Bantu Spirantization

Morphologization, lexicalization and historical classification*

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This paper examines the irregular application of the sound change commonly known as 'Bantu Spirantization (BS)' — a particular type of assibilation — in front of certain common Bantu morphemes. This irregularity can to a large extent be explained as the result of the progressive morphologization (through 'dephonologization') and lexicalization to which the sound shift was exposed across Bantu. The interaction with another common Bantu sound change, i.e. the 7-to-5-vowel merger, created the conditions necessary for the morphologization of BS, while analogy played an important role in its blocking and retraction from certain morphological domains. Differing morpho-prosodic constraints are at the origin of the varying heteromorphemic conditioning of BS. These uneven morphologization patterns, especially before the agentive suffix *-i*, were entrenched in the lexicon thanks to the lexicalization of agent nouns. The typology of Agent Noun Spirantization (ANS) developed in this paper not only contributes to a better understanding of the historical processes underlying the varying patterns of BS morphologization and lexicalization, but also to internal Bantu classification. The different ANS types are geographically distributed in such a way that they allow to distinguish major Bantu subgroups. From a methodological point of view, this article thus shows how differential morphologization and lexicalization patterns can be used as tools for historical classification.

Keywords: historical classification, lexicalization, morphologization, dephonologization, Bantu, spirantization, assibilation, agent nouns

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1. Introduction

The most common and archaic manner of deriving agent nouns from verbs in Bantu is through the use of the nominal prefix *mʊ- refering to human beings and the agentive suffix *-i. Both affixes have been reconstructed into Proto-Bantu (PB) (Meeussen 1967).[1] The *-i suffix is attached to the right of the verb stem and often affects the latter's final consonant, as can be observed in the examples from Taabwa in (1).

(1) Agent noun derivation in Taabwa

-end̲-a	"to travel"	→	*mu-enz̲-i* "traveller"
-lind̲-a	"to watch"	→	*mu-linz̲-i* "watchman, guardian"
-land̲-a	"to talk"	→	*mu-lanz̲-i* "talkative person"
-bumb̲-a	"to make clay pots"	→	*mu-bumv̲-i* "potter"

The sound shift which the final consonants of the verb stems in (1) undergo is commonly known as Bantu Spirantization (BS) and its application, as discussed in detail below, applies more broadly than just before the agentive suffix. In this specific morphological context, the sound shift will be referred to as 'Agent Noun Spirantization' (ANS). However, as can be seen in (2), BS does not systematically apply in this environment, even in a given language.

(2) Irregular application of Agent Noun Spirantization in Taabwa

-lob̲-a	"to fish"	→	*mu-lob̲-i* "fisherman"
-and̲-a	"to win"	→	*mu-and̲-i* "winner"
-lemb̲-a	"to decorate"	→	*mu-lemb̲-i* "decorator"
-luk̲-a	"to plait"	→	*mu-luk̲-i* "plaiter"

In this paper, I will argue that the irregular application of BS before this and other morphemes can be accounted for as a result of the variable degrees of morphologization and lexicalization to which this sound change has been exposed. Moreover, I will claim that these patterns of morphologization and lexicalization are synchronically distributed across Bantu in a way that is diachronically relevant to historical Bantu subgrouping.

Morphologization and lexicalization are such common processes that they would need no introduction, except that both have been conceptualized in a variety of ways in historical linguistics. I will therefore define how I conceive them and explain how they are involved in BS.

1. Agentives of this type are predominantly found in the human-referent noun classes 1–2, but can also be found in other classes, to refer for instance to related abstract concepts, e.g. *-gòd- "barter, buy", *mʊ-gòdì "buyer, seller, tradesman", *bʊ-gòdì "goods, price" (Bastin & Schadeberg 2003).

Joseph & Janda (1988) have described morphologization as the historical shift from both syntax and phonology into morphology via respectively 'desyntacticization' and 'dephonologization'. Morphologization through 'desyntacticization', i.e. a change from an autonomous word to an affix, is to a great extent identified with grammaticalization in the literature (Idiatov 2008). In this respect, the "univerbation of a loose syntactic structure into a morphologically complex word whereby the constituent order becomes petrified in morphotactic regularity", especially in verb forms, is without doubt the most commonly studied type of morphologization in Bantu (Güldemann 2003: 183). Morphologization through 'dephonologization', whereby morphophonological alternations cease to be part of the productive phonological system but remain as signals of morphological structure, has been thoroughly documented within Indo-European studies (Joseph & Janda 1988, McMahon 1994, Spencer 1998). Examples from Bantu are less common (e.g. Hyman 2003a), but their extremely agglutinative character is particularly appropriate for this type of morphologization. The great variety of morphemes that can be affixed to the verbal base frequently induces morphophonological alternations, which may then become morphologized. Such is the case with BS, originally triggered by the PB high vowels *i and *u of several verbal derivational and inflectional suffixes, such as the agentive morpheme discussed above. The morphophonological alternations generated by these suffixes could, in certain languages, no longer be predicted from the phonological context due to a restructuring of the vowel system. Because of this, BS did not fade away, but turned into a morphological fact. In other languages, in contrast, analogical levelling prevented the full morphologization of BS.

