weak Bracketing approach to avoid the other OPIP effects. (See Hyde 2012b, 2016 for discussion.)

4 Trisyllabic Accent Windows

One of the key areas where an advantage for the Recursive Foot Approach has been claimed is the analysis of trisyllabic accent windows. After surveying the typologies predicted by the Recursive Foot Approach and the Relation-Specific Alignment (Hyde 2012a, 2016; Hyde, Hofmeister, and Husic 2012; Hyde and Husic 2012) approach, Kager (2012) concludes that the Recursive Foot approach is superior. While both accounts are able to produce the full range of trisyllabic accent windows, he argues, the RSA approach suffers from a greater degree of over-generation. In particular, it produces unattested four-syllable accent windows, and it produces a type of pattern, incorrectly identified as a Midpoint Pathology (Eisner 1997; Hyde 2012b, 2015, 2016) pattern, resulting from the interaction of accent windows at opposite edges of a form.

Kager's conclusions result from a number of errors. First, the RSA approach's ability to produce four-syllable accent windows results from Kager's implementation of the RSA approach in the context of a Standard Weak Layering framework rather than in the context of the Weak Bracketing framework within which it was developed. (In the discussion below, the RSA approach will be implemented in the context of a Weak Bracketing approach.) Second, there actually are attested cases of the types of patterns that Kager misidentifies as Midpoint Pathology patterns. Rather than the ability to generate such patterns being an overgeneration problem that represents a disadvantage for the RSA approach, then, the inability to generate the same patterns turns out to be an undergeneration problem that represents a disadvantage for the Recursive Foot Approach. (See Hyde 2015 for discussion.) Third, Kager fails to recognize that the Recursive Foot Approach cannot capture a key type of trisyllabic accent window: accent windows where a secondary stress accompanies the primary stress within the window. The inability to capture such windows, the focus of the discussion below, only adds to the Recursive Foot Approach's undergeneration problem.

4.1 The Recursive Foot Approach

The Recursive Foot Approach offers a direct, but ultimately inadequate, approach to trisyllabic accent windows. Under the Recursive Foot Approach, the maximum size of trisyllabic accent windows is a direct reflection of the maximum size of feet: since feet are maximally trisyllabic, the accent associated with any given foot is restricted to the range (of up to three syllables) defined by the foot's boundaries. In reality, then, since every accent exists within a foot, every accent exists within a (maximally) trisyllabic window. The key to the analysis of the types of phenomena designated as trisyllabic accent windows in the literature, then, is to ensure that the foot containing the relevant accent occurs in the appropriate peripheral position (initial or final) and that it is allowed to expand to its maximum trisyllabic size under the appropriate circumstances.

To establish a final trisyllabic accent window under the recursive foot approach, it is necessary that the foot containing the accent be maximally trisyllabic and that it also be anchored at the right edge of the word, as in (59a). As long as these two conditions hold, the accent will occur on one of the final three syllables. If the head foot is larger then trisyllabic, either because it has multiple dependents or because it has a dependent foot, than the accent can fall to the left of the final three syllables, as in (59b). Failing to anchor the head foot at the right edge of the word, as in (59c), also allows the accent to fall to the left of the final three syllables.

(59) Defining trisyllabic accent windows under the Recursive Foot Approach

a. *Within the window (maximally trisyllabic foot anchored to the right edge)*

i.	Ultimate:	σσσ[σ(σά)]	σσσσ[(σά)]	σσσσσ[(ά)]
ii.	Penultimate:	σσσ[(σά)σ]	σσσ[σ(όσ)]	σσσσ[(όσ)]
iii.	Antepenultimate:	σσσ[(όσ)σ]		

b. *Outside the window (because head foot is larger than trisyllabic)*

Pre-antepenultimate:	σσ[(όσ)σσ]	σσ[(όσ)(ὸσ)]

c. *Outside the window (because head foot is not anchored to the right edge)*

Pre-antepenultimate:	σσ[(όσ)σ]σ	σσ[(όσ)](ὸσ)

In addition to the structural assumptions of the Recursive Foot Approach, Kager's analysis contains the nine constraints in (60). The three most important in establishing trisyllabic accent windows are PARSE-SYL, ALIGN-WORD-L, and ALIGN-WORD-R. PARSE-SYL is the constraint that promotes extension of feet to their maximum trisyllabic size: a trisyllabic foot parses more syllables than a disyllabic foot or a monosyllabic foot. Assuming that each form contains no more than a single foot, ALIGN-WORD-L and ALIGN-WORD-R are able to position the foot that defines the accent window. If ALIGN-WORD-L is higher ranked, then the accent window is initial. If ALIGN-WORD-R is higher ranked, then the accent window is final.

(60) Constraints from Kager's (2012) Recursive Foot Approach

a. HD-BIN: Heads are binary under syllabic or moraic analysis.
b. ALIGN-HD-L: Heads are left-aligned with feet.
c. ALIGN-HD-R: Heads are right-aligned with feet.
d. HD=TROCHEE: Heads begin with strong syllable.
e. HD=IAMB: Heads begin with weak syllable.
f. PARSE-SYL: Syllables are parsed by feet.
g. ALIGN-WORD-L: Words are left-aligned with a foot.
h. ALIGN-WORD-R: Words are right-aligned with a foot.
i. NON-FINALITY: Stress must not fall on the final syllable.
j. FAITH-ACCENT: A lexical accent should be realized as primary stress.

