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# ROMANCING WITH TONE: ON THE OUTCOMES OF PROSODIC CONTACT

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This article presents a descriptive and theoretical framework for the analysis of prosodic systems that have emerged from contact between African tone and European intonation-only languages. A comparative study of the prosodic systems of two Romance contact varieties, Central African French and Equatorial Guinean Spanish, shows that they feature two-tone systems, fixed word-tone patterns, tonal minimal pairs, the arbitrary assignment of tone in function words, and tonal processes. Evidence from further contact varieties and creole languages shows that similar systems evolved in other Afro-European contact ecologies. We conclude that tone is imposed by default on contact varieties and creoles that take shape in ecologies characterized by source-language agentivity in tone languages. In doing so, we argue against claims that tone necessarily cedes to stress during language contact and creolization. Instead, contact varieties and creoles partake just like other languages in the convergence processes that lead to the areal clustering of prosodic systems.*

*Keywords*: Central African French, Equatorial Guinean Spanish, creole, prosodic contact, tone, stress, source-language agentivity

**1.** Introduction. There is a common assumption that tone is prone to disappearing when it meets stress during language contact. In an influential article in *Language*, McWhorter states that 'the elimination of such features [i.e. tone, among others] is prototypical of creole genesis in all contexts' (1998:793), and that 'in creoles, [there is] little or no use of tone to lexically contrast monosyllables' (1998:798). Salmons suggests in yet more general terms that 'the basic pattern of accentual change appears to begin with a tonal language, shifts to a pitch-accent language and finally becomes a stress-accent language' (1992:185). Trudgill holds that phonological simplification in language contact includes 'loss of tone' (2010:309). Submissions on the vulnerability of tone in contact, even in ecologies where tone languages dominate, are also found in numerous earlier sources (Heine 1978:220, and the sources cited there). The notion that tone cedes to stress has also found its way into scholarly work beyond linguistics. A key textbook in human geography claims, 'when tonal and non-tonal languages meet and hybridize, tone is soon a casualty' (de Blij 2009:45). The assumption that tone is the loser seems linked to the view that it is somehow more marked than stress, and therefore more likely to be shed due to contact-induced 'simplification' (cf. Salmons 1992:63–65).

Our skepticism toward the idea that tone is a loser per se during prosodic contact provided the impetus for this study. We perceived the need for a systematic approach to

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prosodic contact, founded on empirical evidence, typologically informed, and embedded in social context. Only on such grounds can more general claims be made regarding the fate of prosodic features in language contact. Our own work on prosodic systems that have emerged via contact between African and European languages is the starting point of this study and sets the confines of our observations for now. Contact between prosodic systems has, on the whole, received little attention (cf. Downing 2015). The broad assumptions about the behavior of tone during language contact cited above therefore also rest on somewhat scanty empirical foundations. This circumstance provided a further motivation to explore the fate of tone in language contact.

The first aim of this study is to show that the outcomes of prosodic contact in Afro-European contact scenarios are determined by the composition of linguistic ecologies[1] and the nature of the input prosodic systems, not by typological characteristics of tone as such. Tone can be transferred during language contact, just like other structural features, if the ecology is dominated by speakers of tone languages.

Our argument is based on a comparative acoustic and phonological study of the prosodic systems of Central African French (CAF) and Equatorial Guinean Spanish (EGS), two colonial contact varieties spoken in Africa that have diverged from Standard European French and Standard European Spanish, respectively (see §3). We show that CAF and EGS both have two-tone systems with a high (H) and a low (L) tone, tonal minimal pairs, and fixed word-tone patterns.[2] They therefore possess key diagnostic features of tone systems. At the same time, H tone is obligatory and culminative, meaning that most words (but not all) have one and only one H tone. Hence, CAF and EGS also exhibit two structural features associated with stress systems. In other words, their prosodic systems display a combination of characteristics inherited from the tone AND the stress inputs in the ecology. The double entendre of our title alludes to the rather unexpected presence of tone in Romance, a linguistic grouping otherwise known to exclusively exhibit stress. At the same time, the retention of features identified with stress systems makes the relationship of CAF and EGS with tone appear somewhat flirtatious and not fully committed.

The second aim of this study is to develop a descriptive and theoretical framework that accounts for the outcomes of prosodic contact in different types of ecologies. Our framework is based on the case studies of CAF and EGS, but we furnish additional evidence from other Afro-European contact varieties, especially West African Englishes, as well as the English-lexifier creoles of Africa and the Caribbean. Although we focus on ecologies in which tone languages are spoken by the majority of the population, our framework can potentially be extended to the inverse situation, in which speakers of

[1] Linguistic ecology is a metaphor that goes back to Haugen (1972) to refer to the interaction between a language and the society in which it is spoken. We use it here in the sense of Mufwene (2001:xii) to characterize the 'socioeconomic and ethnographic environment in which a language has evolved' (external ecology), as well as the 'systemic interaction of the linguistic codes in contact' (internal ecology) (Ansaldo 2009:4).

[2] For reference, the following abbreviations are used for language and place names throughout the article: CAF: Central African French, CAR: Central African Republic, EGS: Equatorial Guinean Spanish, SEF: Standard European French, SES: Standard European Spanish. The following tonal notations and abbreviations are used in glosses and elsewhere: – : morpheme boundary, = : clitic morpheme boundary; %: boundary tone, ó: high tone, ò: low tone, ō: mid tone; ACC: accusative case, ADJ: adjective, ADS: adstrate, COMP: complementizer, CON: contact variety, COP: copula, DAT: dative case, DEF: definite article, EXCL: exclusive, F: feminine gender, H: high tone, INCL: inclusive, INDF: indefinite article, INDP: independent person form, IPFV: imperfective aspect, L: low tone, LOC: locative, M: mid tone, M: masculine gender, NOM: nominative case, PFV: perfective aspect, PL: plural number, POSS: possessive case, PRON: pronoun, PRS: present tense, PST: past tense, REFL: reflexive, REL: relative pronoun, SBJ: subject case, SG: singular number, SUB: subordinator (in glosses), SUB: substrate (in text), SUP: superstrate.

stress languages dominate, and yet other contact constellations (see §2.2). We argue that three mechanisms are at work in the creation of contact prosodic systems in tone-dominated ecologies. The most important one is STRESS-TO-TONE MAPPING: speakers of tone languages create the foundations of a tone system by exploiting the perceptual analogies between the phonetic realizations of stress and tone (§4.1). PARADIGMATIZATION, the second mechanism, involves the systematic attribution of tone patterns to words and syntactic categories (§4.2). The third mechanism we term IDIOSYNCRATIZATION: phonological reanalysis gives rise to tonal irregularities within paradigms and to idiosyncratic tonal processes in the contact varieties that often have no direct correspondence in the input languages (§4.3). At several junctures, we address the linguistic AND social factors at play in the emergence of contact prosodic systems (§2.1, §3.1, and §5) and thereby underline the importance of linguistic ecologies in shaping the outcomes of prosodic contact. Section 6 concludes this article and includes some observations about the typological nature of Afro-European contact prosodic systems.

**2.** PROSODY AND LANGUAGE CONTACT. We now address social and linguistic factors that play a role in determining the outcomes of prosodic contact (§2.1). We also provide definitions of the two prosodic types of tone and intonation-only systems, identify four contact constellations between these types, and limit the scope of this study to one of these constellations (§2.2).

**2.1.** SOCIAL AND LINGUISTIC FACTORS IN LANGUAGE CONTACT. We are concerned with how a structural category, namely prosody, is affected by language contact in a mid- to long-term perspective. To investigate this, we take a synchronic look at the prosodic systems of CAF and EGS. We also place the emergence of these systems in a diachronic context by developing hypotheses about general mechanisms that determine the outcomes of prosodic contact. These outcomes are mediated by the interaction of social and linguistic factors in a linguistic ecology (see Mufwene 2010:Ch. 6, Lim & Ansaldo 2015:118–27).

SOCIAL FACTORS. The two most relevant social factors at work in the Afro-European contact ecologies covered here are linguistic demography—that is, the relative proportions of speakers of the input languages—and the socioeconomic stratification of speaker populations and the languages they speak (see also Yakpo 2020). CAF, EGS, and other Afro-European contact varieties and languages all emerged in highly stratified linguistic ecologies during European colonial rule in Africa and the Americas. In these ecologies, the European speakers of European colonial languages were in the minority, while speakers of African languages constituted the overwhelming majority. The social dominance relations that typified these ecologies can be expressed in shorthand via the terms employed for sociolinguistic strata. In the colonial ecologies, the European varieties constituted socially superordinate SUPERSTRATES, which were restructured by the African majority into varieties like CAF, EGS, and the English-lexifier creoles. In the following, restructured varieties like CAF and EGS are collectively referred to as CONTACT VARIETIES, while creoles are referred to as CONTACT LANGUAGES.

Following practice in historical and comparative linguistics (e.g. Witzel 1999), the term SUBSTRATE refers to a socially subordinate language that is eventually lost through shift to the contact variety or language. The African languages that fed into the development of the creole languages of the Caribbean, for example, but are no longer spoken in these ecologies are therefore substrates. ADSTRATES, in turn, coexist with the contact varieties. Adstrates therefore continue to provide features in a situation of long-term language maintenance and societal multilingualism, as is the case in the African contact ecologies treated here.

LINGUISTIC FACTORS. All African adstrates and substrates (that were) spoken in these linguistic ecologies are exclusively tone languages, while the European superstrates are, without exception, languages that employ stress. Socioeconomic stratification meant that, save for a small African elite, the African majority had little to no exposure to the European colonial languages, acquired them nonnatively during adolescence or adulthood if at all, and employed these languages in functionally restricted, mostly formal domains. The combination of social and linguistic factors set the stage for structural influence from the natively acquired tone systems of the African languages on the emerging contact varieties.

With respect to linguistic factors, we draw on Van Coetsem's (2000) psycholinguistic metaphor of AGENTIVITY. The language that has agentivity is the language that provides features to the (emerging) contact variety or language. To account for the differing roles of input languages in contact-induced change, Van Coetsem makes the distinction between the RECIPIENT LANGUAGE (RL) and the SOURCE LANGUAGE (SL). In the case of RL agentivity, features from a weaker, nonnative SL are BORROWED into the speaker's dominant or native RL.

SL agentivity represents the opposite case. The speaker uses a nonnative, weaker RL, and features from her dominant or native SL are transferred to the RL by IMPOSITION (referred to as 'interference' in earlier work; see Weinreich 1953, Thomason & Kaufman 1988). SL agentivity therefore manifests itself as substrate (in cases of shift from the SL to the RL) or adstrate (in cases of maintenance of the SL and the RL) influence on the RL. The Afro-European contact scenarios treated here all constitute cases of SL agentivity.

Linguistic categories have different degrees of entrenchment in the minds of speakers and hence enjoy varying degrees of stability with respect to the likelihood of transfer (see Matras 2009:193–233 for an overview). The more stable the structural category is, the less likely it is to undergo transfer. Phonology is the most stable category of a natively acquired linguistic system (Van Coetsem 2000). Within phonology, prosody (defined as stress, intonation, and tone by Matras (2009:231–33)) has been noted as particularly stable. Under RL agentivity, prosody is therefore the least likely category to be borrowed from an SL into an RL. With SL agentivity, it is the opposite. Prosody, including tone, is the most likely category to be imposed on the RL. When an initially nonnative RL becomes nativized to some degree in a situation of SL agentivity, as has been the case in the scenarios investigated here, features that have been imposed from the SL can be conventionalized as the RL develops into a distinct contact variety (in the case of CAF and EGS) or language (in the case of Afro-European creoles). A final aspect of Van Coetsem's model is that SL and RL agentivity are not mutually exclusive. They can operate at the same time, as in areas characterized by long-term 'small-scale' (Lüpke 2016) or 'egalitarian' (François 2012) multilingualism. This makes allowance for the convergence and fusion outcomes between tone and stress systems that have also been documented (e.g. in the case of Papiamentu; see §4.1).

In the ecologies of the Central African Republic and Equatorial Guinea, demographic imbalances and social stratification, as well as SL agentivity in tone languages, therefore ushered in the speciation of CAF and EGS as Romance varieties with tone systems, distinct from their European siblings Standard European French and Standard European Spanish, which employ stress. A complete understanding of prosodic contact would require a detailed survey of outcomes under SL and RL agentivity. The focus of this study on SL agentivity in Afro-European contact scenarios is a first step in that direction, from which we can eventually arrive at conclusions about prosodic contact of a more general nature.

**2.2.** PROSODIC TYPES AND CONTACT CONSTELLATIONS. Two types of prosodic systems are distinguished with respect to the phonological use of pitch (Gussenhoven 2004): (i) tone systems and (ii) intonation-only systems.

TONE SYSTEMS. In tone systems, 'both pitch phonemes and segmental phonemes enter into the composition of at least some morphemes' (Welmers 1959:2). Pitch is therefore tone when it is part of the lexical realization of a morpheme. Tone manifests itself in 'the output of the lexical phonology' by being inherent to the morpheme, or by assignment through a rule (Hyman 2006:230).

There are substantial differences between languages in the types and numbers of tones they employ (see Gussenhoven 2004:26–28). Equally, in most, if not all, tone languages, the placement of tones and hence the number of possible tone patterns per word (i.e. word-tone patterns) is conditioned to some degree by metrical and segmental structure (for Africa, see e.g. Downing 2010). Sango, the major adstrate of CAF, for example, allows its three tones (high, mid, and low) to occur in many different combinations over a prosodic word, which gives rise to a large number of word-tone patterns (see §3.3). Other languages may allow only a single type of tone per prosodic word (e.g. a high tone) and fewer permutations of tones over a word than theoretically possible, which leads to a lower number of word-tone patterns. This is the case in many Bantu languages (Downing 2010:410–16), as well as in CAF and EGS, as will be shown (see §3.6 and §3.7).

INTONATION-ONLY SYSTEMS. Intonation-only systems make use of stress. A language with stress is

> one in which there is an indication of word-level metrical structure meeting the following two central criteria: (1) obligatoriness (i.e. every lexical word has at least one syllable marked for the highest degree of metrical prominence (primary stress)), and (2) culminativity (i.e. every lexical word has at most one syllable marked for the highest degree of metrical prominence). (Hyman 2006:231)

The acoustic correlates of stress are language-specific but usually involve a combination of the cues of length, loudness, vowel quality, and pitch variations over the stress-bearing syllable. Pitch contours of utterances in intonation-only systems are composed of intonational pitch accents anchored to stressed syllables, and boundary tones associated with the edges of phrases and boundaries. Contrary to tone, as defined above, the term INTONATIONAL PITCH ACCENT refers to anchors in the resulting intonational tunes. Intonational pitch accents are therefore also instantiated by pitch, but in contrast to tone, they are assigned above the morpheme level.

It is important to underline two aspects of this typology. First, pitch is used in intonation-only and tone systems for the purposes of intonation, that is, for marking phrase boundaries and expressing pragmatic functions (see e.g. Downing & Rialland 2016a). The difference between the two prosodic types is that intonation-only systems use pitch distinctively only in this way (hence 'intonation-only') and pitch is not part of the composition of any morpheme. Second, languages can combine intonation-only and tone features. Languages with tone can therefore also have stress and intonational pitch accents (Hyman 2006). In other words, tone languages can have all features that characterize intonation-only languages, but not vice versa.

PROSODIC CONTACT CONSTELLATIONS. Based on the two types of systems, intonation-only (IN) and tone (TO), the following four prosodic contact constellations and outcomes are possible in the situation of SL agentivity that this study is concerned with. The subscript typifies the sociolinguistic stratum that either of the two prosodic systems is associated with in the four constellations, hence superstrate (SUP), substrate (SUB), ad-

strate (ADS), and contact variety or language (CON). The plus sign designates contact between two strata, and the equals sign the outcome of such contact.

(i) $IN_{SUP} + TO_{SUB/ADS} = TO_{CON}$
(ii) $TO_{SUP} + IN_{SUB/ADS} = IN_{CON}$
(iii) $TO_{SUP} + TO_{SUB/ADS} = TO_{CON}$
(iv) $IN_{SUP} + IN_{SUB/ADS} = IN_{CON}$

We are exclusively concerned with constellation (i) ($IN_{SUP} + TO_{SUB/ADS} = TO_{CON}$). The inverse constellation (ii) ($TO_{SUP} + IN_{SUB/ADS} = IN_{CON}$) is outside the scope of this study because the outcome is an intonation-only contact variety in an ecology involving a tonal superstrate and SL agentivity in intonation-only substrates or adstrates. Constellation (ii) is attested, for example, in northern Norway (Jahr 1984, Bull 1995) and southern Finland (Bruce 2004), where the tonal superstrates Norwegian and Swedish have undergone extensive substratal and adstratal transfer from the intonation-only languages Sami and Finnish, and Finnish, respectively. The resulting contact varieties of Norwegian and Swedish feature intonation-only systems. Constellations (iii) and (iv) are not relevant either. For the present purpose, 'prosodic contact' only designates contact between intonation-only and tone systems. The outcomes of contact between different types of tone systems (constellation (iii)) or intonation-only systems (constellation (iv)) are therefore not addressed (for tone-tone contact, see e.g. Vydrine 2004 for Africa, Matisoff 2001 for Asia). Constellation (iv) is probable, for example, in the formation of the Portuguese-lexifier creole of Cape Verde. Lang (2009) argues that Wolof was one of the major substrates of Cape Verdean Creole. Wolof belongs to the Atlantic subfamily of the Atlantic-Congo family, one of the few of Sub-Saharan Africa to feature intonation-only systems (Downing 2010:381).

The four initial constellations above are, of course, dynamic in nature and susceptible to diachronic change, for example through areal contact and convergence (see §6). Changes in prevailing social and linguistic factors can lead to changes in agentivity, and consequently to shifts from tone to intonation-only systems in contact varieties and languages over time, even in ecologies that are initially dominated by tonal substrates or adstrates. This is very likely to have occurred in the Caribbean creoles (see §4.1).