Lexicalization, when used in a synchronic sense, refers to the way in which conceptual categories are realized in language through word formation strategies or onomasiological processes (Blank 2003, Brinton & Traugott 2005). In its diachronic sense, historical linguists have conceived of lexicalization in a number of conflicting ways, as discussed extensively in Brinton & Traugott (2005). Like morphologization, lexicalization may represent developments arising out of an earlier phonological stage (Janda 2003). In the present paper, I use lexicalization primarily to refer to the integration into the lexicon of words resulting from regular word formation processes, especially derivation. One of the common morphemes triggering BS is the deverbal agentive suffix *-i discussed above. In contrast to other types of BS occurring in front of a heteromorphemic front high vowel, ANS is involved in a word formation strategy that easily results in the 'conventionalization' or 'institutionalization' of the newly created words. Agent nouns created in this way become stored as acceptable and frequently used items of a language's lexicon. As a result, they become increasingly independent of their verbs of origin and may start to acquire a more specialized or fixed meaning (Bauer 1992, Brinton &

Traugott 2005). They undergo 'degrammaticalization' in the sense that they are linguistic signs formed by the rules of grammar, but no longer perceived in this way, rather simply as lexical entries (Ramat 1992: 550–551). Through time, these agent nouns may even become lexicalized in the sense that they deviate in form and/or meaning from what can be formed according to synchronically productive rules (Antilla 1989: 151, Bauer 1992: 561). For this reason, agent nouns are particularly suitable for detecting changes over time in morphologization patterns that have been progressively entrenched in the lexicon. Within individual Bantu languages, earlier derived agent nouns often behave differently as regards BS than more recently derived agent nouns. From a comparative perspective, morphologically identical and cognate agent nouns derived from the same verb stem often display variable BS behaviour across Bantu languages. This irregular application of BS in front of the agentive suffix indicates that the sound shift has not been morphologized to the same extent in all Bantu languages and that these different degrees of morphologization are reflected in the lexicon. The different ways in which nouns are spirantized in Bantu can be reduced to five common ANS types.

Interestingly, these five ANS types are not distributed randomly across Bantu languages. Their geographical patterning shows that the extent to which BS morphologized is historically significant. Since it is an innovatory feature that is rather unlikely to be spread through contact, it can be considered as significant for defining historical subgroups within Bantu. Although several studies have dealt with the morphological conditioning of BS, often even from a comparative perspective (Bastin 1983, 1986, Downing 2007, Kula 2000b, 2002, Hyman 2003a), Labroussi (1999) is the only one to have done this from a genuinely historical perspective. Her paper focuses, however, on a particular region of the Bantu area: the Lake Corridor area in southwestern Tanzania. A global historical-comparative approach to the phenomenon of BS morphologization, such as the one developed in this paper, has not been undertaken previously. It is — to my knowledge — the first study to use differential morphologization and lexicalization as tools for wide-scale historical Bantu subgrouping. This paper therefore contributes to the detection of pertinent non-lexicostatistical evidence for internal Bantu classification, which has so far been difficult to find (Nurse & Philippson 2003b).

In sum, this article shows how BS has become morphologized in various ways across Bantu languages, how these different degrees of morphologization are reflected in the lexicon through the lexicalization of deverbal agent nouns which have undergone BS unevenly across the language family, and how the geographical distribution of these different ANS types can be used to refine historical Bantu classification. In §2, I introduce the uninitiated reader into the basics of Bantu classification. In §3, I present the phonetic characteristics and origin of BS. In §4, I discuss the diachronic phonetic evolution of BS and its implications for Bantu

language history. The interaction between BS and another common Bantu sound shift, i.e. the 7-to-5-vowel merger, and the role the latter played in the morphologization of BS are considered in §5. In §6, I present the functioning of BS as a synchronic morphophonological alternation. In §7, I briefly come back to the interaction between morphologization and lexicalization as regards ANS. In §8, an ANS typology is developed. In §9, I argue that analogical change had an important impact on the uneven morphologization of BS across Bantu. In §10, I consider the historical significance of the geographical patterning of ANS types in terms of Bantu classification. The conclusions are presented in §11.

2. An introductionary note on Bantu classification

Since this paper deals with historical aspects of BS, the uninitiated reader may need a concise introduction into Bantu language classification. The term 'Bantu' in this paper stands for 'Narrow Bantu', thus excluding the closely related 'Bantoïd' languages from NW-Cameroon and SE-Nigeria, often considered as part of 'Wide Bantu'. Historically speaking, there is no agreement on how to define 'Bantu' (Nurse & Philippson 2003a). For lack of indisputable innovations, there is no clearcut split between 'Narrow' and 'Wide' Bantu languages. They form a linguistic continuum rather than two clearly distinct branches of the Southern Bantoïd subgroup of Benue-Congo, itself one of the main branches of the Niger-Congo phylum.

