

Word stress in the languages of the Caucasus¹

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1. Introduction

The languages of the Caucasus exhibit impressive diversity when it comes to word stress. This chapter provides a comprehensive overview of the stress systems in Abkhaz-Adyghean/North-West Caucasian (henceforth NWC), Nakh-Dagestanian/North-East Caucasian (NEC), and Kartvelian/South-Caucasian (SC) languages, as well as the larger Indo-European (IE) languages of the area, Ossetic (Iron and Digoron) and Armenian. For most of these languages, stress facts have only been partially described and analyzed, which raises the question about whether the available data can be used in more theoretically-oriented studies; cf. de Lacy (2014). Instrumental studies are not numerous either. Therefore, the current chapter relies mainly on impressionistic observations, and reflects the state of the art in the study of stress in these languages: there are still more questions than answers. The hope is that the present summary of the existing research can serve as a starting point for future investigations.

This chapter is structured as follows. Section 2 describes languages that have free stress placement – i.e., languages in which stress placement is not predicted by phonological or morphological factors. Section 3 describes languages with fixed stress. These categories are not mutually exclusive, however. The classification of stress systems is best thought of as a continuum, with fixed stress and free stress languages as the two extremes, and most languages falling in the space between them. Many languages with fixed stress allow for exceptions based on certain phonological and/or morphological factors, so that often no firm line can be drawn between, e.g., languages with fixed stress that contain numerous morphologically-based exceptions (cf. Lezgi, Section 3), and languages in which morphological structure is the main factor determining stress placement (cf. Aghul, Section 5). At the same time, languages with free stress often exhibit some tendencies in stress placement based on phonological and/or morphological factors (cf. Qaytagh Dargwa, Section 2).

Section 4 discusses languages with quantity-sensitive (QS) stress system – that is, systems in which stress placement is determined by syllable weight, with heavy syllables attracting stress. Section 5 addresses the languages in which morphological factors play a defining role in stress placement. Section 6 highlights some more complex cases which do not easily fit into the typology outlined above. Section 7 summarizes the known facts about the languages in which stress facts await further investigation. Section 8 provides some discussion on the acoustic correlates of stress and the existing instrumental studies.

Languages of the Caucasus for which tonal contrasts are reported or suspected, and intonational properties of the languages of the Caucasus are addressed in the chapter “Tone and Intonation in the languages of the Caucasus” in the present volume.

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2. Free stress languages

In a number of the languages of the Caucasus stress is free. This means that stress placement is not restricted to particular syllable types, morphemes, or set of syllables in a word (so-called ‘stress window’, as discussed in Sections 4 and 5). Crucially, this is not the same as free placement of stress within a given word, which would mean that any syllable can be more prominent than others. Some trends and tendencies, and even strict rules, exist even in languages in which stress placement is mostly unpredictable.

A number of NEC languages exhibit free stress. Specifically, stress placement is free in the Cudaxar dialect group of Dargwa (NEC, Lak-Dargwa) (Abdullaev 1954:62; Moroz 2014:266), as well as in Qaytagh Dargwa (Temirbulatova 2004:56). In these varieties, stress is phonemic. For example, in Butri Dargwa, a dialect of the Cudaxar group, minimal pairs based on stress are numerous: e.g., *sák:a* ‘meadow’ - *sak:á*² ‘give me’ (Shaxbanova 2007:45)

Certain types of words have predictable stress placement even in languages with free stress. This often depends on the morphosyntactic role of a word (i.e., case form, verb form, etc.) and/or its morphological structure (i.e., the ability of certain morphemes to attract/repel stress). The availability of such exceptions blurs the distinction between free stress languages and languages in which stress placement is regularly driven by morphological structure. In Cudaxar, for example, vocatives are regularly formed by shifting stress to the initial syllable: *t:ut:éf* ‘father’ - *t:út:ef* ‘father.VOC’ (Abdullaev 1954:69).³ Similarly, in Qaytagh and Tanty Dargwa, past forms of the verb systematically differ from participles in stress placement: *kit̪iv* ‘fall_down.PST.3SG’, *kit̪iv* ‘fall_down.PST.PTCP’; *if̪ibáziv* ‘see.PST.3SG’, *if̪ibaziv* ‘see.PST.PTCP’ (Temirbulatova 2004:58); *ixub* ‘throw.PRET’, *ixúb* ‘throw.PRET.PTCP’ (Lander & Sumbatova 2014:123). In Tanty, many other verbal suffixes systematically attract stress too (Lander & Sumbatova 2014:114).

In Qaytagh, the pluralizing morphemes *-bi*, *-ba*, *-p:i*, *-mi*, *-ti* attract stress from the root: *úli* ‘eye.SG’ - *ilbí* ‘eye.PL’ (Temirbulatova 2004:57); so do pluralizing morphemes in Kubachi and Tanty Dargwa: *sulá* ‘tooth.SG’ - *sulbé* ‘tooth.PL’, *ulgám* ‘fur_coat.SG’ - *ulgamté* ‘fur_coat.PL’ (Magometov 1963:63); *máts:á-li* ‘sheep.SG-ERG’, *máts:a-li* ‘sheep.PL-ERG’ (Lander & Sumbatova 2014:50). The same has been reported for some but not all Dargwa dialects (Moroz 2014:254). In contrast, in Karbachimaxi Dargwa the initial syllable carries stress in plural forms (Shaxbanova 2010:80).

² The examples have been converted into IPA from the transcription standards used in the respective languages. Aspiration is not marked in the examples, since the facts are not established for many languages. Similarly, because precise characteristics of vowels in many languages are unknown, the most general symbols are used for simplicity (a for a/á/æ, e for e/é, etc.), unless the variants are contrastive.

³ Glosses used (following the Leipzig Glossing Rules and including some additional glosses not listed in the Leipzig Glossing Rules): 1 – first person, 3 – third person, ABL – ablative, ABS – absolutive, ADJ – adjective, AOR – aorist, AUG – augment, CAUS – causative, CON – contact case, COND – conditional, DAT – dative, DEF – definite, DEM – demonstrative, ERG – ergative, EVID – evidential, FUT – future, GEN – genitive, IMP – imperative, INDF – indefinite, INF – infinitive, IRR – irrealis, LOC – locative, M – masculine, MAS – masdar, N – neuter, NEG – negation, NOM – nominative, PL – plural, POSS – possessive, PTCP – participle, PRF – perfective, PRET – preterite, PROH – prohibitive, PST – past, PV – preverb, PRT – pre-root vowel, SG – singular, SUPER-ESS – superessive, TS – thematic suffix, VOC – vocative. Glosses in examples cited from other work are modified for uniformity.

There are also morphemes which, while not carrying stress themselves, require stress to appear on a particular syllable – typically, the syllable either immediately preceding the morpheme in question (so-called prestressing morphemes), or, rarer, the syllable immediately following (poststressing). The adjective-forming suffix - *tsi* in Qaytagh Dargwa is prestressing, in contrast with another adjective-forming suffix -*kan*, which attracts stress: *umzu-kán* – *umzú-tsi* ‘clean-ADJ’, *finif-kán* – *finif-tsi* ‘green-ADJ’ (Temirbulatova 2004:58).

Phonological factors, such as syllable weight, can influence stress placement in free stress languages too. In Qaytagh Dargwa disyllabic words are stressed on the second syllable if it is closed; if the second syllable is open, stress commonly targets the initial syllable, though there are some minimal pairs: *dúli* ‘1SG.ERG’, *dulí* ‘pus’ (Temirbulatova 2004:56). The same tendency is observed in the Cudaxar dialect group, though with less consistency (Abdullaev 1954:68).

Bats (Tsova-Tush) (NEC, Nakh) also has predominantly free stress (Imnaišvili 1977:20), but certain alternations in the stress pattern have a morphological function. In the nominal domain, stress on the second as opposed to first syllable indicates plurality: *t̃fák’ox* ‘chair.CON.SG’ – *t̃fak’óx* ‘chair.CON.PL’ (Gagua 1983:184; Holisky & Gagua 1994:155). Adjectives are regularly formed from genitive forms of nouns by shifting the stress from the first to the second syllable: *véneⁿ* ‘wine.GEN.SG’ – *venéⁿ* ‘wine.ADJ’ (Gagua 1983:231). In the verbal domain, certain forms of the verb, carrying either a subject or an object marker, also systematically differ from each other in terms of stress placement (Črelašvili 2007:94).

Bats stress facts contrast with those of other Nakh languages, Chechen and Ingush, which have fixed initial stress. This could be due to Georgian influence, since the majority of Bats speakers are bilingual in Georgian (Dešeriev 1953:51; Gagua 1983:184), though see chapter X for the complex stress facts of Georgian.

3. Fixed stress languages

In contrast to languages with free stress, some languages of the Caucasus have stress fixed on a certain syllable, counted from the left (first, second, etc.) or right (final, penultimate, etc.) edge of a word. However, even languages with fixed stress typically have a number of exceptions to the default stress pattern, based on phonological or morphological factors, or a combination of both. This Section first discusses a number of Lezgian languages with fixed stress, before proceeding to other NEC and SC languages.

Though stress in Lezgi (NEC; Lezgian) is weak (Uslar 1896:19), researchers agree that it regularly targets the second syllable: *duvúl* ‘root’, *nisíni* ‘mid-day’, *miḡíniz* ‘nail.DAT’, *zirzáz* ‘tremble.INF’, *galámuq* ‘remain.IMP’ (Žirkov 1940:109; Kibrik & Kodzasov 1990:342; Haspelmath 1993:64). However, a few affixes in Lezgi are prestressing; if such an affix forms the second syllable, stress targets the initial syllable. These include the abstract noun suffix -*val* (*q^hsán-val* ‘kindness’), pluralizer -*bur* (*q^hsán-bur* ‘good-ADJ.PL’), past tense suffixes -*na* and -*ra* (*gá-na* ‘give-PST.3SG.M’, *áɁ-ra* ‘hit-PST.3SG.M’), irrealis suffix -*t’a* (*já-t’a* ‘be-IRR’), and masdar⁴ suffix -*xun* (*jár-xun* ‘fall_down-MAS’); for a full list, see Žirkov (1940:109), Haspelmath (1993:69), Gajdarov et al. (2009:86). Additionally, plural formants -*ar*/-*er* can

⁴ A nominalized form of the verb often used instead of/ in addition to an infinitive in the languages of the Caucasus.

carry stress, but not any affixes following them: *kas* ‘person’, *ksár* ‘people’ (<*kisár*), *ksáriz* ‘people.DAT’ (Žirkov 1940:110).