**3.** PROSODIC SYSTEMS OF CENTRAL AFRICAN FRENCH AND EQUATORIAL GUINEAN SPANISH. We now present a case study of the prosodic systems of CAF and EGS. A description of the ecologies in which they emerged and are spoken (§3.1) is followed by an overview of the prosodic systems of their superstrates (§3.2) and adstrates (§3.3). A presentation of the research methods and the data (§3.4) precedes the phonetic (§3.5) and phonological analysis of CAF (§3.6) and EGS (§3.7). Finally, we provide a comparison of the prosodic systems of the contact varieties, their adstrates, and their superstrates (§3.8). The somewhat detailed analysis of CAF and EGS in this section prepares the ground for determining the place of their prosodic systems in the broader context of Afro-European contact and allows us to identify specific mechanisms in the emergence of contact prosodic systems (§4).

**3.1.** ECOLOGIES. We proposed in §2.1 that both social and linguistic factors determine the outcomes of prosodic contact. The case studies therefore begin with an overview of the complex linguistic ecologies of the Central African Republic and Equatorial Guinea, focusing on adstrates and superstrates and their relation to each other (see n. 1 for a definition of 'linguistic ecology').

ADSTRATES. Both ecologies are highly multilingual. Seventy-two languages are estimated to be spoken in the Central African Republic (CAR), and most of these belong to

the Ubangian subbranch of the Atlantic-Congo family (Hammarström, Forkel, & Haspelmath 2017). At least fourteen languages are spoken by the peoples of Equatorial Guinea besides Spanish (Hammarström et al. 2017). Two of these are European-lexifier creoles: the Portuguese-lexifier creole Fa d'Ambô (Zamora 2010, Post 2013) and Pichi, an Afro-Caribbean English-lexifier Creole (Yakpo 2010, 2019a). All other languages belong to the Bantu subfamily of Atlantic-Congo, among which Fang and Bube have the largest speaker numbers. Moreover, both ecologies feature lingua francas: Sango in the CAR and Pichi in Equatorial Guinea. These two languages function as the principal adstrates to the varieties of CAF and EGS described in this study, namely those spoken in Bangui and Malabo, the capitals of the CAR and Equatorial Guinea, respectively.

Sango is an African-lexifier creole that emerged as a trade language in the area around the Ubangui River toward the end of the nineteenth century (Pasch 1993, Samarin 2000). The bulk of its lexicon is derived from the Ubangian language Ngbandi. The sources of the grammar are more eclectic, with Ubangian languages like Ngbandi, Gbanziri, and Banda among the inputs (Samarin 2013). Today, Sango is spoken by the vast majority of Central Africans, and it has become the principal language of the capital Bangui where it tends to be the first language acquired by children (Thornell 1997). Moreover, Sango is co-official with French and is used in formal contexts, such as in courts and religious ceremonies. Although Sango is presently the dominant adstrate of CAF in Bangui, it was still consolidating itself as the primary lingua franca of the CAR in the late nineteenth and early twentieth centuries (Samarin 2013:13–14). Allowance should therefore also be made for the transfer to early CAF of tonal features from other languages of the CAR, and particularly Ngbandi, the lexifier of Sango (e.g. in the case of idiosyncratization; see §4.3).

Pichi is an offshoot of Krio, a language of the family of Afro-Caribbean English-lexifier Creoles brought to Bioko (the insular part of Equatorial Guinea) in the early nineteenth century by African settlers from Sierra Leone (Martín del Molino 1993). Pichi is also the principal adstrate to Bube, a continuum of Bantu varieties spoken by the autochthonous population of Bioko. In the course of language shift, Pichi has become the main home language and lingua franca of the Bube ethnic majority in the capital Malabo (Bolekia Boleká 2007, Morgades Besari 2011). It also functions as an urban lingua franca and a youth sociolect for people of all ethnicities and nationalities in Malabo (Yakpo 2016). EGS has undergone influence from other adstrates besides Pichi, in particular from Bube (see Yakpo 2013:287–90 for Bube influence on the segmental phonology of Pichi).

Superstrates. French and Spanish were introduced into the ecologies by European colonizers. The area that today constitutes the CAR was colonized by France at the end of the nineteenth century, while Equatorial Guinea was subjected to Spanish colonial rule from the middle of the nineteenth century. Little is known about the exact nature of the linguistic input by colonial administrators, soldiers, educators, missionaries, and settlers, who disseminated French and Spanish in the early colonial period. It is, however, certain that CAF and EGS began crystalizing at the end of the nineteenth century from varieties of French and Spanish spoken in Europe. We also know with sufficient certainty that only a minute proportion of Central Africans and Equatoguineans used French or Spanish as a vernacular language in their daily affairs during the colonial period (Diki-Kidiri & Caprile 1982, Castillo-Rodríguez 2013).

All adstrates of the two ecologies are tone languages, and the speakers of these adstrates at all times vastly outnumber(ed) any past or present population with a command of the European superstrate varieties of French or Spanish. The CAR and Equatorial

Guinea therefore provide a typical setting for SL agentivity, in which the imposition of tone from the adstrates on idiolects and on an emergent contact variety is plausible from the very beginning of the implantation of the two colonial languages.

Social status, acquisition, and practices. French and Spanish have remained the de facto and de jure official languages of the CAR and Equatorial Guinea from colonial times until today. The social functions of French and Spanish are therefore very similar in the two ecologies. French and Spanish are the languages of public administration, and school instruction is mainly dispensed in the colonial languages. In both the CAR and Equatorial Guinea, proficiency in French and Spanish indexes prestige and social status, although they are spoken by a far smaller section of the population than the autochthonous languages of these two countries. Today, they are mainly transmitted by people who themselves acquired them in the local ecologies. The linguistic models of those who learn French or Spanish, often the idiolects of teachers, are thus no longer the European superstrate varieties of before, but the local contact varieties. Further, speakers of the two contact varieties deploy them as part of multilingual repertoires characterized by extensive code-switching between Sango and CAF in the CAR, and EGS and Pichi in Equatorial Guinea (for the latter language pair, see Yakpo 2018).

The prosodic characteristics described in the following have nevertheless coalesced into a rather coherent norm for the majority of speakers. These characteristics are subject to little variation and are one of the most consistent indicators of the 'nativization' (Schneider 2003) of CAF and EGS and the evolution of an endocentric standard. In CAF, for instance, there is far more intra- and interspeaker variation in segmental phonology (Bordal 2012a) and grammar (Bordal Steien, Boutin, & Beyom 2016) as an effect of its acquisition as an additional language for the vast majority of Central Africans than there is in prosody.

**3.2.** Superstrate prosodic systems. This section gives a brief overview of the prosodic systems of Standard European French (SEF) and Standard European Spanish (SES), the historical superstrates of CAF and EGS. We employ the metrical-autosegmental model (Pierrehumbert 1980), which has been used for phonological descriptions of SEF, SES, and other intonation-only languages (see Ladd 2008) and therefore facilitates comparison. The description is synchronic. As mentioned in §3, not much is known about the exact nature of the prosodic systems from which CAF and EGS developed. We therefore extrapolate from the prosodic systems of SEF and SES as they are described by contemporary phonological models.

Standard european french. SEF is one of the best-described languages in the world. There is therefore a corresponding level of factionalism with respect to the analysis of the entire spectrum of SEF prosodic features. Because most of the fine theoretical details of these analyses do not matter for the key aspects covered in this study, we do not delve into them here. Instead, the focus is placed on aspects of the system that are relevant for the comparison with CAF.

SEF has phrasal stress that primarily occurs on the last syllable of the accentual phrase, a prosodic constituent that can consist of one or more content words and dependent function words, for example, *des gentilles **filles*** 'nice girls' (Avanzi, Bordal, & Nimbona 2014). The accentual phrase also has an optional secondary stress on one of its first syllables whose realization depends on factors like speech rate, syntactic constituency, emphasis and focus marking, style, and idiolectal particularities, for example, *des **gen**tilles **filles***. In addition to pitch variations, the main acoustic correlate of stress in SEF is vowel length.

The final stressed syllable of accentual phrases is in most cases aligned with a high intonational pitch accent, notated as H*. If the accentual phrase has secondary stress, the initial stressed syllable is also associated with a high intonational pitch accent, notated Hi (Jun & Fougeron 2000, 2002, Delais-Roussarie et al. 2015). Moreover, SEF has two optional low intonational pitch accents, notated as aL and L (Delais-Roussarie et al. 2015). The first target, aL, can occur at the beginning of an accentual phrase, and the second, L, somewhere between Hi and H*. The default and most common pitch contour of the SEF accentual phrase is thus a rising-falling-rising pattern, which can be represented by the template /(aL)(Hi)(L)H*/, in which optional targets are in parentheses (cf. Jun & Fougeron 2002, Delais-Roussarie et al. 2015). Depending on various factors, the accentual phrase is realized with different pitch contours, such as [aLH*], [aLHiH*], [aLHiL*], and so forth. Further, SEF makes use of boundary tones over the final syllable(s) of prosodic constituents larger than the accentual phrase, such as utterance-final H% and L%. Different intonational contours are constituted by the interplay of utterance-internal intonational pitch accents and boundary tones. These contours serve pragmatic functions and differentiate declaratives from yes/no questions, for instance (Delais-Roussarie et al. 2015).

STANDARD EUROPEAN SPANISH. While SEF features phrasal stress, SES makes use of word stress. Stress occurs on one of the three last syllables of the prosodic word. Stress placement is largely conditioned by phonotactics and membership in word classes (e.g. nouns vs. verbs) and by syntactic categories (content vs. function words). The position of stress is therefore both phonologically derived and morphologically determined (Roca 2005). About 80% of SES content words bear penultimate stress, and about 18% have stress on the final syllable. Altogether, 95% of nouns and adjectives carry stress on the final vowel of the base, for example *africa**n**-o*, *universida**d*** (Quilis 1978, Hualde 2012). The stressed syllable of utterance-internal words can be aligned with different kinds of intonational pitch accents depending on the realized speech act, focus conditions, and so forth. Stress is realized by a culmination of acoustic cues, mainly length and loudness, in addition to pitch variations.

The most common intonational pitch accent of utterance-internal prosodic words is rising pitch, referred to as /L+H*/ or /L+<H*/ (Hualde & Prieto 2015). The '<' of the latter template indicates that the pitch peak is delayed, hence realized after the stressed syllable. Such a contour occurs in prenuclear position of broad-focus declarative utterances, while a pitch peak on the stressed syllable itself conveys contrastive focus or emphasis (for examples of other intonational pitch accents and their pragmatic meanings, see Hualde & Prieto 2015). SES also makes use of boundary tones over the final syllable(s) of prosodic constituents larger than the prosodic word, such as utterance-final H% and L%. As in SEF, utterance-internal intonational pitch accents and boundary tones constitute intonational contours that mark different question and statement types (Hualde & Prieto 2015).

PROSODIC TYPOLOGY. The intonational pitch accents in SEF and SES are different from word-level tones, since they are not a part of the composition of morphemes (see §2.2). They instead constitute the building blocks of intonational contours that express pragmatic functions (e.g. emphasis, counter-expectation, yes/no questions) as a whole. This is why SEF and SES are classified as intonation-only languages (for SEF, see Gussenhoven 2004:253).

**3.3.** ADSTRATE PROSODIC SYSTEMS. In the cities of Bangui and Malabo, where we collected our data, Sango and Pichi dominate in everyday conversations, and thus function

as the principal adstrates of CAF and EGS (see §3.1). Sango, Pichi, and the other tone languages of the CAR, Equatorial Guinea, and the wider region all share broad genetic and areal similarities in the number and kinds of tones, types of tonal processes, and the functions of tone (cf. Hyman et al. 2015). Many of the tonal features described in §3.6 and §3.7 below are therefore sufficiently general to be found within the specific linguistic ecologies and beyond in the 'Macro-Sudan' linguistic area (Güldemann 2008).

Sango (CAR). Sango has three phonological level tones: low (L), mid (M), and high (H) (Pasch 1993, Walker & Samarin 1997, Samarin 2000). Words have a maximal tonal density. Every syllable is thus associated with at least one tone (Gussenhoven 2004). There are also numerous tonal minimal pairs in Sango, for example, *sárá* /HH/ 'to itch', *sārā* /MM/ 'scabies', and *sàrà* /LL/ 'a (type of) fish', and the use of grammatical tone is attested in the formation of deverbal nouns (Pasch 1997:223). Sango has many different word-tone patterns, as shown by the following trisyllabic content words: *sándégà* /HHL/ 'ritual meal', *bágàrà* /HLL/ 'beef', *lìkùndá* /LLH/ 'witchcraft', and *kōtàrā* /MLM/ 'ancestor'. Word-level tonal processes are few, and word-tone patterns tend to be realized according to their phonological specification. Pragmatic functions are expressed through boundary tones associated with the final syllable of an utterance; there are no utterance-internal intonational pitch accents. L%, for example, marks utterances as declarative, while H% marks yes/no questions (Diki-Kidiri 1977). Another characteristic of Sango prosody is the absence of utterance-level downstep (Walker & Samarin 1997), a phonological process common to many other African tone languages (Downing & Rialland 2016b), which lowers the pitch of an H tone relative to a preceding H.[3]

Pichi (equatorial guinea). Pichi has two phonological tones, a level H and a level L tone. The language features numerous monosyllabic tonal minimal pairs, for example, *dé* /H/ 'locative-existential copula' vs. *dè* /L/ 'imperfective marker', and *wét* /H/ 'wait' vs. *wèt* /L/ 'with'. It also shows the maximal number of possible tone patterns over bisyllabic words of the same syntactic category, for example, *fíbà* /HL/ 'fever', *wàtá* /LH/ 'water', *nyɔ́ní* /HH/ 'ant', and *jɔ̀mbà* /LL/ 'lover'. Grammatical tone is used for the inflection of personal pronouns for case and in compounding (see §4.2 for more on Pichi pronouns). Tone patterns over words are unevenly distributed. Most English-derived words, which constitute the majority of lexemes, bear at least and not more than one H, and the position of the H tone largely coincides with primary stress placement in the cognate forms of English.[4] Polysyllabic lexemes with more than one H or no H at all are fewer and are generally found in words with an African etymology, as in *nyɔ́ní* /HH/ 'ant' above, derived from Mende 'red ant' (Fyle & Jones 1980:403).

Pichi also has a number of tonal processes, including rightward H-tone spreading, tone sandhi and deletion, and a tone-conditioned suppletive allomorphy. As in Sango, intonational boundary tones expressing pragmatic functions like clausal focus and emphasis or yes/no questions exclusively occur over the utterance-final syllable. By contrast with Sango, Pichi features utterance-level downstep, which means that every H tone is lower than a preceding one within the same utterance. For a detailed discussion of the phenomena mentioned above, including acoustic evidence, see Yakpo 2012, 2019a:37–70, 2019b.

[3] Following Yip (2002:xix), downstep is used here as a cover term for downdrift and downstep, two downtrends proper to tone languages.

[4] There are exceptions, such as the word *wàtá* 'water'. The diachronic and phonological background of 'tone shift' in a group of words that includes *wàtá* is extensively treated by Devonish (2001).

PROSODIC TYPOLOGY. In Sango and Pichi, tones are exponents of morphemes (see Hyman 2018). There are no intonational pitch accents, and pragmatic functions are exclusively expressed by boundary tones. The prosodies of Sango and Pichi therefore show typical characteristics of tone systems (see §2.2).

**3.4.** DATA AND METHODS. We now provide some information on data collection and the nature of our corpora for the case studies of the prosodic systems of CAF and EGS in §§3.5–3.7. Before proceeding, we briefly comment on the rationale behind comparing two contact settings, instead of limiting our study to just one, and why we thought it necessary to provide a fairly detailed acoustic analysis of the two systems, instead of purely phonological descriptions.

A comparative approach was chosen in order to strengthen the potential for generalization that it offers and its capacity to inform the theoretical framing of our case studies in §4. In spite of broad typological similarities, the overviews in §3.2 and §3.3 show quite a few differences between the intonation-only systems of the superstrates SEF and SES, and between the tone systems of the adstrates Sango and Pichi. Equally, CAF and EGS are spoken in two geographically distinct, noncontiguous places that have not had contact with each other. At the same time, the CAR and Equatorial Guinea feature very similar ecologies with respect to linguistic demography and sociolinguistic dominance relations. The presence of independent variables (different superstrate and adstrate prosodic systems in different locations) and a controlled variable (near-identical ecologies) allows for a good measure of control in our assessment of the resulting contact prosodic systems in §3.8. Comparing two contact settings also reduces the chance that our observations are linked to idiosyncratic characteristics of a particular ecology.

We opted for an acoustic analysis of pitch in CAF and EGS prior to phonological analysis in order to validate our field observations. Since much of what follows on the prosody of CAF and EGS has not been described in detail before and this is the first comparative study between the two varieties, a second purpose of the acoustic analysis is language documentation. Empirical evidence is also necessary in order to speak to some of the controversies around the outcomes of prosodic contact (see §1 and §5).

DATA COLLECTION. The CAF data was collected in Bangui (CAR) in 2008 by Guri Bordal Steien, and the EGS data was gathered in Malabo (Equatorial Guinea) between 2003 and 2007 by Kofi Yakpo. The corpus consists entirely of naturalistic speech recorded during spontaneous conversations and covers aspects of everyday life including family affairs and relationships, livelihoods and politics, events and occurrences, and personal narratives. Descriptions of the prosodic systems of SEF (Jun & Fougeron 2000, 2002) and SES (Hualde & Prieto 2015:360) are mostly based on laboratory data, rather than on naturally occurring discourse. A word is therefore in order regarding our decision to use naturalistic data from spontaneous speech rather than controlled laboratory data. First, our approach was inductive. Both of us went into the field with few assumptions about the nature of the phonological systems of these two languages. While Steien's research was focused on the phonological system of CAF from the outset (see Bordal 2012a,b, 2013, 2015), Yakpo's EGS corpus was collected as a by-product of his fieldwork on Pichi (Yakpo 2009, 2019a). His interest arose ex post through the peculiar prosodic nature of the EGS recordings.

Second, we both realized independently from each other that the formality of the setting in which a recording took place could have an impact on the type of data generated. The use of a European colonial language is rarely neutral, since it is more often than not

indexical of status differences and therefore typical for interactions higher on the formality cline (see §3). Interactions reminiscent of formal and institutional settings therefore sometimes resulted in less fluent speech or speech (perceived as) closer to the standard varieties of European French and Spanish. These observations prompted us to prioritize ecological validity, that is, to restrict recordings to interactions conducted in informal settings and to exclude laboratory-like conditions. A list of speakers that includes basic sociolinguistic characteristics can be found in the appendix.