'Bantu' conventionally stands for 'Guthrie's Bantu languages'. The classification of Guthrie (1967–1971) is the most widely used reference tool for comparative Bantu studies. He subdivided the Bantu languages, on both typological and geographical grounds, into 15 'zones' (represented by a capital letter) and each of these zones into 'groups' (referred to by decimal numbers). Guthrie's classification is purely referential, and, contrary to what non-Bantuists might assume, not historically motivated. It provides an approximate geographic location where a particular language is spoken, which is convenient given the large number of Bantu languages. For this reason, every Bantu language mentioned for the first time in this paper will be followed by its Guthrie reference code (capital letter, decimal number and sometimes a lower-case letter, which refers to a dialect). There have been several attempts to make Guthrie's classification more historically valid. Only the so-called zone J, a 16th zone which merges part of Guthrie's original zones D and E, has found some support and is also adopted in this paper (Bastin 1978, 2003). Languages having a three digit number code or a two digit number code followed by a capital letter were not part of the original Guthrie classification, but were incorporated in Maho's (2003) update. Map 1 in the Appendix represents Guthrie's zones plus zone J.

For the historical (internal) classification of Bantu languages, no global proposal has achieved unanimous approval yet (Schadeberg 2003b). Most attempts have applied lexicostatistics, Bastin et al. (1999) being the most recent and comprehensive one. Subclassifications based on the classical comparative method, that is on non-lexical innovatory features, are far less common and certainly do not result in the straightforward genealogical trees which lexicostatistics generates. The most recent attempt towards such a non-lexically-based classification has been Nurse & Philippson (2003b). The results of both types of classification methods are not necessarily dramatically different. Approximately the same subgroups emerge most of the time.

The real debate surrounds the internal relationships between them. It is generally acknowledged that there is considerably more historical diversity in the western part of the Bantu domain than in the eastern part. The latter comprises the East Bantu subgroup, whose internal coherence is widely accepted, consisting of a large Northeastern Savanna group in the north and several smaller groups in the south (Nurse & Philippson 2003b). In the West, however, there are at least 5 distinct major subgroups, whose historical interrelations are not so well established: North-West Bantu (Guthrie's zone A + B10/(20)/30, Lebonya/Boan-Bantu (C42–5, D12, D23, D32–3), Inner Congo Basin Bantu (most of zone C), West-Coastal Bantu (B40–80 + most of zone H) and South-West Bantu (most of zones K and R, L10+50). While the first two western subgroups are supposed to form primary offshoots of the Proto-Bantu nucleus, the latter three probably go back to an intermediate common ancestor, sometimes labelled as 'Narrow West Bantu' (Vansina 1995). I adopt here the subgroups and their names as coined by Vansina (1995), whose classification actually is a summarized preview of the more complex study subsequently published in Bastin et al. (1999). The geographical distribution of these subgroups is represented on Map 2 in the Appendix.

A major issue in historical Bantu studies is the question whether East Bantu is a primary Bantu branch (Bastin et al. 1999, Coupez et al. 1975, Möhlig 1981) or a later offshoot from a western Bantu node (Ehret 2001, Heine et al. 1977, Henrici 1973). According to the latter hypothesis, East Bantu would constitute, together with more or less the West-Coastal Bantu and South-West Bantu subgroups, a greater subgroup called 'Savanna Bantu' as opposed to the remainder of the Bantu languages, the so-called 'Forest Bantu' languages (Ehret 2001). However, the subdivision between Forest and Savanna Bantu is a simple geographical subdivision, rather than a historical split between two major Bantu branches. Grégoire (2003) has demonstrated for instance that the forest is an area of great linguistic diversity. Nurse & Philippson (2003b) have shown that several 'Savanna' languages from the western part of the Bantu share several innovations with the Forest languages to their north, which they do not have in common with the 'Savanna' languages

from the East. The current closeness between certain Savanna Bantu languages originally belonging to distinct subgroups is most likely the result of a long period of intensive contact and convergence. On Map 2 in the Appendix, the Forest/Savanna split is plotted on that of the major genealogical Bantu subgroups. It is clear that this geographical/environmental subdivision coincides by no means with the historical subgrouping. As I will show in §4 below, Bantu Spirantization has been one of the innovations, which has been mistakenly considered characteristic of 'Savanna Bantu'.

3. The phonetic characteristics and origin of Bantu Spirantization

The consonant system reconstructed for Proto-Bantu (PB) is relatively simple. Apart from the prenasalized consonants, three modes of articulation have been reconstructed, as shown in (3): voiced stops, voiceless stops, and nasals (Meeussen 1967, Schadeberg 2003b).

(3) Proto-Bantu simple consonants

*p	*t	*c	*k
*b	*d	*j	*g
*m	*n	*ɲ	

The consonantal systems of most modern Bantu languages are generally more complex in manner of articulation. Bantu Spirantization (BS) contributed significantly to this by creating fricatives and/or affricates.[2] Spirantization in Bantu linguistics does not exactly stand for "the replacement of plosives through homorganic fricatives" (Bussmann 1996: 450). BS actually is the common denominator for the effect exerted by the PB high front and back vowel on preceding stop consonants. The Nyamwezi (F22) examples given in (4) illustrate this effect. The reflex of PB *d in front of the high vowels *i and *u (4a) is clearly distinct from its reflex in front of non-high vowels (4b).