Further exceptions are due to other morphological factors. Deverbial nouns typically keep stress on the root, which gives rise to minimal pairs: *fin* ‘departure’, *fin-in* ‘departure-POSS’; *fin* ‘seed’, *fin-in* ‘seed-POSS’. Verbs formed by reduction and cliticization of an auxiliary verb *avún* ‘do.INF’ do not stress the resulting suffix *-un*, which differentiates them from verbs formed by a homophonous stress-attracting suffix *-un*: *hál-un* ‘cover/race-INF’ vs. *qal-ún* ‘show-INF’ (Žirkov 1940:113). Verbs in *-ar* (historically a verb-deriving suffix) regularly carry stress on the initial syllable: *gádarun* ‘throw.INF’, *χkádarun* ‘jump.INF’ (Haspelmath 1993:65). Reduction of the pretonic vowel can also create exceptions: *klíg-un* ‘look-INF’ (<*kilíg-un*) (Žirkov 1941:28; Haspelmath 1993:70). There are other stress-based minimal pairs too: *abúr* ‘decency’, *ábur* ‘they’; *míxiz* ‘on the whole’, *míxiz* ‘while cleaning’ (Gaidarov et al. 2009:85). Some Lezgi dialects, such as those of Jaba (Ganieva 1972:220) and Yarki (Mejlanova 1964:59) regularize some of the exceptions. At the same time, Jaba Lezgi exhibits some tendencies for initial stress (Ganieva 2007:29).

In Budukh (NEC; Lezgi), too, stress is fixed on the second syllable of disyllabic non-derived nominal stems. Certain nominal and adjectival suffixes can attract stress further to the right. Similarly, various masdar forming affixes are always stressed (Alekseev 1994:263). At the same time, certain verb forms - future, general past, as well as imperatives and prohibitives - are usually stressed on the initial syllable (Talibov 2007:47). See also chapter X, Section 2.3 for a tonal analysis of Budukh.

In Tabasaran (NEC; Lezgi) nouns, as well as nominal paradigms, stress tends to target the ultima: *ifl* ‘blood’, *kamantǵá* ‘accordion’; *k’ul* ‘head.SG’, *k’ulár* ‘head.PL’; *barχál* ‘rug’, *barχlik*: ‘under the rug’, *barχlik:án* ‘from under the rug’ (Magometov 1965:33; Xanmagomedov 1967:548; Kodzasov & Muravjeva 1982:12). Certain affixes attract or repel stress: e.g., of the two abstract noun-forming suffixes, *-fin* attracts stress while *-wal* repels it: *mitǵifin* ‘darkness’, *mitǵiwal* ‘night of ignorance’ (Magometov 1965:37). Dyubek Tabasaran has final open syllables where other dialects dropped the final vowel; in such cases, the preceding syllable carries stress (Magometov 1965:34). See also chapter X, Section 2.2 for a tonal analysis of Dyubek Tabasaran.

Verbs in Tabasaran form two accentual classes: those that have stress on the stem in infinitives, present and incomplete past tenses, and those that have stress on the affixes in these forms: *dáq^hus* ‘lie.INF’, *díq^hurda:za* ‘lie.PRS’, *dáq^hnuza* ‘lie.PST’; *liχús* ‘work.INF’, *liχúnda:za* ‘work.PRS’, *liχnúza* ‘work.PST’ (Kodzasov & Muravjeva 1982:12). This distinction is likely to be derived from the morphological makeup of a verb: disyllabic verbs with no prefixes, such as *liχús* ‘work.INF’, have stress on the second syllable, while disyllabic verbs containing a prefix have stress on the initial syllable, as in *k:ábqχ^hub* ‘fall_under.INF’ (Alekseev & Šixalievá 2003:31). Negative verbs are typically stressed on the second syllable (Magometov 1965:37). There are minimal pairs: *ábsub* ‘stick_in.INF’, *absúb* ‘smear.INF’, *úbsub* ‘pour_in.INF’, *ubzúb* ‘sow.INF’ (Alekseev & Šixalievá 2003:31). Examples like this, again, bring up the continuum nature of the free/fixed stress distinction.

Syncope of the pretonic syllable is common in Tabasaran: *múχúr* ‘chest.SG’, *múχr-ár* ‘chest-PL’ (<*múχurá-r*). However, it does not apply if it would result in an inadmissible

triconsonantal cluster: *yarts'ál* 'cheek.SG', *yarts'ul-ár* 'cheek-PL' (**yarts'l-ár*) (Kodzasov & Muravjeva 1982:12).

In Udi (NEC; Lezgi), stress typically targets the final syllable too, which is attributable to Turkic influence (Jeiranišvili 1971:276; Schulze-Fürhoff 1994:456): *adamár* 'person', *adamarúx* 'people'. Exceptions to this pattern include demonstrative particles *ha-*, *ka-*, *te-*, *me-*, which often attract stress: *há-for* 'in this way', *té-sahat* 'now' (Dirr 1903:3). Imperatives and certain tense forms in the indicative mood retain stress on the root: *tsámpesun* 'write.INF', *tsámpa* 'write.IMP', *tsámzuko* 'write.FUT.1SG', *tsámzupe* 'write.PST.1SG'. The causative morpheme *-es-*, too, attracts stress (Dirr 1903:4).

Person markers, question particle *-a*, particle *-al* 'too', and some others typically shift stress to the preceding syllable:

- (1) a. *me-t'u-xo xabar-aq'-í-ne*
DEM-AUG-ABL question-take-AOR-3SG
'he was asking him' (Schulze-Fürhoff 1994:456)
- b. *zú-al*
1SG-too
'me too' (Dirr 1903:4)

In Udi, final stress often causes reduction of the pretonic syllable: *afnebsá* 'work.PRS.3SG' (< *afnebeša*) (Jeiranišvili 1971:276).

The two main dialect groups of Dargwa, Cudaxar and Akusha-Uraxi, vary in their stress properties: Cudaxar dialects have free stress (see Section 2), while in Akusha-Uraxi dialects stress is fixed (Abdullaev 1954:6–11), most often on the initial syllable: *távra* 'bag', *rúrsi* 'daughter', *búrib* 'say.PST.3SG' (Abdullaev 1954:63–64; Moroz 2014:266). In the Mekege dialect group, in contrast, stress is fixed on the second syllable: *tavrá* 'bag', *rursí* 'daughter', *buríb* 'say.PST.3SG' (Abdullaev 1954:62; Jamaladinova 2008; Moroz 2014:266).

In Mehweb Dargwa stress is fixed on the second syllable (Moroz 2015:3; 2016:27):

- (2) a. *uq'láha* window
b. *uq'láha-jni* window-ERG
c. *uq'láha-li-t̤je-r* window-OBL-SUPER-ESS(N.SG)
'on the window'
- (3) a. *b-ik-íb* N-become.PFV-AOR
'he became'
b. *ħa-b-ík-ib* NEG-N-become.PFV-AOR
'he didn't become' (Moroz 2016:27, 28)

However, the optative marker is prestressing: *lúf'-ab* 'read.IPFV-OPT', *úrc-ab* 'fly.IPFV-OPT'. The same is true of the imperative suffix, though only in singular forms: *árc-e* 'fly.PFV-IMP', *arc-é-na* 'fly.PFV-IMP-PL' (Moroz 2016:28). Certain irregular verbs, whose roots consist of a single consonant, can also have exceptional stress patterns (Moroz 2015:6–7). An Optimality Theory account of the Mehweb stress facts is offered in Moroz (2015).

In Chechen (NEC; Nakh), stress is fixed on the first syllable. According to Magomedov (2005:86), long vowels can attract stress away from the initial position, but this view is not

shared by other authors. Exceptionally, though Chechen does not have strong evidence for secondary stress, verbs that take preverbs carry stress both on the preverb and on the verbal root (Nichols 1997:966; Komen 2007a:8). This might justify an analysis in which Chechen preverbs form separate prosodic words, which is also supported by the fact that Chechen preverbs can detach from the root – e.g. when a *wh*-word immediately precedes the verb (Komen 2007b:20). Closely related Ingush (NEC; Nakh) also has stress fixed on the first syllable. Exceptions to this include certain causative forms of the verb, in which the causative suffix attracts stress away from the initial syllable, and disyllabic teen numerals (Nichols 2011:100).

Chechen and Ingush have also been analyzed as having some tonal distinctions, which are only found on a small number discourse particles (Nichols 1994:44; Nichols 1997:942); more on this in chapter X and Komen et al. (this volume). An Optimality Theory account of Chechen stress is offered in Komen (2007b).