Corpus. For the current study, we put together a corpus of fifty utterances per contact variety, hence a hundred in total, for a detailed investigation of pitch variations and a systematic comparison between CAF and EGS. We prepared the corpus for analysis in the following way: (i) all recorded conversations, which varied in length between twenty and forty minutes, were transcribed orthographically in Praat (Boersma & Weenink 2018); (ii) the Praat plugin EasyAlign (Goldman 2011), which has a script for both French and Spanish, converted the orthographic transcriptions into SAMPA characters in a separate Praat tier and generated tiers with segmentations into words and syllables aligned with Praat spectrograms; (iii) the automatic transcriptions, segmentations, and alignments were manually corrected; (iv) fifty utterances per variety were selected for further investigation. The selection was done according to two criteria. First, we identified syntactically coherent utterances by taking specificities of oral syntax into account. Second, we excluded utterances with poor F0 detection in the spectrograms. We also aimed at an equal number of utterances per corpus. An overview of the corpora is given in Table 1.

| VARIETY | SPKRS | UTTS | AVG UTTS PER SPKR | AVG WORDS (*SD*) | AVG WORDS PER UTT (*SD*) | AVG SYLLS (*SD*) | AVG SYLLS PER UTT (*SD*) |
|---|---|---|---|---|---|---|---|
| CAF | 10 | 50 | 5 (min: 5, max: 5) | 61.00 (11.98) | 12.20 (2.40) | 86.30 (17.83) | 17.26 (3.57) |
| EGS | 8 | 50 | 6.25 (min: 1, max: 12) | 54.75 (29.87) | 11.50 (4.98) | 95.50 (60.30) | 18.48 (6.73) |
| TOTAL | *18* | *100* | | *58.22 (21.30)* | | *90.39 (41.08)* | |

Table 1. Overview of CAF and EGS corpora.

Table 1 shows the average number of utterances and the maximum and minimum values per speaker per corpus. The standard deviation (*SD*) of words per utterance and of syllables per utterance is also provided. As the table shows, we were able to balance the number of utterances per speaker in the CAF subcorpus and to retain five utterances per speaker (5 × 10 speakers = 50 utterances). The quality of the EGS data was more variable, and we ended up with an unequal number of utterances produced by eight different speakers.

Analysis. In order to capture pitch variations in the corpus, we conducted an analysis of pitch in three steps. First, each author manually annotated pitch variations based on audio-visual analyses of their data in Praat. Each syllable was given a label based on its relative pitch height and the shape of its contour. Syllables with static pitch were annotated H (high) or L (low), while syllables with pitch movements received the composite labels LH (rising pitch) or HL (falling pitch). The label of each syllable was determined locally with reference to the pitch height and the shape of the contour of the preceding and following syllable within the same intrapausal sequence (see Ladd 2008:189–210 for discussion). Second, we verified each other's corpora through joint listening and correction, and agreed upon a reference annotation. Third, we checked our

manual annotation against measurements of pitch variations extracted with Praat. Some of these measures are presented in §3.5.

The phonetic annotation provided the basis for subsequent qualitative phonological analyses of the tone patterns of words and types of contours (e.g. transitions between targets, utterance-final contours, and downstep). During phonological annotation on a separate tier in Praat, syllables were labeled according to their phonological tone (see Figs. 2 and 3 below for examples). This procedure, presented in §3.6 and §3.7, enabled us to obtain a broader understanding of the functions of pitch in CAF and EGS.

LIMITS OF THE STUDY. Given the relatively small sample, we do not claim to have captured all prosodic phenomena characterizing the two varieties. There might also be interspeaker variation that we have not been able to describe. Furthermore, not all kinds of speech acts are represented in the corpus, which imposes limits on the discussion of the pragmatic functions of prosody. Further, we studied only pitch variations and left out other acoustic parameters related to prosody (e.g. intensity and length). This choice is due to the nature of the data (recorded outdoors in sometimes noisy public places), which made measures of other cues less reliable. Nevertheless, the phenomena discussed in §§3.5–3.7 are sufficiently generalized across all speakers in the two corpora despite differences in their sociolinguistic profiles (age, gender, formal education; see appendix). Given the naturalistic setting, the data reflects in a relatively faithful fashion the 'normal way of speaking' CAF and EGS as observed during field research.

**3.5.** PITCH VARIATIONS. In order to verify the accuracy of the pitch annotations described in §3.4, we conducted measurements of the pitch variations over individual syllables of all words in the corpus and generated a statistical summary. The results show that the phonetic annotation of pitch variations is consistent. For illustration, we focus on pitch variations in utterance-internal disyllabic content words. This allows us to compare syllables annotated H and L within the same domain and in a syntactic position that does not attract boundary tones (in contrast to utterance-final words).

Disyllabic EGS words can have the patterns LH or HL (see Table 3 below), but for the illustration of pitch variations presented here, only EGS words with an LH pattern were selected. This was done in order to ensure maximal comparability, because unlike EGS, this is the only possible pattern for disyllabic words in CAF. The corpus contains 100 such words, sixty of them in the CAF subcorpus and forty in the EGS subcorpus. A statistical summary of pitch differences between syllables with H and L tones in utterance-internal disyllabic words in the entire corpus is presented in the box-and-whiskers diagram in Figure 1.

The box-and-whiskers diagram in Fig. 1 allows the following observations on pitch variation in utterance-internal disyllabic words:[5] there is a pitch difference between syllables annotated L and H of two to about four semitones in the middle fifty percent of all words. Further, the pitch difference in the overwhelming majority of words is at least one semitone and less than six semitones. Languages differ with respect to the relative height at which a tone annotated for the same value is produced (see Hao 2012:276), and differences in the range of semitones between L and H syllables in CAF vs. EGS should therefore not be unusual. Table 2 presents a random selection of some of the

[5] The box-and-whiskers diagram should be read as follows: the boxes represent the middle 50%. The line in each box is the median. The whiskers represent the spread of all the observations (except for outliers). The top line of each whisker indicates the highest pitch difference, while the bottom line represents the lowest pitch difference. The three dots on the top of the diagram are defined as outliers by the algorithm in the statistical software (see R Core Team 2018).

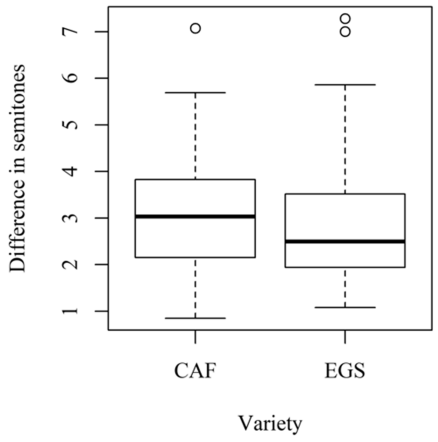


FIGURE 1. Box-and-whiskers diagram of pitch differences between syllables annotated L and H in utterance-internal disyllabic content words with the pattern LH (sixty CAF and forty EGS words).

words measured, together with the corresponding pitch values. This illustrates the pitch differences found in individual words.

| VARIETY | SPEAKER # (AGE/GEND) | WORD | TONE PATTERN | L TONE (ST) | H TONE (ST) | DIFFERENCE (ST) |
|---|---|---|---|---|---|---|
| CAF | SP7 (44/F) | *cité* 'city' | LH | 10.94 | 15.06 | 4.12 |
| | SP8 (28/F) | *année* 'year' | LH | 10.96 | 13.45 | 2.49 |
| | SP2 (28/M) | *savoir* 'know' | LH | –2.91 | 0.55 | 3.46 |
| EGS | SP17 (54/M) | *después* 'after' | LH | –0.56 | 3.28 | 3.84 |
| | SP18 (58/F) | *comer* 'eat' | LH | 16.12 | 17.64 | 1.52 |
| | SP14 (83/F) | *murió* 's/he died' | LH | 4.75 | 7.55 | 2.80 |

TABLE 2. Examples of pitch variation in utterance-internal disyllabic content words given in semitones (ST) above 100 Hertz.

Table 2 also shows that the variation found in Fig. 1 reflects variation between speakers. Interspeaker variation between L and H is to be expected and can, for instance, be attributed to differences in the size of the vocal tract, speech idiosyncrasies, body size, or a habit of smoking (see Koffi 2018a:17). In spite of the expected intervariety and interspeaker variation in pitch height and range, the measurements reproduced in Fig. 1 and Table 2 show that the pitch of syllables annotated H is consistently higher than that of syllables annotated L. In §3.6 and §3.7, we show how these L and H tones constitute fixed word-tone patterns in CAF and EGS and, in this way, form part of the morphemes they occur with.

**3.6.** CENTRAL AFRICAN FRENCH. The first study of CAF prosody was Bordal 2012b, which, based on a corpus of two hours of spontaneous speech and detailed acoustic analyses following established methodologies (e.g. Mertens 2004), analyzed CAF as a tone language. The main arguments for this conclusion are that tones are invariant and attributed at the word level, and that the tones of monosyllabic function words are lexically specified and therefore arbitrary. The current analysis complements the work of Bordal 2012b, with the aim of comparing CAF with EGS.

TONES AND WORD-TONE PATTERNS. CAF has two level tones, L and H. Tones are attributed to the prosodic word, hence inclusive of affixes (e.g. *rapide-ment* /LLLH/ 'quick-ly'). The distribution of tones can be described with respect to (i) syntactic cate-

gory (content vs. function words) and (ii) the number of syllables (mono- vs. polysyllables). Table 3 presents the three word-tone patterns of CAF grouped by syntactic category and number of syllables. Identical tone patterns have the same number across the two categories.

| SYNTACTIC CATEGORIES | TONE PATTERNS | | | EXAMPLES |
|---|---|---|---|---|
| CONTENT WORDS | 1 | /(L)H/ | monosyllables | *père* /H/ 'father', *peux* /H/ '(I) can' |
| | | | polysyllables | *sentir* /LH/ 'feel' |
| | | | | *phénomène* /LLH/ 'phenomenon' |
| | | | | *instituteur* /LLLH/ 'teacher' |
| FUNCTION WORDS | 2 | /L/ | monosyllables | *je* /L/ '1SG.SBJ', *le* /L/ 'DEF.SG.M' |
| | 3 | /H/ | monosyllables | *tu* /H/ '2SG.SBJ', *mon* /H/ '1SG.POSS.M' |
| | 1 | /(L)H/ | polysyllables | *devant* /LH/ 'in front of', *après* /LH/ 'after' |

TABLE 3. Word-tone patterns in CAF.

CONTENT WORDS. Table 3 shows that CAF content words bear at least one and at most one H tone. H tones exclusively occur on the last syllable of a word or on the only syllable of a monosyllable. This means that (i) there is no H tone on any syllable but the last; (ii) there is no evidence that an H tone can be deleted; (iii) the positions of H and L tones are fixed and do not change in different pragmatic modes; and (iv) there is no evidence that word-tone patterns are affected by tonal processes, such as tone spreading (in contrast to EGS; see §3.7 below).

Syllables without H tones, we argue, are associated with L tones rather than being toneless. CAF utterances give an undulating and pulsating auditory impression that stands in stark contrast to the gradual pitch transitions of SEF intonational tunes. This is caused by abrupt transitions between adjacent H and L tones. If all or some of the syllables between two H tones were toneless rather than L-toned, we would expect INTERPOLATION, a gradual fall after an H over the span of several syllables before the next H (Gussenhoven 2004:128–29).[6] In sum, CAF content words systematically feature the pattern /(L)H/.[7] There is but one exception to this pattern in the corpus. The language name *Sango* is realized with a flat tonal contour. This realization mirrors the tone pattern of the word in Sango, which features M(id) tones on both syllables, that is, [sāngō].

MONOSYLLABIC FUNCTION WORDS. The tone of monosyllabic function words is arbitrarily specified for either H or L tone. This group of words provides further evidence for the lexical specification of tone in CAF. A list of monosyllabic function words found in the corpus and their tonal specifications is provided in Table 4 (see §4.3 for a detailed discussion of CAF personal pronouns).

MINIMAL PAIRS. CAF has some minimal pairs in the category of function words, that is, segmental homophones that are systematically realized with different tones. The minimal pairs found in the corpus are listed in Table 5 (also see Bordal 2012b).

[6] Gradual transitions between high tones over the span of several syllables, hence interpolation, is, however, found in the variety of French spoken in Burundi (Nimbona 2014). Interpolation has been transferred to Burundi French from its adstrate Kirundi, which has a privative tone system (H vs. Ø) with only one lexically specified H tone per word. We see this as additional evidence that there are no toneless syllables in CAF and EGS. On the same grounds, Gussenhoven (2006:210) argues against the lexical specification of L in Nubi, because slopes GRADUALLY DECLINE after an H, and the shape of slopes therefore depends on the distance between two H tones.

[7] The parentheses indicate the absence of left-adjacent L tones over monosyllables.

| | TYPE | WORDS |
|---|---|---|
| H TONE | Singular indefinite determiners | *un* 'INDF.SG.M', *une* 'INDF.SG.F' |
| | Demonstratives | *ce*/*cette*/*ces* 'this/that/these/those' (ADJ) |
| | | *celle*/*ceux* 'this/that/these/those' (PRON) |
| | Some subject pronouns | *tu* '2SG.SBJ', *on* '3SG.SBJ/1PL.SBJ' |
| | | *nous* '1PL.SBJ', *vous* '2PL.SBJ' |
| | | *ils* '3PL.SBJ.M', *elles* '3PL.SBJ.F' |
| | Some adnominal possessives | *mon* '1SG.POSS.M', *ton* '2SG.POSS.M', *son* '3SG.POSS.M' |
| | | *notre* '1PL.POSS', *votre* '2PL.POSS' |
| | Some prepositions | *pour* 'for', *dans* 'in', *par* 'by', *en* 'at' |
| L TONE | Plural indefinite determiner | *des* 'INDF.PL' |
| | Definite determiners | *le* 'DEF.SG.M', *la* 'DEF.SG.F', *les* 'DEF.PL' |
| | Some subject pronouns | *je* '1SG.SBJ', *il* '3SG.SBJ.M', *elle* '3SG.SBJ.F', *ce* '3SG.SBJ' |
| | All object pronouns | *me* '1SG.OBJ', *te* '2SG.OBJ' |
| | | *le* '3SG.ACC.M', *la* '3SG.ACC.F', *les* '3PL.ACC' |
| | | *se* '3SG/PL.OBJ.REFL' |
| | | *nous* '1PL.OBJ', *vous* '2PL.OBJ' |
| | | *lui* '3SG.DAT', *leur* '3PL.DAT' |
| | Some prepositions | *à* 'at', *de* 'of' |

TABLE 4. Tone in CAF monosyllabic function words found in the corpus.

| WORD | TONE | GLOSS | WORD | TONE | GLOSS |
|---|---|---|---|---|---|
| ce | H | 'this/that' (ADJ) | ce | L | 'it/that' (PRON) |
| nous | H | '1PL.SBJ' | nous | L | '1PL.OBJ' |
| vous | H | '2PL.SBJ' | vous | L | '2PL.OBJ' |
| ils | H | '3PL.SBJ.M' | il | L | '3SG.SBJ.M' |
| elles | H | '3PL.SBJ.F' | elle | L | '3SG.SBJ.F' |

TABLE 5. Tonal minimal pairs in the CAF corpus.

POLYSYLLABIC FUNCTION WORDS. Polysyllabic function words behave the same way as polysyllabic content words. They have L tones on the first syllable(s) and an H tone on the last syllable, and hence feature an /(L)H/ pattern.

PROSODY BEYOND THE WORD LEVEL. CAF has boundary tones that mark the right edge of utterances. Unlike the word-level tone patterns covered above, boundary tones instantiate the pragmatic functions of intonation and are therefore assigned to utterance and phrase boundaries. CAF has a least two boundary tones, L% and H%, which express declarative and continuative intonation, respectively. When an utterance is marked by an L% tone, the pitch of the utterance-final syllable starts at a higher point than that of the preceding L-toned syllable and then falls. This indicates that the H tone of the final syllable is not deleted by the L% boundary tone. Both tones are therefore realized together as an HL% contour over the same utterance-final syllable. When an utterance is marked by an H% boundary tone, the pitch of the utterance-final syllable culminates on a higher level than a preceding H tone within the same utterance. No evidence was found for utterance-level downstep in CAF.

ILLUSTRATION. The tonal system of CAF can be illustrated by an example consisting of the two utterances displayed in Figure 2. The figure presents the spectrogram and pitch contour of *Je suis née à Mobaye. Mon père fut un instituteur* 'I was born in Mobaye. My father was a school teacher' (SP7).[8]

[8] In the pictures we use to illustrate our analysis, the first tier under the spectrogram represents our phonological annotation of tones. The second tier shows the segmentation into syllables and the SAMPA phonemic transcription. The last tier contains the segmentation into orthographically transcribed words. The pictures

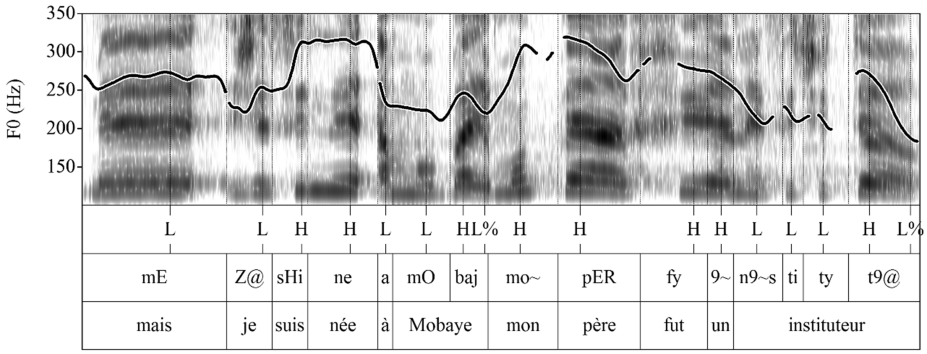


FIGURE 2. Pitch contour of two CAF utterances.

