

**“A review of perceptual cues and cue robustness” by Richard Wright**

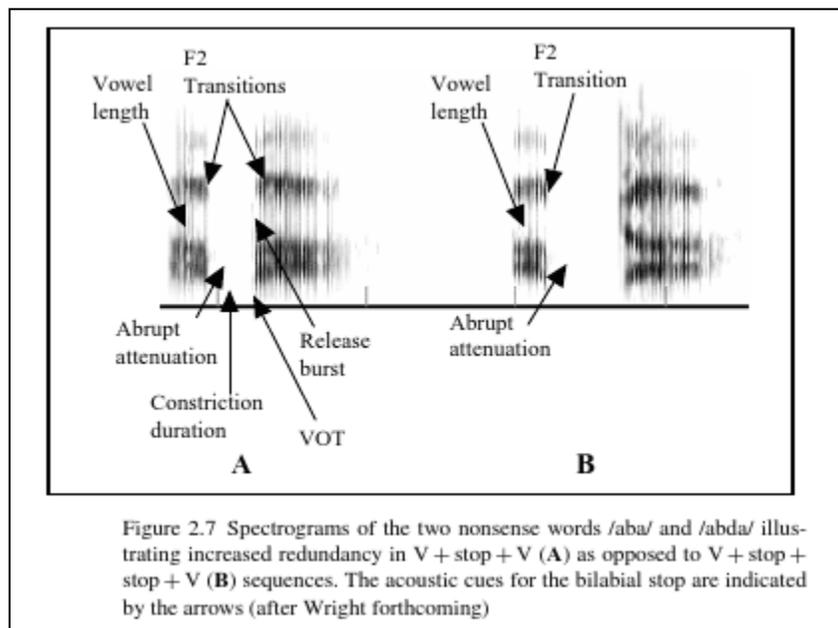
In this chapter-length excerpt from *Phonetically Based Phonology*, Wright wants to “motivate phonotactic markedness from a perceptual perspective” as a general approach to phonological constraints, starting with the Sonority Sequencing Constraint because it is “one of the most widely used, and yet one of the most problematic constraints in phonological theory.” According to Wright, the Sonority Sequencing Constraint (SSC) is “plagued with exceptions” and various attempts to reformulate it have failed “at least in part” due to “its greatest flaw: it lacks an explicit, unified phonetic characterization.” (Wright: 34)

He proposes “reformulating the Sonority Sequencing Constraint as a perceptually motivated and scalar constraint in which an optimal ordering of segments is one that maximizes robustness of encoding of perceptual cues to the segmental makeup of the utterance.” (Wright: 35) He does so in this chapter primarily by means of two extensive discussions of auditory cues and cue robustness, and how these affect and influence the success with which meaningful sounds are successfully interpreted. No new studies were done, but rather, the discussion of Wright’s proposal (as he himself characterizes it) has been “piece[d] together observations of earlier work [by numerous researchers working the realm of the phonology-phonetics interface] on the interaction of perception and organization of speech sounds...” (Wright: 35)

Wright defines cue “narrowly,” as “information in the acoustic signal that allows the listener to apprehend the existence of a phonological contrast.” (Wright: 36) It’s not just the cues themselves, however—robustness also plays a major role: “Robustness involves cue redundancy, resistance of cues to environmental masking, the ability of cues to survive momentary distractions on the part of the listener, and the exploitation of the auditory system’s tendency to boost certain aspects of the signal.” (Wright: 42)

So, in Wright's view, it's the nature of certain acoustic cues and the robustness of certain cues that enables listeners to (subconsciously? psycho-acoustically) tease-out ("apprehend the existence of") the intended sound (intended by the speaker) from noise in the signal, and from the plethora of conflicting elements in a stream of sounds that makes up a word or a syllable. And it's these influences that shape the patterns of acceptability with regard to onset formation and manifest as the CVCV pattern as being "by far the most common pattern in the world's languages..." which is also "the best pattern in terms of the sheer number and redundancy of cues in the signal." (Wright: 49)

Wright's figure (below) provides something of a summary-snapshot of a couple of his main points:



(Wright: 53)

In the spectrogram of the nonsense word shown above, we can see that there's no signal at all during both /b/ and /d/ (in the words of Hayes & Steriade, "all stops sound alike during a closure..." (Hayes & Steriade; 23)) and that the VOT cue, release burst cue, and F2 transition in example B (/abda/) seem to be missing. I think this last point could exemplify that "external cues are more salient at CV transitions than at VC transitions..." (Hayes & Steriade; 23). From a purely impressionistic perspective, this figure does seem to show at a glance the motivation for syllabification as /ab.da/.