In Laz (SC), stress is regularly penultimate in non-verbs (Marr 1910:4; Öztürk & Pöchtrager 2011:18). In verbs, stress is rightmost in the part of the stem up to and including the perfective causative marker; all suffixes following the perfective causative marker are stress-repelling. If there is no perfective causative marker, stress is placed as far right as possible, excluding the stress-repelling affixes. Depending on the morphological composition of a verb, stress can fall anywhere between the second and fifth syllables from the right:

- (4) a. $\widehat{d\bar{z}e-m-i-t\bar{j}^h-am-\acute{a}p^h-ur-t^h}$
 PV-1SG-PRT-aabeat-AUG-CAUS.PRF-TS-PL
 ‘I have beaten you (pl.) before’
- b. $p^h-t\bar{s}^h\acute{o}p^h\bar{x}-i-k^h-o-t^h$
 1SG-build-1SG.PST-COND-TS
 ‘If we built it. /Let us build it’ (Öztürk & Pöchtrager 2011:18,43)

4. Quantity-sensitive stress systems

In contrast with free and fixed stress systems, in languages with quantity-sensitive (QS) stress, syllable weight plays the primary role in determining stress location (Hayes 1995; Kager 1995; van der Hulst 1999; 2014). Specifically, heavy syllables attract stress, but what counts as a heavy syllable is language-specific, and can include syllables with a low vowel, long vowel, and/or a coda. All these language types are represented in the Caucasus.

4.1 Unbounded systems

QS unbounded stress systems place no limit on the distance between the stressed syllable and word edge, though it is typical of QS stress to be right- or left-edge oriented – i.e., for the right- or leftmost heavy syllable to attract stress. Unbounded systems contrast with bounded ones, in which stress placement is determined by distance from word edges and secondary stresses in addition to syllable weight. Because little is known about the availability or distribution of secondary stresses in the languages of the Caucasus, bounded systems are not discussed here.

Many NEC languages have QS stress. In Andi (NEC; Avar-Andic) stress regularly targets the rightmost closed syllable, including in derivations: *iḡvób* ‘mill’, *hárk’u* ‘eye’, *gungúl* ‘pot’; *gédu* ‘cat.SG’, *gedobíl* ‘cat.PL’ (Tsertsvadze 1965:26). In words containing only open

syllables, stress is free, which is typologically unusual in QS systems: *hek'á* ‘man’, *mát'u* ‘mirror’ (Tsertsvadze 1965:27).

It is important to take into account that word stress in Andi is weak and hard to distinguish from phrase-level prosodic phenomena (Tsertsvadze 1965:26). While Tsertsvadze (1965), Alekseev (1999a:221) and Salimov (2010:19) identify Andi as having word stress, Kibrik & Kodzasov (1990:322) hypothesize that the pitch target that closed syllables are the locus of phrasal stress. See also chapter X, Section 2.3 for a tonal analysis of Andi.

Stress facts are notoriously unclear in Lak (NEC; Lak-Dargwa). Stress in Lak interacts with vowel length (see Friedman, this volume), but because vowel length facts are not well-established and vary across Lak dialects (Xajdakov 1966:118), stress patterns are also poorly understood. At the same time, there are clear QS tendencies: Lak stress is mobile and tends to target closed syllables and syllables containing long vowels or diphthongs, or geminated consonants; if there is more than one such syllable in a word, the rightmost one is stressed (Murkelinskij 1971:53). Similarly, if all syllables contain short vowels, the rightmost one carries stress. Exceptionally, certain suffixes (e.g., *-ma*, *-va*) always attract stress: *arx-má* ‘the far away one’, *q:atlu-vá* ‘from home’ (Murkelinskij 1971:55).

Like in Andi, because stress in Lak is acoustically weak (Xajdakov 1999:91), it has been hypothesized that Lak relies on phrasal prominence only (Kibrik & Kodzasov 1990:334). However, Žirkov (1955:15) notes that Lak speakers have consistent intuitions about its placement.

Little is known about Karata (NEC; Avar-Andic) stress, but it also shows some clear QS tendencies. In disyllabic nouns the final syllable, if closed, tends to carry stress; if open, stress is initial (Magomedova & Xalidova 2001:444; Dalgatov 2015:265). However, some plural forms are derived by shifting the stress to the second syllable regardless of syllable structure: *béle* ‘shovel.SG’ - *belé* ‘shovel.PL’, *hárk'a* ‘eye.SG’ - *hark'á* ‘eye.PL’ (Magomedbekova 1971:16). Long vowels tend to attract stress, too. There are some stress-based minimal pairs: *hádir* ‘in the face’ vs. *hadír* ‘here’ (Magomedova & Xalidova 2001:445).

Finally, Standard (Eastern) Armenian (Indo-European) has predominantly final stress, except in some dialects, like Karabakh, where stress is regularly penultimate (Vaux 1998:141; Dum-Tragut 2009:48. ft 57). Final stress is preserved with the addition of suffixes: *kʰavákʰ* ‘town’, *kʰavákʰatsʰí* ‘citizen’ *kʰavákʰatsʰiutʰjún* ‘citizenship’ (Kusikjan 1950:29; Kozintseva 1995:6; Vaux 1998:132; Dum-Tragut 2009:47). Appearance of [ə] as the final vowel can cause retraction of stress to the penultimate syllable, showing that Armenian stress is quantity-sensitive: *kájsər* ‘emperor’, *ástəɾ* ‘star’ (Dum-Tragut 2009:48). Exceptionally, a number of adverbs and vocative forms of personal names can receive initial stress (Vaux 1998:133; Dum-Tragut 2009:48). Certain enclitics, such as markers of definiteness, possessive suffixes and enclitic adverb *el* ‘also, even’ are stress-repelling, so that in words containing them stress is penultimate (Dum-Tragut 2009:48).

4.2 Stress-window systems

Some languages of the Caucasus assign stress within a so-called “stress window”. In these languages, only a syllable within a group of two or three syllables that are “visible” for stress assignment can carry stress. In a given language, the stress window is either left- or right-aligned in a word. Both phonological and morphological factors can determine stress

placement within a stress window. In the rest of this Section, languages that rely on phonological factors for stress assignment within a stress window are discussed.

In Archi (NEC; Lezgian), the first two syllables of a lexical word comprise the stress window. Stress placement in disyllabic nouns is determined by vowel height: the second syllable is only stressed if the vowel in it is non-high (*a*, *o* or *e*): *dórki* ‘eyelid’, *zímzu* ‘ant’, *buvá* ‘mother’, *motól* ‘baby goat’ (Mikailov 1967:18; Kibrik et al. 1977:266). However, in the oblique forms of monosyllabic and disyllabic nouns stress often targets the second syllable, regardless of vowel height: *lo* ‘child.SG’, *lobúr* ‘child.PL’ (Mikailov 1967:20). If the morphological makeup of a word would cause it to have stress outside of the stress window, the pretonic vowel is syncopated: e.g. *matlá* ‘baby goat.ERG’ (< *motolá*) (Kibrik 1994:305). In verbs, as a rule, stress stays on one of the root syllables: *áq* ‘as’ ‘leave.INF’, *ék* ‘as’ ‘choose.INF’ (Mikailov 1967:19).

In Tsez (NEC; Tsezic), the two final syllables constitute the stress window: stress targets the ultima if it is closed, otherwise the penult: *t’akán* ‘glass’, *bélo* ‘pig’, *gagáli* ‘flower’ (Alekseev & Radžabov 2004:118); cf. Section 7 for Xalilova’s (2009) similar analysis of Kvrashi (NEC; Tsezic) facts. Exceptionally, in vocatives, the first syllable is stressed, and in ergatives - the final one: *báharǵi* ‘man.VOC’; *zeyá*: ‘bear.ERG’. Personal pronouns are stressed on the ultima regardless of syllable structure: *elí* ‘1PL’, *meží* ‘2PL’. Imperatives have initial stress: *iso* ‘take/buy.IMP’, *éro* ‘put_down.IMP’; the infinitival suffix *-a* attracts stress: *exur-á* ‘kill-INF’, *ik’-á* ‘walk-INF’ (Imnaišvili 1963:22). In contrast, Kibrik & Kodzasov (1990:329) tentatively suggest that Tsez doesn’t have word stress and might have a system of contrastive tones.

In the Senaki dialect of Mingrelian (SC), the stress window consists of the penultimate and antepenultimate syllables (Gudava 1969). Stress is penultimate in consonant-final words, and antepenultimate in vowel-final ones.⁵ Exceptionally, some vowel-final verbs, including perfective future and certain aorist forms, have penultimate stress, which leads to minimal pairs: *dóyuru* ‘die.AOR.3SG’, *doyúru* ‘die.PRF.FUT.3SG’ (Gudava 1969:109). See Section 7.2 for more Mingrelian facts.

In Iron Ossetic (IE), the stress window consists of the first two syllables of a word (Bagaev 1965:56–57), and in Digor Ossetic, according to some accounts, of the first three (Bailey 1950:59; Isaev 1966:26). The latter is less certain because Digor stress is acoustically weaker than Iron (Abaev 1939:100; Henderson 1949:74; Bagaev 1965:56). See Dzagurov (1929) and Takazov (2009) for a view that Digor stress placement is much less restricted. In a prosodic phrase, individual words lose their stress; more on this in chapter X.

In Iron Ossetic, stress placement within the stress window is conditioned by vowel quality and syllable weight. According to traditional descriptions, Ossetic has strong (*a*, *e*, *i*, *o*, *u*) and weak (*ɐ*, *ə*) vowels (Bagaev 1965:17; Isaev 1959:28; Dzakhova 2010:10). If both vowels in the stress window are weak, the second one is stressed.⁶ Exceptionally, any vowel following

⁵ This system, where a heavy ultima attracts stress closer to the right edge of the word but not to the ultima itself is reminiscent of the recessive accent in Greek. There, words with a heavy ultima (containing a long vowel) are stressed on the penult, while words with a light ultima are stressed on the antepenult. Thank you to Kevin Ryan for bringing this to my attention.

⁶ Exceptions to this pattern, where stress is initial, have historically had an initial /ə/, which is pronounced weakly/not pronounced and is not rendered in orthography, but affects stress assignment (Bagaev 1965:58).

the verbal prefix *s-* carries stress: *sémbelən* ‘meet.INF’, *səzdəχən* ‘return.INF’. If both vowels in the stress window are strong, typically, the first one is stressed (Bagaev 1965:58; Dzakhova 2010:10), though there is some variability (Abaev 1939:99; 1949:386). If the vowels in the stress window are of unequal strength, the strong one carries stress. However, if the first vowel is strong, and the second vowel is weak but the second syllable is closed, the second syllable can attract stress (Isaev 1959:66; 1966:27).