The monosyllabic content words in Fig. 2 (*suis* 'am (= was)', *née* 'born', *fut* 'was', *père* 'father') invariably bear an H tone. The rightmost syllables of the polysyllabic content words *Mobaye* [mò.báj] (a place name) and *instituteur* 'school teacher' also bear an H tone. Further, the pitch contour falls sharply toward the first L-toned syllable of *instituteur* from the preceding H tone over *un* 'INDF'. Rises from L to H are equally steep, as shown by the transition between the penultimate and the final syllables of *instituteur*. The syllables without H tones thus bear L tones. Figure 2 also shows two utterance-final declarative L% boundary tones, which mark the end of each utterance. They occur on the last syllables of *Mobaye* [báj] and *instituteur* [tœ̀] and induce sudden drops over the final syllables of each of these words.

**3.7.** EQUATORIAL GUINEAN SPANISH. The first indication that the prosodic system of EGS may be tonal was provided by Yakpo 2009. The pitch contours of utterances involving code-switched EGS words in mixed Pichi-EGS discourse led Yakpo to conclude that in EGS, 'Spanish primary stress [gets] reinterpreted as a high tone' (2009: 13). Lipski's later analysis of a number of EGS utterances, although framed in the methodology and terminology proper to the study of intonation-only systems, prompted him to conclude that EGS words carry a single 'pitch accent' on the syllables that bear stress in SES (Lipski 2015:247). In other words, EGS speakers place the highest pitch ON the stressed syllable and not on the syllable AFTER the stressed one, as is usually the case in SES declaratives (see §3.2).

Lipski further shows via pitch measurements and a statistical summary that EGS words 'approach tonal invariance'. We interpret this to mean that EGS word-tone patterns are fixed. Lipski's study does not provide an acoustic or phonological analysis of the pitch patterns of individual EGS words or an overview of the distribution of word-tone patterns. Nor does it mention the presence of tonal minimal pairs nor analyze tonal processes and the functions of boundary tones. Lipski also concludes (mistakenly, as we show in due course) that EGS words occur in 'citation forms' in connected speech (in our understanding, this implies that all utterance-medial words feature a declarative L%) and that there is no H-tone spreading in EGS (Lipski 2015:248). In contrast to the two sources cited above, this section therefore contains the first fuller account of the main features of the prosodic system of EGS.

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were generated by the Praat script create_pictures v.4.5 developed by the Laboratory of Phonetics at the University of Barcelona (http://stel.ub.edu/labfon/en/praat-scripts). The sound files for the spectograms in Figs. 2 and 3 can be accessed online at http://muse.jhu.edu/resolve/91.

TONES AND WORD-TONE PATTERNS. Like CAF, the tonal system of EGS is characterized by the presence of two level tones, H and L. Equally, tone patterns apply to the prosodic word inclusive of affixes (e.g. *matricul-amos* /LLLHL/ 'matriculate-1PL.PRS'). Four possible tone patterns were identified for content and function words, and these are provided in Table 6. The word-tone patterns of EGS words are again listed separately for the two syntactic categories, but identical patterns bear the same number, irrespective of the category.

| SYNTACTIC CATEGORIES | TONE PATTERNS | | EXAMPLES |
|---|---|---|---|
| CONTENT WORDS | 1 | /(L)H/ | *pan* /H/ 'bread' |
| | | | *edad* /LH/ 'age' |
| | | | *educación* /LLLH/ 'education' |
| | 2 | /(L)HL/ | *clase* /HL/ 'class' |
| | | | *picante* /LHL/ 'spicy' |
| | | | *matricul-amos* /LLLHL/ 'matriculate-1PL.PRS' |
| | 3 | /(L)HLL/ | *jóvenes* /HLL/ 'youths' |
| | | | *película* /LHLL/ 'film' |
| FUNCTION WORDS | 1 | /(L)H/ | *yó* /H/ '1SG.SBJ' |
| | | | *porqué* /LH/ 'why?' |
| | 2 | /(L)HL/ | *esta* /HL/ 'this' |
| | | | *nosotros* /LHL/ '1PL.SBJ' |
| | 4 | /(L)L/ | *me* /L/ '1SG.OBJ', *en* /L/ 'in', *a* /L/ 'at, to' |
| | | | *desde* /LL/ 'since' |
| | | | *excepto* /LLL/ 'except' |

TABLE 6. Word-tone patterns in EGS.

CONTENT WORDS. As in CAF, all content words bear at least one and at most one H tone. However, H tones are distributed in a more arbitrary fashion in EGS and are found in three word positions, namely on the final, penultimate, and antepenultimate syllable. The most common tone pattern over EGS polysyllabic words in the corpus features an H on the penultimate syllable (103/171 = 60.2%), followed by an H on the final (52/171 = 30.4%) and the antepenultimate syllables (16/171 = 9.4%). As in the CAF corpus, there are sharp falls and rises between adjacent H and L tones from one syllable to the next rather than gradual falls between nonadjacent H tones over the span of several syllables. Further, nowhere in the EGS data is there variation in the relative pitch of the tones that form the four word-tone patterns of individual content and function words identified in Table 6, even in the most emphatic of contexts. We deduce from this that in EGS, too, a syllable without an H tone bears an L tone. The only exception is in the clearly circumscribed context of H-tone spreading, a tonal process with the following characteristics.

H-TONE SPREADING. In some utterances, the L-toned syllable(s) right-adjacent to an H-toned syllable is/are also realized with high pitch. This therefore applies only to polysyllabic words without a final H, hence with tone patterns 2 /(L)HL/ and 3 /(L)HLL/. These pitch realizations are instances of H-tone spreading. The domain of H-tone spreading is limited to the prosodic word (stem + affixes and host + clitic), and spreading exclusively occurs rightward. Spreading is common but not systematic in the corpus. There is variation within the same speakers and within syntactic categories (i.e. nouns, verbs, and adjectives). Tone spreading may therefore be an incipient process in EGS that is yet to consolidate itself.

We considered, and eventually discarded, the alternative explanation that the rightmost H in words that otherwise have an /(L)HL/ pattern might instead be a boundary

tone of some prosodic constituent, such as an accentual or intermediate phrase. However, H-tone spreading is not limited to the final syllable. Instead, it occurs rightward up to the word boundary, irrespective of the position of the lexical H tone. Hence in words with an antepenultimate H tone such as *jóvenes* 'youths', we find /HLL/ → [HHH].

FUNCTION WORDS. As in CAF, the lexical tone of monosyllabic function words is arbitrary and can be either H or L. Some polysyllabic function words bear one and only one H tone, like polysyllabic content words, while others bear only L tones. There is therefore a small group of polysyllabic function words that have only L tones. An exhaustive list of function words found in the corpus with their tone patterns is given in Table 7.

| TONE PATTERNS | | TYPE | WORDS |
|---|---|---|---|
| 1 | /(L)H/ | Indefinite determiners and demonstratives | *un* /H/ 'INDF.SG.M' |
| | | Subject and independent pronouns | *yo* /H/ '1SG.SBJ', *mí* /H/ '1SG.INDP' |
| | | | *tú* /H/ '2SG.SBJ', *él* /H/ '3SG.SBJ.M' |
| | | Question words | *qué* 'what?', *quién* /H/ 'who?' |
| | | Conjunction | *después* /LH/ 'after' |
| 2 | /(L)HL/ | Demonstratives | *esta* /HL/ 'this', *eso* /HL/ 'that' |
| | | Indefinite determiners and demonstratives | *unos* /HL/ 'INDF.PL.M' |
| | | Subject and independent pronouns | *ella* /HL/ '3SG.SBJ.F' |
| | | | *nosotros* /LHL/ '1PL.SBJ', *vosotros* /LHL/ '2PL.SBJ' |
| | | | *ellos* /HL/ '3PL.SBJ.M', *ellas* /HL/ '3PL.SBJ.F' |
| | | Question words | *cómo* /HL/ 'how?', *cuál(es)* /HL/ 'which (ones)?' |
| 4 | /(L)L/ | All definite determiners | *el* /L/ 'DEF.SG.M', *la* /L/ 'DEF.SG.F' |
| | | | *los* /L/ 'DEF.PL.M', *las* /L/ 'DEF.PL.F' |
| | | Adnominal possessives | *mi* /L/ '1SG.POSS', *tu* /L/ '2SG.POSS' |
| | | | *su* /L/ '3SG.POSS', *mis* /L/ '1PL.POSS' |
| | | Object pronouns | *me* /L/ '1SG.OBJ', *te* /L/ '2SG.OBJ' |
| | | | *lo*/*la* /L/ '3SG.ACC.M/F', *le* /L/ '3SG.DAT' |
| | | | *se* /L/ '3SG/PL.OBJ.REFL' |
| | | | *nos* /L/ '1PL.OBJ', *os* /L/ '2PL.OBJ' |
| | | | *los*/*las* /L/ '3PL.ACC.M/F', *les* /L/ '3PL.DAT' |
| | | Conjunctions & relativizers | *que* /L/ 'SUB' |
| | | | *como* /LL/ 'how, as (well as)', *pero* /LL/ 'but' |
| | | | *porque* /LL/ 'because', *para* /LL/ 'in order to' |
| | | Some prepositions | *a* /L/ 'to', *de* /L/ 'of', *por* /L/ 'by', *con* /L/ 'with' |
| | | | *para* /LL/ 'for', *como* /LL/ 'like' |
| | | | *hasta* /LL/ 'until', *mientras* /LL/ 'while' |
| | | | *excepto* /LLL/ 'except' |

TABLE 7. Tone in EGS function words found in the corpus.

MINIMAL PAIRS. Like CAF, EGS also has a few tonally distinguished minimal pairs. In contrast to CAF, where minimal pairs are encountered only among monosyllabic function words, EGS minimal pairs are found among both monosyllabic and disyllabic function words. All minimal pairs in the corpus are listed in Table 8.

| WORD | TONES | GLOSS | WORD | TONES | GLOSS |
|---|---|---|---|---|---|
| qué | H | 'what?' | que | L | 'that' (SUB) |
| cómo | HL | 'how?' | como | LL | 'like'; 'how' (REL) |
| esta | HL | 'this' | está | LH | 'COP.LOC.3SG.PRS' |
| él | H | 'he' (3SG.SBJ.M) | el (que) | L | 'he (who)' (3SG.SBJ.REL.M) |
| tú | H | 'you' (2SG.SBJ) | tu | L | 'your' (2SG.POSS) |

TABLE 8. Tonal minimal pairs in the EGS corpus.

PROSODY BEYOND THE WORD LEVEL. Just like CAF, EGS makes use of boundary tones on the right edge of utterances. We have, for now, identified an L% and an LH% (con-

tour) boundary tone. The L% occurs in pragmatically neutral declarative utterances, and its realization begins at the pitch level of the tone of the utterance-final syllable (L or H). The L% then provokes a steep fall over the utterance-final syllable, with a drop to a level lower than the pitch of a preceding L tone. LH% is a contour boundary tone that occurs over the utterance-final syllable in yes/no questions. The H tone that forms part of the LH contour may rise above the height of a preceding H tone in the utterance-final word, which then conveys pragmatic nuances like emphasis or counter-expectation in addition to polarity. Further, EGS utterances systematically display downstep: noninitial H tones are lower than preceding ones, and the slope thus falls gradually from the beginning to the end of the utterance.

Illustration. The following spectrogram and pitch contours illustrate most of the pitch characteristics described for EGS above. Figure 3 shows the two EGS utterances *Que no abandonéis los estudios. Tanto chicos como chicas* 'You should not give up your studies. Neither boys nor girls' (SP12).

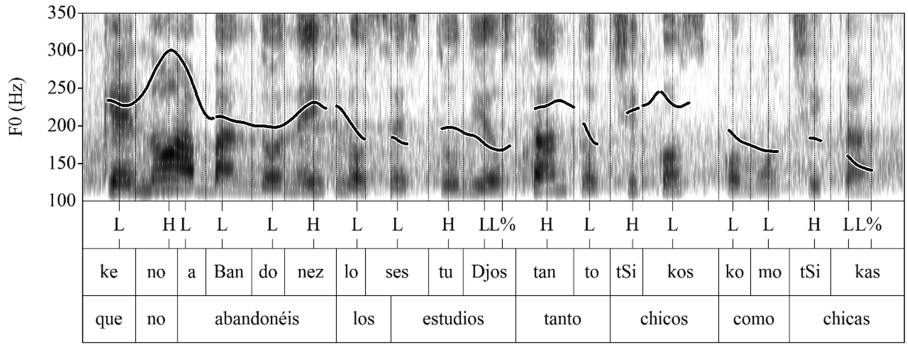


Figure 3. Pitch contour of two EGS utterances.

The two utterances in Fig. 3 contain four polysyllabic content words that reflect the most frequent tone patterns of EGS content words. The word *abandon-éis* 'abandon-2pl.prs' has the pattern /(L)H/, while *estudio-s* 'study-pl', *chico-s* 'boy-pl', and *chica-s* 'girl-pl' have the pattern /(L)HL/. Figure 3 also contains the L-toned monosyllabic function word *que* /L/ 'sub' and the polysyllabic, yet L-toned, adverbial/relative clause introducer *como* /LL/ 'how, as (well as)'. Sharp falls and rises between H and L tones rather than interpolation between H tones over the span of several syllables are illustrated by the transition between the H tone of *no* and the L tone on the first syllable of *abandon-éis* 'abandon-2pl.prs'.

Further, the behavior of pitch over *chico-s* 'boy-pl' indicates H-tone spreading: the H tone of the first syllable [tʃí] spreads to the second—and last—phonologically L-toned syllable [kò] (which is therefore annotated as L). The two utterances also illustrate prosodic characteristics of EGS beyond the word level. Both feature utterance-level downstep. This is reflected in the gradual downward slope of the entire utterance. Finally, the presence of declarative L% tones over the final syllable of *estudios* [djòs] 'studies' and the final syllable of *chicas* 'girls' [kàs] produces final falls in the pitch register of each of the two utterances.

**3.8.** Prosodic systems compared. We now provide a comparison of the central aspects of the prosodic systems of the contact varieties CAF and EGS with those of the superstrates SES and SEF as well as their adstrates Sango and Pichi. A comparison is

useful for identifying the contact-related aspects of the CAF and EGS systems and, in a second step, situating them in the context of the emergence of contact prosodic systems, which follows in §4. The prosodic characteristics discussed in the previous sections are listed as features in Table 9. A plus sign (+) indicates the presence of a particular feature, a minus sign (−) its absence. Both signs (+/−) are used when the variety has the feature in some parts of the lexicon but not in others. The same abbreviations used in §2.2 apply here: superstrate (SUP), substrate (SUB), adstrate (ADS), contact variety (CON).

| FEATURES | CENTRAL AFRICAN REPUBLIC | | | EQUATORIAL GUINEA | | |
|---|---|---|---|---|---|---|
| | CON | ADS | SUP | CON | ADS | SUP |
| | CAF | Sango | SEF | EGS | Pichi | SES |
| 1. Tones | + | + | − | + | + | − |
| 2. Tonal minimal pairs | + | + | − | + | + | − |
| 3. Obligatoriness of word-level H or stress in content words | + | − | − | + | +/− | + |
| 4. Culminativity of word-level H or stress in content words | + | − | − | + | +/− | + |
| 5. H-tone spreading | − | − | − | + | + | − |
| 6. Downstep | − | − | − | + | + | − |
| 7. Intonational pitch accents | − | − | + | − | − | + |
| 8. Boundary tones | + | + | + | + | + | + |

TABLE 9. Comparison of prosodic features.

TONES (FEATURE 1). Every syllable in CAF and EGS bears a low (L) or high (H) tone, and words have fixed tone patterns, indicating that tones are part of the composition of morphemes (see §2.2). Feature 1 is thus exclusively found in CAF, EGS, and their adstrates Sango and Pichi, but not in SEF and SES.

TONAL MINIMAL PAIRS (FEATURE 2). CAF and EGS have tonally distinguished minimal pairs in the category of function words (see Tables 5 and 8). This is also a feature they share with their adstrates, although in the latter, tonal minimal pairs are also found among content words. The superstrate SES has minimal pairs distinguished by stress placement and the presence vs. absence of stress. Both EGS and SES therefore have prosodic minimal pairs, but the difference between EGS and its superstrate SES is the prosodic feature that distinguishes segmental homophones. SEF, in contrast, does not have minimal pairs that are distinguished prosodically. This shows that CAF has developed in this regard an idiosyncrasy vis-à-vis its superstrate that EGS does not have vis-à-vis its own superstrate (also see §4.3).

OBLIGATORINESS (FEATURE 3) AND CULMINATIVITY (FEATURE 4). The presence of at least one (feature 3) and at most one (feature 4) H or primary stress characterizes content words in CAF, EGS, Pichi, and SES.[9] These four varieties/languages differ from Sango and SEF in this regard but for very different reasons: while SEF does not have word stress, Sango has few restrictions on tone combinations in content and function words. As a result, Sango has many words with more than one H tone or with L tones

[9] A more complete picture of the situation in Pichi with respect to features 3 and 4 is the following (also see §3.3): we find the characteristic obligatoriness and culminativity of H in most content words of English origin. However, monosyllabic English-derived function words bear an arbitrary L or H. In addition, Pichi has a stock of African-derived words with more diverse tone patterns, among them multisyllabic words bearing only L or H tones (for Pichi, see Yakpo 2019a:45–46; for Krio, see Hancock 1971, Finney 2004). The layered nature of the lexicon of Pichi is reflected by (+/−) in the corresponding cells of features 3 and 4 in Table 9.

alone (see §3.3). Turning to EGS, tone patterns in content words faithfully reproduce those of stress patterns in SES. For instance, words with the pattern /(L)H/ in EGS have stress on the last syllable in SES, and so forth. In contrast, CAF H tone placement less directly reflects SEF stress placement. In SEF, the smallest prosodically marked constituent is the accentual phase, which is often larger than the word (see §3.2). Hence in natural discourse, not every content word necessarily bears stress in SEF. Nevertheless, the most common position for primary stress in SEF is the final syllable of the accentual phrase, which is very often also the final syllable of a content word. In that sense, the position of H tone in CAF content words mirrors the most frequent position of stress at the word level in SEF.

