# Squamish Stress Clash*

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In recent work in phonology the phenomenon of stress clash has received considerable attention. A number of studies have shown that the way in which stress clash is resolved is language particular. In English, for example, stress clash is resolved by a leftward movement of secondary stress, <1> while in German such movement can either be leftward or rightward.<2> In addition, stress clash can, in many cases, be resolved by lengthening the first of the clashing syllables (i.e., either by prolonging the vowel or by geminating the following consonant), which separates the clashing syllables in time. According to Nespor & Vogel (1979), this is the essence of raddoppiamento sintattico in Italian.<3> In this paper, I will be concerned with the way in which Squamish, a Coast Salish language of Southern British Columbia, resolves stress clash. The Squamish data to be discussed are taken from Kuiper's (1967) description of the language as well as from Demers and Horn (1978).

The analysis of Squamish stress-clash proposed here incorporates both metrical trees and metrical grids. I will argue that stress clash in Squamish is defined by a particular tree configuration, but resolved by reference to the grid. In terms of grid structure, then, the rule that I will propose to resolve Squamish stress-clash is a "delete x" rule. Specifically, the Squamish stress-clash resolution-rule is a left-to-right (directional) rule that removes an x (grid mark) from the clashing syllable containing the second mora. However, before arguing for this analysis and outlining its consequences, I first want to discuss the Squamish stress system in general. I will next present the cases illustrating stress clash, and then formulate and reject two alternate (non-"delete x") ways in which Squamish stress-clash can be defined and resolved - one solely in terms of syllable geometry, and another one solely with metrical grids. Following this, I will present and argue for the above-mentioned "delete x" rule, then discuss a specific class of counterexamples to the proposed "delete x" rule, and finally, look at its application to a particular group of words in which clash involves three stressed syllables.

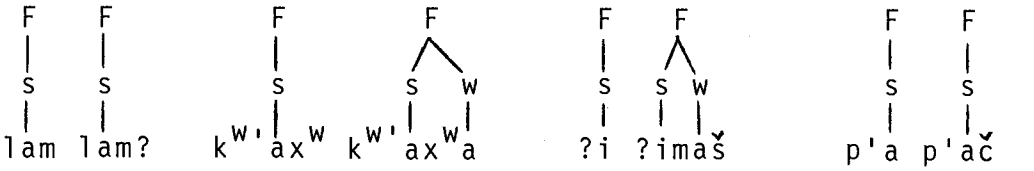
Stress in Squamish usually falls on the penultimate syllable of a stem. In terms of metrical structure, a quantity-insensitive, left-dominant foot is constructed onto the final two syllables of the stem (or, if the stem is monosyllabic, a degenerate foot). Squamish differs from other Salish languages in that the mid central vowel phoneme (schwa) can bear stress when in penultimate position, even when other vowel qualities are present.<4> It should be noted in passing that stems of three syllables are not common, and stems of more than three syllables are virtuallly nonexistent; thus, whether there can be alternating stress before the penultimate stress on the stem is unknown. However, this is not really relevant to the topic at hand.

Most words in Squamish are not monomorphemic, but rather,

consist of a stem plus an affix (or affixes). Affixes in Squamish often seem to have their own stress properties. Many suffixes, especially suffixes referring to body-parts (the so-called "somatic" suffixes), always receive stress (usually penultimately, if the suffix has more than one syllable); hence, such a suffix comprises a foot.<5> Most prefixes, on the other hand, never receive stress. An exception, though, is the prefixal part of the templates for Squamish reduplication,<6> which can receive stress; that is, a reduplicated prefix is also a foot on its own.<7>

Stress clash in Squamish arises when two adjacent syllables are stressed. This occurs when a one- or two-syllable stem bearing initial stress is reduplicated, so that there is a clash between the stressed syllable of the stem and the stressed reduplicated prefix. The following words in (1a), given with their foot structure, illustrate clash,

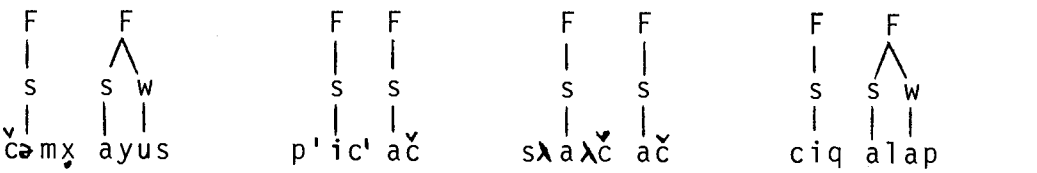
(1) a.