(4)

	PB (Bastin & Schadeberg 2003)[3]		Nyamwezi (Bastin & Schadeberg 1992)
a.	*-dím-	"to extinguish"	> -*zimá*
	*-dùb-	"to fish"	> -*zuβa*
b.	*-dìm-	"to cultivate"	> -*lɪma*

2. However, BS is certainly not the sole source of fricatives or affricates in modern-day Bantu languages.

3. Unless indicated differently, all lexical reconstructions given in this article are taken from the online database *Bantu Lexical Reconstructions 3* (Bastin & Schadeberg 2003, last consultation: 01-04-2008).

*-dúk-	"to vomit"	>	*-lʊ́ká*
*-dèd-	"to bring up"	>	*-lela*
*-dác-	"to shoot at (bow)"	>	*-lasá*

The phonetic output of this change varies significantly across Bantu languages and may be unusual from a cross-linguistic point of view. It is a widespread complex of changes involving both mode and articulation place (Hyman 2003b, Maddieson 2003, Schadeberg 1994–95: 75). For a comprehensive overview of phonetic outputs, the reader is referred to Janson (2007). Nonetheless, the outcome of BS is most often a sibilant, either a fricative or an affricate. Assibilation might therefore be a more appropriate term (Coupez 1954, Bastin 1983), even more so because BS shares three more 'universal' properties with assibilation processes observed in other languages of the world: (a) the input segment is a stop; (b) the trigger is a high (most often front, but also back) vowel; (c) the trigger is always to the right of the target (Clements 1999, Hall et al. 2006, Hall & Hamann 2006, Kim 2001).[4]

At the same time, BS also manifests certain particularities with reference to universal assibilation tendencies. Assibilation is more commonly related to coronals (Hall & Hamann 2006), while labials and velars undergo similar mutations in Bantu. Another particularity is the phenomenon known as 'liquid spirantization' (Downing 2001). In Bantu, not only stops, but also liquids like /r/ and /l/ can be affected by BS leading to the same phonetic outputs, as specifically shown by the Jita (J25) examples in (9) below, but also by many other cases throughout this paper. Liquids in present-day Bantu languages are mainly reflexes of the stop *d. However, the historical relationship between the stop /d/ and the liquids /l/ and /r/ is more complex than that between a proto-sound and its current-day reflexes. In certain Bantu languages, *d is maintained as [d] before the front (and back) high vowel, but realized as [l] or [r] before other vowels (Hyman 2003b: 54). This allophonic variation *[d]/_{i u} vs. *[l/r] has been reconstructed into PB (Schadeberg 2003b, Stewart 1993). The most likely morphological context in Bantu for such an alternation is the concatenation of a verb root and suffix, as shown for instance by the Jita examples in (9). It is only in this context that 'liquid spirantization' occurs. This synchronic heteromorphemic BS of liquids always parallels the diachronic tautomorphemic BS of *d, both mutations always having the same phonetic outcome. It can therefore be safely assumed that liquid BS has its origin in an inherited allophonic variation and can actually be seen as the mutation of a stop.

4. Hall & Hamann (2006: 1197) consider 'spirantization' (t→s/_i) as a subtype of assibilation, along with 'affrication' (t→ts/_i) and 'posteriorization' (t→tʃ/_i). Other — less appropriate — designations for BS are '(historical) palatalization' (Kahigi 1988, Good 2005), or simply 'consonant mutation' (Kisseberth & Abasheik 1975, Myers 1992–1994).

With respect to the origins of BS, a major issue of debate is the original phonetic character of the vowels that trigger(ed) the sound shift. PB has been reconstructed with a four-height system of 7 vowels with two degrees of high vowels. The notations presented in (5) are the two most common ways of transcribing these inventories.

(5) a. *ị *ụ b. *i *u
*i *u *ɪ *ʊ
*e *o *e [ɛ] *o [ɔ]
*a *a

These notation systems reflect fundamentally different phonetic characterizations of the two highest degrees of vowels. The system in (5a) is the classical one which builds on the hypothesis of Meinhof (1899), the first to reconstruct seven vowels for Proto-Bantu. He considered the highest vowels as *schwer* ('heavy'), more commonly called 'superclose'. The highest vowels were thus thought to have an unusual phonetic quality, and the main reason to do so was precisely the fact that they trigger BS. More recently, Maddieson (2003: 19–20) presents a number of synchronic phonetic facts which would combine to suggest that "the distinctive characteristics of these original vowels was indeed an unusually narrow constriction, nearly consonantal in character". Connell (2007) has suggested that the PB high vowels were fricative vowels, similar those currently observed in Mambila (Bantoid). The major objection against these theories is the fact that such 'superclose' vowels are nowhere (convincingly) attested in Bantu today. Phonetically speaking, the highest vowels in all present-day 7V languages are always [i] and [u], and their entire vowel system is much closer to the one in (5b) (Bastin & Schadeberg 2003, Hyman 2003a, Schadeberg 1994–1995, 2003b, Stewart 2000). The vowels of the second height actually display more variation. Certain current 7V languages have exactly the same system as in (5b), others have mid vowels [e] and [o] instead of [ɪ] and [ʊ]. The latter were probably the original PB second height vowels. They are not only universally far more uncommon than their mid counterparts (Maddieson 1984), which makes a shift [e]/[o] > [ɪ]/[ʊ] less likely. They are also attested in the vowel systems of historically related non-Bantu Niger-Congo languages (Stewart 2000). I will therefore use the system in (5b) for the Bantu lexical reconstructions presented in this paper, though this is not directly relevant to BS.

