Encoding of perceived contrast between CC-clusters & their simplified counterparts in coda cluster simplification. Keywords: synchronic knowledge, historical change, perception, coda cluster simplification

This paper examines the nature of grammatical constraints on word-final consonant cluster inventories (VC_1C_2#). Crosslinguistically, languages such as Trinidad dialectal English (TE), African American English, Cameroon English, Quebec French (QF), and Catalan show striking consistency in the set of clusters that are illicit word-finally as shown in (1) (cf. Côté 2004, Green 1992, Bobda 1994, Mascaro 1978). Languages that ban these clusters also lack release (cf. Archambault & Dumochel 1993). This makes it seem likely that simplification is related to the perceptibility of C_2 in the absence of release. How does perceptibility play a role, and what is the grammar of a speaker that lacks these clusters? Is perceptibility something that causes loss of C_2 over time, resulting in a grammar with a set of constraints that simply characterizes the set of attested clusters in terms of features as claimed by some analyses (e.g. Côté 2004)? Alternatively, does the grammar continue to attribute their absence to their perceptual difficulty? The central claims are (1) that deletion of C_2 is triggered when the distinctiveness of VC_1C_2 and VC_1, as a function of phonetic cues, falls below a particular threshold and (2) that speakers encode this perceptually based difference between simplified and preserved clusters in their grammars. First, experimental results will show which clusters speakers of TE simplify in their synchronic grammars. Then results of a second experiment will confirm that the grammar attributes their absence to their perceptual difficulty.

In an affix stripping experiment, 11 TE speakers were forced to consider producing words that end in unattested clusters. If speakers know about perceptibility, they should be more likely to preserve nonce clusters to the extent that C_2 is more perceptible. If not, then they should simplify across the board. Subjects were exposed to nonce adjectives of the form X-y. Simplification occurs word-finally in TE but does not occur before the –y affix (eg. frosty /frɔsti/). Subjects were prompted to produce sentences that contained the bare X as a verb (e.g. *They call him **gind**y because he likes to ___ a lot*). The contents of X were varied as shown for stimuli in (2a) –(2c): (2a) X= [...VC_1C_2] sequences attested in TE; (2b) X = [...VC_1C_2] sequences unattested in TE and hypothesized to be discriminable from VC_1 even when C_2 is unreleased; (2c) X = [...VC_1C_2] unattested in TE and indiscriminable from VC_1 when C_2 is unreleased. Cues that are hypothesized to signal C_2's in the absence of release are given in (3) for real and unattested clusters (cf. Wright 2004). Subjects' responses were recorded and analyzed in Praat. The simplification pattern for attested clusters is consistent with what is shown in (1). Among unattested clusters it was found that /mk/#, /mʤ/#, and /lg/# were simplified significantly less frequently than /mg/#, and clusters /kf/# and /zb/# were significantly less frequently simplified than /kp/# and /zd/# respectively. Cluster /pʃ /# was significantly less simplified than /kp/#. The next experiment demonstrates that simplification of nonce as well as real clusters is not arbitrary but is based on perceived contrast between VC_1C_2# & VC_1#, due to cues signaling C_2.

In a binary forced choice identification task, VC_1C_2# and VC_1# stimuli recorded by a native Standard English (SE) speaker were presented to SE subjects. Clusters included attested and unattested clusters of English. All releases of final stops were edited out. This created stimuli comparable to the unreleased VC_1C_2# strings that speakers of TE would have been exposed to prior to the changes that resulted in simplification of coda clusters. The perceptual difference between stimuli types was quantified using the sensitivity measure d' (cf. Macmillan & Creelman 2006). Sensitivity measures of the contrast between VC_1C_2 − VC_1# are given in (4) and (5) for attested and unattested clusters respectively. The results of this study show, as one might expect, a significant correlation between VC_1C_2# clusters simplified in languages with unreleased C_2's and VC_1C_2# clusters that cannot be distinguished from their VC_1# counterparts. Since all stimuli lacked releases, we hypothesize that the difference between VC_1C_2# sequences that continue to be accurately perceived in the absence of release and VC_1C_2# sequences that were not, is due to the fact that additional cues signaling the presence of C_2 exist for the former but not the latter clusters. Analyses like Côté's that correlate simplification with similarity between C_1 and C_2 in terms of features does not predict that TE and QF preserve */sp/*# but not /sk/# or that TE speakers preserve unattested /lg/# but not /mg/#.