In the constraints in (60), "head" seems to refer only to the [+min] foot encased in a larger recursive foot. "Head" does not appear to refer to a foot's head syllable, for example, which the constraints refer to as the "strong" syllable. Though we need not focus on them here, non-recursive structures would vacuously satisfy the constraints in (60) that refer to "heads".

In the discussion that follows, we focus on two examples of trisyllabic accent windows: Macedonian (Comrie 1976), whose accent window exhibits a 1-to-3 ratio, and Maithili (Jha 1940-1944, 1958), whose accent window often exhibits a 2-to-3 ratio. In the regular accent pattern of Macedonian, as (61) illustrates, the accent prefers to fall on the leftmost of the final three syllables. In forms with three or more syllables, then, accent regularly occurs on the antepenult.

(61) Macedonian regular pattern

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

Macedonian also has an irregular pattern, however, illustrated in (62). 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 to the left of the final three, stress shifts to the antepenult by default.

(62) Macedonian irregular pattern

a.			b.		
	citát	'quotation'		román tik	'romantic'
	citátot			román tikot	
	citáti			román tici	
	citátite			romantícite	

For the Recursive Foot Approach to produce the consistent antepenultimate accent of the regular Macedonian pattern, the crucial rankings in (63) are necessary.

(63) Key rankings for regular antepenultimate stress

a. ALIGN-WORD-R >> ALIGN-WORD-L
b. PARSE-SYL >> ALIGN-HD-R
c. ALIGN-HD-L >> ALIGN-HD-R
d. HD=TROCHEE >> HD=IAMB

To illustrate, the position of the accent window is determined by the relative ranking of ALIGN-WORD-R and ALIGN-WORD-L. Ranking ALIGN-WORD-R above ALIGN-WORD-L ensures that the accent window is final rather than initial. It positions that the foot containing the accent at the right edge of the form, as in (64w-e), rather than the left edge, as in (64f). The size of the accent window is determined by the ranking between PARSE-SYL and the lowest ranked head alignment constraint—in this case, ALIGN-HD-R. Ranking PARSE-SYL above ALIGN-HD-R ensures that the foot containing the accent expands to its maximum trisyllabic size. By excluding disyllabic feet, as in (64d,e), in favor of trisyllabic feet, the ranking ensures that the accent window is trisyllabic. The ranking between ALIGN-HD-L and ALIGN-HD-R determines the position of the head within the recursive foot. Ranking ALIGN-HD-L above ALIGN-HD-R ensures that the disyllabic head of the trisyllabic foot is located at its left edge, as in (64w,a), rather than at the right edge as in (64b,c). Finally, the ranking between HD=TROCHEE and HD=IAMB determines whether the head is trochaic or iambic. Ranking HD=TROCHEE above HD=IAMB ensures that the disyllabic head foot is trochaic, as in (65w), rather than iambic, as in (64a). The result is antepenultimate accent.

(64)

σσσσσσ	PARSE	HD-L	HD-R	WD-R	WD-L	TROC	IAMB
☞ w. σσσ[(σ́σ)σ]	3		1		1		1
a. σσσ[(σσ́)σ]	3		1		1	1 W	L
b. σσσ[σ(σ́σ)]	3	1 W	L		1		1
c. σσσ[σ(σσ́)]	3	1 W	L		1	1 W	L
d. σσσσ[(σ́σ)]	4 W		L		1		1
e. σσσσ[(σσ́)]	4 W		L		1	1 W	L
f. [(σ́σ)σ]σσσ	3		1	1 W	L		1

In producing the irregular Macedonian accent pattern, it is necessary to accomplish two objectives. First, the analysis must prevent a lexical accent from appearing outside of the accent window in surface forms, returning it to its default antepenultimate position when it wanders further to the left under suffixation. As (65) indicates, it is necessary to rank ALIGN-WORD-R above FAITH-ACCENT to prevent a lexical accent from surfacing outside the accent window. Given this result, the ranking responsible for regular antepenultimate accent, given in (63) above, can then return the accent to the default antepenultimate position, as in (65w).

(65)

σσόσσσ	ALIGN-WORD-R	FAITH-ACCENT
☞ w. σσσ[(όσ)σ]		1
a. σσ[(όσ)σ]σ	1 W	L
b. σσ[(όσ)]σσ	1 W	L

The second objective in producing the irregular pattern is to maintain the position of a lexical accent associated either with the penult or the ultima. There are five rankings, corresponding to five different combinations of structural options, that produce the desired results. The first, FAITH-ACCENT, PARSE-SYL >> ALIGN-HD-L >> HD=TROCHEE, preserves a lexical accent on the penult with an iambic head left-aligned in a larger trisyllabic foot. It preserves a lexical accent on the ultima with an iambic head right-aligned in a larger trisyllabic foot.