On the whole, the binary contrast between stressed and unstressed syllables in SEF and SES has been converted into a binary H vs. L contrast in CAF and EGS. This translates into culminative and obligatory H tone placement in CAF and EGS content words. Due to its canonical placement on the final syllable, the position of H tone in CAF content words is entirely predictable. In EGS, however, the position of H is arbitrary from a synchronic point of view, leaving aside knowledge of the stress pattern of the SES etymon.

H-tone spreading (feature 5) and downstep (feature 6). The processes listed under features 5 and 6 are typical of tone systems and hence not found in either of the superstrates. They are, nevertheless, not reported for Sango, and no evidence was found for them in CAF. EGS, by contrast, has both H-tone spreading and downstep, and both processes are also found in Pichi.

Intonational pitch accents (feature 7). This feature is attested only in SEF and SES. There is no evidence in our data that word-level tones in CAF and EGS may be altered by intonational pitch accents that form part of intonational tunes spanning the utterance. In CAF and EGS, utterance-final boundary tones fulfill the pragmatic functions associated with intonational pitch accents and intonational tunes in SEF and SES. Intonational pitch accents are not found in the adstrates Pichi and Sango either.

Boundary tones (feature 8). Boundary tones fulfilling the functions of intonation are common both to intonation-only and to tone systems, and they are present in the superstrates, the adstrates, and the contact varieties.

Summary. The comparison shows that, on the one hand, CAF and EGS possess acoustic and phonological features associated with tone systems, namely tone inherent to morphemes, word-tone patterns, minimal pairs, tonal processes, and the absence of intonational pitch accents. On the other hand, both contact varieties also have two structural features generally identified with intonation-only systems, that is, obligatoriness and culminativity. The relation between tone and intonation-only features in the contact varieties is discussed further in the following section, where we suggest three mechanisms that drive the emergence of contact prosodic systems.

**4.** Mechanisms in the emergence of contact prosodic systems. Prosodic contact was defined in general terms in §2.2 as contact between tone and intonation-only systems. The synchronic description of the resulting contact prosodic systems CAF and EGS led to the conclusion in §3.8 that they possess defining features of tone systems. At the same time, they share structural features with intonation-only systems: H tone in the tonal contact varieties and primary stress in the intonation-only superstrates are obligatory and culminative.

These characteristics of contact prosodic systems therefore also raise a question of a diachronic nature. How do contact prosodic systems emerge and consolidate them-

selves? It is well known that the distribution of prosodic systems across the globe is largely areal (Matisoff 2001, Gussenhoven 2004:42–45, Clements & Rialland 2008:74). Switches from one prosodic type to another are necessary in order to arrive at an areal distribution. In spite of this, there has not been, to our knowledge, an attempt to identify the precise mechanisms by which contact prosodic systems have emerged in Afro-European contact ecologies. We make such an effort in the following by drawing on the preceding analyses of CAF and EGS and by adducing additional evidence from African varieties of English and French, and Afro-European creole languages. We argue that three mechanisms are at work, namely stress-to-tone mapping (§4.1), paradigmatization (§4.2), and idiosyncratization (§4.3). We also discuss the persistence of tone in language contact with respect to the composition of linguistic ecologies (§5).

**4.1.** Stress-to-tone mapping. Most CAF and EGS words bear H tone where the superstrate etymons bear stress. We refer to the mechanism through which stress in the superstrate is converted into H tone in contact varieties and languages as stress-to-tone mapping. Stress-to-tone mapping relies on the perception by native speakers of tone languages of the stress vs. nonstress contrast as an H vs. L contrast. Beyond CAF and EGS, stress-to-tone mapping has also shaped the prosodic systems of a wide range of Afro-European contact varieties and languages that emerged in ecologies with SL agentivity in tone languages.

Stress-to-tone mapping in other afro-european contact varieties. Gussenhoven and Udofot (2010) and Gussenhoven (2017) present acoustic and phonological evidence that Nigerian English has inherent word-tone patterns like CAF and EGS. Nigerian English also has two tones, H and L. The syllable with primary stress in the British English cognate receives an H, as in *member* /HL/. While content words feature a culminative and obligatory H, function words that normally remain unstressed in British English are L-toned in Nigerian English, as in *of* /L/, *a* /L/, and *he* /L/. Ghanaian English also has a two-tone H vs. L contrast, fixed word-tone patterns, a culminative and obligatory H in content words, and L-toned function words (Criper 1971, Criper-Friedman 1990).

The prosodic systems of African Romance varieties other than CAF and EGS have not been studied in great detail. The available sources suggest, however, that stress-to-tone mapping also characterizes the varieties of French spoken in Côte d'Ivoire (Boutin & Turscan 2009) and Mali (Bordal & Skattum 2014). In both varieties, a high tone is realized on the right edge of every content word, as in CAF.

Stress-to-tone mapping in afro-european creoles. Like the colonial contact varieties, all English-lexifier creoles of Africa are spoken in ecologies that exclusively feature tone systems. Among these languages, the prosody of Pichi, the major adstrate of EGS, has been studied in greatest depth so far (Yakpo 2009, 2019a). Other works cover aspects of the prosodic systems of Krio (Berry 1970, Hancock 1971, Nylander 1984, Finney 2004), Nigerian Pidgin (Faraclas 1996), Cameroon Pidgin English (Nkengasong 2016), and Ghanaian Pidgin English (Huber 2013). The sources suggest that the prosodic systems of these languages show the characteristic outcomes of stress-to-tone mapping. They have two-tone systems in which most content words of English origin feature an obligatory and culminative H tone, while African-sourced content words show diverse tone patterns, including ones with no H tone at all.

Tone systems that evolved through stress-to-tone mapping are also found in the African Portuguese-lexifier creoles Forro (Ferraz 1979, Maurer 2008) and Angolar

(Maurer 1995), both spoken on São Tomé, and Lung'le (Traill & Ferraz 1981, Maurer 2009), spoken on Príncipe; see Hagemeijer 2011 for the sociohistorical context. Angolar, for example, has the characteristic two-tone contact prosodic system based on stress-to-tone mapping, albeit with many idiosyncrasies (see §4.3 below). As expected, the H vs. L contrast is based on the stress contrast of Portuguese, for example, *kalôlô* /LHL/ 'heat' from Port. *ca*ˈ*lor*, and *kotho* /LH/ 'heart' from Port. *cora*ˈ*ção* (examples from Maurer 1995).

Afro-European creole languages with Indo-European lexifiers and African substrates of the Atlantic-Congo family are also spoken on the other side of the Atlantic. Research on the origins of Africans deported to the Caribbean during the European slave trade has established that the vast majority came from exclusively tonal ecologies (for Suriname, for example, see Arends 1995, Migge 1998). During the height of European slavery regimes, Africans starkly outnumbered Europeans. Much of the colonial Caribbean therefore also featured a type (i) constellation characterized by intonation-only superstrates, tonal substrates, and SL agentivity in tone languages (see §2.1).

Caribbean creoles that were isolated from the influence of European languages from the early colonial period until recently still have two-tone systems that show the unmistakable signs of stress-to-tone mapping. Saramaccan, a creole spoken by the descendants of Africans who established independent polities in the Amazonian rainforests of Suriname in the seventeenth century, has a prosodic system with two tones and numerous tonal processes (Rountree 1972, Good 2004). Portuguese- and English-sourced words have an H tone on the syllable that bears stress in the lexifier; compare *wómì* /HL/ 'man' (< Port. ˈ*homem* 'man') and *àkí* /LH/ 'here' (< Port. *a*ˈ*qui* 'here') (examples from Good 2009). The same holds for Saramaccan's sister language Ndyuka (see §4.3).

Less-isolated Caribbean creoles like Jamaican Creole and Sranan (coastal Suriname) have intonation-only systems (Gooden 2003, Barth 2016). However, the sociohistorical context suggests that a shift from tone to intonation-only systems took place earlier in these Caribbean creoles. The end of the European slave trade in the nineteenth century gradually led to declining proportions of native speakers of African tone languages in the Caribbean. In the twentieth century, immigration from Asia, urbanization, and the expansion of education led to further recompositions of the linguistic ecologies of the Caribbean (for an overview of the Guyanas, see Yakpo & Muysken 2017). More porous social boundaries led to increasing opportunities for the non-European majority of the Caribbean colonies to acquire the European colonial languages that served as standards. In the process, numerous Caribbean creoles may have acquired intonation-only systems from the colonial superstrates.

Even so, most Caribbean creoles retain features that hark back to a tonal past. Barth (2016) argues on the grounds of historical phonology that Sranan once had a tone system. Today, Sranan, like numerous other Caribbean intonation-only creoles, manifests 'residual tone' (Berry 1972) in a few grammatical functions and semantic fields. Not by chance, residual tone is found in parts of the linguistic system with a high density of Africanisms. For instance, Sranan ideophones bear fixed (series of) H or L tone(s) that cannot be altered. Many of these ideophones can be traced directly to African etymons. Compare *pétépété* /HHHH/ 'thoroughly' (< Akan/Ewe *pétépété* 'thoroughly') and *tjùbùm* /LL/ 'with a plop sound' (Smith & Adamson 2006:216). Other word classes in Sranan feature stress with characteristic effects like the shortening of unstressed syllables, often leading to consonant gemination, for example, *pa*ˈ*pa* → *p*ˈ*pa* 'father' (van der Hilst 1988:51–54).

Contact of tone and intonation-only systems has also engendered hybrid prosodic systems with the acoustic and phonological properties of tone AND stress. The Iberian-lexi-

fier creole Papiamentu, spoken in the Netherlands Antilles, combines stress from its European heritage with tone (and various tonal processes) from its African lineage (Rivera-Castillo & Pickering 2004).[10] The vowels of stressed syllables are longer and louder than unstressed ones, and unstressed syllables tend to be more centralized (i.e. more schwa-like) than stressed ones (Remijsen & van Heuven 2005:223). At the same time, syllables marked for H and for L differ consistently in pitch in a way similar to that established for CAF and EGS (see §3.5). Although much still remains obscure about the origins of Papiamentu (see Martinus 1996), its hybrid system seems to have taken shape in a small ecology with a more balanced demographic ratio of Africans to Europeans, a prevalence of domestic instead of plantation slavery, significant exposure to the European lexifier by Africans, and to the creole by Europeans, and widespread multilingualism (see Jacobs 2012). The ecology therefore appears to have had a good measure of simultaneous RL and SL agentivity in tone and intonation-only languages when Papiamentu emerged (see also §2.1).

THE ROLE OF PERCEPTION IN STRESS-TO-TONE MAPPING. Stress-to-tone mapping is the crucial mechanism through which the prosodic systems of Afro-European contact varieties and languages took shape in type (i) contact constellations featuring SL agentivity in tonal adstrates and substrates (see §2.2). Stress-to-tone mapping originates in perceptual analogies between stress and H tone. These analogies lead speakers of tone languages to interpret the stress vs. nonstress contrast in the intonation-only superstrate or lexifier as a tonal H vs. L contrast in the contact variety or language.

The production of both H tone and stress involves activation of the cricothyroid muscle and therefore demands more articulatory effort than that of L tones and absence of stress (Yip 2002:63). The articulatory effort involved in producing stress tends to entail raised rather than lowered pitch. Consequently, high pitch is a frequent correlate of stress in intonation-only systems. This is the case, for instance, with SEF, the superstrate of CAF (see §3.2) and with (British) English, the superstrate of African Englishes and the lexifier of the Afro-European English-lexifier Creoles (Fry 1958, Lieberman 1960). Speakers of tone languages are perceptually also more sensitive to pitch variations than to other acoustic cues of stress. Speakers of Mandarin Chinese selectively perceive the higher pitch of stressed syllables in English, rather than vowel length or loudness, thus making pitch the primary cue for distinguishing stressed from unstressed syllables (Wang 2008).

Two influential models of the nonnative acquisition of phonology, the PERCEPTUAL ASSIMILATION MODEL FOR SECOND LANGUAGE LEARNERS (PAM-L2; Best & Tyler 2007, So & Best 2010) and the SPEECH LEARNING MODEL (SLM; Flege 1995), provide theoretical and empirical support for the role of perception in stress-to-tone mapping. Both models postulate that the perception of a nonnative phonetic input is linked to the phonology of a learner's native language(s). The PAM-L2 proposes that additional language learners will assimilate nonnative phonemes to the native phonemes that are perceptually the most similar. For example, Best (1994:199) shows that English speakers associate the Zulu voiceless lateral fricative /ɬ/ with any of the voiceless coronal fricatives /s/, /ʃ/, or /θ/. The acoustic overlaps (i.e. coronality, friction, and voicelessness) engender sufficient perceptual similarities for English speakers to render them with a corresponding native phoneme. Stress vs. nonstress is also such a nonassimilable con-

[10] According to Childs (1995), mixed prosodic systems that make use of lexical tone and lexical stress are also found in the Atlantic subfamily (spoken mostly between Senegal and Liberia) of the Atlantic-Congo family (see also §2.2).

trast, since it does not match a phonemic contrast in the native tone languages of Africans who acquired European languages during the colonial period. However, due to the articulatory-perceptual overlaps outlined above, the stress contrast is assimilated to a tone contrast.

The second model, SLM, was nurtured by research suggesting that with continuous exposure learners become better over time at learning new phonemes than phonemes that are similar but not equivalent to native ones (see e.g. Ingham 2015). The higher the degree of exposure to an additional language, the more likely it is that learners will be successful at learning nonnative phonemic contrasts (Flege 1987). The SLM therefore supports our view that the tone systems of Afro-European contact varieties could emerge because the colonial ecologies did not provide sufficient opportunity or motivation for African speakers to acquire or reproduce the stress systems of SEF and SES. A similar, if not greater, chasm of inequality separated the speakers of European lexifiers and of African substrates in European enslavement colonies in the Americas, which explains the emergence of tone systems in Afro-European creoles as well (see below and §4.3).

Further evidence in favor of the crucial role of perception in stress-to-tone mapping comes from neurolinguistic research. Word-tone patterns are stored separately from the segmental shapes of words, and tone perception is lateralized differently in native speakers of tone languages (mostly left hemisphere) from nonnative speakers without prior exposure to tone (mostly right hemisphere) (Kwok et al. 2017). Tone is, it seems, neurologically deeply entrenched and therefore highly susceptible to imposition during SL agentivity in tone languages, even when other parts of a linguistic system are affected less by contact.

Summary. Stress-to-tone mapping is the elemental mechanism through which contact prosodic systems like those of CAF and EGS emerge when intonation-only languages are introduced into ecologies dominated by speakers of tone languages. This is to be expected in such ecologies, which typically feature SL agentivity in tone languages with the overwhelming majority of speakers. Evidence from the creole languages of the Caribbean suggests that the reverse also holds. Tone languages lose tone when ecologies are, or come to be, dominated by speakers of intonation-only languages. We now turn to paradigmatization, a second mechanism besides stress-to-tone mapping that we see to be operative in the emergence of contact prosodic systems.

**4.2.** Paradigmatization. As shown in §3.6 and §3.7, all CAF and EGS words have fixed tone patterns. These word-tone patterns constitute a diagnostic of membership in the syntactic categories of content words and function words. We employ the term paradigmatization for the mechanism that leads to the systematic attribution of tone patterns to words as members of syntactic categories.

Paradigmatization by replication. The tonal patterning of the lexicon following phonological, morphological, and semantic principles is a hallmark of African tone languages (see Newman 1973, Courtenay 1974, and Faraclas 1984:46–48 for African languages of diverse affiliations). In CAF and EGS, paradigmatization occurred by default when existing prosodic patterns based on stress were replicated in the tone patterns of these two contact varieties (see §3.6 and §3.7). CAF and EGS tone patterns therefore largely mirror corresponding stress patterns in the European input varieties. The exceptions confirm the rule (see §4.3).

The same holds for other colonial contact varieties. Monosyllabic function words that normally remain unstressed in British English are assigned a fixed L tone in the variety of English spoken in Ghana, as in the subject pronouns *I* /L/, *he* /L/, and *they* /L/,

and the monosyllabic prepositions *in* /L/, *at* /L/, and *with* /L/. By contrast, content words bear one and only one H tone over the syllable that receives primary stress in English, hence *boy* /H/, *teacher* /HL/, *calabash* /LLH/ (Criper-Friedman 1990).

PARADIGMATIZATION BY REGULARIZATION. In contrast to the colonial contact varieties, the English-lexifier creoles of West Africa show a greater degree of prosodic autonomy. Not all tone patterns in the creoles can be extrapolated from corresponding English stress patterns. In the creoles, lexifier words have sometimes been accommodated to satisfy the prosodic requirements of certain lexical and grammatical paradigms and assume functions within them. Such accommodation may involve regularization by analogical leveling (Hockett 1967, Hock 1986): morphophonemically irregular forms are replaced by regular ones in order to create tone paradigms with similar and predictable forms.

Pichi and Krio personal pronouns (both languages have the same system) illustrate paradigmatization by regularization. Tonal regularization has created prosodically consistent pronominal paradigms showing significant departures from what would be expected from stress-to-tone mapping based on the English input; see Table 10.

| | DEPENDENT (CLITIC) PRONOUNS | | | INDEPENDENT (NONCLITIC) PRONOUNS |
|---|---|---|---|---|
| | SUBJECT (L-toned) | OBJECT (L-toned) | POSSESSIVE (L-toned) | OBJECT & EMPHATIC (H-toned, except 2PL) |
| 1SG | à | | mì | mí |
| 2SG | yù | | yù | yú |
| 3SG | è | =àm | ìn | ín |
| 1PL | wì | | wì | wí |
| 2PL | ùnà, ùnù | | ùnà, ùnù | ùnà, ùnù |
| 3PL | dɛ̀n | | dɛ̀n | dɛ́n |

TABLE 10. Pichi and Krio personal pronouns.

The pronominal system of Pichi and Krio shown in Table 10 is divided into a dependent (clitic) and an independent (nonclitic) series. Dependent pronouns comprise subject, object, and possessive pronouns and are exclusively L-toned. Pronouns of the independent series assume the syntactic and pragmatic functions of objecthood and emphasis and are exclusively H-toned. The L vs. H contrast between most pronouns instantiates case inflection by tonal ablaut, for example, *yù* /L/ '2SG.SBJ, 2SG.POSS' vs. *yú* /H/ '2SG.INDP', and *mì* /L/ '1SG.POSS' vs. *mí* /H/ '1SG.INDP'. There is a sole exception: the 2PL pronoun *ùnà* /LL/ (and its free variant *ùnù*) is L-toned in all case functions, probably because it is the only form not derived from English (see Parkvall 2000:121–22).

