# /r/ drop in Colloquial Georgian

(Work in progress)

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Phonetics and Phonology Panel

# Importance of studying colloquial speech

Colloquial speech is characterized by various phonetic deviations from standard/literary language, for instance, contraction and loss of sounds, simplification of consonant clusters, assimilation, metathesis, etc.

The simplified forms often reveal unmarked structures of a language.

# /r/ drop in colloquial Georgian bears on many important aspects of Georgian phonology:

- reveals unmarked structures of the language
- demonstrates which CrC undergo simplification and how (in which direction)
- shows different behaviour of /r/ in clusters
- bears on the status of harmonic groups
- specificities of certain groups of consonants in certain positions

**Cluster simplification: C1rC2 > C1C2**

| Standard Georgian | Colloquial Georgian | Gloss |
|---|---|---|
| prta | pta | "wing' |
| grdemli | gdemli | 'anvil' |
| brdzeni | bdzeni | 'wise' |
| brdzaneba | bdzaneba | 'order' |

**/r/ drop & no assimilation**

| Standard | Colloquial | Gloss |
|---|---|---|
| k'rdzalva | k'dzalva | 'respect' |
| χ'rdena | χ'dena | 'leaning' |
| k'rtolva | k'tolva | 'shimmering' |
| ts'rtoba | ts'toba | 'tempering' |
| ts'rtvna | ts'tvna | 'training' |

## /r/ drop & Assimilation

| Standard | Colloquial | Gloss |
|---|---|---|
| brk'e | p'k'e | 'mould' |
| brk'oleba | p'k'oleba | 'delay, hindrance' |

## No /r/ drop

| Standard | Colloquial | Gloss |
|---|---|---|
| grgvinva | grgvinva | 'thundering' |
| ʒrʒola | ʒrʒola | 'shiver' |
| χ'rma | χ'rma | 'baby' |
| drk'oma | drk'oma | 'wavering, backing off' |

The paper argues that **the main factors** triggering changes in colloquial speech are: **economy and access.**

Thus, *markedness* and *relative perceptibility* determine well-formedness of the output forms. The same factors explain why the simplification does not apply to certain contexts.

 The paper aims at providing a unified account for this multidimensional cluster simplification process in colloquial Georgian within Optimality Theory framework.

# Data collection and statistical analysis of C1rC2 sequences

The study is based on "A Comprehensive Georgian-English Dictionary" (two-volume set) (2006). The volumes include virtually all entries from the eight-volume Explanatory Dictionary of the Georgian language published between 1950 and 1964. Only Standard Modern Georgian forms are included. We extracted 78 (attested in 114 words) #C1rC2 mono-morphemic word-initial sequence types.

**3 Patterns of change in #C1rC2 Sequences**

/r/ drop ■ /r/ drop & assimilation ■ no /r/ drop

27%

18%

55%

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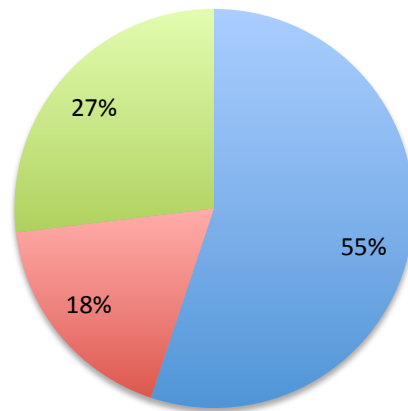
# The list of relevant factors that can play a role in C1rC2 simplification process:

- phonetic weakness of /r/ in immediate neighborhood of consonants (phonetics studies by Zhghent'I, Akhvlediani, /r/ devoicing when followed by voiceless, e.g. in *rtveli, rxeva*, etc.)
- weak voicing in voiced obstruents, potentially leading voiced obstruents to be targets of assimilation (weak release attested in phonetic studies  and weak release in voiced obstruents related to final devoicing in Georgian (Butskhrikidze 1998), my observation: perception of Georgian voiced as voiceless/glottalized.
- strong release of aspirated and glottalized obstruents potentially leading glottals and aspirated obstruents to trigger assimilation
- The OCP
- The SSP
- Agree FB (Akhvlediani 1949, Vogt 1961, Melikishvili 1997, Chitoran et al.  (2002) )
- IDENT [Coronal]/[$_w$ (data from /s/coronal>/r/coronal

- optional /r/ drop

(testing the predictions made by Steriade (2002) that in case of departure from the UR (underlying representation) less minimal modifications are preferred resulting in less input-output dissimilarity).