| /lám-lám?/ | /k^w'áx^w-k^w'áx^wa/ | /?í-?ímaš/ | /p'á-p'áč/ |
|---|---|---|---|
| redup house | redup box | redup walk | redup hot |
| houses | boxes | walk around | be very hot |

In addition, stress clash occurs when a monosyllabic stem has a one- or two-syllable somatic suffix attached to it, as the following words in (1b) show:

(1) b.




| /čə́mx̣-áyus/ | /p'íč'-áč/ | /sλáλč-áč/ | /cíq álap/ |
|---|---|---|---|
| pitch eyes | caught hand | top hand | stabbed thigh |
| have one's eyes closed with a pitch | get one's hand caught | top of the hand | be stabbed in the thigh |

Stress clash is resolved, for these words, as in (2a) and (2b), respectively (where stress is indicated as it appears on the surface).

(2) a. Resolution of stress clash of words in (1a):

lamlám? k^w'ax^wk^w'áx^wa ?i?im?aš p'áp'ač

b. Resolution of stress clash of words in (1b):

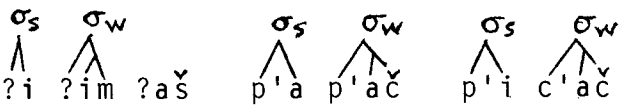
čəmxáyus sλaλčáč p'íč'ač cíqalap

Comparing (1a) with (2a) and (1b) with (2b), we see that the first two words in (1a) and (1b) are resolved with stress ending up on the second syllable of the clashing pair, while the last two words in (1a) and (1b) wind up with stress on the first of the clashing syllables.

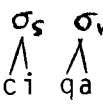
With reference to the forms in (1) and (2), let us now consider an analysis of Squamish where the resolution of stress clash is formulated solely in terms of syllable geometry. Let us assume that resyllabification occurs over morpheme boundaries. Then, the basic generalization for resolving Squamish stress-clash is that, when two syllables clash, stress ends up on the first syllable if it is light, but on the second syllable otherwise. This is illustrated below in (3):

(3) a. Stress falls on the first of the clashing syllables if it is light (L=light syllable, H=heavy syllable)

1. ĹH́---> ĹH

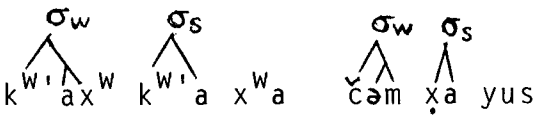



2. ĹĹ--->ĹL

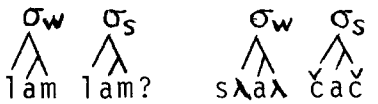



b. Otherwise, stress falls on the second syllable

1. H́Ĺ---> HĹ



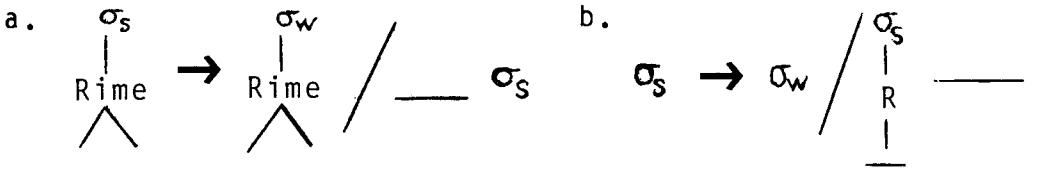

2. H́H́--->HH́




However, this generalization about Squamish stress-clash - which is, essentially, an instruction to try first to stress the syllable that is light - must be considered quite bizarre in light of the widely-held view on syllable structure that, when syllable quantity (i.e., the distinction between light vs. heavy syllables) plays a role in stress, then it is the branching of syllable rimes that attracts stress. In the Squamish case, though, it is the first light syllable (i.e., a syllable with nonbranching rime) that attractss stress (as can be see from (3) above). The bizzareness of such an approach leads one to consider other ways of looking at the resolution of Squamish stress-clash.