Stress in Digor Ossetic has a stronger tendency to gravitate towards final syllables (Abaev 1939:100; 1949:386). In words containing weak vowels only, the rightmost one is stressed, excluding inflectional suffixes. The same holds for words with strong vowels only, though exceptions are numerous, including minimal pairs: *zizá* ‘meat’, *ziza* ‘breadwinner’ (Bagaev 1965:61; Isaev 1966:27). In words with strong and weak vowels, the rightmost strong vowel carries stress.

According to some sources, shifting stress to the initial syllable in nouns that otherwise carry stress on the second syllable in Ossetic signals definiteness: *ləppú* ‘boy.INDF’, *léppu* ‘boy.DEF’; *kəság* ‘fish.INDF’, *kəsag* ‘fish.DEF’ (Bagaev 1965:60; Abaev 1939:99; 1949:386)⁷. Historically, this phenomenon arose from a definite article *i-* that was lost in Iron Ossetic but preserved in Digor (Cheung 2002:287), the presence of which shifted the stress window, and, consequently, stress placement.

Svan (SC) is likely to be a stress window language, too, though the facts are not entirely clear. Stress in Svan usually targets the final or penultimate syllable. There might be a tendency for stress to stabilize on the penult (Zhghenti 1949:100), but stress placement interacts with other processes, such as umlaut, vowel length and vowel reduction, some of which are poorly understood, which makes stress facts harder to grasp. There is also considerable dialectal variation (Tuite 1998:9).

Long vowels often carry stress: *má:re* ‘man’ vs. *maré* ‘but’ (Zhghenti 1949:97). At the same time, there is no one-to-one correspondence between stress and long vowels, as up to four long vowels per word are possible: *kæ:di:ya:læ:n* ‘got undressed’⁸ (Tuite 1998:8). A number of suffixes, both nominal and verbal, are pronounced as long and viewed as stressed (Zhghenti 1949:100), though it is unclear if this lengthening is due to word stress or phrasal intonation: *dedber-i:l* ‘old woman’, *ts’ir-ó:l* ‘hammer’, *iqve:zi-é:l* ‘nod_off.PRS.3SG’. Some of these suffixes are also marked by noticeable tonal movement, especially in the Lashxian and Upper Bal dialects (Zhghenti 1949:101; Zhghenti 1960:101). Certain particles, such as *-i* ‘too’ and preverbal negative particles are always stressed (Zhghenti 1960:99, 103); for the latter, see also Section 5.2.

5. Morphologically-conditioned stress placement

In a number of languages stress placement is determined by morphological factors. These include morphological conditioning of stress placement within a stress window, variable behavior of different parts of speech with respect to stress, and stress requirements of particular morphemes.

⁷ The productivity of this phenomenon in contemporary Ossetic is argued for in Testen (1997:729) and Dzakhova (2010:12) and contested by Cheung (2002:118) and Erschler (this volume).

⁸ Stress placement is not marked in this form in the source.

5.1 Stress-window systems

In some languages of the Caucasus, stress placement within a stress window is determined by morphological factors. See also Section 7.2 for languages in which morphological conditioning for stress placement within a stress window is less robust.

In Aghul (NEC; Lezgian), the first two syllables of a word constitute the stress window. In disyllabic nominals, stress usually targets the second syllable; monosyllabic nouns shift stress to the second syllable in oblique forms: *t'ibít'i* 'grape.NOM.SG', *t'ibít'iarin* 'grape.GEN.PL'; *ray* 'sun.NOM.SG', *rayárin* 'sun.GEN.PL' (Magometov 1970:19). In verbs, stress targets the second syllable in root infinitives and those with the prefix *al-* 'on': *útsás* 'reap.INF', *uzás* 'milk.INF'; *aligβas* 'sit_on.INF'. Verbs with spatial prefixes are stressed on the initial syllable: *k:íq'βas* 'sit_under.INF', *hiq'βas* 'sit_in_front_of.INF'. Negative verbs are stressed on the penult: *dútsas* 'reap.INF.NEG', *daχúras* 'read.INF.NEG'; if there is another prefix in a negative verb, stress targets the second syllable: *k:edíq'βas* 'sit_under.INF.NEG', *hadiq'βas* 'sit_in_front_of.INF.NEG' (Magometov 1970:20). If the addition of affixes leads to a word being stressed outside of the stress window, the second syllable is syncopated (Magometov 1970:22; Kibrik & Kodzasov 1990:339).

Rutul, like Aghul (NEC; Lezgian), has a stress window consisting of the first two syllables of a word. Stress in nominals usually targets the second syllable: *barmák* 'sheepskin hat' *aván* 'string', but *árab* 'sickle' (Alekseev 1994:218; Ibragimov 2004:47). Monosyllabic nouns can shift stress onto suffixes: *χud* 'fist'- *χudá* 'fist.LOC'; when the same happens in disyllabic nouns, the immediately pretonic vowel is often syncopated: *ubúl* 'wolf.NOM' - *ublís* 'wolf.DAT' (< *ubulis*) (Ibragimov 2004:47). There are stress repelling suffixes (e.g., pluralizer *-bir*) and stress attracting suffixes (e.g., pluralizers *-ba/bæ*, *-mar/mæ*, *-ar/æ* and *-abar*): *q̄χ'úl-bir* 'head-PL' but *fu-bæ* 'brother-PL', *sus-már* 'bride-PL', *hambaz-ár* 'friend-PL', *did-abár* 'father-PL' (Ibragimov 2004:47). In verbs stress is typically initial: *áts'ara* 'know.1SG', *ráts'iri* 'find_out.PST.3SG.M', *gúk^was* 'endure.INF', but *sug^wás* 'lose.INF' (Alekseev 1994:218; Ibragimov 2004:48).

In the Muxrek dialect of Rutul, stress in disyllabic words can shift to the first syllable in case forms and derivations: *uxún* 'stomach.NOM', *úxnid* 'stomach.GEN', *sik'il* 'rye', *sik'lid* 'rye.ADJ' (Ibragimov 1978:171). In Ixrek Rutul, stress regularly targets the penultimate syllable (Ibragimov 1978:199).

According to a different analysis, Rutul carries pitch-based stress on the penult (Jeiranišvili 1964; 1967:581; 1983:95). In his earlier work, Ibragimov (1978:41, 240) also mentions pitch-based stress in Rutul, especially in the Borch and Khnov dialects, but does not provide any details. See also chapter X, Section 2.2 for a tonal analysis of Rutul.

5.2 Other morphological generalizations

Nominals and verbs have different stress patterns in a number of Dagestanian languages, including Dargwa (Moroz 2014) and Khinalug (Kibrik et al. 1972:31). In Kryts (NEC; Lezgian), stress placement varies by part of speech. Di- and trisyllabic nominals, including deverbal nominals such as *masdars*, are stressed on the second syllable, while most verbs (apart from future forms) and adverbs have initial stress. This leads to minimal pairs: *yigríc* 'grab.INF', *yígric* 'grab.PST.PTCP' (Saadiev 1994:411; Authier 2009:26, 141).

Prohibitive and negative morphemes share the same status with respect to stress assignment in a number of genetically unrelated languages of the Caucasus, possibly constituting an areal feature. Specifically, these exponents obligatorily attract stress in Armenian (Dum-Tragut 2009:49), Svan (Schmidt 1991:485), Laz (Marr 1910:5; Holisky 1991:401; Öztürk & Pöchtrager 2011:152), Mingrelian (Kluge 1916:4), Udi (Dirr 1903:4; Schulze-Fürhoff 1994:456), Rutul (Ibragimov 2004:48), Hunzib (Isakov & Xalilov 2012:79), Khinalug (Alekseev 1999b:155), Qaytagh (Abdullaev 1954:64), Tanty (Lander & Sumbatova 2014:41) and Cudaxar Dargwa (Abdullaev 1954:63). A similar phenomenon is reported for Chechen, in which the negative particle, *tsa* and the prohibitive particle *ma* (as well as the coordinating and focus scope-marking particle *ʔa*) are specified for a high tone (Nichols 1994:15; 1997:967; Komen 2007b:11). *ʔa*, an enclitic, can in certain cases attract stress, shifting it to the final syllable of the word (Nichols 1997:967). Proclitics, *tsa* and *ma*, however, only realize the high tone and do not attract stress from the following verb:

- H
|
- (5) *ma tuóxa!*
PROH hit
'don't hit!'
- (Nichols 1997:967)

Similar facts obtain for cognate particles in closely related Ingush; see chapter X for the tonal properties of Ingush.

In Ubykh (NWC; extinct), negative morphemes also tend to carry stress, though less consistently (Dumézil 1975:181; Charachidze 1989:402):

- (6) a. *á-y-z-naχ*
3SG-to.here-return-PL.OPT
'so that they return'
- b. *a-y-má-z-naχ*
3SG-to.here-NEG-return-PL.OPT
'so that they do not return'
- (Charachidze 1989:402)

A slightly different pattern is observed in Budukh. Here, some negative/prohibitive morphemes, such as *-mo-*, are poststressing: *ʃorot'ú* 'cut.IMP' – *ʃo-mo-rót'u* 'cut.PROH' (Talibov 2007:47).

A tendency to stress negative and prohibitive morphemes might stem from the communicative need to make them more prominent; this hypothesis requires further investigation.

6. More complex cases

Word stress systems in some languages of the Caucasus are highly complex and/or idiosyncratic, and do not fit easily into the classification provided in the previous Sections. Section 6.1 covers the intricate stress facts of the NWC languages and the available analyses. Section 6.2 is dedicated to several Andic languages that have been analyzed as having stresses of different 'strength'.