- /r/ drop and assimilation

(testing predictions made by Lombardi (1996) that voicing assimilation will always be regressive unless additional constraints are active).

(the role of the audibility of stop release bursts will explain blocking of assimilation in certain contexts as predicted by 'Licensing by cue' framework developed by Steriade (1999). The framework also makes prediction about C2 to be the least targeted segment in the process of simplification of #C1rC2).

- the cases of no simplification of #C1rC2
- some ramifications of the analysis of C1rC2 simplification for treating harmonic groups as complex segments.

# Optional /r/ drop

Out of 78 #C1rC2 types attested in the dictionary, 32 have optional /r/ drop. /r/ drop is attested in voiced, voiceless and glottal contexts both in front-back (FB) and back-front (BF) sequences.

**/r/ drop**

■ homogeneous    ■ heterogenous

24%

76%
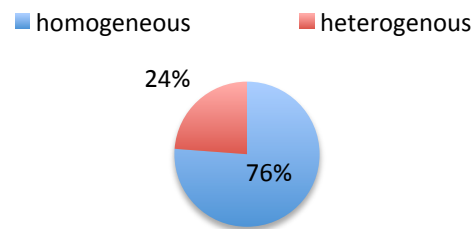
| C1 C2 | Voiced | Voiceless | Glottal |
|-------|--------|-----------|---------|
| FB    | 7      | 11        | 3       |
| BF    | 6      | 3         | 2       |

# /r/ drop/ in homogenous sequence

FB C1/C2 [voiced]

brdvn > bdvn
brdγv> bdγv
brdγvn > bdγvn
brdʑm > bdʑm
brdʑn > bdʑn
brdʒ > bdʒ


FB C1/C2 [voiceless]
prt > pt
prtv > ptv
prtk > ptk
prtkv > ptkv
prtx > ptx


Concerning BF sequences, all are combinations of
$$C1_{[dorsal]} + C2_{[coronal]}$$

Less overlap in homogeneous BF and labial-coronal (Chitoran and other works)  sequences means that C1 can be easily retrieved both in $C1_{[dorsal]}C2_{[coronal]}$   and $C1_{[labial]}C2_{[coronal]}$ sequences.

/r/ drop in sequences listed both in these cases create less overlapped C1C2, that on its own does not cause any C1 retrieval problems. Thus, we can say that in this case /r/'s optional drop is justified on perceptual grounds.

# /r/ drop in heterogeneous sequence

Out of 78 #C1rC2 types, 10 types exemplify this pattern. All are combinations with a glottal consonant.

  a) BF (glottal +voiced/voiceless)

C1[glottal]rC2[voiced]

| | | | |
|---|---|---|---|
| k'rʣ | k'rʣalva | k'ʣalva | 'respect' |
| χ'rd | χ'rdena | χ'dena | 'leaning' |

C1[glottal]rC2[voiceless]

| | | | |
|---|---|---|---|
| k'rt | k'rtolva | k'tolva | 'shimmering' |
| ʦ'rt | ʦ'rtoba | ʦ'toba | 'tempering' |
| ʦ'rtvn | ʦ'rtvna | ʦ'tvna | 'training' |
| ʦ'rp | ʦ'rpe | ʦ'pe | 'straight line' |
| | ʦ'rpeli | ʦ'peli | 'sincere, genuine' |
| | ʦ'rpivi | ʦ'pivi | 'rectilinear' |

b) BF (fricative+glottal)

| | | | |
|---|---|---|---|
| xrts'n | xrts'na | xts'na | 'rotting, decaying' |
| ʃrt' | ʃrt'iali | ʃt'iali | 'loud scolding' |
| ɣrtʃ' | ɣrtʃ'ena | ɣtʃ'ena | 'creaking' |
| xrt' | xrt'ili | xt'ili | 'cartilage' |

In heterogeneous context /r/ drop and no assimilation between C1 and C2 is conditioned by IDENT [glottal], guaranteeing surfacing of the C1 and C2 intact.

| I:  /k'rt/ | IDENT [glottal] | SSP | Max C |
|---|---|---|---|
| k'rt | | *! | |
| ☺ k't | | | * |
| kt | *! | | * |

# /r/ drop & assimilation

Out of 78, 14 #C1rC2 types undergo /r/ drop, followed by assimilation. Two types of assimilations are attested: glottalization and aspiration. There is no case of voicing in our database.