But, before abandoning the possibility that syllable geometry is what is involved here, let us briefly consider an analysis where stress clash is resolved by a rule that destresses the first syllable of a clashing pair if it is heavy (as in (3b)), but otherwise destresses the second syllable (as in (3a)). Formally, this is somewhat difficult to express, though the two following rules in (4) do capture the facts at issue:

(4) Destressing rules resolving stress clash:




The first rule, (4a), destresses a (strong) syllable with a branching rime if it immediately precedes another stressed syllable, while rule (4b) destresses a syllable if it immediately follows a stressed syllable with a nonbranching rime. Though some solution expressed solely in terms of syllable geometry can thus obviously be formulated for Squamish stress-clash, there are, however, a number of reasons for rejecting such an analysis. First, two destressing rules are needed to remove Squamish stress-clash, as in (4), whereas it would be preferable to have one rule accomplishing this. Second, the branching-nonbranching rime distinction can be considered unimportant in Squamish. This is because assignment of main stress is normally on penultimate syllables, regardless of syllable quantity. If main stress is not sensitive to the heavy-light distinction, then, it would be very surprising if the rules for the alleviation of stress clash were sensitive to such a distinction. Third, Prince (1983) has argued, independently, that stress clashes are better resolved using metrical grids. Metrical grids represent rhythmic structure and stress clash is a rhythmic phenomenon.

Now, following Prince's proposal, let us consider a possible grid analysis of words with stress-clash, for example, the words in (5) below:

(5) Possible grids of words with stress-clash (before resolution)

a.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| x | x | | | x | | x | | | x | x | | | | x | x | | | | |
| x | x | | | x | | x | | x | | x | x | | x | | x | | | | |
| l | a | m | l | a | m | ʔ | k | $^{w'}$ | a | x | $^{w}$ | k | $^{w'}$ | a | x | $^{w}$ | a | ʔ | i | ʔ | i | m | ʔ | a | š | p | ' | a | p | ' | a | č |

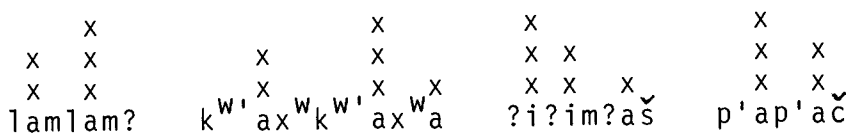
b.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| x | | x | | | | | x | | x | | | | x | x | | | | | | x | | x | | | | | | | | |
| x | | x | x | | | | x | | x | | | | x | x | x | | | | | x | | x | | | | | | | | |
| č | ə | m | x | a | y | u | s | s | λ | a | λ | č | a | č | c | i | q | a | l | a | p | p | ' | i | c | ' | a | č | | |

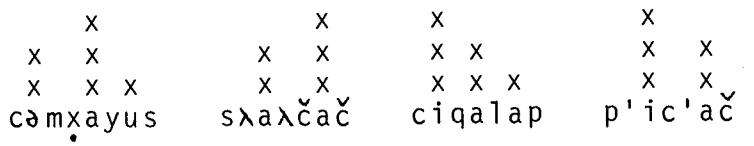
For some of these words it is obvious that stress clash is not resolved in terms of a rule "move x", since, there is nowhere for x to move to. Perhaps, then, stress clash is resolved by an "add x" rule - something like, "add an x to the first light syllable in a clashing pair, but otherwise to the second syllable." This yields the forms in (6):

(6) Add x Rule

a.



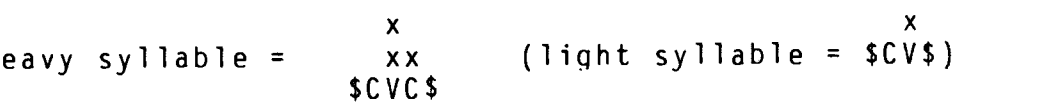

b.




But in having an "add x" rule, one would expect, that in (6), secondary stress should occur on syllables with two rows of grid marks; however, no secondary stress occurs in the words in question. This would always require a stipulation (of a rule interpretation) to the effect that secondary stress is never realized. Consequently, an "add x" rule as in (6) does not seem to be an attractive option.

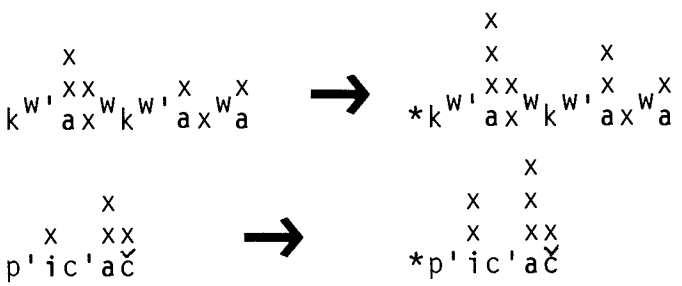
There is, nevertheless,at least one other possible grid analysis for Squamish stress-clash, one that incorporates Prince's proposal of bipositional reprsentation for heavy syllables. That is as Prince (1983:58) states: "... a heavy syllable characteristically maps into two grid positions, the first of which corresponds to the peak, or nucleus, and the second to the post-peak material." A bipositional analysis of a heavy syllable would thus be as in (7):