6.1 NWC stress

The NWC stress facts have received attention in the literature due to their unusual complexity as well as the interplay between stress and other phenomena, such as vowel quality. In Kabardian and Adyghe, stress has been variably analyzed as conditioned by syllable weight or morphological factors, including variable behavior of nominal and verbal affixes with respect to stress. Yet, neither analysis can account for all of the data. The polysynthetic nature of these languages additionally complicates the morphological accounts. In Abkhaz and Abaza, stress is predominantly conditioned by morphological factors, though this conditioning is highly intricate. Dybo (1977:45) and Dybo et al. (1978:17) hypothesize that the stress properties of NWC languages could have arisen from a tonal system.

6.1.1 Kabardian and Adyghe

According to some accounts, Kabardian stress is conditioned by syllable weight within a stress window comprised of the penultimate and final syllables (Abitov et al. 1957:29; Applebaum 2013:97). A heavy ultima (CV: or CVC) carries stress; if the ultima is light, stress is penultimate: *həg'ěbz* 'girl', *sa.báj* 'kid'; *harzánə* 'good', *xwá:bə* 'warm' (Applebaum 2013:97).⁹ While some maintain that Kabardian has secondary stress (Turčaninov & Tsagov 1940:42; Colarusso 1989:269), this is not supported by instrumental evidence (Gordon & Applebaum 2010).

Notably, some affixes are 'invisible' for stress assignment - e.g., the addition of case and number suffixes to nominals has no effect on stress placement, contrary to the predictions of the stress window account: *xádə-* 'garden (nominal root)', *xádə-r* 'garden-ABS', *xádə-xə-r* 'garden-PL-ABS' (Balkarov 1970:38; Colarusso 1989:319; Applebaum 2013:98). Based on this, Colarusso (1989:269; 1992:16) proposes a morphological account of Kabardian stress, according to which stress targets the final vowel of the stem in nouns and the first syllable in verbs, with certain affixes as exceptions. Colarusso (2006:7) provides an updated morphophonological approach. According to it, primary stress targets the vowel before the final consonant in both nominal and verbal stems, but while verbal inflectional affixes are part of the stem, nominal ones are not. Similarly, Moroz (2012) provides a morphophonological account of stress assignment in the Ulyap dialect of Kabardian, spoken in the Adyghe-dominant area. In contrast with Colarusso (2006), Moroz (2012) incorporates diachronic elements into his analysis, similarly to an earlier account of Kabardian stress by Jakovlev (1948:346)

In closely related Adyghe, the picture is yet more complicated. Adyghe stress is reported to be acoustically weak, with high inter-speaker variability in stress placement (Rogava & Keraševa 1966:25; Kuznetsova 2006; Sumbatova 2009:23) and dialectal variation in stress-related phenomena (Zekox 1984).

Adyghe stress placement is conditioned by morphological factors but also constrained by phonological ones. Specifically, Adyghe stress is described as targeting the last or penultimate syllables of the stem (Rogava & Keraševa 1966:25; Smeets 1984:128), which can be analyzed

⁹ Dialectal evidence suggests that, historically, Kabardian is likely to have allowed final stress on light final syllables, similarly to today's Adyghe (Šagirov 1961:21).

as the stress window. Which one of the two syllables carries stress is partially unpredictable and partially determined by the part of speech of a given word (nominal vs. verbal) and syllable structure/vowel quality.

The notion of the stem in a polysynthetic language like Adyghe is highly complex, with certain affixes counting as part of the stem and others being external to it for the purposes of stress placement; this is reminiscent of Kabardian facts, as well as Laz facts discussed in Section 3. Specifically, temporal suffixes, subject markers, demonstrative markers and the 3rd person possessive marker constitute part of the stem for the purposes of stress assignment, while many case affixes, number affixes, 1st and 2nd person possessive markers do not (Jakovlev & Ašxamaf 1941:420). Multiple affixes of the latter type can cause stress to fall close to the left edge of the word:

- (7) só-k^wa-ke-ba
 1SG.ABS-go-PST-EMPH
 ‘I did go’ (Jakovlev & Ašxamaf 1941)

These differences between nominal and verbal morphology lead to minimal pairs: *wéjxə* ‘laugh.PRS.2SG’ - *weljxə* ‘rain’ (Zekox 1984:33).

Similarly to Kabardian, a closed final syllable of the stem in Adyghe always carries stress. A closed final syllable is commonly thought of as being produced by elision of the unstressed final vowel /ə/: *š^wəz* ‘wife’ (< *š^wəzə*) (Rogava & Keraševa 1966:25; Sumbatova 2009:24). This process, however, only applies to nominal categories - in verbs, a final unstressed /ə/ remains intact: *jétxə* ‘write.PRS.3SG.M’ (Sumbatova 2009:26). If the ultima is open, in contrast with Kabardian, either the ultima or penult can carry stress: *ī^jalé* ‘boy’, *ī^lalé* ‘village’, *máte* ‘basket’, *lex^wámbe* ‘toe’ (Sumbatova 2009:23).

Adyghe stress interacts with other phonological processes, some of which are poorly understood - for instance, the *e/a* alternation in the stem, whereby *a* can only be found in the penultimate position: *mezako* ‘moonlit night’ ← *maze* ‘moon’ + *ko* ‘night’ (Rogava & Keraševa 1966:49). Kuznetsova (2006) offers an Optimality Theory account of Adyghe stress and points out that a framework that does not differentiate between lexical and post-lexical levels cannot successfully account for the interaction between stress facts and *e/a* alternation. Specifically, the *e/a* alternation applies in a (partially) lexically/morphologically conditioned environment, and also creates opacity in its interaction with the stress assignment rule. Because of this, a purely phonological OT account that does not consider lexical/morphological facts is insufficient for capturing Adyghe stress. For an overview of the facts and existing approaches to the *e/a* alternation, see Arkadiev & Testelefs (2009).

6.1.2 Abkhaz and Abaza

Morphological conditioning of stress placement in Abkhaz (NWC) can be captured by the rule known as Dybo’s Law (Dybo 1977); a similar formalization has been proposed in a detailed study of Abkhaz stress by Spruit (1985). The main insight of these analyses is that there are two types of morphemes in Abkhaz: in Spruit’s analysis, dominant ones (‘+’ ones for Dybo) and recessive ones (‘-’ for Dybo). Stress falls on the rightmost dominant morpheme

that is not immediately followed by another dominant morpheme (i.e., that is immediately followed by a recessive morpheme or a word boundary).^{10,11}

(8) D = dominant, R = recessive, ' = stress

- | | |
|--|--|
| a. a-j ^w á (D [́])
DEF-dry
'dry' | d. a-tʃ ^h a-j ^w á (DD [́])
DEF-bread-dry
'dry bread' |
| b. a-tʃ ^h á (D [́])
DEF-bread
'bread' | e. á-x ^j a-j ^w a (D [́] RD)
DEF-chestnut-dry
'dry chestnut' |
| c. á-x ^j a (D [́] R)
DEF-chestnut
'chestnut' | |

(Jakovlev & Ašxamaf 1941)

While Dybo's Law accounts well for the Abkhaz facts, it is highly language-specific. Consequently, several proposals that break it down into a set of more general independent rules have been put forward. The most successful one is a metrical analysis by Trigo (1992), which breaks Dybo's Law into three separate rules (here, accented syllable = dominant, unaccented = recessive):

1. Default Accentuation: beginning with the leftmost syllable, construct a single right-headed unbounded foot on line-0 (assigns default final stress to words containing only recessive syllables).
2. Accent Deletion: delete an accent of a syllable that immediately precedes an accented syllable (ensures that only the syllables followed by a recessive one or a word break are candidates for carrying stress).
3. Word Stress: construct a left-headed word foot on line-1.

However, in order for this account to work, Trigo (1992) makes a number of stipulations, such as assuming that recessive monosyllabic stems are extrametrical for the purposes of stress assignment, and that negative and causative morphemes are infixes and trigger reapplication of Default Accentuation. Kathman (1992) offers a similar break down of Dybo's Law but does not address words consisting only of recessive syllables.

Further complicating matters, there is considerable variation in stress patterns between Abkhaz dialects (Bgažba 1964:134; Lomtadze 1944:68; 1977:99; Aršba 1979), and a number of word forms exhibit stress variants (Aristava et al. 1968:26; Trigo 1992:204, ft. 11). Also, according to some accounts, in certain verb forms stress can shift to a particular morpheme in order to focus it:

- (9) a. yá-rə-tʃ^htʃ^ha
3SG-CAUS-splash_through_mud

¹⁰ For the interaction between stress placement and vowel quality (a/ə/ø), see Spruit (1985) and Trigo (1992).

¹¹ Yanagisawa (2000) reports several problematic cases for the above generalization from the Abzhuy dialect of Abkhaz, in which the negative marker of certain past tenses alternates between dominant and recessive behavior. Such verb forms are not discussed in Dybo's seminal work.

‘make HIM splash through mud’

b. $yə-rə-tp^h tp^h á$

3SG-CAUS-splash_through_mud

‘make him SPLASH through mud’

(Jakovlev 2006:299)

In closely related Abaza (NWC), the stress facts resemble those of Abkhaz, though there is also dialectal variation (Genko 1957:225; Aršba 1979). The analysis offered in Genko (1955:64) and Tabulova (1976:40) is not explicitly based on Dybo’s Law, but can easily be translated into one of the formalisms used for Abkhaz. These accounts divide Abaza roots into two types: those that retain stress and those that shift it; the latter group has two subtypes: leftward and rightward stress-shifting roots. Affixes can also accept or repel stress. The roots that retain stress consist of either one (closed) syllable, or consist of multiple syllables and carry stress on a non-final syllable (e.g., DDR or RDR in a Dybo’s Law-like formalism). Both rightward- and leftward- stress-shifting roots contain a single open syllable and can be represented as D and R in a Dybo’s Law-like formalism, respectively. See also chapter X, Section 2.2 for a tonal analysis of Abaza.