**a) FB/glottalization (regressive glottalization)**

C1rC2

| C1rC2 | Word | Assimilated form | Gloss |
|---|---|---|---|
| brk' | brk'e | p'k'e | mould |
| | brk'ialeba | p'k'ialeba | glittering |
| | brk'oleba | p'k'oleba | delay, hindrance |
| brt'χ' | brt'χ'eli | p't'χ'eli | flat |
| brχ' | brχ'ena | p'χ'ena | willow-leaved pear |
| brʧ' | brts'amli | p'ts'amli | Sarsaparilla |
| brts'k' | brts'k'ali | p'ts'k'ali | splinder, sliver |
| | brts'k'ena | p'ts'k'ena | pinching |
| | brts'k'iali | p'ts'k'iali | shining |
| brts'k'l | brts'k'liani | p'ts'k'liani | clawed |
| brts'χ' | brts'χ'ena | p'ts' χ'ena | glittering |
| | brts'χ'inavi | p'ts' χ'inavi | shining claw |
| brʧ'χ' | brʧχ'ali | p'ʧχ'ali | claw |
| brʧ'χ'v | brʧχ'viali | p'ʧχ'viali | sparkle |

**b) BF/aspiration (progressive aspiration)**

| | | | |
|---|---|---|---|
| ʧʰrd | ʧʰrdili | ʧʰtili | shade, shadow |
| | ʧʰrdiloeti | ʧʰtiloeti | North |

**c) FB/aspiration (regressive aspiration**

| | | | |
|---|---|---|---|
| vrʦ | vrʦeli | vʦeli/fʦeli | widespread, broad |
| ʧʰrx | ʧʰrxiali | ʧxiali | cry |

**d) BF/aspiration (regressive aspiration)**

| | | | |
|---|---|---|---|
| grʧ | grʧolva | xʧolva | emitting smoke |
| χ'rʧ | χ'rʧola | xʧola | smoking |

As shown regressive glottalization is attested in 9 out of 14 types. All are cases of regressive glottalization in FB C1C2 sequence

Higher ranked constraint AGREE FB accounts for this assimilation pattern.
Higher ranked constraint AGREE FB accounts for this assimilation pattern.

| I:  /brk'/ | AGREE (FB) | SSP | IDENT [glottal] | Max C |
|---|---|---|---|---|
| a. brk' |  | *! |  |  |
| b. bk' | *! |  |  | * |
| c. ☺ p'k' |  |  |  | * |
| bg |  |  | *! |  |

We have to note that all conditions for /r/ drop is created in this context: C1 and C2 are not homorganic, C1 is not a coronal consonant, C1 and C2 do not have high gestural overlap and /r/ drop does not create homonymy.

Thus /r/ drops, and a next step would be C1 and C2 to remain heterogeneous. Note that C1 and C2 are Front-Back sequences. Thus, they have to assimilate. Note an asymmetric behavior of coronal + dorsal sequences as opposed to bilabial + dorsal, with respect to /r/ drop. Because of more gestural overlap in coronal + dorsal sequence (as opposed to labial + dorsal), we do not have /r/ drop and assimilation in coronal-r-dorsal context, while /r/ drop is attested in labial -r- dorsal sequences.

We can conclude this section by saying that

In all cases assimilation applies after /r/ drop takes place. Thus only in contexts where /r/ drop is possible. After /r/ drop assimilation steps in. Assimilation mostly applies in FB (bilabial + dorsal) sequences. The patterns and direction of assimilation is determined by the strongest percept, in this case by glottals, having a strong release.

# no /r/ drop

no /r/ drop cases are mainly attested in 3 contexts: a) when C1 and C2 are homorganic; b) environment, in which the /r/ drop would lead homonymy, which formally coincides with CRS (obstruent+/r/+ sonorant) sequence; and 3) C1[coronal]rC2. There is only one C1rC2 cluster type represented by only two monosyllabic words that does not fit in any above -mentioned categories.