(66)

σσσσόσ	FAITH-ACCENT	PARSE	HD-L	HD=TROCHEE
☞ w. σσσ[(σό)σ]		3		1
a. σσσ[(όσ)σ]	1 W	3		L
b. σσσ[σ(όσ)]		3	1 W	L
c. σσσσ[(όσ)]		4 W		L

(67)

σσσσσό	FAITH-ACCENT	PARSE	HD-L	HD=TROCHEE
☞ w. σσσ[σ(σό)]		3	1	1
a. σσσ[(όσ)σ]	1 W	3	L	L
b. σσσσ[(σό)]		4 W	L	1
c. σσσσ[σ(ό)]		4 W	1	L
d. σσσσσ[(ό)]		5 W	L	L

The second ranking, FAITH-ACCENT, PARSE-SYL >> HD=TROCHEE >> ALIGN-HD-L, preserves a penultimate lexical accent with a right-aligned trochaic head in a larger trisyllabic foot, and it preserves a lexical final accent with a right-aligned iambic head in a larger trisyllabic foot.

(68)

σσσσσό	FAITH-ACCENT	PARSE	HD=TROCHEE	HD-L
☞ w. σσσ[σ(σό)]		3		1
a. σσσ[(σσ)σ]	1 W	3		L
b. σσσ[(σσ́)σ]		3	1 W	L
c. σσσσ[(σσ)]		4 W		L

(69)

σσσσσό	FAITH-ACCENT	PARSE	HD=TROCHEE	HD-L
☞ w. σσσ[σ(σό)]		3	1	1
a. σσσ[(σσ)σ]	1 W	3	L	L
b. σσσσ[(σσ́)]		4 W	1	L
c. σσσσ[σ(σ́)]		4 W	L	1
d. σσσσσ[(σ́)]		5 W	L	L

Third, the ranking FAITH-ACCENT, ALIGN-HD-L >> PARSE-SYL >> HD=TROCHEE preserves an underlying penultimate accent with a left-aligned iambic head in a larger trisyllabic foot, and it preserves an underlying final accent with a final iambic foot.

(70)

σσσσσό	FAITH-ACCENT	HD-L	PARSE	HD=TROCHEE
☞ w. σσσ[(σσ́)σ]			3	1
a. σσσ[(σσ)σ]	1 W		3	L
c. σσσ[σ(σσ)]		1 W	3	L
d. σσσσ[(σσ)]			4 W	L

(71)

σσσσσό	FAITH-ACCENT	HD-L	PARSE	HD=TROCHEE
☞ w. σσσσ[(σσ́)]			4	1
a. σσσ[(σσ)σ]	1 W		3 L	L
b. σσσ[σ(σσ́)]		1 W	3 L	1
c. σσσσ[σ(σ́)]		1 W	4	L
d. σσσσσ[(σ́)]			5 W	L

Fourth, the ranking FAITH-ACCENT, HD=TROCHEE >> PARSE-SYL >> ALIGN-HD-L retains a penultimate accent with a right-aligned trochaic head in a larger trisyllabic foot. It retains a final lexical accent with a right-aligned monosyllabic head in a larger disyllabic foot.

(72)

σσσσσό	FAITH-ACCENT	HD=TROCHEE	PARSE	HD-L
☞ w. σσσ[σ(όσ)]			$_{3}$	$_{1}$
a. σσσ[(όσ)σ]	$_{1}$ W		$_{3}$	L
b. σσσ[(σό)σ]		$_{1}$ W	$_{3}$	L
c. σσσσ[(όσ)]			$_{4}$ W	L

(73)

σσσσσό	FAITH-ACCENT	HD=TROCHEE	PARSE	HD-L
☞ w. σσσσ[σ(ό)]			$_{4}$	$_{1}$
a. σσσ[(όσ)σ]	$_{1}$ W		$_{3}$ L	L
b. σσσ[σ(σό)]		$_{1}$ W	$_{3}$ L	L
c. σσσσ[(σό)]		$_{1}$ W	$_{4}$	$_{1}$
d. σσσσσ[(ό)]			$_{5}$ W	L

The final ranking, FAITH-ACCENT, HD=TROCHEE, ALIGN-HD-L >> PARSE-SYL, preserves an underlying penultimate accent with a final trochaic foot, and it preserves an underlying final accent with a final monosyllabic foot.

(74)

σσσσόσ	FAITH-ACCENT	HD=TROCHEE	HD-L	PARSE
☞ w. σσσσ[(όσ)]				$_{4}$
a. σσσ[(όσ)σ]	$_{1}$ W			$_{3}$ L
b. σσσ[(σό)σ]		$_{1}$ W		$_{3}$ L
c. σσσ[σ(όσ)]			$_{1}$ W	$_{3}$ L

(75)

σσσσσό	FAITH-ACCENT	HD=TROCHEE	HD-L	PARSE
☞ w. σσσσσ[(ό)]				$_{5}$
a. σσσ[(όσ)σ]	$_{1}$ W			$_{3}$ L
b. σσσ[σ(σό)]		$_{1}$ W	$_{1}$ W	$_{3}$ L
c. σσσσ[(σό)]		$_{1}$ W		$_{4}$ L
d. σσσσ[σ(ό)]			$_{1}$ W	$_{4}$ L

Kager's Recursive Foot Approach, then, successfully produces the regular and irregular accent patterns found in Macedonian. In general, the Recursive Foot Approach is capable of producing trisyllabic accent windows, like that of Macedonian, with 1-to-3 ratios. (The exceptions are those involving interacting initial and final accent windows, such as Içuã Tupi (Abrahamson 1968) and North Kyungsang Korean (Kenstowicz and Sohn 2001). See Hyde 2015 for details). Unfortunately, it is not possible for the Recursive Foot Approach to account for trisyllabic accent windows with 2-to-3 ratios,

accent windows where a secondary stress accompanies the accent within the window.