(7) Prince's bipositionality




Now, Prince's definition of heavy syllable is not formulated in terms of rime branching, but rather, in terms of sonority: "A heavy syllable encloses significantly more (total) sonority than a light syllable. Stress is a kind of heightening of sonority; heavy syllables are intrinsically heightened; and - in the capitalism of stress assignment - them as has, gets." Applied to Squamish stress, a bipositional analysis in which heavy syllables are gridded for two positions has the effect of always leaving the main stress on the heavy syllable. For instance, consider the two following examples in (8) (where the words are first gridded before any stress rules have applied, and then gridded after a rule has applied that adds an x to the strongest syllable of each foot):

(8)




In the above examples, main stress would be predicted to fall on the heavy syllables; however, in each case, it is the light syllable that wins out and receives main stress. It is quite apparent, then, that a bipositional analysis of heavy syllables (in Prince's sense) cannot be maintained for Squamish, for, as shown by the examples just given, such an approach incorrectly predicts that bipositional (or heavy) syllables should receive stress in certain cases.

Moreover, there are a number of shortcomings inherent in any attempt to capture the stress-attracting abilities of heavy syllables in terms of sonority. Claiming that syllables that are more sonorous are likely to receive stress would entail that, if a word has only light syllables, then the syllable with the most sonorous vowel should receive stress, but this is almost never the case. Moreover, the bipositional reprsentation of heavy syllables incorporates a claim that the initial part of a syllable (or, rather, of a rime) is more sonorous than the second part. However, this does not seem to be always true in languages where long vowels act as a heavy syllable. A final drawback in trying to relate the stressability of heavy syllables to their heightened sonority is that such a proposal is unable to handle a rule like English sonorant destressing - the fact that, in certain environments, a heavy syllable with a vowel and sonorant consonant in the rime destresses (compare, for example, legendary with directory, by this rule the second syllable of legendary has destressed - see Hayes (1981) and Travis (1983) for details). Here we see that a syllable containing a very high degree of sonority (i.e., one containing a vowel plus a following sonorant consonant) destresses. Such a rule militates against an analysis of stress as a heightening of sonority.

So far, we have seen that an analysis in terms of syllable geometry alone or in terms of grids alone cannot capture the bizarre generalization that seems to be the essence of Squamish stress clash - that, when two syllables clash, stress ends up on either the first light syllable or, if there are no light syllables on the second heavy syllable.

Before presenting my mora-based "delete x" solution for resolving Squamish stress-clash, I want to mention briefly the way I propose to reprsent heavy syllables in Squamish. Assignment of main stress is not sensitive to syllable quantity, therefore, I will not assume a rime structure for heavy syllables. Though the rest of what I will say may not be incompatible with a rime structure analysis. Heavy syllables are represented here, not by a branching rime, but rather, as part of a level (or flat) syllable structure incorporating an onset, a

peak, and a coda. Even though,as mentioned before, a heavy syllable does not attract stress (as would be predicted by postulation of a branching rime), the heaviness or lightness of syllables does apparently play a role in the resolution of stress clash. This is captured by having a heavy syllable (i.e., a syllable with a coda) map into two grid positions as follows:

$$\overset{xx}{\$CVC\$}$$

Notice that my use of bipositionality here differs from Prince's use of it, in that, here, a heavy syllable has no additional grid slot on its second row (unless it is stressed). In this way, we can express the fact that heavy syllables play a role in the resolution of Squamish stress clash without predicting it should attract stress.

"Grid position", here, is synonymous with "mora". Various linguists have used the term "mora" in a variety of senses. In some studies (for example, Munro (1977)), the mora is correlated with vowel length - short vowels consist of one mora, and long vowels contain two. McCawley (1977), on the other hand, defines mora as something which a light syllable has one of and a heavy syllable has two of, so that sometimes moras correlate with post-vocalic consonants. But Prince (1983) defines the mora as a position on the grid, and this is the notion I will adopt here. In Squamish, then, both peak and coda map onto one grid-position (i.e., each constitutes one mora). In terms of grid-positions, or moras, the rule resolving Squamish stress-clash is a left-to-right directional rule that can be informally stated as in (9):

(9) Squamish stress-clash resolution rule (informally stated)

"Delete an x from the clashing syllable containing the second mora."