The Abkhaz/Abaza stress system is also interesting from a theoretical point of view. Vaux (2015), based on Vaux & Wolfe (2000), argues that a stress system such as the Abkhaz one cannot be modelled in Classical or Stratal Optimality Theory or Harmonic Serialism. The problem here resembles the one in Adyghe pointed out by Kuznetsova (2006) – certain lexical information of the input to computation must be made visible for markedness constraints in order for the right predictions to be made. According to Vaux (2015), introducing a two-level $*_0\text{CLASH}$ constraint, which takes certain syllables in Abkhaz roots to be inherently accented, allows to account for the Abkhaz facts. This, however, comes at the cost of weakening the scope of markedness constraints such as $*\text{CLASH}$, since they typically cannot refer to the input to computation (McCarthy 2002:49).

6.2 Variation is ‘stress strength’

A number of Andic languages have been analyzed as distinguishing ‘weak’ and ‘strong’ stresses. The exact nature of this prosodic contrast is unclear. Based on the available descriptions, this distinction is orthogonal to that between primary and secondary stress, as both terms are used to describe the only stress in a word. It is also hard to tell whether this distinction can be recast in terms of word-level vs. phrasal prosody. Possibly, ‘weak’ and ‘strong’ stresses can be thought of as lexical pitch accents. Overall, the facts summarized in this Section require further investigation.

In Bagvalal (NEC; Andic) Kibrik et al. (2001:44) identify three nominal accentual classes, according to the degree of prosodic prominence the stressed syllable receives: ‘strong’ stress (‘’), ‘weak’ stress (‘’), or no stress (no marking). The distribution of strong stress is unclear; weak stress seems to be sensitive to syllable weight: it targets the final syllable if it is heavy, otherwise the penult. Additionally, stress can be mobile in case paradigms. There are numerous minimal pairs based on stress ‘strength’: *húns* ‘honey’, *hùns* ‘door’; *tá:* ‘run_in.PST.3SG.M’, *ta:* ‘run.IMP’; *bàla* ‘put_on.PST.3SG.M’, *bala* ‘edge’ (Kibrik et al. 2001:44).

Instrumental measurements show that ‘strong’ stress is realized as increased duration and intensity of a stressed vowel, while ‘weak’ stress is primarily intensity based. At the same

time, ‘strong’ stress on the final syllable in *hihali* ‘in Gigatli’ as opposed to the final syllable in unaccented *hihali* ‘to Gigatli’ is accompanied by a noticeable rise in pitch (Kibrik et al. 2001:59). Unstressed words are reported to have reduced vowel articulations.

See also Gudava (1971:11) for stress pattern in Bagvalal verbs, not cast in stress ‘strength’ terms. According to him, stress never targets the final syllable in past tense forms of the verb but is final in infinitives.

According to Magomedova (1981:103), stress in the Gakvari dialect of Chamalal (NEC: Andic), too, can be ‘strong’ or ‘weak’. Stress often targets the initial syllable but can appear further to the right too; long vowels do not necessarily attract stress. Initial stress can be either ‘strong’ and ‘weak’, while non-initial stress can only be ‘strong’. There are minimal pairs based on stress ‘strength’: *húŋʃa* ‘grass’ - *hũŋʃa* ‘fist’; *áxva* ‘wreck’ - *àxva* ‘crown of head’ (Magomedova 1981:103; 2004:27).

‘Strong’ stress tends to stay on the same syllable throughout the paradigm, while ‘weak’ stress tends to be mobile: *viha* ‘win.PST.3SG.M’, *vihi:la* ‘win.INF’, *vihabe* ‘win.IMP’; *basàⁿ* ‘tell.PST.3SG’, *basí:na* ‘tell.INF’, *basáⁿ* ‘tell.IMP’. Exceptionally, monosyllabic roots tend not to shift stress, regardless of strength. Plural formants *-be*, *-li* and *-e* are stress-repelling, while plural formant *-di* attracts stress, though it is unclear how that interacts with root stresses of different ‘strengths’. Magomedova (1981:104) lists the following examples: *jik’ul* ‘key.SG’ - *jikuldí* ‘key.PL’, *jébil* ‘thigh.SG’ - *jébildi* ‘thigh.PL’, *jafál* ‘necklace.SG’ - *jafaldí* ‘necklace.PL’. Like Bagvalal, Chamalal might have several nominal accentual classes, though this has not been investigated. In verbs, stress tends to be initial. It shifts further to the right in causative, imperative and prohibitive forms of verbs with ‘weak’ stress on the root.

According to another analysis that does not refer to stress ‘strengths’, there are numerous stress-based minimal pairs in Gakvari Chamalal: *béta* ‘having left’, *betá* ‘leave.IMP’; *níxa* ‘oats’, *nixá* ‘take.IMP’ (Bokarev 1949:17); *xóxa* ‘bean-pod’, *xoxá* ‘wheat straws’ (Magomedova 1999:292). See also chapter X, Section 2.4 for a tonal analysis of Chamalal varieties.

Tindi (NEC; Andic) stress properties are similar to those of Chamalal but seem to be less regular. As in Chamalal, initial stress can be either ‘strong’ or ‘weak’; non-initial stress, as a rule, is ‘strong’. Initial stress, particularly ‘weak’, can shift rightwards with the addition of suffixes: *hèra* ‘now’, *heráhilo* ‘until now’, *herahína* ‘this year’. There are minimal pairs based both on stress location and ‘strength’: *rázi* ‘handful’, *razí* ‘in agreement’; *q̂x’áru* ‘bootleg’, *q̂x’áru* ‘time’ (Magomedova 2012:43; 2014:106). Stress tends to be initial in both nouns and verbs. Exceptionally, imperatives, negative verb forms, participles and many irrealis verb forms have final stress: *baq̂x’á* ‘cut up.IMP’, *baq̂x’é* ‘(he) did not cut up’, *baḡahá* ‘let him take’, *baḡavá* ‘if he takes’, *boḡolò* ‘if he had taken’ (Magomedova 2012:50; 2014:108). See also chapter X, Section 2.4 for an attempted tonal analysis of Tindi.

7. Stress systems pending further investigation

In some languages of the Caucasus, stress facts are unclear. This is often attributable to (i) lack of sufficient or reliable data, or (ii) conflicting descriptions of the facts leading to incompatible analyses; this Section addresses the languages that fall into both categories. One likely source of the incompatible descriptions is the fact that their authors do not speak the language they work on natively, and in their descriptions of the stress systems may

inadvertently rely on acoustic cues that mark stress in their native language instead. Further data collection, instrumental studies and theoretical analyses, especially by native speaker linguists, are required to account for stress facts in these languages. In addition to poor understanding of acoustic correlates of stress in a given language, its acoustic weakness can complicate the picture. Interaction of stress with other phenomena, such as vowel length and phrasal intonation, as well as possible tonal contrasts also need to be considered; for more on this, see chapter X.

7.1 Insufficient descriptions

Little is known about stress in Botlikh (NEC; Avar-Andic). It is reported to be mobile in singular (but not plural) nominal paradigms. Pluralizers *-de* and *-e* attract stress, while pluralizer *-bali* is prestressing: *ʔambur-dé* ‘roof-PL’, *ged-é* ‘cat-PL’; *ʔimá-bali* ‘father-PL’ (Gudava 1962:17). There are stress-based minimal pairs: *bétli* ‘barn’ vs. *betli* ‘tillage’, *masá* ‘say.IMP’ vs. *mása* ‘say.PST.3SG.M’ (Gudava 1962:18).

In verbs, stress targets the ultima in imperatives (*hiŋt*: ‘á’ ‘say.IMP’), penult in conditional verb forms (*χvardála* ‘write.3SG.COND’), antepenult in prohibitives (*hiŋt*: ‘ábas:i’ ‘say.PROH’), and penult or antepenult in past tense forms (*hiŋt*: ‘u’ ‘say.PST.3SG’). The question particle *-ma* is usually prestressing: *buká-ma?* ‘be.PST.3SG-Q’ (Gudava 1962:18).

Similarly, stress in Khinalug (isolate) awaits further research. Khinalug stress appears to be primarily conditioned by morphological factors. In non-derived nouns, stress is final, and its placement is preserved when most affixes are added: *dzumá* ‘dance’, *dzumátŋi* ‘dancer’; *halám* ‘sheep’, *halámχer* ‘shepherd’. The adjective-forming suffix *-lu* attracts stress: *adžák* ‘wrath, anger’, *adžák-lú* ‘angry’ (Kibrik et al. 1972:30). In complex verbs consisting of a noun+light verb, the noun carries stress on the final syllable of the root. Polymorphemic verbs typically carry stress on the initial syllable (Kibrik et al. 1972:31). At the same time, Kibrik & Kodzasov (1990:346) take Khinalug to have a stress window consisting of the first three syllables, but do not provide any details.

Little is known about stress in Ubykh (NWC; extinct); the sources convey uncertainty about stress placement (Dirr 1928:8; Dumézil 1931:12; Dumézil & Namitok 1954:172). However, there are systematic stress-based minimal pairs: e.g., the definiteness marker *a-* is stress-attracting, while predicative particle *a-* is not (von Mészáros 1934:41; Vogt 1963:33; Charachidze 1989:368):

- (10) a. á-wa
DEF-dog
‘the dog’
b. a-wá-Ø
PRED-dog-STAT
‘this is a dog’ (Charachidze 1989:369)

Similarly, formation of causative verbs and verbs with multiple arguments involves systematic changes to the stress pattern, leading to minimal pairs (Charachidze 1989:368):

- (11) a. wə-sá-ya-n
2SG-1SG-hit-PRES
‘you hit me’

- b. wá-Ø-sə-Ø-ya-n
2SG-3SG-1sg-CAUS-hit-PRES
'I make you hit him' (Charachidze 1989:411)
- (12) a. sə-yá-n
1SG-hit-PRES
'I hit (something)'
- b. sá-Ø-ya-n
1SG-3SG-hit-PRES
'I hit him' (Charachidze 1989:368)

7.2 Conflicting descriptions and accounts

There are several accounts of Akhvakh (NEC; Avar-Andic) stress. Magomedova & Abdulaeva (2007:657) observe that all types of vowels (short, long, and nasalized) can carry stress. In some verb forms, stress placement is predictable: it targets the penult in past participles (*gujé:he* 'having done'), and the ultima in imperatives and masdars (*gujá* 'do.IMP', *k'usá* 'sit_down.IMP'; *hirilé* 'red.MAS', *batǰalé* 'beautiful.MAS'). Di- and trisyllabic words often have initial stress, while longer words can have stress further to the right. There are minimal pairs: *míχe* 'fur', *míχé* 'unity'; *mína* 'head', *miná* 'house'.