Consider the case of Maithili. In Maithili, the default position for primary stress is penultimate, but a heavy syllable can attract the primary stress away from the penult if it is one of the final three syllables. If the penult is heavy, as in (76c,d,f), the penult retains the primary stress. If the penult is light and the antepenult heavy, as in (76e), the primary stress shifts to the antepenult. If the penult is light and the ultima heavy, as in (76g), the primary stress shifts to the ultima.

(76) Final accent window in Maithili (Jha 1940-1944, 1958)

a.	ÀĹL	bìndúlə̌	'a fabulous horse'
b.	ÀLĹL	bà:ʄĩtʊ́tʰĩ	'speak-3 FUT.'
c.	ÀÀLH́L	dàhìnə̌bá:rĭ	'the right one'
d.	ÀH́L	dè:kʰá:rə̌	'seen'
e.	ÀÀLH́ÀL	ʄìmùtə̌bá:hʊ̀nə̌	(proper name)
f.	ÀLH́H̀	àgərá:hì:	'setting fire to a thing'
g.	ÀLÀLH́	pʰùləkùmərí:	(proper name)

The two cases of greatest interest in the present discussion are the case where primary stress occurs on a heavy antepenult, (76e), and the case where the primary stress occurs on a heavy penult followed by a heavy ultima, (76f). In both of these cases, a secondary stress accompanies a primary stress within the accent window.

The difficulty for the Recursive Foot Approach is the second stress within the window. Under the Recursive Foot Approach, accent windows are single maximally trisyllabic feet, meaning that accent windows should never contain more than a single stressed syllable. In those cases where a second stress does occur within the window, the Recursive Foot Approach cannot represent the pattern in a way that maintains the window's integrity. As a consequence, the Recursive Foot approach simply cannot offer the general approach to trisyllabic accent windows claimed by Kager (2012).

To illustrate, in (76e), [ʄìmùtə̌bá:hʊ̀nə̌], the final three syllables form an antibacchius, a ternary configuration that cannot be represented with a recursive foot. In the structure in (77), for example, both the accent and the secondary stress appear within the minimal (head) foot encompassed within the larger trisyllabic foot. This structure is impossible because it results in a head foot with two stresses—in other words, in a head foot that has two strong syllables.

(77) Option 1: Doubly-headed recursive foot

(ʄì)(mùtə̌)[(bá:hʊ̀)nə̌]

In the alternative structure in (78), the antepenultimate accent appears over a monosyllabic minimal foot while the penultimate secondary stress occurs on an adjoined syllable. This is impossible under the Recursive Foot Approach for two reasons. First, it locates stress on a dependent (weak) syllable and, second, it locates two dependent syllables under a single maximal foot.

(78) Option 2: Recursive foot with multiple adjoined syllables

(ʄì)(mùtə̌)[(bá:)hʊ̀nə̌]

Finally, in the alternative structure in (79), the antepenultimate accent appears in the minimal (head) foot and the penultimate stress appears in a dependent trochee. This structure is impossible under the Recursive Foot Approach because the dependent of a recursive foot cannot itself be a foot—it can only be a syllable. (If it the adjunct could be a foot, the maximal size of a recursive foot would be four syllables rather than three, thoroughly unraveling the account of trisyllabic accent windows and many of the other advantages claimed for the Recursive Foot Approach.)

(79) Option 3: Recursive foot with a foot as dependent
(ʃi)(mùtə)[(bá:)(hɒnə)]

The structure, then, must be the non-recursive structure in (80), where a heavy monosyllabic foot is followed by a disyllabic trochee, meaning that a recursive foot simply cannot be responsible for the maximum distance between the accent and the right edge in Maithili.

(80) What's left: Non-recursive footing
(ʃi)(mùtə)(bá:)(hɒnə)

Although it does not exhibit one of the ternary patterns focused on here, the pattern in (76f), [ə̀gərá:hì:], presents essentially the same problem. The configuration within the stress window consists of two stressed syllables, meaning that the Recursive Foot Approach must use two (non-recursive) feet to represent it. Since two feet are required to represent the configuration within the window, the window cannot be the result of a single peripheral maximally trisyllabic foot. The recursive foot approach, then, fails as a general, uniform analysis of trisyllabic accent windows.

Though Kager acknowledges the importance of the Maithili case, citing it in his arguments against Extended Lapse Avoidance (Gordon 2002, Kager 2005) and Weak Local Parsing (Kager 1994, Green 1995, Green and Kenstowicz 1995), he fails to acknowledge that the same pattern constitutes an argument against the Recursive Foot Approach.

> Yet another problem for an anti-lapse account of stress windows, observed by Hyde (2008a), is the fact that in Maithili (Indo-Iranian; Jha, 1958) and other languages, a non-primary stress may occur inside the final three syllable window. This pattern defeats a lapse-based account of the stress window, since no syllable bearing stress, whether primary or non-primary, can be involved in lapse violations. (Kager 2012:1481)

We can add the Recursive Foot Approach, then, to the list of potential analyses of trisyllabic accent windows excluded by the Maithili case. Before moving on it should be noted that Maithili is not the only case that would exclude such analyses. The case of Munster Irish, as described by Ó Sé (2000, 2008) and Iosad (2013), presents essentially the same problem as Maithili: an accent accompanied by a secondary stress within an accent window.