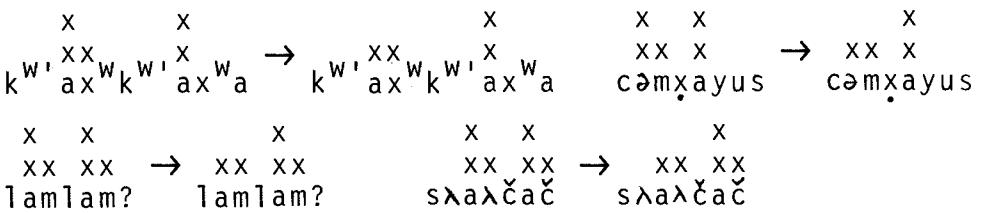
Examples of its application are as in (10) (with heavy syllables gridded $\overset{xx}{\$CVC\$}$, as proposed):

(10) Application of stress clash resolution rule (syllables not involve in clash are not gridded)

a.

| | | | | | |
|---|---|---|---|---|---|
| x x<br>x xx<br>?i?im?aš̌ | → | x<br>x xx<br>?i?im?aš̌ | | x x<br>x xx<br>p'ap'ač̌ | → | x<br>x xx<br>p'ap'ač̌ |
| x x<br>x x<br>ciqalap | → | x<br>x x<br>ciqalap | | x x<br>x xx<br>p'ic'ač̌ | → | x<br>x xx<br>p'ic'ač̌ |

b.




In (10a), the second mora is in the second of the clashing syllables so that syllable destresses, whereas, in (10b), the second mora is in the first of the clashing syllables so that syllable destresses. Thus, this one rule resolves Squamish stress-clash elegantly via a single process, and without reference to the branching or nonbranching of syllable rimes.

The Squamish "delete x" rule is able to resolve stress clash in all the data presented so far. Now, I want to consider a class of apparent counterexamples to the "delete x rule proposed. Consider the following words, in (11), with stress clash, given with their grid-structures (before resolution):

(11)

| s-xə̓n?-xən | mən?-mən | t'ə̓x-t'ə̓x-c |
|---|---|---|
| redup leg | redup child | redup open mouth |
| legs | children | have the mouth open |

In the above words, the "Delete x" rule should delete an x from the first syllable since it is heavy (i.e., contains the second mora); and thus, the second syllable should be stressed. However, unexpectedly, the first syllable is stressed in the above words. An x has been deleted from the second syllable, instead, thus, yielding (12):

(12)

| sxən?xən | mən?mən | t'ə̓xt'ə̓xc |
|---|---|---|

But, notice that, in these words, both the clashing syllables have the vowel schwa. This suggests that, when the clashing syllables both contain schwa, the syllables count as only having one mora, whether they are light or heavy. Positing heavy schwa syllables that only have one mora may be synchronically ad hoc, but diachronically, it is probably a remnant of an earlier stress rule. Evidence for this comes from Squamish's closest relative, Halkomelem. Elmendorff and Suttles (1960:9) state the following about stress in Halkomelem, "If the stem or derivative contains only /ə̓/, stress is on the first /ə̓/." Synchronically, though, we would handle the above data by stipulating that when the clashing syllables both contain schwa, their syllable counts as only having one mora (i.e., they would be gridded just for one grid-position), and thus, the regular "Delete x" rule applies to resolve the clash by deleting an x from the second of the

clashing syllables which would contain the second mora as shown in (13):

(13)

```
 x   x          x
 x   x    →     x   x
sxən?xən       sxən?xən

 x   x          x
 x   x    →     x   x
mən?mən        mən?mən

 x   x          x
 x   x    →     x   x
t'əxt'əxc      t'əxt'əxc
```

The proposed "Delete x" rule also applies to words in which stress clash involves three consecutive stressed syllables. These would be words (though, there are not many) that consist of a monosyllabic stem, a reduplicated prefix, and a somatic suffix. Consider the following two words, in (14), gridded before the resolution of stress clash:

(14) a.

```
   x    x  x
   xx   x  xx
t'aq't'aq'ač̌
```

/t'áq'-t'áq'-áč̌/
redup six hand
six people

b.

```
   x  x  x
   x  x  xx
t'at'aq'ač̌
```

/t'á-t'áq'-áč̌/
redup six hand
six animals

The stress-clash resolution rule (Delete x) which is a left-to-right directional rule will apply whenever there are two adjacent stressed syllables. Thus, in (14a), Delete x applies between the first two syllables (i.e., between the reduplicated prefix and the stem) in which it deletes an x from the first syllable since it contains the second mora, as is illustrated in (15):