Simplification of VC_1C_2# occurs where there is insufficient perceptual contrast between VC_1C_2# and VC_1#, due to insufficient cues to C_2. Results of the affix stripping experiment show that speakers encode this perceptually based difference between simplified and preserved clusters. That such speakers' grammars take into account somehow, that certain contrasts of VC_1C_2# and VC_1# are more perceptible than others, corroborates the P-map hypothesis (Steriade 2001).

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(1) F = Fricative, T = Voiceless Stop, N = Nasal, <…> = deleted C_2. Examples given in TE

C2 preserved	VN_1T_2#, VN_1F_2#	VI_1T_2#, VI_1b_2#, VI_1g_2#, VI_1N_2#, VI_1F_2#	T_1F_2#	Vs_1p_2#
TE Examples:	[ænt˺], [ɪntʃ]	[mɛlt˺], [bʌlb˺], [fɪlm], [ɛls]	[æks]	[lɪsp˺]
C2 deleted	VN_1 <d_2>#	VI_1<d_2>#	VT_1<T_2>#	VF_1<T_2>#, Vs_1<t_2>#
TE Examples:	[æn<d˺>]	[ol<d˺>]	[æk<t˺>]	[lɪf<t˺>], [lɪs<t˺>]

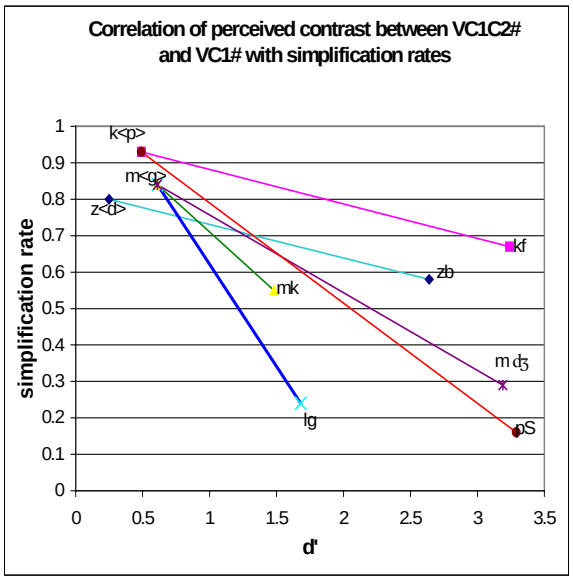
(2) (a) Attested cluzters: ginty, vinty, genty, vunty, zanty; gindy, vindy, gendy, vundy, zandy; zilty, vilty, klelty, vulty, zalty; zilby, vilby, gelby, vulby, zalby; zilmy, shilmy, kelmy, wulmy, zalmy; zildy, vildy, geldy, vuldy, zaldy; gispy, bispy, kespy, wuspy, shaspy; gisty, bisty, kesty, wusty, shasty; kifty, difty, kefty, vafty, zafty; gickty, zickty, geckty, vuckty, chackty; gicksy, shicksy, gecksy, vucksy, chacksy; kifsy, vifsy, gefsy, vufsy, zafsy

(b) Unattested clusters with C_2 perceptible: gickfy, zickfy, geckfy, vuckfy, chackfy; kizby, dizby, kezby, vuzby, shazby; zimky, fimky, gemky, vumky, zamky; zilgy, vilgy, gelgy, ulgy, zalgy; zamjy, vumjy, zimjy, fimjy, gimjy; vupshy, bipshy, kepshy, shapshy, gipshy

(c) Unattested clusters with C_2 imperceptible: gickpy, zickpy, geckpy, vuckpy, chackpy; kizdy, dizdy, kezdy, vuzdy, shazdy; zimgy, fumgy, gemgy, vumgy, zamgy

(3) Preserve		Cues contrasting preserved VC_1C_2# & VC_1#	Simplify	
Attested	Unattested		Attested	Unattested
Vlt, Vnt	Vmk	Vowel-Sonorant shortening because of final voiceless stop	Vld, Vnd, VTT	Vkp
Vlb	Vlg	Transition cues in the liquid for heterorganic final stop	Vld	Vmg
Vsp	Vzb	Transition cues in the /s/ or /z/ due to labial (Munson 2001)	Vst, Vsk, Vft (Naeser 1970)	Vzd (un-attested TE)
VnF, VlF, VTF	Vmd͡ʒ, Vkf, Vpʃ	Frication noise	Vnd, Vld, VTT	Vmg, Vkp

(4) Unattested Clusters



(5) Attested clusters