Adherents of the 'superclose vowels' theory, like Connell (2007), question what the connection between the highest Bantu vowels and BS might have been if the production of these vowels did not involve frication. Noise accompanying the transition between the stop and the high vowel is indeed held responsible for having triggered BS, possibly involving aspiration (Hyman 2003a). However, this frication is not necessarily inherently linked to the high vowel. It is more likely just

the brief period of turbulence that occurs at the release of a stop into a high vocoid which has been demonstrated to be at the origin of assibilation/spirantization in several other languages of the world (Clements 1999, Hall & Hamann 2006, Hall et al. 2006, Kim 2001).

4. The phonetic evolution of Bantu Spirantization and its historical implications

Bantu Spirantization (BS) has not been reconstructed into Proto-Bantu (PB). Nevertheless, in respect of what has been stated in §3 above, it would not be implausible that it had already occurred in PB as an allophonic variation of stop consonants in front of high vowels. It is obvious that even if BS did not occur in PB, at least its phonetic seeds were already present in PB. Each PB daughter language essentially fulfilled the basic conditions for BS to be triggered. This explains why the sound change is so widespread. On the other hand, its effects are completely absent from a good number of modern Bantu languages, and a 'de-spirantization' scenario cannot be substantiated. This is the main reason for not reconstructing it in PB. Being post-PB but very widespread, the question arises whether this sound change can serve to elucidate internal Bantu classification. Should it be considered as an innovation affiliating all languages that attest it to a common ancestor not shared with languages that do not exhibit traces of BS? Or could its widespread distribution instead be the result of intensive contact within the huge convergence area the Bantu languages have formed for centuries? The most prudent but least satisfying answer is no doubt that "the phenomenon has its source in a complex mix of genetic and diffusional mechanisms" (Hinnebusch et al. 1981: 41). It is undeniably true that both genetic and contact events have played a role in the currently widespread distribution of BS, but is it possible to distinguish between them? Most historical approaches to BS have focussed on its phonological aspects and its relationship with the 7-to-5-vowel merger (7>5V), another widespread Bantu sound change, which I will discuss in §5 (Hinnebusch et al. 1981, Janson 2007, Möhlig 1981, Mpiranya 1997, Nurse 1999, Nurse & Hinnebusch 1993, Nurse & Philippson 2003b, Schadeberg 1994–1995).

From a phonetic point of view, assibilation is a widespread sound shift (Bhat 1978, Foley 1973, Maddieson 2003). In a recent typological study, Hall & Hamann (2006) examined the phenomenon in over 30 languages from different language families, only seven of them Bantu and one, non-Bantu Niger-Congo. It is thus certainly not a sound change restricted to Bantu. Even within Bantu, BS is attested in languages peripheral to its main distribution area. BS mainly occurs in the so-called 'Savanna Bantu' languages. While it might, then, be taken as a distinctive Savanna

innovation in support of an assumed historical split between Forest and Savanna Bantu, there is no strong support for this. BS has also been reported in certain Forest Bantu languages (Nurse & Philippson 2003b: 174, Schadeberg 1994–1995: 83), see e.g. the Mongo (C61) examples in (24) below. Map 3 shows the geographical distribution of BS. Moreover, related phenomena have been observed in languages of other Benue-Congo subgroups (Connell 2000, 2007, Hyman 1972), while there are also several Savanna Bantu languages which are not affected by BS (Nurse & Philippson 2003b: 174, Schadeberg 1994–5: 83), as can be seen on Map 3. The mere assibilation/spirantization of stop consonants in front of high vowels is thus a far too common phenomenon, both inside and outside Bantu, to be valid indicator of common ancestry. The inherited properties of the PB highest vowels obviously allowed BS to be triggered repeatedly and independently and at different times in different Bantu subgroups, producing not only varied results across languages, but also frequently identical outcomes (Ehret 1999: 54, Maddieson 2003: 19). As a consequence, the successive sound changes induced by BS are too natural to allow for distinguishing major subgroups within Bantu. As stated above, the noisy release of a stop into a high vowel is assumed to be the trigger of BS, possibly accompanied by aspiration. This in turn would give rise to affrication, which may result through 'de-affrication' into fricatives. These may be further weakened into glottal fricatives and eventually vanish entirely (Hyman 1997, 2003a, Janson 2007). Abstracting from an often more complex phonetic reality, this pathway is schematized in (6):

(6) Possible evolution of PB *di/*ti sequences

PB	Noisy release/ aspiration		Affrication		De-affrication		Weakening		Loss
*di	>	*$d^h i$*	>	*dzi*	>	*zi*	>	*hi*	>	*i*
*ti	>	*$t^h i$*	>	*tsi*	>	*si*	>	*hi*	>	*i*