(15)

```
 x    x                          x
 xx   x     Delete x ⟶      xx   x
t'aq' t'a                  t'aq' t'a
```

Now, this yields the form in (16):

(16)

```
     x  x
  xx   x  xx
t'aq't'aq'ač̌
```

Notice that, in (16), there is a stress clash between the second and third syllables (i.e., between the monosyllabic stem and the somatic suffix). Once again the stress-clash resolution rule applies. This time it deletes an x from the suffix since it contains the second mora (of the clashing pair), as shown in (17):

(17)

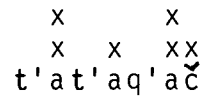

Thus, after the two applications of Delete x the surface form predicted is [t'aq't'áq'ǎč]. And, in fact, the correct form is [t'ə q't'áq'ǎč] with vowel reduction applying to the first syllable.

As for (14b), going left-to-right, there is a stress clash between the first two syllables. The Delete x rule will apply deleting an x from the second syllable since it contains the second mora, as illustrated in (18):

(18)

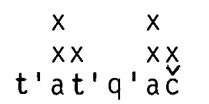

This yields the form in (19):

(19)



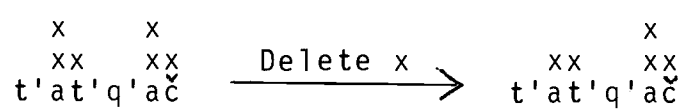

In (19), there is no stress clash (i.e., no two stressed syllables are adjacent). However, a deletion rule applies that deletes the unstressed /a/ in the second syllable (see Demers and Horn (1978)), yielding (20)"

(20)




Now, notice that once again a stress clash occurs since there are two adjacent stressed syllables. This time the stress-clash resolution rule will delete an x from the first syllable in (20) since it contains the second mora, shown as follows in (21):

(21)




Thus, the surface form predicted is [t'at'q'áǎč], and, in fact, this is correct.

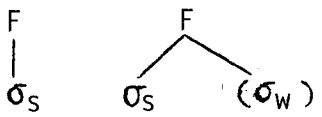
These examples have illustrated that the proposed Delete x rule applies accurately even in words in which there are three adjacent stressed syllables. That it extends to such cases would constitute evidence for the correctness of the rule.<8>

Now that I have presented the Delete x rule and have shown the various kinds of clash in which it applies, I would like to discuss some of its consequences for grid theory and tree theory.

One of the consequences of the Squamish Delete x rule is

that stress clash is defined by the adjacency of stress-syllables, which is reflected by a particular tree configuration, i.e., one in which a degenerate foot is next to either a left-dominant binary foot or another degenerate foot, as in (22):

(22) Tree configuration of stress clash



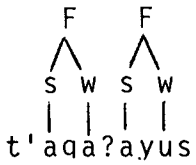

But stress clash is resolved in terms of grids. This is somewhat different than analyses proposed by other researchers who have attempted both to define and resolve clash solely in terms of tree structure (most notably Kiparsky (1979)) or solely in terms of grid structure (Prince (1983)). Earlier, I have here dealt with the complications involved in trying to define and resolve clash solely through syllable geometry. One might think it still possible, though, both to define and resolve Squamish stress-clash solely in terms of grids, given the manner of gridding
xx
heavy syllables utilized here for Squamish (i.e., as $CVC$). But if we define stress clash solely on their grids, it must be claimed that, in the words in (10b), there is no stress clash, because there is an intervening column with one grid mark between the columns with two grid marks. Instead, stress clash can be defined only where two adjacent columns both have grid marks on their second row, as in (10a). On such an analysis, then, only
xx
the grid formation xx constitutes clash, while the configuration
x x x x
xxx does not. A crucial part of my analysis is that xxx can constitute a clash if the first two columns are in the same syllable. What is the evidence for this? Well, as already discussed, in words like those in (10b), the first syllable does not retain its stress; in fact, the vowel in it often reduces,
x x
and this would be totally unexpected if the grid formation xxx here were non-clashing. Someone trying to maintain a grid-based definition of clash, though, might propose the following reduction rule, (23):

(23)
x x
xxx
V
↓
ə

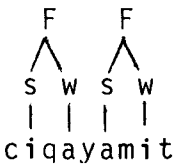
However, there are cases involving the grid configuration
x x
xxx in which vowel reduction does not occur and syllables containig two rows of grid marks are stressed. These are cases where the intervening x is a grid mark of a light syllable. Consider the

following words, (24):