Putting aside *ùnà*, the English-derived forms have been tonally regularized in order to fit into the case paradigms in Table 10 in the following way: the English independent personal pronouns *you*, *we*, and *them* can carry stress and can therefore be focused, topicalized, clefted, relativized, conjoined, and modified. The expectation is therefore that ALL Pichi/Krio reflexes of these English etymons should ALWAYS bear H tone as a consequence of stress-to-tone mapping. However, only the H-toned reflexes *yú* /H/, *wí* /H/, and *dɛ́n* /H/ of the independent series in the rightmost column may be focused, topicalized, clefted, relativized, conjoined, and modified. Compare *yú, kám yá!* 'you, come here!'. The L-toned pronouns *yù* /L/, *wì* /L/, and *dɛ̀n* /L/, although derived from the same English etymons *you*, *we*, and *them*, may, in contrast, be employed only as dependent subject or adnominal possessive pronouns; compare *yù kám yá* 'you came here' and *yù màmá* 'your mother'.

Similarly, both the L-toned dependent possessive pronoun *ìn* '3SG.POSS' and the H-toned independent pronoun *ín* '3SG.INDP' are derived from the English independent

and stressable pronoun *him*. Stress-to-tone mapping has rendered a predictable H-toned Pichi/Krio reflex *ín* '3SG.INDP', which can also undergo any of the pragmatic and syntactic operations mentioned above. The L-toned counterpart *ìn* '3SG.POSS' has, however, been lexicalized as a dependent adnominal possessive pronoun. Like all other forms in the possessive series it bears an L tone, which is contrary to the expectation of stress-to-tone mapping. Tonal regularization has therefore rendered uniform case paradigms in the pronominal systems of Pichi and Krio.

SUMMARY. The tonal paradigms of the contact varieties and languages reflect the outcomes of stress-to-tone mapping in differing degrees. The regularization of paradigms in the English-lexifier creoles indicates a higher degree of prosodic restructuring with respect to the lexifier than the mere replication of stress-based paradigms of the superstrates as tonal paradigms in colonial contact varieties like CAF, EGS, or Ghanaian English. In this respect, the creoles are therefore further along the path of prosodic autonomy vis-à-vis English than CAF and EGS vis-à-vis their respective superstrates. However, not all aspects of CAF and EGS prosody result from the automatic conversion of stress to tone and paradigmatization by regularization. We identify a third mechanism in the emergence of contact prosodic systems, namely idiosyncratization, and show how it also renders autonomous structures in the contact varieties.

**4.3.** IDIOSYNCRATIZATION. Neither CAF tonal minimal pairs (Table 5) nor the EGS tonal processes of H-tone spreading and downstep can be explained by stress-to-tone mapping or paradigmatization. These prosodic characteristics have been determined by a third mechanism involved in shaping contact prosodic systems, which we call IDIOSYNCRATIZATION: phonological reanalysis gives rise to tonal variation in the contact varieties that has no parallel in the superstrate or lexifier. In many instances, idiosyncratization is nevertheless influenced by adstrate structures and processes, even if a particular instance may not have a direct correlate in the adstrates. The outcomes may therefore be idiosyncratic to different degrees vis-à-vis the inputs to the contact varieties.

IDIOSYNCRATIC TONAL PARADIGMS. To illustrate idiosyncratization, we turn to the CAF personal pronoun system. Table 11 presents CAF clitic subject, object, and nonclitic emphatic pronouns and their tonal specifications. Subject and object pronouns do not receive stress in SEF, while emphatic pronouns may be stressed. As Table 11 shows, CAF object pronouns are L-toned throughout, and emphatic pronouns are H-toned. Both pronominal series therefore conform to the general pattern of stress-to-tone mapping and paradigmatization by replication. Subject pronouns, however, show a mix of L-toned and H-toned forms, and the H-toned forms run counter to the expectation that ALL subject pronouns should be L-toned. The relevant forms are set in bold in Table 11.

| | SUBJECT (L- or H-toned) | OBJECT (L-toned) | EMPHATIC (H-toned) |
|---|---|---|---|
| 1SG | je /L/ | me | moi |
| 2SG | **tu /H/** | te | toi |
| 3SG | il, elle /L/; **on /H/** | le, la, lui | lui, elle |
| 1PL | **nous /H/**; **on /H/** | nous | nous |
| 2PL | **vous /H/** | vous | vous |
| 3PL | **ils, elles /H/** | les, leur | eux |

TABLE 11. CAF personal pronouns.

The Pichi/Krio paradigms in Table 10 and the CAF paradigms in Table 11 both display exceptions to stress-to-tone mapping. The changes due to paradigmatization in Pichi/Krio attested in Table 10 have created tonally regular forms, while the changes in CAF

subject pronouns due to idiosyncratization shown in Table 11 have rendered tonally irregular or arbitrary forms. The following structural principles have determined the attribution of L or H tone to CAF subject pronouns, the latter in a departure from the expected pattern of stress-to-tone mapping.

(a) There is a crosslinguistic preference for heavy monosyllables to bear an H tone and for light ones to carry an L (de Lacy 2002). Accordingly, *ils* [íl] '3PL.SBJ.M' and *elles* [él] '3PL.SBJ.F' both bear an H, and so does the pronoun *on* [ő] '3SG/1PL.SBJ.N'. The same distribution of L and H tones can be found with other types of function words. The light monosyllabic indefinite articles *des*, *le*, *la*, *les* are L-toned and contrast with the heavy H-toned monosyllables *un(e)* 'INDF.SG.M(F)', *en* 'at', *dans* 'in', and *on* '3SG/1PL.SBJ.N'.

(b) Segmental homophones bear different tones in CAF. Accordingly, *il* [il] '3SG.SBJ.M' and *elle* [èl] '3SG.SBJ.F' bear L tones, creating a suprasegmental contrast with H-toned *ils* [íl] '3PL.SBJ.M' and *elles* [él] '3PL.SBJ.F'. There is no systematic correspondence between the tones of personal pronouns in Sango and in CAF, however. For instance, the Sango pronoun *mɔ̀* '2SG.SBJ/OBJ' is L-toned (Diki-Kidiri 1977:64), while the CAF form *tu* [tý] '2SG.SBJ' bears an H tone. Equally, Sango, contrary to CAF, has no tonal minimal pairs in the pronominal system: the Sango pronoun *álà* /HL/ instantiates both 2PL and 3PL number (Diki-Kidiri 1977:65); the number distinction is not instantiated via a tonal alternation. Tonal minimal pairs in the pronominal paradigm are nevertheless a hallmark of Central African languages other than Sango. In the Linda variety of the Banda group of languages of the CAR, a clusivity opposition is expressed via a tonal alternation between L and M(id) tone; compare *ʔà* /L/ '1PL.SBJ.INCL' with *ʔā* /M/ '1PL.SBJ.EXCL'. In Ngbandi and Yakoma, an L vs. H alternation in personal pronouns expresses the aspectual opposition of perfective vs. imperfective, as in *mo̍ dɔ̀* /L L/ '1SG.PFV pull' vs. *mó dɔ̀* /H L/ '1SG.IPFV pull' (Boyeldieu 1975:65). Even if there is no correspondence with CAF in these specific cases, paradigmatic tone contrasts in pronominal systems are commonly used to express grammatical distinctions in many Central African languages and could have provided a ready model for the 3SG vs. 3PL tonal number distinction in CAF.

(c) The subject pronouns *nous* [nú] '1PL' and *vous* [vú] '2PL' bear an H, again a departure from the expected L tone. *Nous* and *vous* are, however, the only morphologically invariant forms for subject and object case in SEF (and CAF). The two are also the only subject forms that can be extraposed or focused and can bear emphatic stress in SEF. This may explain why the homophonous object pronouns *nous* and *vous* also bear H instead of L tone.

(d) The tone of *je* '1SG.SBJ' is L, as expected. The syllable nucleus of *je* is a schwa [ə] in SEF, thus a vowel that can be deleted. However, the schwa of monosyllabic function words has been analyzed as a full vowel [e] in CAF and is generally not deleted (Bordal 2012a, Nimbona & Bordal Steien 2019). It seems nonetheless that the reduced segmental and suprasegmental prominence of schwa in tandem with the clitic status of *je* in the SEF input translated into a consistent assignment of L-tone in CAF.

Tonal idiosyncratization in the personal pronoun system has also occurred in other colonial contact varieties of Africa. In the variety of French spoken in Côte d'Ivoire, there is the tonal minimal pair *leur* /L/ '3PL.DAT' vs. *leur* /H/ '3PL.POSS' (Boutin &

Turscan 2009), where stress-to-tone mapping should have rendered both with L tones. The Kwa adstrates that served as inputs into Ivorian French also mark some case functions of pronouns via tonal alternations. Anyi, for example, has exactly the same tonal alternation as Ivorian French. L and H mark object and possessive case, respectively, in the 3PL personal pronoun; compare *màn bɛ̀* 'give 3PL.OBJ' with *bé sìkáá* '3PL.POSS money' (Koffi 2018b:32, 58).

IDIOSYNCRATIC TONAL PROCESSES. Section 3.7 described two tonal processes in EGS, namely rightward H-tone spreading and downstep. Such processes also constitute instances of idiosyncratization in EGS vis-à-vis the superstrate SES because their presence in EGS is not linked to stress-to-tone mapping in any way. At the same time, tone spreading and downstep are not idiosyncratic vis-à-vis the adstrates. Both processes occur in Pichi (see §3.3) and other languages of Equatorial Guinea, Cameroon, and Gabon, among them Fang (Zamponi 2009), Eton (Van de Velde 2008:58–60), and Bantu in general (Downing & Rialland 2016b). These processes could therefore be directly transferred from the adstrates without phonological reanalysis proper. Spreading and downstep also occur in other contact varieties when the adstrates have them. For instance, Nigerian English features rightward H-tone spreading in utterance-medial positions (e.g. *member* /HL/ → /HH/), as well as downstep. Both processes are common in the Benue-Congo and Ijoid languages that have served as major adstrates of Nigerian English since the implantation of English in Nigeria (for Yoruba, see Clements & Laniran 2007; for Ijọ, see Williamson 1978).

H-tone spreading, downstep, and other tonal processes were also directly transferred from adstrates and substrates to the English-lexifier creoles of Africa and the Americas, among them Pichi (see Yakpo 2019a:46–58, and §3.3) and Nigerian Pidgin (Faraclas 1996:266–67). For instance, Pichi speakers delete tone in the creation of compounds in a process that has been identified as areal (Yakpo 2012). The H tone of the dependent is replaced by an L tone, while the head retains its original tone pattern; compare *wách* /H/ '(to) watch' and *mán* /H/ 'man' → *wàch-mán* /L-H/ 'watchman' (Yakpo 2012:257). The Surinamese creole Ndyuka features a way of creating compounds similar to that of Pichi; compare *kàu* /H/ 'chew' and *bón* /H/ 'bone' → *kàu bón* /L H/ 'chewed bone(s)' (Huttar & Huttar 1994:373). As is the case with paradigmatization, the English-lexifier creoles once more manifest a higher degree of autonomy with respect to their lexifier English than the contact varieties. Pichi, for example, has an idiosyncratic instance of constructional tone: a tonal obligatory contour principle (Leben 1973) conditions the variation of the two English-derived object pronouns *ín* '3SG.INDP' and *àm* '3SG.OBJ' (for the complex details, see Yakpo 2019b).

SUMMARY. While stress-to-tone mapping renders the tonal configuration of a large part of the European-derived lexicon of Afro-European contact varieties predictable from the vantage point of their superstrates and lexifiers, it is the idiosyncratic aspects, more than anything else, that show the autonomy of Afro-European contact prosodic systems vis-à-vis their input systems. The aspect of autonomy is discussed further in §5 below when we take a final look at the role of the linguistic ecology in determining the variation observed in the outcomes of prosodic contact in tone-dominant ecologies.

**5.** LINGUISTIC ECOLOGIES AND THE PERSISTENCE OF TONE SYSTEMS. The prosodic systems of CAF, EGS, and the Afro-European creoles can be seen to reflect different degrees of autonomy vis-à-vis their superstrates and lexifiers. Taking SEF and SES as a point of departure, the prosodic systems of CAF and EGS show a modest degree of autonomy. The placement of H tone and primary stress reveals a striking structural paral-

lelism in spite of the different acoustic natures of tone and stress. As a result, the word-tone patterns of the contact varieties can be deduced from corresponding stress patterns in the superstrates, exceptions notwithstanding, as shown in §4.3. Stress-to-tone mapping and paradigmatization also render many word-tone patterns in the English-lexifier creoles forecastable on the basis of English stress placement. In comparison to CAF and EGS, the tone systems of the creoles nevertheless show more independent developments in tonal paradigmatization and idiosyncratization with respect to word-tone patterns and to tonal processes (see §4.3, and n. 4 and n. 9). The creoles are therefore more autonomous than CAF and EGS in this regard.

This is, for one thing, because the creoles have enjoyed a longer period of speciation than the European colonial varieties. The creoles have been in use for at least two hundred years in Africa, if not longer (Hancock 1986), and for about four centuries in the Caribbean (Smith 2017). CAF, EGS, and the English colonial varieties of Africa have, by contrast, speciated for not much longer than a century. Second, the colonial varieties have almost exclusively been learned in classrooms and other formal settings, are exposed to standardization and engineering by African and Western elites, and continue to function as vertical means of communication. This has constrained considerably the space for autonomous developments in their tone systems. By contrast, the tonal creoles are acquired naturally outside of the classroom and are deployed as horizontal means of communication, and their prosodic systems have evolved without institutional interference through self-authored accommodation processes in their respective linguistic ecologies.

Despite their differing extents of autonomy, the prosodic systems of the contact varieties and the Afro-European creoles on both sides of the Atlantic testify to the fact that tone persists during contact in the right kind of ecology. In the Afro-European contact scenarios covered, tone has endured because tone language speakers constituted the overwhelming majority during the formative period of the contact varieties, and social stratification prevented the large-scale acquisition of intonation-only features from the lects of the European colonizers. The tonal creoles and the colonial contact varieties therefore arose in tone-dominant ecologies characterized by SL agentivity and imposition (contact constellation (i) in §2.2). A founder effect (Mufwene 1996) then led to the transmission and nativization of these contact varieties with subsequent generations of learners. Today, these tonal contact varieties are firmly entrenched in their ecologies.

**6.** Conclusion. In the preceding sections we argued on acoustic and phonological grounds that Central African French and Equatorial Guinean Spanish are tone languages. Further, we extrapolated from existing sources on a wide range of other contact varieties and languages that the emergence of tone systems is the default in Afro-European contact scenarios. Based on these observations, we conclude that tone is easily imposed on contact varieties and languages that emerge in ecologies characterized by SL agentivity in tone languages. In doing so, we argue against claims that tone cedes *per se* to stress or is drastically reduced in some way during language contact and creolization. Restrictions—for example, on the number of word-tone patterns and on the uses of grammatical tone—are to be expected in contact prosodic systems due to the nature of the input: the acoustic and phonological realization of tone imposed by the adstrates and substrates can initially play out only on the prosodic patterns provided by the intonation-only superstrate or lexifier.

Some sources (see Hyman 2009 for an overview) discount the idea that prosodic systems like those of CAF and EGS are genuine tone systems and instead classify them as

(pitch) accent systems (e.g. Goldsmith 1987). Pulleyblank (1986:158) deconstructs the notion of pitch accent early on by showing that 'pure' tone languages also show numerous limitations in the number of tones that can be assigned to a prosodic unit. Positional restrictions on the placement of tones in African languages have been documented more recently by Downing (2010). Restrictions are apparently so common in tone languages that van der Hulst is prompted to 'entertain the hypothesis that perhaps all languages are accentual' (2010:9). We, in contrast, maintain along with others that the opposite holds, and that languages like CAF and EGS, in which pitch enters into the composition of morphemes, are tone languages (cf. Gussenhoven 2004, Hyman 2006).

This study was explicitly limited to type (i) contact constellations ($IN_{SUP} + TO_{SUB/ADS} = TO_{CON}$). We nevertheless also assume the opposite to be the case in type (ii) constellations ($TO_{SUP} + IN_{SUB/ADS} = IN_{CON}$). In ecologies featuring SL agentivity in intonation-only adstrates, a tonal superstrate is likely to undergo the inverse mechanism of tone-to-stress conversion. This leads us back to the controversial claims cited in the introductory paragraph of this article. Maintaining, as does McWhorter (1998), that creolization leads to the abandonment of tone is counterintuitive against the backdrop of the extensive imposition of African substrate structures on creoles in categories that are less stable under SL agentivity than prosody (e.g. in the tense-mood-aspect system (see Winford & Migge 2007) and in the grammar of space (see Yakpo 2017)). Such a claim also has no empirical basis, as shown in §4. In a similar vein, Trudgill's (2010) suggestion that tone disappears during contact is not raised independently of the issue of simplification. Since tone is so stable in natively acquired languages, even morphologically isolating contact languages, like many of the creoles covered, will therefore retain tone if they emerge under SL agentivity in tone languages.

Further, Salmons (1992:45) does not differentiate between the tonal and nontonal baselines of SL agentivity when he proposes the 'vulnerability of tone to contact' in arguing for his tone-to-stress cycle. With evidence involving SL agentivity in nontonal languages he suggests tone loss as a general tendency. Among the examples given is the shift from tone to stress in Norwegian and Swedish contact varieties occasioned by substrate and adstrate transfer from nontonal Sami and Finish (see §2.2). In ecologies where native languages with intonation-only systems dominate, tone is, of course, not likely to be selected into an emerging contact variety. The persistence of tone in contact languages that arose under SL agentivity in tone languages is, in turn, framed as unusual by Salmons, although it merely represents the other side of the coin of tone loss (1992:34–35, with respect to the presence of tone in Saramaccan, Krio, and Lingala).

