

An Algorithm Describing the Verb Valence Changes in the Kartvelian Linguistic Space

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ABSTRACT. The four vowel-prefixes of a verb, which are distinguished in the South Caucasian (i.e. Kartvelian) languages, represent various verb forms, such as: transitive, causative, reflexive, reciprocal, deponent, passive, potential, subjective and objective version. Such polyfunctionality of the prefixes leads us to suppose that they should have more general, common function. Based on a semantic and functional analysis of these prefixes the certain generalization is proposed; and the whole process of prefixes choices is presented as an algorithm with four implicational rules. The algorithm reflects a hierarchically organized optimal generating/dynamic process of linguistic structuring of the verb valence changes continuum both in the Proto-Kartvelian and in the contemporary Kartvelian languages. Such a dynamic approach clarifies why these vowels are polyfunctional in the whole Karvelian linguistic space: Georgian, Svan, Megrelian and Laz (i.e. modern Kartvelian languages) and their dialects; and describes the main direction of diachronic changes in the functions of valence markers, which turn into (co)markers for various derivational verb categories. © 2019 Bull. Georg. Natl. Acad. Sci.

Key words: Kartvelian languages, verb valence, verb derivational categories, semantic roles, algorithms in grammar

There are four verbal pre-root vowel prefixes in the South Caucasian (resp. Kartvelian) languages. Based on the comparative-historical methodology they can be reconstructed for the Proto-Kartvelian level: **a-*, **i-*, **e-*, **u-*.

Table 1. Correspondences of the vowel prefixes

Proto-	Georgian	Megrelian	Svan
<i>*a-</i>	<i>a-</i>	<i>o-</i>	<i>a-</i>
<i>*e-</i>	<i>e-</i>	<i>a-</i>	<i>e-</i>
<i>*i-</i>	<i>i-</i>	<i>i-</i>	<i>i-</i>
<i>*u-</i>	<i>u-</i>	<i>u-</i>	<i>o-</i>

According to the Georgian grammatical tradition, these prefixes are the markers of main categories such are: Voice – **i-* (monopersonal passive) and **e-* (bipersonal prefix), Causative – **a-*; and Version –

**i* (subjective version), **u-* (objective version), and **a-* (neutral version) ([1]), but they can represent also different semantics and, therefore, verb categories as well: transitive, reflexive, reciprocal, potential, deponent and some other so-called middle forms ([2-6]). Thus, they are poly-functional: they occupy one and the same position in the string of verb morphemes never appearing simultaneously in the structure of verb forms. All this complicates their unequivocal interpretation ([7]). Reconstruction of these categories for the Proto-Kartvelian level is also problematic ([8-10]), while diachronic reconstruction of the prefixes themselves is quite transparent. To solve such problems it is assumed that they should have one common, more general function.

For more adequate analysis we turned on new theoretical approaches (e.g. functional approach [11], theory of semantic roles [12]) and methodological devises (e.g. tree-structures [13], algorithms in grammar [14], conceptual frames [15]).

Semantics and Functions of the Prefixes

An exhaustive analysis of concrete prefixes shows:

**a-* marks out an increase of verb valence: when Agent-Actor and/or Agent-Initiator of an action appears in a verb argument structure, additionally, specific suffixes arise in a verb form: **-(ev)in* (in case of Causative) or the specific thematic marker for present tense forms **(-eb)* (in case of Transitive); while when Locative appears, only **a-* is presented in a verb form.

**u-∞i-* marks out an increase of verb valence when Recipient/Benefactive appears in a verb argument structure (resp. Objective Version).

**i-* marks out a decrease of verb valence when disappears either an Agent (resp. so-called Monopersonal Passive sometimes expressing Potential), or Recipient/Benefactive (resp. Subjective Version expressing Reflexive as well).

**e-* marks out the more complicated case: simultaneously, Agent's disappearance and Recipient/Benefactive's appearance (resp. Bipersonal Passive sometimes expressing Potential as well).