All steps are synchronically attested in Bantu (Hyman 2003a, Janson 2007),[5] but their outputs are geographically distributed in such a way that they do not allow to distinguish major subgroups. De-affrication is too common and must have taken place independently at distinct stages in Bantu language history, as the scattered synchronic distribution of affricates resulting from BS testifies (Janson 2007). Even such a highly marked and structurally drastic phonetic change as 'spirant-devoicing', ensuing from BS and having a particular distribution within East Bantu, does not lend itself to a straightforward historical interpretation (Labroussi 2000). Only within relatively small-scale language groups, such as North-East Coastal

5. The output of the first step is the less frequent one, but it occurs for instance in Ikalanga (S16) (Mathangwane 1998). In wider Bantu, such forms have for example been noted in Fe'Fe'-Bamileke (Hyman 1972).

Bantu or Sabaki, does the chronological ordering of BS outcomes lead to the successful reconstruction of internal relationships (Hinnebusch et al. 1981, Nurse & Hinnebusch 1993). Other shifts, such as weakening to a glottal fricative or total loss, are less common, but too localized to be of use for the reconstruction of early Bantu language history (Janson 2007). Hence, it is no surprise that Nurse & Philippson (2003b: 174) conclude that BS is not a useful indicator for major Bantu subgroups. On the other hand, even if contact has to be acknowledged as a vital force in Bantu history, it is also not plausible that the overall distribution of BS could be the result of a wave-like spread across language boundaries, as proposed by Janson (2007). Such a contact-driven diffusion of sound change starting in a focal area and spreading partly to transitional areas, but leaving untouched relic areas, may be a valid explanation for the spread of BS within particular dialectal areas. However, as I argue in §10, it does not explain how BS could have come to affect almost the entire Bantu area.

5. Bantu Spirantization and the 7-to-5-vowel merger

It is well known that most Bantu languages have reduced the 7V system of Proto-Bantu (PB) through the loss of the original opposition between the two highest vowel heights. While certain Bantu languages replaced the rather atypical second-height vowels [ɪ] and [ʊ] by the more canonical mid vowels [e] and [o], most Bantu languages just dropped them.

As Map 3 in the Appendix shows, Bantu Spirantization (BS) and the 7-to-5-vowel merger (7>5V) are historically closely knit sound shifts. Most Bantu languages have undergone both changes. Only few have undergone BS but not 7>5V, while (almost) no languages have undergone 7>5V but not BS.[6] In all languages having been subject to both shifts, BS must have preceded 7>5V (Schadeberg 1994–5: 78). It is clear that 7>5V has rarely taken place without having been preceded by BS. In contrast, although BS does not necessarily induce 7>5V, it makes it easier at least, since the original vocalic opposition can be given up without causing loss of phonological distinctiveness. Lexical items that originally contained distinct high vowels have not become homonyms. On the other hand, a significant implication of 7>5V is the fact that it irreversibly turns BS from an allophonic variation into a phonological distinction. In languages where this was not the case

6. Exceptional cases of 5V languages without BS are Lengola (D12) (Stappers 1971) and Lozi (K21) (Janson 1991–1992). In the latter case, it is well-known that the original Sotho (S32) 7V system was reduced to a 5V system only recently under substrate influence of local Zambian languages, all having 5V (Gowlett 1989).

yet, the new consonant series created by BS inevitably became phonemic, at least in a basic descriptive sense.[7] In all 5V languages, the original vocalic opposition was thus transphonologized to a consonantal opposition (Hyman 2003a: 56). The Ciluba (L31a) reflexes of the PB sequences *bu/*bʊ and *bi/*bɪ in (7) illustrate this. We see the fusion of the two highest PB vowel heights, but the emergence of an opposition between fricative and plosive consonants in stem initial position.

(7)	PB (Bastin & Schadeberg 2003)		Ciluba (Kabuta 2006)
	*-bùd- "to become plentiful"	>	*-vul-*
	*-búd- "to break, smash"	>	*-bùl-*
	*-bìtá "war"	>	*m-vità*
	*-bíd- "to call"	>	*-bìl-*

Another important impact of 7>5V on BS is the fact that it created the conditions necessary for its morphologization. Unlike what the advocates of the 'superclose vowels' hypothesis tend to believe, it is not the vowels responsible for BS which disappeared in 5V languages, but the second height vowels. The highest degree vowels of today's 5V languages phonetically correspond to the highest degree vowels of the remaining 7V languages, and not to their second height vowels. On the other hand, one needs to assume that BS was blocked, once the vowel merger had taken place. Otherwise, the original *Ci/*Cɪ and *Cu/Cʊ oppositions would have entirely vanished in the 5V languages. Nevertheless, while 7>5V was irreversible, BS was not entirely wiped out in all languages. Its effects can still synchronically be observed as morphophonological alternations (see §6). 7>5V did not turn BS into a fully unproductive sound shift that just left diachronic morpheme-internal traces. While BS initially was an across-the-board phonological process, it has acquired varying morphological restrictions in current-day languages.