In Munster Irish, primary stress is restricted to syllables whose initial mora is one of the first three moras of the word. As illustrated in (81e-q), stress occurs on the rightmost heavy syllable whose leftmost mora is one of the initial three. As illustrated in (81a-d), in the absence of a qualifying heavy syllable, the initial syllable is stressed.

(81) Munster Irish Primary Stress (Ó Sé 2000, 2008; Iosad 2013)

a.	ÍL	carraig	[ˈkarɪgʲ]	‘rock, boulder’
b.	ÍLL	clagarnach	[ˈklagərnəx]	‘clattering’
c.	ÍLLL	armacach	[ˈarəməkəx]	‘tender’
d.	ÍLLH	imleacán	[ˈimʲɪlʲəkɑːn]	‘navel’
e.	ÍL	álainn	[ˈɑːlɪnʲ]	‘nice’
f.	ÍLL	cúramach	[ˈkuːrəməx]	‘careful’
g.	ÍLH	údarás	[ˈuːdərɑːs]	‘authority’
h.	ÍLHL	údaráiseach	[ˈuːdərɑːʃəx]	‘authoritative’
i.	ÍLHH	amparánaíocht	[ˈoumpərɑːniːxt]	‘ungainliness’
j.	LÍ	cailín	[kaˈlʲiːnʲ]	‘girl’
k.	LÍL	coiméadann	[kʲɪˈmʲɑːdən]	‘(s)he observes’
l.	LÍH	bithiúntaíocht	[bʲɪˈhuːntiːxt]	‘villainy’
m.	LLÍ	ceannaitheoir	[kʲanəˈhoːrʲ]	‘buyer’
n.	LLÍH	amadántaíocht	[əməˈdɑːntiːxt]	‘foolishness’
o.	HÍ	díomhaoin	[dʲiːˈviːnʲ]	‘idle’
p.	HÍL	ógánach	[oːˈgɑːnəx]	‘young man’
q.	HÍH	amhránaí	[uːˈrɑːniː]	‘songs’

The key examples in this context are words where primary stress appears on the post-peninitial syllable: as illustrated in (82a), secondary stress often appears on the first syllable. In such cases, then, the initial accent window forms a cretic, a 2-to-3 configuration that cannot be represented with a recursive foot.

(82) Munster Irish Secondary Stress

a.	ÌLÍ	ceannaitheoir	[ˌkʲanəˈhoːrʲ]	‘buyer’
b.	ÍLÌ	údarás	[ˈuːdəˌrɑːs]	‘authority’
c.	ÍLÌL	údaráiseach	[ˈuːdəˌrɑːʃəx]	‘authoritative’
d.	ÍLÌH	útamálaí	[ˈuːtəˌmɑːliː]	‘bungler’
e.	ÍLLÌ	formadúil	[ˈforəməˌduːlʲ]	‘envious’

4.2 Weak Bracketing and Relation-Specific Alignment

Where the Recursive Foot Approach to accent windows focuses on the maximal size of the span from the edge of the form that also includes the accent, the Relation-Specific Alignment (RSA; Hyde 2012a) approach focuses on the maximal size of the gap between edge and accent. In trisyllabic accent windows, the maximal size of the gap is two

syllables—the space of a single foot. As (83) illustrates, if no more than a single disyllabic foot can intervene between the accent and the right edge of the prosodic word, the accent can occur no further away than the third syllable from the right edge.

(83) Final feet and the maximal gap in final trisyllabic accent windows

Within the window

a. (σσ)(σσ)(σσ́)
b. (σσ)(σσ)(σ́σ)
c. (σσ)(σσ́)(σσ)

Outside the window

d. (σσ)(σ́σ)(σσ)
e. (σσ́)(σσ)(σσ)

Similarly, if no more than a single disyllabic foot can intervene between the accent and the left edge of the prosodic word, the accent can occur no further away than the third syllable from the left edge.

The RSA approach creates trisyllabic accent windows with the two opposite edge RSA constraints defined in (84). INITIAL-WINDOW prohibits an accent from following a foot with a syllable intervening, and FINAL-WINDOW prohibits an accent from preceding a foot with a syllable intervening. ("X_ω"stands for "prosodic word-level gridmark", the grid entry typically associated with the accent.)

(84) a. INITIAL-WINDOW: *$\langle F, X_\omega, \sigma\rangle$ / $F \ldots \sigma \ldots X_\omega$

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

b. FINAL-WINDOW: *$\langle X_\omega, F, \sigma\rangle$ / $X_\omega \ldots \sigma \ldots F$

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

To illustrate how the constraints create trisyllabic accent windows, FINAL-WINDOW is the constraint that would be used to establish an accent window at the right edge of a form. FINAL-WINDOW is satisfied when the accent occurs within the final foot, as in (85a,b), or when it occurs on the syllable adjacent to the final foot, as in (85c). In either situation, the accent occurs on one of the final three syllables. FINAL-WINDOW is violated when the accent moves further to the left, as in (85d,e), so that one or more syllables intervenes between the accent and the left edge of the final foot. In this situation, the accent does not fall on one of the final three syllables.