**No /r/ drop**

■ homorganic    ■ heterorganic, homogeneous
■ heterorganic, heterogeneous  ■ CrS(sonorant)



24%

52%

19%

5%
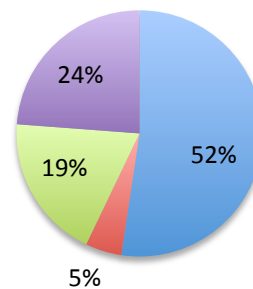
# Homorganic context

11 homorganic (bilabial, coronal and dorsal) C1rC2 types display no /r/ drop.

No /r/ drop in C1rC2

**Bilabials**
brb
Prp

**Coronals**
drt'v
**/r/ is not attested between coronals with different points of articulation**
trt
tʃrtʃ
tʃrtʃn
dʐrts'
ʒrʒ

**Velars**
grg
grgv

ɣrɣn
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**/r/ is not attested between velars and uvulars**

No /r/ drop in these cases can be explained by the OCP or by constraint against geminates

| I:  /brb/ | OCP | SSP | Max C |
|-----------|-----|-----|-------|
| a. bb | *! | | |
| b. ☺ brb | | * | |
| c. rb | | *! | * |

# CrS context

With respect to the sequence: obstruent + /r/ + sonorant, we can distinguish two scenarios: a) /r/ drop and b) no /r/ drop. We attest /r/ drop in case when /r/ drop does not lead to homonymy, while in case of the /r/ drop leading to homonymy, it gets blocked.

# C1[coronal]rC2

No /r/ drop is attested in 4 type C1rC2 sequences. In all cases C1 is a coronal.

drk'
trg
t'rp
*srb

Here we need a faithfulness constraint IDENT [Coronal]/[$_w$ to account for the word-initial coronals surfacing unchanged

| trgu | Ident voice/_V | Ident voice/#Cor_ | Agree FB | SSP | Max C |
|---|---|---|---|---|---|
| ☺ trgu | | | | * | |
| tgu | | | *! | | * |
| dgu | | *! | | | * |
| tku | *! | | | | * |

To conclude this section, we can say that there are three main factors blocking /r/ drop in #C1rC2: the OCP, faithfulness to the word-initial coronal obstruents and homonymy.

# Ramifications for the status of harmonic groups

Type A                                              Type B
bg          pk          p'k'          bɣ          px          p'χ'
dg          tk          t'k'          dɣ          tx          t'χ'
dzg         tsk         ts'k'         dzɣ         tsx         ts'χ'
dʒg         tʃk         tʃ'k'         dʒɣ         tʃx         tʃ'χ'

From 24 harmonic groups there are only 3 cases where the /r/ is attested in-between the harmonic groups: *brg*, *prk* and *p'rk'*. Note that all these 3 types of #C1rC2 sequences (brg, prk and p'rk') are of only one type: $C_1$[bilabial]r$C_2$[velar stop].  This suggests that we have to consider only /coronal/ + /dorsal/ as harmonic groups (as originally suggested by Vogt) and not combinations of /bilabial/  + /dorsal/.


This is supported by experimental studies (Butskhrikidze & van Heuven 2001).


This distributional generalization and #C1rC2 simplification again confirm that harmonic groups are a very special phenomenon in Georgian, formed not as a result of a vowel deletion, cluster simplification, or assimilation process, but historically by a labio-velarization process and they (harmonic coronal + dorsal groups) should be analyzed as complex segments (as also suggested by many scholars).

# Simplification patterns of #C1rC2 demonstrate that:

- the speaker is in search of the minimal input deformation that solves a phonotactic problem
- voicing assimilation will always be regressive unless additional constraints are active
- the audibility of stop release bursts will explain blocking of assimilation in certain contexts as predicted by 'Licensing by cue' framework developed by Steriade (1999). The framework also makes prediction about C2 to be the least targeted segment in the process of simplification of #C1rC2. This prediction is testified by the data discussed in this paper.

The analysis of #C1rC2 simplification has shown that in colloquial Georgian /r/ is the consonant undergoing deletion (due its phonetic weakness) and C1 is the segment undergoing assimilation in most of cases. Both processes, /r/ drop and assimilation, can only apply in case of minimal deviation from the input, not threatening C1 retrieval and creation of homonymy.

# Remaining questions

Is /r/ syllabic in the context when  the presence of /r/ is obligatory?

Are there any differences in the realization of /r/ in different (with respect to /r/ drop and assimilation) CrC contexts?

4 important environments:

When/r/ drops
When /r/ drops and assimilation happens
When /r/ drops and assimilation does not happen
when /r/ does not drop