6. Bantu Spirantization as a synchronic morphophonological alternation

There are four well-defined contexts in which Bantu Spirantization (BS) is regularly observed as a morphophonological alternation: in front of 1) the adjectival derivation suffix *-u; 2) the causative suffix *-i-;[8] 3) the agentive suffix *-i, and 4) the

7. In certain languages, convergent sound changes, e.g. *c > *s* or *j > *z*, led to identical outcomes as BS, so that the appearance of these sounds was already no longer predictable from the context before 7>5V.

8. This suffix not only adds causative semantics to the verb, but also increases its valence.

perfect and/or past tense suffix *-ide (Bastin 1983, Hyman 2003a, Labroussi 1999).[9] Examples of BS in these three contexts are given in (8), (9), (10), and (11) below.

(8) Adjective derivation suffix *-u* (< *-u) in Nyakyusa (M31) (Felberg 1996)

-kíb-a	"be brave"	→	*-kíf-ú*	"brave"
-gand-a	"emaciate"	→	*-gaaf-ú*	"emaciated"
-nyagaluk-a	"get well"	→	*-nyagaluf-ú*	"appetizing (food)"
-katal-a	"become tired"	→	*-kataf-ú*	"weary, weak, faint"

(9) Causative suffix -y- (< *-i-) in Jita (Downing 2001: 4)[10]

okw-é: r-a	"to be clean"	→	*okw-é: s-y-a* (*-céd-)[11]
oku-lir-a	"to cry"	→	*oku-lis-y-a* (*-dɪ̀d-)
oku-kor-a	"to do"	→	*oku-kos-y-a* (*-kód-)
oku-βúr-a	"to get lost"	→	*oku-βús-y-a* (*-búd-)
oku-sír-a	"to send"	→	*oku-sís-y-a*
oku-te: m-ér-a	"to cut for"	→	*oku-te: m-és-y-a* (*-tém-ɪd-)
oku-kum-ír-a	"to heap for"	→	*oku-kum-ís-y-a* (*-kúm-ɪd-)

(10) Agentive suffix *-i* (< *-i) in Hunde (J51) (Kaji 1992)

i-anul-a	"to explain"	→	*mu-anuts-i*	"s.o. who explains"
i-kôl-a	"to work"	→	*mu-kôts-i*	"worker"
i-bêh-a	"to lie"	→	*mu-bês-i*	"liar"
i-îb-a	"to steal"	→	*mw-îts-i*	"thief"

(11) Perfect suffix *-ye* (< *-ide) in Rundi (J62) (Meeussen 1959: 38–9)

-hit-	"to pass"	→	*-hít-ye*	→	*-híz-e*
-dúud-	"to hit"	→	*-dúud-ye*	→	*-dúuz-e*
-vúg-	"to say"	→	*-vúg-ye*	→	*-vúz-e*
-shik-	"to arrive"	→	*-shik-ye*	→	*-shits-e*

In the comparative Bantu literature, the causative suffix *-i- is the best-studied case of a BS triggering morpheme, undoubtedly because it triggers BS most consistently,

9. I use the term 'perfect', because it is more accurate and less ambiguous than the long established term 'perfective' that is traditionally given to this suffix. I am indebted to Derek Nurse for this suggestion.

10. The canonical position of this suffix is between the verb root and the inflectional final vowel. In most Bantu languages, this particular morpheme concatenation results in a disallowed vowel sequence that triggers glide formation as a hiatus resolution. The same is often the case for the perfect suffix, as seen in (11).

11. These lexical reconstructions are given as a reminder that Jita liquids are historically derived from the stop *d (see §2), as is the case in most other languages where BS synchronically affects liquids.

as I will show further on. The causative suffix can also most easily be contrasted with phonetically similar morphemes from the same paradigm of verbal derivational suffixes. In Jita, for instance, the applicative suffix *-ir-* manifests contrasting synchronic behaviour with the causative, in the sense that it does not trigger BS though it has a phonetically identical initial vowel, as can be seen in (12, Downing 2001: 2,5).[12]

(12)

oku-lamur-a	"to decide"	→	*oku-lamur-ir-a*
oku-kor-a	"to work"	→	*oku-kor-er-a*
oku-kúra	"to grow"	→	*oku-kur-ír-a*
oku-nyur-ur-a	"to pull"	→	*oku-nyur-ur-ir-a*

This contrast is not unique to Jita, but common in Bantu. The applicative suffix never triggers BS,[13] and different theoretical approaches have been developed to account for the divergent morphophonological behaviour of these synchronically phonetically similar morphemes (Downing 2001, 2007, Hyman 1994, Kula 2000a, b, 2002, Zoll 1995).[14] From a diachronic perspective, it is hardly surprising that these suffixes affect preceding consonants differently. The causative goes back to a PB high vowel, i.e. *-i-, while the applicative does not, i.e. *-ɪd- (Meeussen 1967, Schadeberg 2003a). Nonetheless, the contrasting synchronic behaviour shows that an unambiguously phonological process has become morphologized. The changed stem consonant is no longer predictably based on the phonological context alone.

The morphological conditioning of BS is even more clear in languages where the PB *-i- suffix no longer has an overt segmental reflex. The glide created as a hiatus resolution strategy may be absorbed into the spirantized consonant. This 'y-absorption' is illustrated in (13) with examples from Bemba (M42), where /sh/ stands for [ʃ].