In contrast, Creissels (2010) analyzes Akhvakh as having accented and unaccented words. According to him, accented ones can carry stress on any non-final syllable, while unaccented words are realized with low and flat tone throughout. Addition of phrase-level intonational targets to unaccented words can create an illusion of such words being accented. One way of deriving plural forms involves deletion of the accent on the singular form: *béka* 'snake.SG' - *beki* 'snake.PL', *ǰadáti* 'custom.SG' - *ǰadata* 'custom.PL'; sometimes deletion of the accent is the only marker of plural: *ǰǰanáka* 'sledge.SG' - *ǰǰanaka* 'sledge.PL'. Another pluralization strategy involves underlyingly accented suffixes, which can add an accent both to accented and unaccented words: *reǰe* 'year.SG' - *reǰéna* 'year.PL', *rávi* 'war.SG' - *rávila* 'war.PL' (Creissels 2010:5). Magomedova & Abdulaeva (2007:659) analyze such forms as bearing stress on the plural suffix only. See also chapter X, Section 2.3 for a tonal analysis of Akhvakh.

There is no agreement about stress in Hunzib (NEC; Tsezic). Bokarev (1967:474) takes Hunzib stress to be weak and tonal, and "not having a fixed place in the word". According to Gamzatov (1975:18), Hunzib stress is non-tonal and fixed on the initial syllable. Lomtadze (1984:145) describes Hunzib as having mobile stress in some paradigms. Kibrik & Kodzasov (1990:332) propose that Hunzib lacks word stress, but initial syllables carry phrasal accents. Van den Berg (1995:28) takes Hunzib stress to be penultimate, and notes that it is often accompanied by high pitch, though not for all speakers. Isakov & Xalilov (2012:77) share the view that Hunzib stress often is initial but provide numerous counterexamples: *ǰǰ'itǰ'ix* 'intestine', *bilázba* 'beard'; *rǰǰǰládija* 'hang/hook.IMP'.

There are some morphologically-driven tendencies in stress placement. Certain case and number suffixes in Hunzib nouns are stress-attracting: *mǰǰǰna* 'knee.SG' - *mǰǰǰnár* 'knee.PL', *ǰǰǰle* 'side' - *ǰǰǰlás tora* 'ribs' (Isakov & Xalilov 2012:78). Similarly, certain verbal suffixes

attract stress: *ruv-á* ‘do-AOR.3SG’, *neḡa-ár* ‘eat-FUT.3SG’, *gul-á¹²* ‘put.down-INF’, *bes-áŋ* ‘eat-PTCP’; see van den Berg (1995:29), Isakov & Xalilov (2012:78) for the full list. However, stress-based minimal pairs are uncommon: Bokarev (1967:474) and Gamzatov (1975:18) suggest there are none, and van den Berg (1995:29) lists only one: *béd̄do* ‘then’ vs. *bedd̄o* ‘back’.

There is no consensus about stress placement in Khvarshi (NEC; Tsezic). Kibrik et al. (1978a; 1978b) tentatively describe Khvarshi as possessing tonal contrasts, but provide little detail. Lomtadze (1998:72) characterizes Khvarshi stress as targeting either the initial or the final syllable. According to him, syllable weight is irrelevant for stress placement in both Khvarshi and Inxokvari, a distinct dialect of Khvarshi: *lidá* ‘wood’, *yobolá* ‘hat’, *urhól* ‘when’ (Khvarshi); *yodé* ‘tomorrow’, *ḡogelí* ‘nearby’ *ḡezól* ‘eye’ (Inxokvari). In contrast, Xalilova (2009:34) describes Khvarshi stress as targeting the last syllable if it is closed, otherwise the penult: *kóde* ‘hair’, *rekéne* ‘cradle’, *ezól* ‘eye’, *muzóm* ‘marsh’. Ergative forms and genitive forms of personal pronouns are exceptional: *lidó* ‘firwood.ERG’, *dijó* ‘1SG.GEN’. Similarly, some codaless verbal suffixes are stress-attracting: *ṡus-á* ‘sleep-INF’, *tuq̄ḡ-í* ‘finish-PST.EVID’, *ṡus-bí* ‘sleep-NEG’ (Xalilova 2009:34). However, imperatives are stressed on the initial syllable: *ṡús-o* ‘sleep-IMP’, *súsan-a* ‘move-IMP’. There are some minimal pairs: *iso* ‘say.IMP’ - *isó* ‘that.GEN’, *iḷo* ‘1PL.ABS’ - *iḷó* ‘1PL.GEN’ (Xalilova 2009:37).

Accounts of Bezhta (NEC; Tsezic) stress vary too. According to Madieva (1965), Bezhta stress is weak and stress variants are often possible: *nísona/nisóna* ‘say.PST.3SG’ *zúq’ona/zuq’óna* ‘be.PST.3SG’. Other accounts suggest that word stress in Bezhta does not exist (Kibrik et al. 1978a:44; Kibrik & Kodzasov 1990:331; Testelelets & Xalilov 1998:46). In contrast, Lomtadze (1984) argues for the availability of word-level stress in Bezhta and other Tsezic languages, but Testelelets (1993:126) refutes his analysis as conflating word stress and phrasal intonation. Xalilov (1995:394) describes Bezhta stress as initial and acoustically weak, and in later work suggests that the initial syllable in Bezhta carries phrasal stress (Xalilov 2014:17), though does not provide justification for the reanalysis.

According to Xalilov (2014), most words have initial stress: *ábo* ‘father’, *bóval* ‘do-INF’, *bábalo* ‘shiny’, *áyohdagi* ‘haymaker’, *bífelayako* ‘calf shepherd’. Exceptionally, stress shifts to the final syllable in vocative forms of di- and trisyllabic proper names: *Baḡír* (VOC), *Aminát* (VOC). Also, locative forms in *-ḡ* and *-ṡ* and adverbs in *-ḡ* have final stress: *vanáḡ* ‘forest.LOC’, *pardaláḡ* ‘porch.LOC’, *onzíṡ* ‘under the snow’, *maḡfinalíṡ* ‘under the car’, *hoṡḡóḡ* ‘here’, *ḡebláḡ* ‘nearby’ (Xalilov 2014:18–19), and disyllabic causatives in *-(V)l/(V)ll* carry stress on the causative morpheme: *nisóllal* ‘say.CAUS’, *ḡuṡḡóllal* ‘drink.CAUS’ (Comrie et al. 2015:110). Based on the examples in Xalilov (2014), long vowels seem to attract stress: *bí:rk’i* ‘thistle’, *kib.á:* ‘girl.ERG’, *iṡḡelá:l* ‘shout-INF/call-INF’, *bizoṡḡ’adá:* ‘towards a mountain’. See also chapter X, Section 2.3 for a tonal analysis of Bezhta.

In Tsakhur (NEC; Lezgic), there is some evidence for a stress window consisting of the first two syllables, but stress placement is influenced by a number of other processes, and is subject to different analyses. In nouns, stress often targets the second syllable: *k’umk’úm* ‘saucepan’, *k’umk’úm-e* ‘saucepan-LOC’, *ḡinēj* ‘bread’, *balkán* ‘horse’ (Talibov 1967:593; Ibragimov 1968:85; 1990:51). Certain affixes, like pluralizers *-ar/-er*, can attract stress further

¹² Hunzib has a phonemic distinction between /a/ (front) and /ɑ/ (back) vowels.

to the right, but all syllables following them are stress-repelling: *balkanár* ‘horse.PL’, but *balkanájin* ‘horse.PL.GEN’ (Ibragimov 1968:90); cf. Section 3 for a similar restriction in Lezgi. In contrast, plural morpheme *-bə* is stress-repelling: *ósbə* ‘firewood.PL’ *χáibə* ‘house.PL’. See Ibragimov (1968:88; 1990:52) for other stress-attracting and stress-repelling affixes.

In contrast, Kodzasov (1999:20) argues for two accentual paradigms for Tsakhur nouns, with ‘strong’ and ‘weak’ stress; see Section 6.2 for similar analyses of some Andic languages. The acoustic correlates of this distinction are unclear. In Kodzasov’s (1999:22) analysis, the accentual paradigm of a word can also change depending on its syntactic function.

In verbs, stress usually targets the initial syllable, with the exception of future tense: *óxanas* ‘eat.INF’, *χárna* ‘come.PST.3SG.M’. (Talibov 1967:593; Ibragimov 1990:52). At the same time, there are minimal pairs in the verbal domain: *ók’anas* ‘write.FUT.1SG’, *ok’anás* ‘write.INF’ (Ibragimov 1968:92). Disyllabic imperatives are always stressed on the initial syllable: *ódza* ‘get_up.IMP’ *óxne* ‘eat.IMP’ (Ibragimov 1968:88). Kodzasov (1999:24) hypothesizes that there also are several accentual paradigms in Tsakhur verbs.