See examples given below in the appendix.

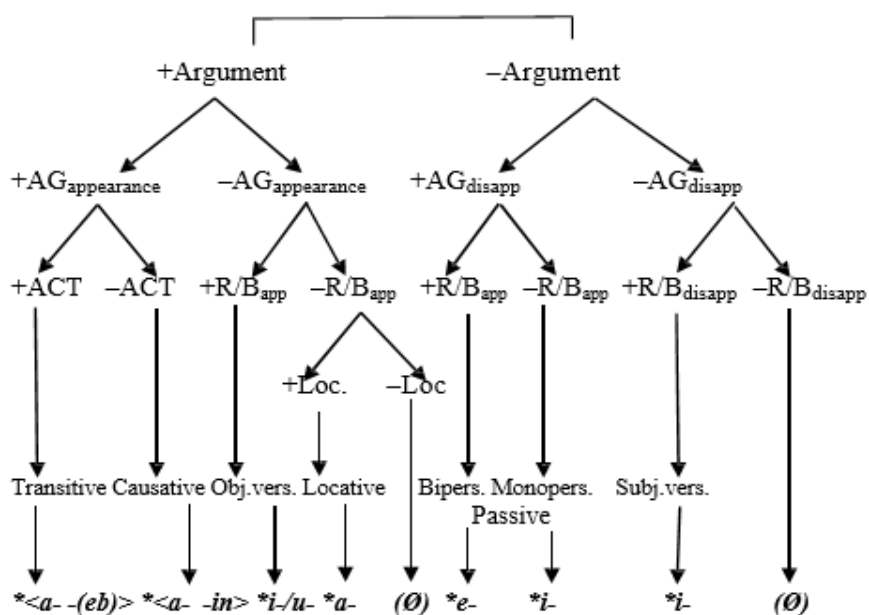


Fig. 1. The tree-structure describing the correlation between the verb valence changes and vowel prefixes.

New Interpretations: General Function of the Prefixes and the Tree-Structure Describing Various Verb Derivatives

Based on semantic and functional analysis of vowel prefixes, the following generalization is proposed: The main function of verbal vowel prefixes is to represent conceptual changes resulting from an increase and/or decrease of verb valence implying either appearance or disappearance of semantic roles in a verb argument structures.

Various possibilities of verb valence changes can be summarized by the scheme, which reflects generalized functions of verbal pre-root vowel prefixes mainly preserved in all Kartvelian languages (Georgian, Svan, Megrelian and Laz) and their dialects.

A generative strategy of verb forms creation is based on either appearance and/or disappearance of decisive semantic roles: $+/-[\text{ARGUMENT}]$, $+/-[\text{AGENTAPPEARANCE}]$, $+/-[\text{AGENTDISAPPEARANCE}]$, $+/-[\text{AGENT-ACTOR}]$, $+/-[\text{RECIPIENT/BENEFACTIVEAPPEARANCE}]$, $+/-[\text{RECIPIENT/BENEFACTIVEDISAPP}]$, $+/-[\text{LOCATIVEAPPEARANCE}]$.

The Algorithm Describing Valence Changes and Appearance of Vowel Prefixes

The whole process can also be reinterpreted and represented as an algorithm with the four stages of implicational rules where critical features for choices of the vowel-prefixes are adding or/and removing of certain semantic roles (Fig. 2).