(24) a.
```
      x     x
    x x   x xx
  t'aqa?-ayus
be bruised eye
have a black eye
```




b.
```
    x     x
  x   x x xx
  ciq-ayamit
stab shoulder
get one's shoulder stabbed
```




x x

The same grid formation (xxx) occurs in these words as in the words in(10b). But, whereas the first syllable of each word in (10b) loses its stress, both stresses remain on the words in (24), there is no reduction (both stresses are equally realized).

x x

Thus the same grid-formation, xxx, is sometimes realized with the vowel of the first syllable stressed, and sometimes with it not stressed. The determining factor is whether the single x in the intervening column comes from an intervening light syllable (as in (24), with no clash), or is part of the initial heavy syllable (as in (10b), with clash). This constitutes strong evidence that, for Squamish, stress clash is defined at least partly in terms of adjacent syllables (i.e., by a particular tree configuration, as in (22)) and not in terms of grid structure alone.

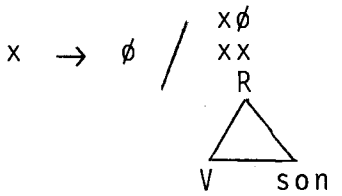
So, to reiterate, in (10b), the stressed syllables clash, since they are in the tree configuration of (22) (and the Delete x rule applies), while the stressed syllables in the words in (24), with the same grid-formation as in (10b), do not clash since they are not adjacent (they are not in the tree configuration of (22) and Delete x does not apply). Thus, we see that Squamish stress-clash is defined at least partly in terms of tree structure, but resolved by reference to the grid. And this accounts for the Squamish data in question with just a single rule.

And so another consequence of the rule resolving Squamish stress-clash proposed here clearly relates to the issue of metrical trees versus metrical grids. The Squamish Delete x rule which must make reference to a particular tree configuration (as in (22)), is an example of a process involving both metrical trees and metrical grids, and this, therefore, constitutes support for a theory (like that of Liberman & Prince (1977) and Hayes (1983)) which incorporates both metrical trees and metrical grids.

Another consequence that emerges from the analysis just proposed is that a "delete x" rule is a possible way of resolving stress clash. In the Squamish examples, clash cannot be resolved by a "move x" rule, since, in many cases, there is nowhere for x to move to. In addition, I have already mentioned the problems

that arise for an "add x" rule in Squamish. A "delete x" rule, then, is most suitable for Squamish stress-clash resolution. Moreover, other "delete x" rules for stress clash have been proposed. For example, Travis (1983) analyzes English sonorant destressing (or weakening) as essentially an occurrence of a "delete x" rule: "Sonorant weakening would delete a grid mark over a [V + son] rime which follows a stressed syllable (p.294)." This is, thus, an instance of stress clash. Her formalization of this generalization is given in (25):

(25) Sonorant weakening after Travis (1983:295)




A grid analysis of a word that undergoes this process, such as 'legendary' can be illustrated as in (26):

(26)

```
x x  x          x    x
x x  x          x x  x
legendary ----> legendary
```

Hence, a rule deleting an x from a grid position is one of the possible ways in which stress clash can be resolved.

In summary, then: I have here shown that Squamish stress-clash is best resolved by a rule that deletes a grid mark from the clashing syllable containing the second mora (from the left). In the first part of this paper, I presented and rejected two other possible analyses of Squamish stress-clash resolution, one formulated solely in terms of syllable geometry, and the other solely in terms of grids. I, then, looked at a class of possible counterexamples to the proposed Delete x rule. These were words in which the clashing syllables both contained the vowel schwa, in such words stress will always fall on the 1st of the clashing syllables. It was proposed that the clashing syllables with schwas, in this instance, be gridded for just one position whether they are heavy or light, and thus, Delete x would always delete an x from the second syllable in these cases. After this, I looked at examples of words in which there were three adjacent stressed syllables, and showed that Delete x correctly applies to these words. Finally, I discussed several consequences of the Delete x rule for tree theory and grid theory. First, heavy syllables can play a role in stress (more specifically, in stress clash) and yet not necessarily attract stress. This seems best represented by positing an analysis of unstressed heavy syllables whereby there is a level syllable-structure with no rime constituent, but one gridded for two columns (one each for peak and coda) with just one x on each column of the metrical grid

$$\overset{x}{\$C}\overset{x}{VC\$}$$

(i.e., as $\$CVC\$$). Second, stress clash need not be defined solely in terms of grid structure. Third, languages can have processes that refer both to mora (or grid position) and metrical

structure, this constitutes support for a theory incorporating both tree structure and grid structure. Fourth, deleting a grid mark is a possible way of resolving stress clash. Other means of resolving stress clash (like "move x", or "add x", or lengthening of a syllable which is, perhaps, "insert x") have been proposed for other languages, and so "delete x" is just a natural addition to this inventory. In this regard, then, the resolution of Squamish stress-clash, which looked so bizarre when formulated solely in terms of syllable geometry (stress the first light syllable; otherwise, the second syllable) turns out not to be so unusual, after all, when it is analyzed as a result of an interaction of moras (defined as grid position) with tree structure.