Syllable structure also affects stress placement in Tsakhur, though the facts are not entirely clear. According to Ibragimov (1990:52), monosyllabic words of the shape CVC and CVCC retain stress on the root: *q’om* ‘crown of head/peak’, *q’ómal* ‘crown of head/peak.LOC’, *boz* ‘grey’, *bózun/bózna* ‘grey.GEN’, while vowel-initial (VC, VCC) and open ones (CV) tend to shift stress to affixes: *urg* ‘lamb.SG’, *urgúbə* ‘lamb.PL’, *ts’a* ‘fire’, *ts’ajís* ‘fire.DAT’. This is an instance of cross-linguistically rare onset weight determining stress placement (Hyman 1985). In Kodzasov’s (1999) analysis, both ‘strong’ and ‘weak’ stresses target the rightmost heavy syllable in the root. In the ‘strong’ paradigm, syllables containing a low and/or long vowel and/or a coda count as heavy. In the ‘weak’ paradigm, only vowel length and/or presence of a coda make a syllable heavy. According to yet another view, there is an overall tendency to fix stress in Tsakhur on the penult (Jeiranišvili 1964:352; 1983:95). See also chapter X, Section 2.4 for a tonal analysis of Tsakhur.

In Avar (NEC; Avar-Andic), stress typically targets the first or the second syllable, but the conditioning for stress placement often evades explanation. Stress variants for some lexical items are possible (Charachidzé 1981:18), and here is considerable dialectal variation (Mikailov 1958; 1959). In some dialects, such as Tlox Avar, the disyllabic stress window does not hold (Nurmagomedova 2009).

Most nouns carry stress on the second syllable, though exceptions and minimal pairs are numerous: *k’úlal* ‘key.PL’ vs. *k’ulál* ‘lock’, *ráki* ‘fight’ vs. *ra^hkí* ‘balcony’ (Isakov 1981:88). There are productive morphological processes that derive minimal pairs based on stress, such as pairs of deverbial and deadverbial nouns: *bák’li* ‘heavening, weighing’ vs. *bak’li* ‘burden’ (Mikailov 1958:120; Charachidzé 1981:19).

Many case affixes don’t shift stress: *rúq* ‘house’, *rúq’atul* ‘house.GEN’, *rúq’ale* ‘house.DAT’. On the other hand, some do, so that certain case forms differ in stress only, such as singular and plural instrumental forms (Uslar 1889:65; Charachidzé 1981:18). Monosyllabic roots typically retain stress when modified by suffixes: *gúlf-ab* ‘strong-ADJ’, *sóf-ab* ‘stern-ADJ’.

Many masdars and numerals are stressed on the initial syllable, and most verbs are stressed on the last syllable of the root/stem. Some verbal affixes, such as iterative and evidential ones, can attract stress out of the stress window: *vusaníla* ‘return.PST.3SG.M.EVID’ (Isakov 1981:97).

Mikhailov (1958) and Saidov (1967) attempt to divide Avar lexical items into two groups: those carrying stress on the initial syllable and those carrying stress on the second syllable. However, both groups come out as idiosyncratic and have numerous exceptions. Isakov (1981) provides a classification of Avar morphemes as either stress-attracting or repelling, but the resulting picture is complicated by the fact that some stress-attracting morphemes can fail to attract stress due to other factors. Dybo et al. (1978:18) postulate three accentual paradigms in Avar: A = stressed on the first syllable, B = stressed on the second syllable, C = possessing mobile stress, and compare them to the accentual paradigms in Slavic languages. See also chapter X, Section 2.2 for a tonal analysis of Avar.

Hinukh (NEC; Tsezic) stress is acoustically weak (Lomtadze 1963:34; Forker 2013:49), and its distribution is poorly understood. Forker (2013:49) notes a tendency for stress to target heavy (CVC or CV:) syllables. So do Kibrik & Kodzasov (1990:330), though they take the phenomenon in question to be phrasal stress.

On the other hand, Lomtadze (1963:27) analyses Hinukh stress as targeting the initial or final syllable of the stem; the basis of such distribution is unclear: *xému* ‘stone’, *zéru* ‘fox’, but *barú* ‘wife’, *kədari* ‘jug’, *begíj* ‘good.ADJ’. The plural marker *-be* attracts stress in the latter but not the former group: *kverej-bé* ‘hand.PL’, *xabar-bé* ‘news.PL’, but *mólu-be* ‘nail.PL’. In both groups, however, stress targets the final syllable of the stem in the case forms: *boṭs’é* ‘wolf.NOM’, *boṭs’í-j* ‘wolf.ERG’; *ṛóbu* ‘father.NOM’, *ṛobú-j* ‘father.ERG’. Postpositions attract stress: *hagze-hó* ‘with them’, *sasa-qó-s* ‘in the morning’. In contrast with Lomtadze’s analysis, Forker (2013:50) also observes that trisyllabic words can be stressed on the second syllable: *aqíli* ‘woman’, *izíro* ‘not castrated’.

Past tense and evidential forms of the verb, as well as infinitives, are regularly stressed on the final syllable: *k’olés* ‘jump.over.PST.3SG.M’, *butiríf* ‘gather.PST.3SG.M’; *jetín* ‘love.PST.PTCP.EVID’, *bafín* ‘find.PST.PTCP.EVID’; *yeyá* ‘grind.INF’, *bafirá* ‘catch.INF’ (Lomtadze 1963:30). Present tense verb forms usually have initial stress: *ṛitṛio* ‘stand.PRS.1SG’, *ṛsáx:o* ‘write.PRS.3SG’. (Lomtadze 1963:30). There are some stress-based minimal pairs: *úhe* ‘die.IMP’ - *uhé* ‘die.FUT.1SG’ (Xalilov & Isakov 1999:75). Forker (2013:51) notes that verb conjugation class influences stress assignment. Specifically, verbs with stem-final *-i* carry stress on the first syllable, while verbs with stem-final *-e* carry stress on the second syllable: *étli* ‘say’, *esé* ‘tell’.

Stress properties of Mingrelian are contested (though cf. Senaki Mingrelian facts in Section 4.2). The descriptions resemble those of Georgian (cf. chapter X), but, in contrast with Georgian, little instrumental data is available. Additionally, Mingrelian stress is reported to be acoustically weaker than Georgian (Amirjebi-Mullen et al. 2006:88); there is also significant interspeaker variation (Gudava 1969:106). Stress in Samurzakano Mingrelian is reported to be the most intensive (Amirjebi-Mullen et al. 2006:89).

There is agreement in the literature that in disyllabic words stress is initial. Kluge (1916:3) claims that in longer words stress is penultimate, and accompanied by high tone. According to Kipšidze (1914:13), longer words have two stresses, primary on the initial syllable and

secondary on either the penult (in four syllable words) or the antepenult (in longer ones). Final vowels in Mingrelian are often lengthened, especially in the Zugdidi dialect (Gudava 1969:109), which has also been analyzed as final stress (Tsagareli 1880:7; Kiziria 1967:65).

8. Acoustic correlates and instrumental studies

Instrumental studies of stress in the languages of the Caucasus are few. A notable exception is the investigation of stress in Georgian and studies of the tonal properties of some NEC languages, both of which are discussed in chapter X. Most claims about the acoustic correlates of stress in the languages of the Caucasus are based on impressionistic observations – e.g., it has been observed that Abkhaz and Abaza stress is based on intensity and not pitch movement or vowel duration, but this has not been verified instrumentally (Genko 1955:63; Tabulova 1976:39; Aršba 1979:7). For the languages in which stress is described as primarily cued by pitch/tone, see chapter X.

Dzakhova (2010) investigates duration and intensity as the acoustic correlates of stress in Iron Ossetic words uttered in isolation. According to her results, mean duration of stressed vowels is slightly greater than that of unstressed vowels (1.2:1), and so is intensity (1.01:1); cf. an earlier study by Sokolova (1953:32) for different results for *v*. As for F0 as a correlate of stress in Ossetic, Dzakhova (2014) concludes that the stressed syllable is not necessarily marked by greater F0 or intensity than surrounding syllables. In fact, in 52% of cases F0 is higher on the post-tonic syllable than the stressed one, while the stressed one is still identified as such by listeners. This means that phonetic realization of Ossetic stress relies on means other than intensity and high pitch alone.

Gordon & Applebaum (2010) investigate the acoustic correlates of stress in Turkish Kabardian and conclude that duration, intensity, and pitch are all employed as such, though with considerable interspeaker variation. According to their results, pitch was used to mark stressed vowels by all seven speakers (mean values: 190Hz for stressed vowels and 163 Hz for unstressed vowels), while intensity was used by five out of seven speakers (mean values: 47.7dB for stressed vowels and 44.7 dB for unstressed vowels), and duration was used by four speakers (mean values: 77ms for stressed vowels and 55ms for unstressed vowels).

9. Conclusion

This chapter provides a comprehensive summary of stress facts in the languages of the Caucasus and a classification of the available stress systems. As shown, there is great variation in stress patterns in the region: there are languages with predominantly fixed stress, free stress, and those with stress placement influenced by phonological and/or morphological factors. This classification, however, is a continuum, with languages of all types having exceptional sub-patterns of stress placement.

The main phonological factor influencing stress placement is quantity/syllable weight, which can manifest itself as a stress-attracting property of closed syllables and/or syllables with a long or low vowel. Syllable weight can also determine stress placement in languages that assign stress within a stress window; in other stress window-based languages, morphological factors are decisive. Stress placement can also be determined by other morphological factors, such as part of speech, accentual paradigm or stress-attracting/-repelling properties of a particular morpheme.

In some languages stress facts are more complex and do not easily fit into this classification. Such is the case for stress in NWC languages, which is conditioned by multiple factors, and some Andic NEC languages, in which, according to some descriptions, ‘weak’ and ‘strong’ stresses are distinguished. Finally, in some languages, stress facts have not been established, due to lack of reliable data, conflicting descriptions, and/or interplay of stress with possible tonal contrasts and phrasal intonational phenomena.

Further in-depth investigations of these remarkably variable stress systems, including quantitative studies, are of utmost importance for the documentation of the languages of the Caucasus area. The resulting descriptions are undoubtedly going to have interesting implications for the theoretical approaches to stress.

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