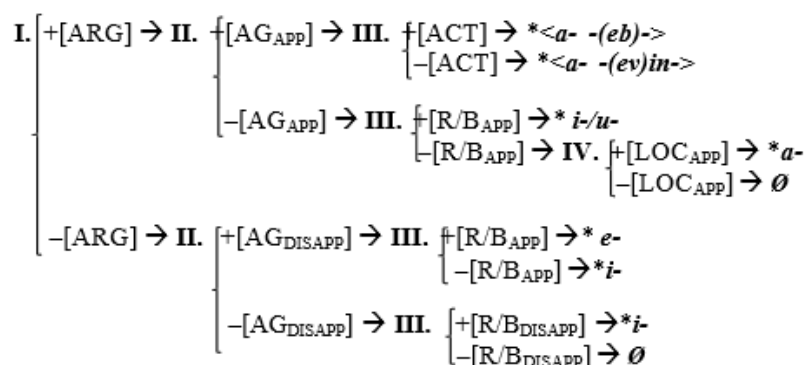


Fig. 2. The algorithm describing the correlation between the verb valence changes and the vowel prefixes.

Additional rules: if there is neither $+/-[\text{AGAPP}]$ nor $+/-[\text{AGDISAPP}]$ (the case: $\{-[\text{AGAPP}]$ and $-[\text{AGDISAPP}]\}$), then $+[\text{REC/BENAPP}]$ is formally marked by the prefix *e-* representing semantics of Reciprocals, while $+[\text{REC/BENDISAPP}]$ is marked by the prefix *i-* representing so called Deponent verbs. If REC/BEN and PATIENT have the same referent, *i-* prefix represents Reflexive (especially in Laz), while if $+[\text{AGDISAPP}]$ is 'generalized, indefinable' argument, *i-* and *e-* prefixes represent semantics of Potentials (especially, in Laz).

Conclusions

The four vowel prefixes, which traditionally were considered as markers of the categories of voice, version and causative, being poly-functional, are reinterpreted and qualified within more general conceptual frames as the markers of valence changes.

The tree structure shows that the choices are hierarchically organized.

The generation of different verb forms is represented as the algorithm with four implication rules.

The proposed algorithm has the universal character: above given changes of a verb valence, defined by ‘adding’ and/or ‘removing’ of semantic roles in the verb argument structures, exist in every language; and the algorithm differs only in strategies of formal representation of the changes that determine the specificity of grammatical systems of various languages.

The algorithm reflects the hierarchically organized optimal generative/dynamic process of linguistic structuring of a verb valence changing continuum that is characteristic as for the Proto-Kartvelian so for the modern Kartvelian languages and dialects.

Development of the Proto-Kartvelian language system is considered and interpreted as a diachronic process showing that the vowels, expressing changes of verb valence, step by step have specified their own self-semantics and functions (mostly by the definite suffixes) and were transformed into the (co)markers of various categories: Voice, Version, and Causative. Additionally, preserving the “old”, general function, they can represent semantics and functions of Locative, Reflexive, Reciprocal, Potential and Deponent verb forms as well.

Such dynamic (both diachronically and synchronically) approach clarifies why these vowels are poly-functional in the contemporary Kartvelian languages (Georgian, Svan, Megrelian and Laz) and dialects and why the reconstruction of the categories of voice and causation is so problematic for the Proto-Kartvelian level.