On a more general note, it is remarkable that languages with differing genealogical affiliations and typological profiles, such as the colonial varieties CAF and EGS, Afro-European creoles, and African adstrates, all end up with similar prosodic systems when spoken in the same tone-dominant ecology. Contact varieties like CAF and EGS, as well as the Afro-European creoles, therefore partake just like other languages in the convergence processes that lead to the worldwide areal clustering of prosodic systems. The presence of some intonation-only features in these languages is characteristic of areal 'buffer zones' (cf. Stilo 2005), in which tone and intonation-only systems collide.

Once demographic and social dominance relations, the stratal composition, and the direction of transfer and agentivity in an ecology have been taken into account, the outcomes of prosodic contact are no longer typologically as unusual as they may first seem.

Appendix: Speaker characteristics[11]

| | SP | age/gend | languages | occupation | education |
|---|---|---|---|---|---|
| Central African Republic | 1 | 28/F | CAF, Sango | Civil servant | University |
| | 2 | 28/M | CAF, Sango | Student | University |
| | 3 | 39/F | CAF, Sango | Secretary | Secondary school |
| | 4 | 59/M | CAF, Sango, Banda | Electrician | Middle school |
| | 5 | 58/M | CAF, Sango, Goula | Trader | Secondary school |
| | 6 | 32/M | CAF, Sango, Langba | Civil servant | Secondary school |
| | 7 | 44/F | CAF, Sango, Yakoma | Civil servant | Secondary school |
| | 8 | 28/F | CAF, Sango, Yakoma, Zande | Student | University |
| | 9 | 41/F | CAF, Sango, Kaba, Banziri | Secretary | Secondary school |
| | 10 | 33/M | CAF, Sango, Kaba, Ngbaka | Civil servant | Secondary school |
| Equatorial Guinea | 11 | 9/M | EGS, Pichi, Bube | Student | Primary school |
| | 12 | 18/F | EGS, Pichi, Bube | Student | Secondary school |
| | 13 | 19/M | EGS, Pichi, Bube | Student | Primary school |
| | 14 | 83/F | EGS, Pichi, Bube | Grandmother | Primary school |
| | 15 | 34/M | EGS, Pichi, Fang | Mechanic | Middle school |
| | 16 | 42/F | EGS, Pichi, Fang | Employee | Secondary school |
| | 17 | 54/M | EGS, Pichi, Fang, French (Cameroon) | Civil servant | University |
| | 18 | 58/F | EGS, Pichi, Fang, Kombe, French (Gabon) | Seamstress | Middle school |

## REFERENCES


Ansaldo, Umberto. 2009. *Contact languages: Ecology and evolution in Asia*. Cambridge: Cambridge University Press.

Arends, Jacques. 1995. Demographic factors in the formation of Sranan. *The early stages of creolization* (Creole language library 13), ed. by Jacques Arends, 233–85. Amsterdam: John Benjamins.

Avanzi, Mathieu; Guri Bordal; and Gélase Nimbona. 2014. The obligatory contour principle in African and European varieties of French. *INTERSPEECH 2014*, 1312–16. Online: https://www.isca-speech.org/archive/interspeech_2014/i14_1312.html.

Barth, Emily. 2016. Tone loss in Sranan Creole: Re-thinking contact driven change. *Papers in Historical Phonology* 1.76–89. DOI: 10.2218/pihph.1.2016.1694.

Berry, Jack. 1970. A note on the prosodic structure of Krio. *International Journal of American Linguistics* 36.266–67. DOI: 10.1086/465120.

Berry, Jack. 1972. Some observations on 'residual tone' in West Indian English. Paper presented at the Conference on Creole Languages and Educational Development, University of the West Indies at St. Augustine, Trinidad, 24–28 July.

Best, Catherine T. 1994. The emergence of native-language phonological influences in infants: A perceptual assimilation model. *The development of speech perception: The transition from speech sounds to spoken words*, ed. by Judith C. Goodman and Howard C. Nusbaum, 167–224. Cambridge, MA: MIT Press.

Best, Catherine T., and Michael D. Tyler. 2007. Nonnative and second-language speech perception: Commonalities and complementarities. *Language experience in second language speech learning: In honor of James Emil Flege*, ed. by Ocke-Schwen Bohn and Murray J. Munro, 13–34. Amsterdam: John Benjamins.

Boersma, Paul, and David Weenink. 2018. Praat: Doing phonetics by computer. Version 6.0.41. Online: http://www.praat.org.

Bolekia Boleká, Justo. 2007. *La enculturación bubi desde los préstamos léxicos del pidgin-english: Procesos de lexicalización progresiva*. Salamanca: University of Salamanca dissertation.

Bordal, Guri. 2012a. A phonological study of French spoken by multilingual speakers from Bangui, the capital of the Central African Republic. *Phonological variation in French: Illustrations from three continents* (Studies in language variation 11), ed. by Randall Gess, Chantal Lyche, and Trudel Meisenburg, 23–43. Amsterdam: John Benjamins.


[11] Speakers are ordered by the number of languages spoken.

Bordal, Guri. 2012b. *Prosodie et contact de langues : Le cas du système tonal du français centrafricain*. Oslo: University of Oslo, and Paris: Université Paris Ouest Nanterre la Défense dissertation.

Bordal, Guri. 2013. Le français centrafricain : Un français à tons lexicaux. *Revue française de linguistique appliquée* 18.91–102. DOI: 10.3917/rfla.182.0091.

Bordal, Guri. 2015. Traces of the lexical tone system of Sango in Central African French. *Prosody and language in contact*, ed. by Elisabeth Delais-Roussarie, Mathieu Avanzi, and Sophie Herment, 29–49. Heidelberg: Springer. DOI: 10.1007/978-3-662-45168-7_3.

Bordal, Guri, and Ingse Skattum. 2014. La prosodie du français en Afrique—traits panafricains ou traits de la langue première ? Le cas de locuteurs natifs de quatre langues : Sango, bambara, wolof et tamasheq. *La phonologie du français : Normes, périphéries, modélisation : Mélanges pour Chantal Lyche*, ed. by Jacques Durand, Gjert Kristoffersen, Bernard Laks, and Julie Peuvergne, 119–52. Paris: Presses universitaires de Paris Ouest.

Bordal Steien, Guri; Akissi Béatrice Boutin; and Robert Beyom. 2016. French in the Central African Republic: A speaker from Bangui. *Varieties of spoken French*, ed. by Sylvain Detey, Jacques Durand, Bernard Laks, and Chantal Lyche, 236–46. Oxford: Oxford University Press.

Boutin, Béatrice Akissi, and Gabor Turscan. 2009. La prononciation du français en Afrique : La Côte d'Ivoire. *Phonologie, variation et accents du français*, ed. by Jacques Durand, Bernard Laks, and Chantal Lyche, 131–51. Paris: Hermès.

Boyeldieu, Pascal. 1975. *Études yakoma, langue du groupe oubanguien (RCA) : Morphologie—synthématique*. Paris: Société d'Études Linguistiques et Anthropologiques de France (SELAF).

Bruce, Gösta. 2004. An intonational typology of Swedish. *Speech Prosody 2004*, Nara, 175–78. Online: https://www.isca-speech.org/archive/sp2004/sp04_175.html.

Bull, Tove. 1995. Language maintenance and loss in an originally trilingual area in North Norway. *International Journal of the Sociology of Language* 115.125–34. DOI: 10.1515/ijsl.1995.115.125.

Castillo Rodríguez, Susana. 2013. Language and the hispanization of Equatorial Guinea. *A political history of Spanish: The making of a language*, ed. by José Del Valle, 350–63. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511794339.029.

Childs, George Tucker. 1995. Tone and accent in Atlantic: An evolutionary perspective. *The complete linguist: Papers in memory of Patrick J. Dickens* (Afrikanische Sprachen und Kulturen), ed. by Anthony Traill, Rainer Vossen, and Megan Biesele, 195–215. Cologne: Rüdiger Köppe.

Clements, George N., and Yetunde Laniran. 2007. Downstep and high tone raising: Interacting factors in Yoruba tone production. Paris: Laboratoire de Phonétique et Phonologie (LPP) UMR 7018, ms. Online: https://halshs.archives-ouvertes.fr/halshs-00180368.

Clements, George N., and Annie Rialland. 2008. Africa as a phonological area. *A linguistic geography of Africa*, ed. by Bernd Heine and Derek Nurse, 36–85. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511486272.004.

Courtenay, Karen R. 1974. On the nature of the Bambara tone system. *Studies in African Linguistics* 5.303–23.

Criper, Lindsay. 1971. A classification of types of English in Ghana. *Journal of African Languages* 10.6–17.

Criper-Friedman, Lindsay. 1990. The tone system of West African Coastal English. *World Englishes* 9.63–77. DOI: 10.1111/j.1467-971X.1990.tb00687.x.

de Blij, Harm. 2009. *The power of place: Geography, destiny, and globalization's rough landscape*. Oxford: Oxford University Press.

de Lacy, Paul. 2002. The interaction of tone and stress in optimality theory. *Phonology* 19.1–32. DOI: 10.1017/S0952675702004220.

Delais-Roussarie, Elisabeth; Brechtje Post; Mathieu Avanzi; Caroline Buthke; Albert Di Cristo; Ingo Feldhausen; Sun-Ah Jun; Philippe Martin; Trudel Meisenburg; Annie Rialland; Rafèu Sichel-Bazin; and Hi-Yon Yoo. 2015. Into-

national phonology of French: Developing a ToBI system for French. *Intonation in Romance*, ed. by Sónia Frota and Pilar Prieto, 63–100. Oxford: Oxford University Press. DOI: 10.1093/acprof:oso/9780199685332.003.0003.

Devonish, Hubert. 2001. On the Sierra Leone–Caribbean connection: Hot on the trail of 'tone-shifted items' in Anglo-West African. *Due respect: Essays on English and English-related Creoles in the Caribbean in honour of Professor Robert Le Page*, ed. by Pauline Christie, 184–205. Kingston: University of the West Indies Press.

Diki-Kidiri, Marcel. 1977. *Le sango s'écrit aussi … : Esquisse linguistique du sango, langue nationale de l'Empire Centrafricain*. (Langues et civilisations à tradition orale 24.) Paris: Société d'Études Linguistiques et Anthropologiques de France (SELAF).

Diki-Kidiri, Marcel, and Jean-Pierre Caprile. 1982. *Contacts de langues et contacts de cultures 4 : L'expansion des langues africaines : Peul, sango, kikongo, ciluba, swahili*. (LACITO documents Afrique 8.) Paris: Société d'Études Linguistiques et Anthropologiques de France (SELAF).

Downing, Laura J. 2010. Accent in African languages. *A survey of word accentual patterns in the languages of the world*, ed. by Harry van der Hulst, Rob Goedemans, and Ellen van Zanten, 381–428. Berlin: De Gruyter Mouton. DOI: 10.1515/97831101989 66.1.381.

Downing, Laura J. 2015. Convergence of prosody under contact: Two African case studies. Paper presented at HALS Workshop 4, Helsinki University.

Downing, Laura J., and Annie Rialland (eds.) 2016a. *Intonation in African tone languages*. (Phonology and phonetics 24.) Berlin: De Gruyter Mouton. DOI: 10.1515/978 3110503524.

Downing, Laura J., and Annie Rialland. 2016b. Introduction. In Downing & Rialland 2016a, 1–16. DOI: 10.1515/9783110503524-001.

Faraclas, Nicholas G. 1984. *A grammar of Obolo*. Bloomington: Indiana University Linguistics Club.

Faraclas, Nicholas G. 1996. *Nigerian Pidgin*. London: Routledge.

Ferraz, Luiz Ivens. 1979. *The creole of São Tomé*. Johannesburg: Witwatersrand University Press.

Finney, Malcolm Awadajin. 2004. Tone assignment on lexical items of English and African origin in Krio. *Creoles, contact, and language change: Linguistic and social implications*, ed. by Geneviève Escure and Armin Schwegler, 221–36. Amsterdam: John Benjamins.

Flege, James Emil. 1987. The production of 'new' and 'similar' phones in a foreign language: Evidence for the effect of equivalence classification. *Journal of Phonetics* 15. 47–65. DOI: 10.1016/S0095-4470(19)30537-6.

Flege, James Emil. 1995. Second language speech learning: Theory, findings, and problems. *Speech perception and linguistic experience: Issues in cross-language research*, ed. by Winifred Strange, 233–77. Timonium, MD: York.

François, Alexandre. 2012. The dynamics of linguistic diversity: Egalitarian multilingualism and power imbalance among northern Vanuatu languages. *International Journal of the Sociology of Language* 2012.85–110. DOI: 10.1515/ijsl-2012-0022.

Fry, Dennis B. 1958. Experiments in the perception of stress. *Language and Speech* 1.126–52. DOI: 10.1177/002383095800100207.

Fyle, Clifford N., and Eldred Durosimi Jones. 1980. *A Krio-English dictionary*. Oxford: Oxford University Press.

Goldman, Jean-Philippe. 2011. EasyAlign: An automatic phonetic alignment tool under Praat. *INTERSPEECH 2011*, 3233–36. Online: https://www.isca-speech.org/archive /interspeech_2011/i11_3233.html.

Goldsmith, John. 1987. Tone and accent, and getting the two together. *Berkeley Linguistics Society* 13.88–104. DOI: 10.3765/bls.v13i0.1827.

Good, Jeff. 2004. Tone and accent in Saramaccan: Charting a deep split in the phonology of a language. *Lingua* 114.575–619. DOI: 10.1016/S0024-3841(03)00062-7.

Good, Jeff. 2009. A twice-mixed creole? Tracing the history of a prosodic split in the Saramaccan lexicon. *Studies in Language* (Special issue: *Language change in contact languages: Grammatical and prosodic considerations*, ed. by J. Clancy Clements and Shelome Gooden) 33.459–98. DOI: 10.1075/sl.33.2.09goo.

Gooden, Shelome. 2003. *The phonology and phonetics of Jamaican Creole reduplication*. Columbus: The Ohio State University dissertation. Online: http://rave.ohiolink.edu/etdc/view?acc_num=osu1070485686.

Güldemann, Tom. 2008. The Macro-Sudan belt: Towards identifying a linguistic area in northern sub-Saharan Africa. *A linguistic geography of Africa*, ed. by Bernd Heine and Derek Nurse, 151–85. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511486272.006.

Gussenhoven, Carlos. 2004. *The phonology of tone and intonation*. Cambridge: Cambridge University Press.

Gussenhoven, Carlos. 2006. Between stress and tone in Nubi word prosody. *Phonology* 23.192–223. DOI: 10.1017/S0952675706000881.

Gussenhoven, Carlos. 2017. On the intonation of tonal varieties of English. *The Oxford handbook of World Englishes*, ed. by Markku Filppula, Juhani Klemola, and Devyani Sharma, 569–98. Oxford: Oxford University Press. DOI: 10.1093/oxfordhb/9780199777716.013.29.

Gussenhoven, Carlos, and Inyang Udofot. 2010. Word melodies vs. pitch accents: A perceptual evaluation of terracing contours in British and Nigerian English. *Speech Prosody 2010*, Chicago, paper 015. Online: https://www.isca-speech.org/archive/sp2010/sp10_015.html.

Hagemeijer, Tjerk. 2011. The Gulf of Guinea creoles: Genetic and typological relations. *Journal of Pidgin and Creole Languages* 26.111–54. DOI: 10.1075/jpcl.26.1.05hag.

Hammarström, Harald; Robert Forkel; and Martin Haspelmath (eds.) 2017. *Glottolog 3.0*. Jena: Max Planck Institute for the Science of Human History. Online: http://glottolog.org.

Hancock, Ian F. 1971. *A study of the sources and development of the lexicon of Sierra Leone Krio*. London: SOAS University of London dissertation. Online: https://eprints.soas.ac.uk/id/eprint/28465.

Hancock, Ian F. 1986. The domestic hypothesis, diffusion and componentiality: An account of Atlantic Anglophone creole origins. *Substrata versus universals in Creole genesis*, ed. by Pieter Muysken and Norval Smith, 71–102. Amsterdam: John Benjamins.

Hao, Yen-Chen. 2012. Second language acquisition of Mandarin Chinese tones by tonal and non-tonal language speakers. *Journal of Phonetics* 40.269–79. DOI: 10.1016/j.wocn.2011.11.001.

Haugen, Einar. 1972. The analysis of linguistic borrowing. *The ecology of language: Essays by Einar Haugen*, ed. by Anwar S. Dil, 79–109. Stanford, CA: Stanford University Press.

Heine, Bernd. 1978. Some generalizations on African-based pidgin languages. *Afrika und Übersee* 61.219–29.

Hock, Hans Henrich. 1986. *Principles of historical linguistics*. Berlin: Mouton de Gruyter.

Hockett, Charles F. 1967. Where the tongue slips, there slip I. *To honor Roman Jakobson: Essays on the occasion of his seventieth birthday*, 910–36. The Hague: Mouton.

Hualde, José Ignacio. 2012. Stress and rhythm. *The handbook of Hispanic linguistics*, ed. by José Ignacio Hualde, Antxon Olarrea, and Erin O'Rourke, 153–71. Malden, MA: Wiley-Blackwell. DOI: 10.1002/9781118228098.ch8.

Hualde, José Ignacio, and Pilar Prieto. 2015. Intonational variation in Spanish: European and American varieties. *Intonation in Romance*, ed. by Sónia Frota and Pilar Prieto, 350–91. Oxford: Oxford University Press. DOI: 10.1093/acprof:oso/9780199685332.003.0010.

Huber, Magnus. 2013. Ghanaian Pidgin English. *The survey of pidgin and creole languages, vol. 1: English-based and Dutch-based languages*, ed. by Susanne Michaelis, Philippe Maurer, Martin Haspelmath, and Magnus Huber, 167–75. Oxford: Oxford University Press. Online: https://apics-online.info/surveys/16.

Huttar, George L., and Mary L. Huttar. 1994. *Ndyuka*. London: Routledge.

Hyman, Larry M. 2006. Word-prosodic typology. *Phonology* 23.225–57. DOI: 10.1017/S0952675706000893.

Hyman, Larry M. 2009. How (not) to do phonological typology: The case of pitch-accent. *Language Sciences* 31.213–38. DOI: 10.1016/j.langsci.2008.12.007.

Hyman, Larry M. 2018. What tone teaches us about language. *Language* 94.698–709. DOI: 10.1353/lan.2018.0040.