(85)

	FINAL-WINDOW
☞ a. (σσ)(σσ)(σσ́)	
☞ b. (σσ)(σσ)(σ́σ)	
☞ c. (σσ)(σσ́)(σσ)	
d. (σσ)(σ́σ)(σσ)	*!
e. (σσ́)(σσ)(σσ)	*!*

Similarly, INITIAL-WINDOW is the constraint that would be used to establish an accent window at the left edge of a form. INITIAL-WINDOW is satisfied when the accent occurs within or adjacent to an initial disyllabic foot—when it falls on one of the three initial syllables—and it is violated when it occurs any further to the right.

The RSA approach, of course, assumes that parsing is universally exhaustive, as in the Weak Bracketing framework of Hyde (2002, 2016). Universal exhaustive parsing is necessary to ensure that the rightmost foot is always in final position in the form and that the leftmost foot is always in initial position. As (86) demonstrates, if the rightmost foot were not necessarily in final position in languages with final accent windows, FINAL-WINDOW could not actually restrict the accent to the final three syllables.

(86)

	FINAL-WINDOW
☞ a. (σσ)(σσ)σ(σσ́)	
☞ b. (σσ)(σσ)(σσ́)σ	
☞ c. (σσ)(σσ)(σ́σ)σ	
☞ d. (σσ)(σσ́)(σσ)σ	
e. (σσ)(σ́σ)(σσ)σ	*!
f. (σσ́)(σσ)(σσ)σ	*!*

Similarly, if the leftmost foot were not necessarily in initial position in languages with initial accent windows, INITIAL-WINDOW could not actually restrict the accent to the three initial syllables.

To illustrate how the analysis works, consider how the RSA approach accounts for the behavior of the Macedonian accent window. To produce the antepenultimate accent of the regular Macedonian pattern, FINAL-WINDOW creates a three-syllable window at the right edge of the word and X_{ω}-LEFT, given in (87), aligns the accent as far to the left within the window as possible.

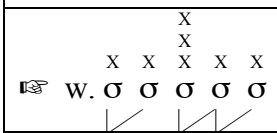
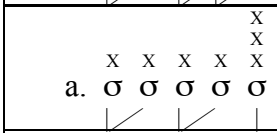
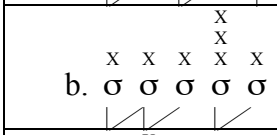
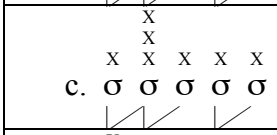
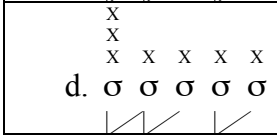
(87) X_{ω}-LEFT: *$\langle \omega, X_{\omega}, \sigma \rangle$ / [… σ … X_{ω} …]$_{\omega}$

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

In (88), ranking FINAL-WINDOW above X_{ω}-LEFT locates the accent just to left of a final stressless foot. FINAL-WINDOW excludes (88c,d), where the primary stress falls to the left of the syllable adjacent to the final foot. In each of the remaining competitors, the primary stress falls on one of the final three syllables: it either falls within the final foot

or on the syllable adjacent to the final foot. X_{ω}-LEFT excludes (88a,b), where the stress occurs within the final foot, because the stress occurs further to the left in (88w), where the stress is adjacent to the final foot.[1]

(88)

	FINAL-WINDOW	X_{ω}-LEFT
☞ w. 		2
a. 		W 4
b. 		W 3
c. 	W 1	L 1
d. 	W 2	L

When we insert the constraint that requires faithfulness to a lexically accented syllable into the ranking between FINAL-WINDOW and X_{ω}-LEFT, the analysis also establishes the appropriate restrictions on the Macedonian irregular pattern.

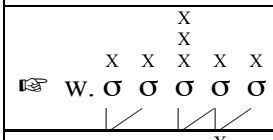
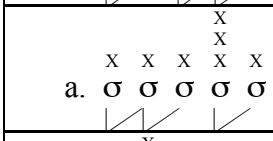
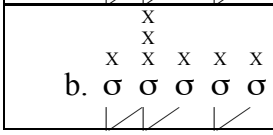
(89) IO-FAITH-X_{ω}

Every prosodic word-level grid entry in the input occurs in the same position in the output.

As (90) illustrates, FINAL-WINDOW must dominate IO-FAITH-X_{ω} to prevent the accent from following the lexically specified syllable outside the three-syllable window. FINAL-WINDOW excludes the faithful candidate in such cases and, in conjunction with the low-ranked X_{ω}-LEFT, returns the accent to its default position over the antepenult.

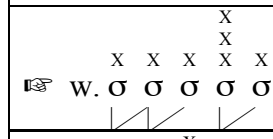
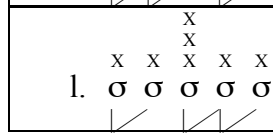
[1] The analysis in the tableau assumes that Macedonian footing is trochaic. It should be noted, however, that the absence of a secondary stress pattern prevents us from being certain about preferred foot-type and parsing directionality.