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Appendix

Table 2. Valence changing vowel prefixes in Georgian: Examples

Initial verb form	Valence changing	Derived verb forms and argument structures
<i>is</i> <i>c'ux-s</i> 3.SG.NON be.sad-PRS.S.3.SG 'S/he is sad.'	Adding: {+[ARG], +[AGAPP], +[ACTOR]}	<i>is</i> <i>ma-s</i> <i>a-c'ux-eb-s</i> 3.SG.NON 3.SG-DAT TRN-be.sad-THM-PRS.S.3.SG 'S/he bothers him/her' TRANSITIVE
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Adding: {+[ARG], +[AGAPP], -[ACTOR]}	<i>is</i> <i>ma-s</i> <i>a-c'er-in-eb-s</i> <i>c'eril-s</i> 3.SG.NON 3.SG-DAT CAUS.1-write-CAUS.1-THM-S.3.SG letter-DAT 'S/he has him/her write the letter.' CAUSATIVE
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Adding: {+[ARG], -[AGAPP], +[R/BAPP]}	<i>is</i> <i>ma-s</i> <i>u-c'er-s</i> <i>c'eril-s</i> 3.SG.NON 3.SG-DAT OV-write-PRS.S.3.SG letter-DAT 'S/he writes him/her the letter.' Note! R/B is III person OBJECTIVE VERSION
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Adding: {+[ARG], -[AGAPP], +[R/BAPP]}	<i>is</i> <i>me</i> <i>m-i-c'er-s</i> <i>c'eril-s</i> 3.SG.NON 1.SG-DAT IO.1.SG-OV-write-PRS.S.3.SG letter-DAT 'S/he writes me the letter.' Note! R/B is I or II person OBJECTIVE VERSION
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Adding: {+[ARG], -[AGAPP], -[ADAPP], +[LOCAPP]}	<i>is</i> <i>xel-s</i> <i>a-c'er-s</i> <i>c'eril-s</i> 3.SG.NON hand-DAT LOC-write-PRS.S.3.SG letter-DAT 'S/he signs the letter.' LOCATIVE
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Removing: {-[ARG], -[AGDISAPP], +[R/BDISAPP]}	<i>is</i> <i>i-c'er-s</i> <i>c'eril-s</i> 3.SG.NOM SV-write-PRS.S.3.SG letter-DAT 'S/he writes the letter for her/himself.' SUBJECTIVE VERSION
<i>is</i> <i>ban-s</i> <i>k'at'a-s</i> 3.SG.NON wash-PRS.S.3.SG cat-DAT 'S/he washes the cat.'	Removing: {-[ARG], -[AGDISAPP], +[R/BDISAPP]}	<i>is</i> <i>i-ban-s</i> 3.SG.NOM SV-wash-PRS.S.3.SG 'S/he bathes (her/himself).' Note! P=R/B REFLEXIVE
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Removing: {-[ARG], +[AGDISAPP], -[R/BAPP]}	<i>c'eril-i</i> <i>i-c'er-eb-a</i> <i>m-is</i> <i>mier</i> letter-NOM PASS-write-THM-PASS.PRS.S.3.SG 3.SG-GEN by 'The letter is written by him/her.' PASSIVE (MONOPERSONAL)
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Removing: {-[ARG], +[AGDISAPP], -[R/BAPP]}	<i>c'eril-i</i> <i>advilad</i> <i>i-c'er-eb-a</i> letter-NOM easily PASS-write-THM-PASS.PRS.S.3.SG 'The letter is written (/can be written) easily.' Note! AG is 'generalized' POTENTIAL
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Removing: {-[AGAPP], -[AGDISAPP], +[R/BDISAPP]}	<i>is</i> <i>ceril-s</i> <i>i-c'er-eb-a</i> <i>sopl-idan</i> 3.SG.NOM letter-DAT PASS-write-THM-PASS.PRS.S.3.SG village-from 'S/he writes the letter from the village.' DEPONENT
<i>is</i> <i>c'er-s</i> <i>c'eril-s</i> 3.SG.NON write-PRS.S.3.SG letter-DAT 'S/he writes the letter.'	Removing and Adding: {-[ARG], +[AGDISAPP], +[R/BAPP]}	<i>c'eril-i</i> <i>ma-s</i> <i>e-c'er-eb-a</i> letter-NOM 3.SG-DAT IO.3.PASS-write-THM-PASS.PRS.S.3.SG 'The letter is written (by him/her) for him/her.' PASSIVE (BIPERSONAL)
<i>is</i> <i>sv-am-s</i> <i>q'ava-s</i> 3.SG.NON drink-THM-PRS.S.3.SG coffee-DAT 'S/he drinks coffee.'	Removing and Adding: {-[ARG], +[AGDISAPP], +[R/BAPP]}	<i>q'ava</i> <i>ma-s</i> <i>e-sm-eb-a</i> coffee.NOM 3.SG-DAT IO.3.PASS-drink-THM-PASS.PRS.S.3.SG 'Coffee is drinkable for him/her //S/he may (without harm) drink coffee.' Note! AG is 'generalized' POTENTIAL
<i>is</i> <i>cek'v-av-s</i> 3.SG.NON dance-THM-PRS.S.3.SG 'S/he dances.'	Adding: {-[AGAPP], -[AGDISAPP], +[R/BAPP]}	<i>is</i> <i>ma-s</i> <i>e-cek'v-eb-a</i> 3.SG.NOM 3.SG-DAT IO.3.PASS-dance-THM-PASS.PRS.S.3.SG 'S/he dances together with him/her // they dance together.' RECIPROCAL