To paraphrase Wright's conclusion, *the CVCV pattern offers listeners the greatest number of cues and the most robust cues in the signal. As listeners, we're constantly using this information to 'recover' the phonetic targets intended by the speaker, to discern the phonological meaning of the sequence.*

Below is a side-by-side view of the syllable onset pattern preference (unmarked?), with the traditional view to the left and Wright's re-statement to the right:

Traditional view of sequencing constraint	Wright's proposal
CV, CVC (where C is a consonant and V is a vowel): 'mama' /mama/ or 'tool' /tul/ CGV, CGVC, etc. (where G is a glide): 'pew' /pju/, 'twin' /twin/, etc. CLV, CLVC, etc. (where L is a liquid) for example 'tree' /tri/, 'clear' /klɪr/, etc. (Wright 51)	CV, CVC ANF boost, increased redundancy, increased perceptual distance CGV, CGVC, etc. ANF boost, increased redundancy, increased perceptual distance CLV, CLVC, etc. ANF boost, increased redundancy, increased perceptual distance sCV internal cues (in frication), increased perceptual distance (as long as C2 is not another fricative) (Wright 51)

The data in the right-hand column encapsulates (synthesizes) much of the information about cues, cue robustness, auditory nerve fiber (ANF) as it's affected by boost from various inputs and assign to the syllable patterns, with an additional pattern, that of sCV. The 's' in the 'sVC' is the **sibilant** (which is often the 'exception' to the traditional SSC), and here Wright tells us how the cues available in frication are what render this pattern acceptable and therefore not an exception to the constraint after all (so I think he's saying that this is actually an unmarked sequence?)

From a high-level perspective this is easy enough to understand, but I've been struggling to work through this information and apply it to a specific example from any language. It wasn't until I went back to Hayes' & Steriade's introduction to *Phonetically Based Phonology* (which we read last week) and reviewed their discussion of Wright that I found some examples that gave me a better understanding of the "SSC" from the view of these researchers, as well as more informative high-level view of the significance of Wright's paper (chapter) vis-à-vis the role of phonetics in phonology. Thinking again about the "sCV" in the Wright's syllable pattern for onsets shown above in the words of Hayes & Steriade gives the pattern more meaning, particularly since they mention an example:

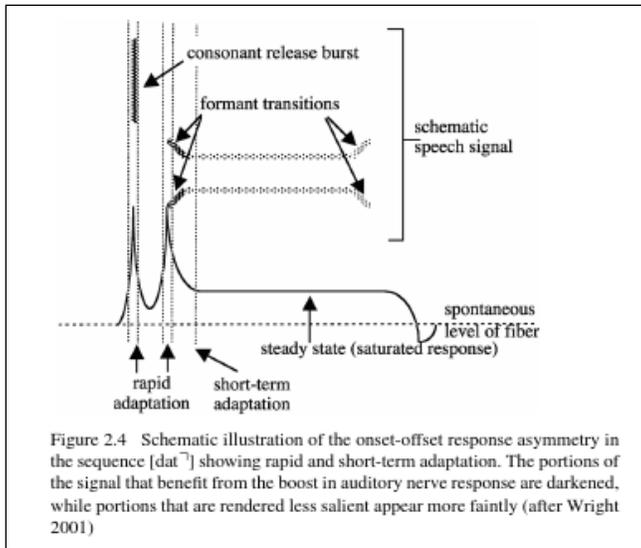
*“sibilant-stop initials should be preferred to other obstruent clusters, on the grounds that sibilants, unlike stops, are recoverable from the frication noise alone. In terms of sonority sequencing, sequences like [spa] are as bad or worse than [tpa], but in terms of perceptual recovery of individual oral constrictions, there is a clear difference that favours [spa].” (Hayes & Steriade; 24)*

The sCV pattern captures this essential notion, and revisiting the paper (introductory chapter to *Phonetically Based Phonology*) by Hayes and Steriade helped with Wright’s paper, thanks to some examples like these, and also help cement the meaning of “markedness” in the context of sonority sequencing a bit better in my mind.

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My reaction to this paper has evolved in the time I’ve spent trying to formulate this simple review. On the one hand, I found the detailed discussion of auditory cues and their role in phonetics-phonology very engaging and interesting, and also much of the information was a good review of some of the concepts we studied in Ling 111, particularly discussion of the formant transitions and role they play in a VC sequence play a key role in helping us (listeners) identify the C (and vice versa, formant transitions in moving from C to V if I remember correctly—I need to go back and review this.)

Wright also presents several graphic illustrations that supported the text, such as his Figure 2.4 (below) that represents the burst from voicing of the [d] in the left side of the figure as compared to the unreleased [t] (which has no burst) to the right side of the figure (Wright: 44) There’s actually a lot of information contained in this schematic that tied to the text and made sense in that context.



(Wright: 44)

On the other hand, it would have been helpful if one or two language-specific examples had been woven through sections 2 (the review of cues) and 3 (cue robustness, discussion of ANF, ANF boost), to better serve the short summary at the end of his chapter.

Finally, in his introduction, Wright points out that there's a direct connection between the constraints on syllable formation and the various workarounds that ameliorate or satisfy the constraints, and that by looking at the phonetic properties we should better understand the "why" and not just the "what." I think I understand some more of the "why" after reading this paper, but I'd like to go back and do further research to better apply that to actual language examples—to better connect the 'why' with the 'what' using actual language examples. But I suppose that's one of the ongoing concerns of phonology.

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