(90)

σσσ́σσσ	FINAL-WINDOW	IO-FAITH-X_ω	X_ω-LEFT
 ☞ w. σ σ σ σ σ		1	2
 a. σ σ σ σ σ		1	W 3
 b. σ σ σ σ σ	W 1	L	L 1

As (91) illustrates, IO-FAITH-X_ω must dominate X_ω-LEFT to allow the lexically specified syllable to retain its accent when it is penultimate or final. In such cases, IO-FAITH-X_ω prevents X_ω-LEFT from pushing the accent to the left edge of the accent window.

(91)

σσσσσ́σ	FINAL-WINDOW	IO-FAITH-X_ω	X_ω-LEFT
 ☞ w. σ σ σ σ σ			3
 l. σ σ σ σ σ		W 1	L 2

To this point, then, we have seen that the RSA approach is able to establish accent windows with 1-to-3 ratios, such as the window that constrains the regular and irregular accent patterns of Macedonian. For Macedonian, the ranking FINAL-WINDOW >> X_ω-LEFT establishes the antepenultimate accent of the regular pattern, and the ranking FINAL-WINDOW >> IO-FAITH-X_ω >> X_ω-LEFT confines lexical accent to a three-syllable window in the irregular pattern.

Unlike the Recursive Foot Approach, the RSA approach easily extends to languages with a secondary stress pattern. The RSA approach works exactly the same way for windows with 2-to-3 ratios as it does for windows with 1-to-3 ratios. As (92) illustrates for a final accent window, the maximum intervening distance between accent and edge is still the space of a single disyllabic foot. Since no more than a single disyllabic foot can intervene between the accent and the relevant edge of the prosodic word, the accent can occur no further away than the third syllable from the relevant edge.

(92) The window is defined exactly the same way if all feet are stressed.

Within the window

a. (σ̀σ)(σ̀σ)(σσ́)
b. (σ̀σ)(σ̀σ)(σ́σ)
c. (σ̀σ)(σσ́)(σ̀σ)

Outside the window

d. (σ̀σ)(σ́σ)(σ̀σ)
e. (σσ́)(σ̀σ)(σ̀σ)

As (93) demonstrates, FINAL-WINDOW produces final trisyllabic accent windows in exactly the same way when a secondary stress pattern is present. FINAL-WINDOW is satisfied when the accent occurs within the final foot, as in (93a,b) or on the syllable adjacent to the final foot, as in (93c). In either situation, the accent occupies one of the final three syllables. FINAL-WINDOW is violated when the accent moves further to the left so that a syllable intervenes between the accent and the left edge of the final foot, as in (93d,e). In this situation, the accent does not occur on one of the final three syllables.

(93)

	FINAL-WINDOW
☞ a. (σ̀σ)(σ̀σ)(σσ́)	
☞ b. (σ̀σ)(σ̀σ)(σ́σ)	
☞ c. (σ̀σ)(σσ́)(σ̀σ)	
d. (σ̀σ)(σ́σ)(σ̀σ)	*!
e. (σσ́)(σ̀σ)(σ̀σ)	*!*

Turning, then, to the Maithili accent window, I will take the pattern of secondary stresses as given and consider only the most relevant possible variations in the position of primary stress. This will allow us to focus on the implementation of the accent window. Given the pattern of secondary stresses, the primary stress prefers to fall on the rightmost nonfinal heavy syllable, as long as it is one of the final three. If there is no nonfinal heavy syllable among the final three, then primary stress occurs on the rightmost nonfinal syllable.

In Maithili, as in Macedonian, the opposite-edge alignment constraint FINAL-WINDOW is responsible for creating the accent window. The rightward orientation of the primary stress is captured with the alignment constraint, X_{ω}-RIGHT, given in (94a), and the preference for stress to avoid the final syllable of the prosodic word is captured with NONFINALITY, given in (94b). The preference of primary stress to fall on a heavy syllable is captured with the STRESS-TO-WEIGHT constraint, given in (94c).[2]

[2] STRESS-TO-WEIGHT is formulated here as a nonfinality constraint. If primary stress cannot occur on the final mora of a syllable, then a syllable must have at least two moras to support a primary stress. See Hyde 2007b for arguments supporting this approach.

(94) a. X_ω-RIGHT: *⟨ω, X_ω, σ⟩ / [… X_ω … σ …]$_\omega$

‘Assess a violation mark for every ⟨ω, X_ω, σ⟩ such that X_ω precedes σ within ω.’

b. NONFINALITY

No X_ω occurs over the rightmost σ of ω.

c. STRESS-TO-WEIGHT

No X_ω occurs over the rightmost μ of σ.

As (95) indicates, the Maithili primary stress pattern emerges when FINAL-WINDOW dominates STRESS-TO-WEIGHT, STRESS-TO-WEIGHT dominates NONFINALITY, and NONFINALITY dominates X_ω-RIGHT.

(95) Maithili ranking

FINAL-WINDOW >> STRESS-TO-WEIGHT >> NONFINALITY >> X_ω-RIGHT

The ranking FINAL-WINDOW >> STRESS-TO-WEIGHT prevents the weight of syllables that occur outside the trisyllabic window from affecting the position of primary stress. In other words, it prevents primary stress from moving to the left of the antepenult in order to satisfy the lower-ranked STRESS-TO-WEIGHT.