ენათმეცნიერება

ზმნის ვალენტობის ცვლის ამსახველი ალგორითმი ქართველურ ენებში

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ოთხივე ქართველურ ენაში ზმნური ფორმების სინტაგმატურ-პარადიგმატული ანალიზის საფუძველზე ყოველგვარი დაბრკოლების გარეშე გამოიყოფა ხმოვანი მორფემები, რომელთაც ზმნის ძირიდან უახლოესი პრეფიქსული პოზიცია უკავიათ. ამ ხმოვნების შეპირისპირებისა და რეგულარული შესატყვისობების დადგენის საფუძველზე საერთო-ქართველურში აღდგება ოთხი ხმოვანი მორფემა: *ა-, *ე-, *ი-, *უ-. ტრადიციულად ამ ხმოვნებს გვარის, ქცევის, კაუზაციის, კონტაქტისა და სიტუაციის მაჩვენებლებად მიიჩნევენ, მაგრამ ამ კატეგორიების ამგვარი დაკავშირება განსახილველ ხმოვნებთან ცალსახად ვერ ხერხდება, რადგან არც ერთი მათგანი არ გულისხმობს მხოლოდ მათთვის ნაგარაუდებ მნიშვნელობებს და ხშირად პოლისემანტიკურ-პოლიფუნქციურია. ასევე პრობლემურია ამ კატეგორიების რეკონსტრუქცია საერთო-ქართველურ დონეზე. ამ პრეფიქსების ამომწურავი სემანტიკურ-ფუნქციური ანალიზის შედეგად იკვეთება მათთვის საერთო, ზოგადი ფუნქცია: ზმნის ვალენტობის 'მატება'-'კლების' თანმხლები ცვლილებების ფორმალური (resp. გრამატიკული) მარკირება. აღნიშნული ცვლილებები შეიძლება აღიწეროს ალგორითმით, რომელიც, ზმნის არგუმენტულ სტრუქტურაში არგუმენტის გაჩენა-გაუჩინარების შემთხვევაში, ხმოვანპრეფიქსების შერჩევის იმპლიკაციური ხასიათის წესებს მოიცავს და დამოკიდებულია „დამატებული“ თუ „გამოკლებული“ არგუმენტის სემანტიკურ როლზე: აგენს-კაუზატორია ის, თუ ბენეფაქტივ-ადრესატი ან ლოკატივი. ამდენად, ხმოვანპრეფიქსების თავდაპირველი ფუნქცია უნდა ყოფილიყო ზმნის არგუმენტული სტრუქტურის ცვლის – გარკვეული სემანტიკური როლების „დამატების“ და/ან „გამოკლების“ – ფორმალური მარკირება. ქართველურ ენათა გრამატიკული სისტემების განვითარების ძირითადი ხაზი სწორედ ვალენტობის ცვლის ზოგადი კატეგორიის ფუნქციების შემდგომ სემანტიკურ დაკონკრეტებას გულისხმობს. ამგვარი მიდგომითა და ინტერპრეტაციით გასაგები ხდება თანამედროვე ქართველურ ენებში არსებული ზმნური ხმოვანპრეფიქსების პოლიფუნქციურობის პირველწყარო და მიზეზები.

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