## Footnotes

*I would like to thank Dick Demers, Rich Janda, Dick Oehrle, Deirdre Wheeler, Natsuko Tsujimura, and Linda Manganaro for their helpful comments and discussion. All errors are my own responsibility. The phonetic symbols employed in this paper are ones used conventionally except for the following: /c/ is the affricate ts; /x̣/ is the voiceless uvular fricative; /λ/ is a lateral that can vary in pronunciation from an affricate to a fricative; symbols with an apostrophe are ejectives. For a detailed discussion of the phonetics of Squamish, see Kuipers (1967).

1. This is illustrated in the phrase 'thirteen men' in which a stress originally on the second syllable of 'thirteen' shifts leftward to the first syllable. However, no such movement rightward occurs as is indicated by the fact that the phrase 'spórts còntest' cannot be pronounced as 'spórts contèst'.

2. An example of a rightward stress shift in German would be 'Féldmàrschall' which becomes 'Féldmarschàll'. There is a leftward movement in the phrase 'der halbtòte Mánn' which can be realized as 'der hàlbtote Mánn'.

3. For example, note the lengthening of the consonant in the Italian phrase 'metà tórta' (half a cake), pronounced as metà:tórta.

4. Nonetheless, though, there are still some words where stress falls on the non-schwa syllable if there is a schwa in penultimate position. This is illustrated in such words as borrowing from French 'səplín' (bread) and'həm?í' (come). Such words probably reflect an older stress process, common to Salish, in which a syllable with a schwa would not be stressed if there were other vowel qualities present. In terms of metrical structure, the words 'səplín' and 'həm?í' would have a lexically marked degenerate foot over the last syllable.

5. A thorough analysis of the stress properties of Sqamish suffixes is needed. Some suffixes, like the transitivizer -n, seem often to cause stress to shift, as is seen when the word /cíq-álap/ (be stabbed in the thigh) is compared with /cíq-aláp-n/ (stab someone in the thigh). On the other hand, some suffixes never receive stress; this is true for the reciprocal suffix -nəw?as. Kuipers (1967) has many examples of words with this suffix, and never does it receive stress (unless followed by the trnsitivizer suffix -n). In terms of metrical structure -nəw?as would have no foot assigned to it and would just be joined to the preceding syllable by a rule like stray syllable adjunction (see Hayes (1981)).

6. Squamish has two types of prefixal reduplication: CV-reduplication and CVC-reduplication. According to Kuipers (1967:104) CV-reduplication can indicate such things as durative

or intensive verb-derivatives and diminutives: while CVC-reduplication expresses such things as plurality in nouns and iteration in verbs.

7. This is indicated in such words as /s-mə́l-məlx$^{w}$íc'a/ (type of bird) and /s-q$^{w}$rí-q$^{w}$ isə́cut/ (toy, diminutive), where it is very clear that stress on the reduplicated prefix is not a copy of the stress on the stem (since the copied syllable is not stressed in the stem). Furthermore, stress on the reduplicated prefix in these words is not assigned by some stress rule that places alternating stress two syllables before the penultimate, since alternating stresses is not a characteristic of this language according to Kuipers' (1967) description. Also, note that in each of these words the two stresses are apparently equally prominent, hence, no word tree is assigned (this, apparently, will always be the case when there is more than one stress in the word).

8. Words like /t'á-t'ák$^{w}$us-áč/ (seven animals) and /t'ák$^{w}$-t'ák$^{w}$us-áč/ (seven people) which were considered in Demers & Horn (1978) were not considered here since these are not examples of three adjacent stressed syllables. Nonetheless, though, the surface form of the first word, according to Kuipers (1967:270), is [ t'át'k$^{w}$usáč ] in which both Delete x and vowel deletion have applied. The second word has the surface form [ t'ət'ak$^{w}$usáč ] with stress only on the last syllable, according to Kuipers.

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