(96)

ÀLÀLL	FINAL-WINDOW	STRESS-TO-WEIGHT
☞ w. H L L L		1
l. H L L L	W 1	L

Ranking STRESS-TO-WEIGHT above NONFINALITY allows the preference for primary stress to fall on a heavy syllable to overcome the preference to avoid primary stress in final position.

(97)

ÀLÀLÁ	STRESS-TO-WEIGHT	NONFINALITY
☞ w. L L L L H		1
l. L L L L H	W 1	L

Ranking STRESS-TO-WEIGHT above X_ω-RIGHT allows the preference for primary stress to fall on a heavy syllable to overcome its basic rightward orientation. In (98), the

higher-ranked STRESS-TO-WEIGHT prevents X_{ω}-RIGHT from positioning the primary stress on a light penult when a heavy antepenult is available.

(98)

ÌLLHÌLL	STRESS-TO-WEIGHT	X_{ω}-RIGHT
☞ w. L L L H L L		2
l. L L L H L L	W 1	L 1

In (99), we see the role that NONFINALITY plays in preventing X_{ω}-RIGHT from pulling primary stress onto the ultima when there is no heavier syllable further to the left within the accent window.

(99)

ÌHLÌL	NONFINALITY	X_{ω}-RIGHT
☞ w. L L H H		1
l. L L H H	W 1	L

Finally, in (100) and (101), we can see that the low-ranked X_{ω}-RIGHT is able to draw primary stress onto the penult when the penult and the antepenult are both the same weight.

(100)

ÌHÌL	STRESS-TO-WEIGHT	X_{ω}-RIGHT
☞ w. H H L		1
a. H H L		W 2

(101)

ÌÌL	STRESS-TO-WEIGHT	x_{ω}-RIGHT
☞ w. x / x x / x x x / L L L	1	1
l. x / x x / x x x / L L L	1	W 2

To summarize, we have seen that the RSA approach, combined with Weak Bracketing, is able to capture both trisyllabic accent windows with 1-to-3 ratios and trisyllabic accent windows with 2-to-3 ratios. It is capable, then, of providing a general, uniform account of trisyllabic accents windows, including cases where accent windows operate simultaneously from opposite edges of the word (Hyde 2015). The RSA approach can also be extended to morpheme-based accent windows (Hyde and Husic 2012; Hyde 2016), and it can be extended to similar phenomena—infixation (Hyde and Paramore, to appear), Wackernagel clitics, verb second—that are not obviously connected to accent. In contrast, because it cannot capture accent windows with 2-to-3 ratios, it is simply not possible for the Recursive Foot Approach to provide a general approach to accent windows, and there seems to be no possibility of extending it to the non-accentual phenomena mentioned above.

5 Conclusion

The claimed advantages of the Recursive Foot Approach lie in the ability of recursive feet to capture phenomena associated with ternary stress configurations, whether the patterns involve repeating ternary configurations, ternary configurations embedded in otherwise binary patterns, or the ternary configurations found in trisyllabic accent windows. Because overlapping feet have been acknowledged to cover the same empirical territory as recursive feet, however, any advantages that arise from recursive feet are not actually advantages over overlapping feet.

The reverse is not true. A number of phenomena that can be captured with overlapping feet cannot be captured with recursive feet. Ternary configurations can be divided into two basic types based on the ratio of stressed syllables to syllables. The first type has one stressed syllable out of three, and the second type has two stressed syllables out of three. The 1-to-3 ratio is the ratio that is typically examined when ternary configurations are discussed in the literature, but the theory must also address patterns based on the 2-to-3 ratio. While overlapping feet can be used to represent both ternary configurations with 1-to-3 ratios and ternary configurations with 2-to-3 ratios, recursive feet can only be used to represent the former.

To demonstrate the advantages of overlapping feet over recursive feet, the paper focused on two phenomena that require the theory to represent ternary configurations with 2-to-3 ratios: quantity-insensitive binary stress patterns and trisyllabic accent windows. As we saw in Section 3, recursive feet cannot be employed to produce a reasonably accurate typology of quantity-insensitive stress patterns because they do not offer a way to address the Odd Heavy Problem. The necessity of using a monosyllabic

foot capture 2-to-3 ratios means that the Recursive Foot Approach must parse an odd-numbered heavy syllable as a monosyllabic foot to achieve exhaustive binary parsing in odd-parity forms. Because they can capture 2-to-3 ratios without resorting to monosyllabic feet, however, an approach based on overlapping feet can ignore the presence and location of heavy syllables and maintain true quantity-insensitivity.

As we saw in Section 4, recursive feet cannot form the basis for a general account of accent windows. Since they cannot be used to represent ternary configurations with 2-to-3 ratios, recursive feet cannot account for accent windows where a secondary stress accompanies an accent within the window. In contrast, because overlapping feet can be used to represent both ternary configurations with 1-to-3 ratios and ternary configurations with 2-to-3 ratios, overlapping feet can be used to account for trisyllabic accent windows where the accent is not accompanied by a secondary stress within the window and accent windows where the accent is accompanied by a secondary stress.

Overall, then, the overlapping feet of the Weak Bracketing approach provide a much more successful analysis of ternary configurations than the recursive feet of the Recursive Foot Approach.

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