Hyman, Larry M.; Peter Jenks; Geoffrey Bacon; Nicolas Baier; Emily Clem; Matthew Faytak; Spencer Lamoureux; Florian Lionnet; John Merril; and Hannah Sande. 2015. Areal features and linguistic reconstruction in Africa. Paper presented at the 8th World Congress of African Linguistics, Kyoto University, 20–24 August.

Ingham, Jacqueline. 2015. Perception, production and perceptual learning in the second language: A study of perceptual learning by L1 Bengali speakers of L2 English. *Papers from the Lancaster Postgraduate Conference in Linguistics and Language Teaching (LAEL PG)* 9.49–69.

Jacobs, Bart. 2012. Embedding Papiamentu in the mixed language debate. *Journal of Historical Linguistics* 2.52–82. DOI: 10.1075/jhl.2.1.05jac.

Jahr, Ernst Håkon. 1984. Language contact in Northern Norway: Adstratum and substratum in the Norwegian, Sami and Finnish of Northern Norway. *Acta Borealia* 1.103–12. DOI: 10.1080/08003838408580308.

Jun, Sun-Ah, and Cécile Fougeron. 2000. A phonological model of French intonation. *Intonation: Analysis, modeling and technology*, ed. by Antonis Botinis, 209–42. Dordrecht: Springer. DOI: 10.1007/978-94-011-4317-2_10.

Jun, Sun-Ah, and Cécile Fougeron. 2002. Realizations of accentual phrase in French intonation. *Probus* 14.147–72. DOI: 10.1515/prbs.2002.002.

Koffi, Ettien N. 2018a. Differential analysis of lexical pitch in accent and tone languages. *Linguistic Portfolios* 7:8. Online: https://repository.stcloudstate.edu/stcloud_ling/vol7/iss1/8.

Koffi, Ettien N. 2018b. *Guide d'orthographe et de lecture de l'agni morofou*. Bongouanou: Centre d'Alphabétisation et de Traduction en Agni (CATA).

Kwok, Veronica P. Y.; Guo Dan; Kofi Yakpo; Stephen Matthews; Peter T. Fox; Ping Li; and Li-Hai Tan. 2017. A meta-analytic study of the neural systems for auditory processing of lexical tones. *Frontiers in Human Neuroscience* 11:375. DOI: 10.3389/fnhum.2017.00375.

Ladd, D. Robert. 2008. *Intonational phonology*. Cambridge: Cambridge University Press.

Lang, Jürgen. 2009. *Les langues des autres dans la créolisation : Théorie et exemplification par le créole d'empreinte wolof à l'île Santiago du Cap Vert*. Tübingen: Gunter Narr.

Leben, William Ronald. 1973. *Suprasegmental phonology*. Cambridge, MA: MIT dissertation. Online: http://www.ai.mit.edu/projects/dm/theses/leben73.pdf.

Lieberman, Philip. 1960. Some acoustic correlates of word stress in American English. *The Journal of the Acoustical Society of America* 32.451–54. DOI: 10.1121/1.1908095.

Lim, Lisa, and Umberto Ansaldo. 2015. *Languages in contact*. Cambridge: Cambridge University Press.

Lipski, John M. 2015. 'Toned-up' Spanish: Stress → pitch → tone(?) in Equatorial Guinea. *Romance linguistics 2013: Selected papers from the 43rd Linguistic Symposium on Romance Languages (LSRL), New York, 17–19 April, 2013*, ed. by Christina Tortora, Marcel den Dikken, Ignacio L. Montoya, and Teresa O'Neill, 233–56. Amsterdam: John Benjamins.

Lüpke, Friederike. 2016. Uncovering small-scale multilingualism. *Critical Multilingualism Studies* 4.35–74. Online: https://cms.arizona.edu/ojs3/multilingual/article/view/100.

Martín del Molino, Amador. 1993. *La ciudad de Clarence: Primeros años de la actual ciudad de Malabo, capital de Guinea Ecuatorial, 1827–1859*. Malabo: Ediciones Centro Cultural Hispano-Guineano.

Martinus, Efraim Frank. 1996. *The kiss of a slave: Papiamentu's West-African connections*. Amsterdam: University of Amsterdam dissertation.

Matisoff, James A. 2001. Genetic versus contact relationship: Prosodic diffusibility in South-East Asian languages. *Areal diffusion and genetic inheritance: Problems in comparative linguistics*, ed. by Alexandra Y. Aikhenvald and R. M. W. Dixon, 291–327. Oxford: Oxford University Press.

Matras, Yaron. 2009. *Language contact*. Cambridge: Cambridge University Press.

Maurer, Philippe. 1995. *L'angolar : Un créole afro-portugais parlé à São Tomé : Notes de grammaire, textes, vocabulaires*. Hamburg: Buske.

Maurer, Philippe. 2008. A first step towards the analysis of tone in Santomense. *Roots of Creole structures: Weighing the contribution of substrates and superstrates* (Creole language library 33), ed. by Susanne Maria Michaelis, 253–61. Amsterdam: John Benjamins.

Maurer, Philippe. 2009. *Principense (Lung'le): Grammar, texts, and vocabulary of the Afro-Portuguese creole of the Island of Príncipe, Gulf of Guinea*. London: Battlebridge.

McWhorter, John H. 1998. Identifying the creole prototype: Vindicating a typological class. *Language* 74.788–818. DOI: 10.2307/417003.

Mertens, Piet. 2004. Le prosogramme : Une transcription semi-automatique de la prosodie. *Cahiers de l'Institut de Linguistique de Louvain* 30.7–25. DOI: 10.2143/CILL.30.1.519212.

Migge, Bettina. 1998. *Substrate influence in the formation of the Surinamese Plantation Creole: A consideration of the sociohistorical data and linguistic data from Ndyuka and Gbe*. Columbus: The Ohio State University dissertation. Online: http://rave.ohiolink.edu/etdc/view?acc_num=osu1487953567769312.

Morgades Besari, Trinidad. 2011. Los criollos (Fernandinos-Kriös) de Guinea Ecuatorial. *La Gaceta de Guinea Ecuatorial* 162, Miscelánea.

Mufwene, Salikoko S. 1996. The founder principle in creole genesis. *Diachronica* 13.83–134. DOI: 10.1075/dia.13.1.05muf.

Mufwene, Salikoko S. 2001. *The ecology of language evolution*. Cambridge: Cambridge University Press.

Newman, Paul. 1973. Grades, vowel-tone classes and extensions in the Hausa verbal system. *Studies in African Linguistics* 4.297–346.

Nimbona, Gélase. 2014. *Étude contrastive de la prosodie du kirundi et du français : Analyse des transferts prosodiques du kirundi au français parlé au Burundi*. Louvain: Université catholique de Louvain. Online: https://dial.uclouvain.be/pr/boreal/object/boreal:152240.

Nimbona, Gélase, and Guri Bordal Steien. 2019. Modes monolingues dans des écologies multilingues : Les études phonologiques des français africains. *Langue française* (Special issue: *Les français d'Afrique. En Afrique. Hors d'Afrique*, ed. by Guri Bordal Steien and Cécile Van den Avenne) 202.1–26.

Nkengasong, Nkemngong. 2016. *A grammar of Cameroonian Pidgin*. Newcastle upon Tyne: Cambridge Scholars.

Nylander, Dudley K. 1984. The relation between the middle tone and 'empty category principle' violations in Krio. *Studies in African Linguistics* 15.163–75.

Parkvall, Mikael. 2000. *Out of Africa: African influences in Atlantic creoles*. London: Battlebridge.

Pasch, Helma. 1993. Phonological similarities between Sango and its base language: Is Sango a pidgin/creole or a koiné? *Topics in African linguistics: Papers from the XXI Annual Conference on African Linguistics, University of Georgia, April 1990*, ed. by Salikoko S. Mufwene and Lioba Moshi, 279–92. Amsterdam: John Benjamins.

Pasch, Helma. 1997. Sango. *Contact languages: A wider perspective* (Creole language library 17), ed. by Sarah G. Thomason, 209–70. Amsterdam: John Benjamins.

Pierrehumbert, Janet Breckenridge. 1980. *The phonology and phonetics of English intonation*. Cambridge, MA: MIT dissertation. Online: http://dspace.mit.edu/handle/1721.1/16065.

Post, Marike. 2013. Fa d'Ambô. *The survey of pidgin and creole languages, vol. 2: Portuguese-based, Spanish-based, and French-based languages*, ed. by Susanne Michaelis, Philippe Maurer, Martin Haspelmath, and Magnus Huber, 81–89. Oxford: Oxford University Press. Online: https://apics-online.info/surveys/38.

Pulleyblank, Douglas. 1986. *Tone in lexical phonology*. Dordrecht: Reidel.

Quilis, Antonio. 1978. *Métrica española*. Madrid: Ediciones Alcalá.

R Core Team. 2018. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing. Online: https://www.R-project.org/.

Remijsen, Bert, and Vincent J. van Heuven. 2005. Stress, tone and discourse prominence in the Curaçao dialect of Papiamentu. *Phonology* 22.205–35. DOI: 10.1017/S0952675705000540.

RIVERA-CASTILLO, YOLANDA, and LUCY PICKERING. 2004. Phonetic correlates of stress and tone in a mixed system. *Journal of Pidgin and Creole Languages* 19.261–84. DOI: 10.1075/jpcl.19.2.02riv.

ROCA, IGGY. 2005. Saturation of parameter settings in Spanish stress. *Phonology* 22.345–94. DOI: 10.1017/S0952675705000655.

ROUNTREE, S. CATHERINE. 1972. Saramaccan tone in relation to intonation and grammar. *Lingua* 29.308–25. DOI: 10.1016/0024-3841(72)90028-9.

SALMONS, JOE. 1992. *Accentual change and language contact: Comparative survey and a case study of early Northern Europe*. Stanford, CA: Stanford University Press.

SAMARIN, WILLIAM J. 2000. The status of Sango in fact and fiction: On the one-hundredth anniversary of its conception. *Language change and language contact in pidgins and creoles*, ed. by John McWhorter, 301–34. Amsterdam: John Benjamins.

SAMARIN, WILLIAM J. 2013. Sango. *The survey of pidgin and creole languages, vol. 3: Contact languages based on languages from Africa, Australia, and the Americas*, ed. by Susanne Michaelis, Philippe Maurer, Martin Haspelmath, and Magnus Huber, 13–24. Oxford: Oxford University Press. Online: https://apics-online.info/contributions/59.

SCHNEIDER, EDGAR W. 2003. The dynamics of New Englishes: From identity construction to dialect birth. *Language* 79.233–81. DOI: 10.1353/lan.2003.0136.

SMITH, NORVAL. 2017. Krio as the Western Maroon Creole language of Jamaica, and the /na/ isogloss. *Language contact in Africa and the African diaspora in the Americas: In honor of John V. Singler* (Creole language library 53), ed. by Cecelia Cutler, Zvjezdana Vrzić, and Philipp Angermeyer, 251–74. Amsterdam: John Benjamins.

SMITH, NORVAL, and LILIAN ADAMSON. 2006. Tonal phenomena in Sranan. *STUF—Language Typology and Universals* 59.211–18. DOI: 10.1524/stuf.2006.59.2.211.

SO, CONNIE K., and CATHERINE T. BEST. 2010. Cross-language perception of non-native tonal contrasts: Effects of native phonological and phonetic influences. *Language and Speech* 53.273–93. DOI: 10.1177/0023830909357156.

STILO, DONALD L. 2005. Iranian as a buffer zone between the universal typologies of Turkic and Semitic. *Linguistic convergence and areal diffusion: Case studies from Iranian, Semitic and Turkic*, ed. by Éva Ágnes Csató, Bo Isaksson, and Carina Jahani, 35–63. London: Routledge Curzon.

THOMASON, SARAH GREY, and TERRENCE KAUFMAN. 1988. *Language contact, creolization, and genetic linguistics*. Berkeley: University of California Press.

THORNELL, CHRISTINA. 1997. *The Sango language and its lexicon (Sêndâ-yângâ tî sängö)*. Lund: Lund University Press.

TRAILL, ANTHONY, and LUIZ IVENS FERRAZ. 1981. The interpretation of tone in Principense Creole: Abstract phonological analysis. *Studies in African Linguistics* 12.205–15.

TRUDGILL, PETER. 2010. Contact and sociolinguistic typology. *The handbook of language contact*, ed. by Raymond Hickey, 299–319. Malden, MA: Wiley-Blackwell. DOI: 10.1002/9781444318159.ch15.

VAN COETSEM, FRANS. 2000. *A general and unified theory of the transmission process in language contact*. Heidelberg: Universitätsverlag Winter.

VAN DE VELDE, MARK L. O. 2008. *A grammar of Eton*. Berlin: Mouton de Gruyter.

VAN DER HILST, EDDY. 1988. *Skrifi Sranantongo bun, leysi en bun tu* [Write Sranantongo, read it well too]. Paramaribo.

VAN DER HULST, HARRY. 2010. Word accent: Terms, typologies and theories. *A survey of word accentual patterns in the languages of the world*, ed. by Harry van der Hulst, Rob Goedemans, and Ellen van Zanten, 3–53. Berlin: De Gruyter Mouton. DOI: 10.1515/9783110198966.1.3.

VYDRINE, VALENTINE. 2004. Areal and genetic features in West Mande and South Mande phonology: In what sense did Mande languages evolve? *Journal of West African Languages* 30.113–25. Online: https://main.journalofwestafricanlanguages.org/index.php/downloads/category/101-volume-30-number-2-new.

WALKER, JAMES A., and WILLIAM J. SAMARIN. 1997. Sango phonology. *Phonologies of Asia and Africa (including the Caucasus)*, vol. 2, ed. by Alan S. Kaye, 861–80. Winona Lake, IN: Eisenbrauns.

WANG, QIAN. 2008. *Perception of English stress by Mandarin Chinese learners of English: An acoustic study*. Victoria: University of Victoria dissertation. Online: https://dspace.library.uvic.ca//handle/1828/1282.

Weinreich, Uriel. 1953. *Languages in contact*. New York: Linguistic Circle of New York.
Welmers, William Everett. 1959. Tonemics, morphotonemics, and tonal morphemes. *General Linguistics* 4.1–9.
Williamson, Kay. 1978. From tone to pitch-accent: The case of Ijo. *Kiabàrà: Journal of the Humanities* 1.116–25.
Winford, Donald, and Bettina Migge. 2007. Substrate influence on the emergence of the TMA systems of the Surinamese creoles. *Journal of Pidgin and Creole Languages* 22.73–99. DOI: 10.1075/jpcl.22.1.06win.
Witzel, Michael. 1999. Early sources for South Asian substrate languages. *Mother Tongue* (Special issue on South Asia), 1–70. DOI: 10.11588/xarep.00000113.
Yakpo, Kofi. 2009. *A grammar of Pichi*. Nijmegen: Radboud University Nijmegen dissertation. Online: http://hdl.handle.net/2066/79407.
Yakpo, Kofi. 2010. *Gramática del Pichi*. (Laboratorio de recursos orales 13.) Barcelona: Ceiba Ediciones.
Yakpo, Kofi. 2012. Reiteration in Pichi: Forms, functions and areal-typological perspectives. *The morphosyntax of reiteration in creole and non-creole languages* (Creole language library 43), ed. by Enoch O. Aboh, Norval Smith, and Anne Zribi-Hertz, 251–84. Amsterdam: John Benjamins.
Yakpo, Kofi. 2013. Wayward daughter: Language contact in the emergence of Pichi (Equatorial Guinea). *Journal of African Languages and Linguistics* 34.275–99. DOI: 10.1515/jall-2013-0009.
Yakpo, Kofi. 2016. 'The only language we speak really well': The English creoles of Equatorial Guinea and West Africa at the intersection of language ideologies and language policies. *International Journal of the Sociology of Language* (Special issue: *Exploring glottopolitical dynamics in Africa: The Spanish colonial past and beyond*, ed. by Susana Castillo-Rodríguez and Laura Morgenthaler García) 2016(239).211–33. DOI: 10.1515/ijsl-2016-0010.
Yakpo, Kofi. 2017. Unity in diversity: The homogeneity of the substrate and the grammar of space in the African and Caribbean English-lexifier Creoles. *Language contact in Africa and the African diaspora in the Americas: In honor of John V. Singler* (Creole language library 53), ed. by Cecelia Cutler, Zvjezdana Vrzić, and Philipp Angermeyer, 225–50. Amsterdam: John Benjamins.
Yakpo, Kofi. 2018. ¿El nacimiento de una lengua afrohispana?: La influencia del español en el idioma criollo inglés de Guinea Ecuatorial. *Trans-afrohispanismos: Puentes culturales críticos entre África, Latinoamérica y España*, ed. by Dorothy Odartey-Wellington, 243–59. Leiden: Brill. DOI: 10.1163/9789004364080_015.
Yakpo, Kofi. 2019a. *A grammar of Pichi*. (Studies in diversity linguistics 23.) Berlin: Language Science. DOI: 10.5281/zenodo.2546450.
Yakpo, Kofi. 2019b. Inheritance, contact, convergence: Pronominal allomorphy in the African English-lexifier Creoles. *English World-Wide* 40.202–27. DOI: 10.1075/eww.00028.yak.
Yakpo, Kofi. 2020. Social factors. *The Routledge handbook of language contact*, ed. by Evangelia Adamou and Yaron Matras. London: Routledge, to appear.
Yakpo, Kofi, and Pieter Muysken. 2017. Language contact and change in the multilingual ecologies of the Guianas. *Boundaries and bridges: Language contact in multilingual ecologies* (Language contact and bilingualism 14), ed. by Kofi Yakpo and Pieter C. Muysken, 3–19. Berlin: De Gruyter Mouton.
Yip, Moira. 2002. *Tone*. Cambridge: Cambridge University Press.
Zamora, Armando. 2010. *Gramática descriptiva del fá d'ambô*. Barcelona: Ceiba Ediciones.
Zamponi, Raoul. 2009. Focus in Fang and other Bantu A70 languages. Siena: Università degli Studi di Siena, ms. Online: https://www2.hu-berlin.de/predicate_focus_africa/data/Zamponi_-_Focus_in_Fang.pdf.

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