12. In Bantu studies, the term 'applicative' is commonly used to designate the verbal derivational suffix that introduces benefactive semantics and increases the verb's valence so that it takes an extra object.

13. In certain Bantu languages, consonants undergo palatalization in front of the applicative and other suffixes (see for instance Hyman & Moxley 1996), but the resulting consonant is generally phonologically distinct from the output of causative spirantization. Lamba (M54), for instance, attests velar palatalization (k > c) before the applicative (-il-) and neuter (-ik-), e.g. -kak-a "to tie" > -kac-il-a, -kac-ik-a (Doke 1938: 186, 183). The output of velar causative spirantization is different (k > s), e.g. -ŵu: k-a "wake up" > -ŵu: s-y-a "arouse" (Doke 1938: 192).

14. A closely related instance of contrasting behaviour is their susceptibility to undergo vowel harmony (Downing 2001, 2007, Hyman 1999). While applicative and phonologically similar suffixes generally undergo vowel harmony, as can be seen in (12), the causative suffix *-i- does not.

(13)	*-end-a*	"to walk"	→	*-ensh-a*	"cause to walk" (Kula 2000a: 237)
	-pit-a	"to pass"	→	*-pish-a*	"cause to pass"
	-kul-a	"to grow"	→	*-kush-a*	"cause to grow"
	-pook-a	"to burst"	→	*-poosh-a*	"cause to burst"
	-lung-a	"to hunt"	→	*-lunsh-a*	"cause to hunt"

It is obvious that in such cases, the consonant mutation has a high functional load as morphological marker. While it only highlights a morpheme boundary in languages without '*y*-absorption', it takes over the function of causative marker in '*y*-absorbing' languages.[15] Hyman (2003a) has demonstrated at length how deeply entrenched these BS effects have become as a mark of a causative morphology in certain Bantu languages, and how, through analogical reanalysis, BS even applies in contexts where it cannot be justified historically.

Across Bantu, the causative suffix *-i- constitutes the most favourable context for heteromorphemic BS. Bastin (1986: 131–40) gives a representative overview of synchronic consonant reflexes in front of this suffix. The overall majority of the languages manifesting BS tautomorphemically also attest it — with or without '*y*-absorption' — in this particular context. This strong tendency towards BS can be attributed to the specific context of a C-*i*-V sequence, which is generally realized as [C*y*V]. In contrast to the other high vowel morphemes, the causative suffix is usually followed by the inflectional final vowel (IFV) of the verb. This vowel sequence favours the formation of a glide whose greater constriction facilitates BS (Bastin 1983: 25, Hyman 2003a: 58). This would explain why nearly all 5V languages attest BS in this specific context. The occurrence of BS in front of a high vowel followed by another vowel in several 7V languages, where BS is otherwise absent, reinforces this hypothesis. Such is the case in Tswana (S31), where BS only occurs before *-iV sequences, both morpheme-internally and before the causative suffix (Creissels 1999, 2007).

(14) a. BS in front of *-iV sequences in Tswana (Creissels 1999, 2007)

*-bíad-	"to give birth"	>	*-tsál-á*
*-bíada	"cross-cousin"	>	*n-tsálá*
*-bíʊk-	"to rise up"	>	*-tsúɣ-á*
*-gèd-i-a	"to try"	>	*-èts-á*
*-búʊd-i-a	"to ask"	>	*-búts-á*
*-njád-i-a	"to fill"	>	*-tɬáts-á*

15. This is not entirely true in languages such as Ganda (J15) (Hyman 2003a) and Haya (J22) (Trithart 1977), where the '*y*-absorption' is, under certain circumstances, compensated for by lengthening the following vowel.

b. Absence of BS in front of simple *-i in Tswana (Brown 1980)
*-bìmb- "thatch, hide" > *-bipa*
*-dímò "spirit" > *mo-dimo*

Along the same lines, Hall & Hamann (2006: 1201) propose that assibilation cannot be triggered by /i/ unless it is also triggered by the corresponding glide. BS in front of the causative suffix is thus a question of phonetic naturalness.

The other morphemes with an original high front vowel trigger BS much less consistently as a synchronic morphophonological rule. The examples in (15) and (16) show the absence of heteromorphemic BS in front of the agentive and perfect suffix, respectively, as opposed to its unfailing diachronic application within morphemes.

(15) Agentive suffix *-i* (< *-i) in Pende (L11) (Gusimana 1972)
-dig-a "to sell" → *mu-dig-i* "salesman"
-kub-a "to weave" → *mu-kub-i* "weaver"
but: *-gídà "bird" > *n-jila*
*-bíì "excreta" > *tu-ji*

(16) Perfect suffix *-ire* in Jita (Downing 2001: 5)
oku-gura "to buy" (< *-gòd-) → *-gur-ire*
oku-mira "to swallow" (< *-mìd-) → *-mir-ire*
oku-fú: ra "to undress" (< *-dúʊd-) → *-fu: r-ire*
but: examples in (9) in front of causative suffix +
*-dím- "to extinguish" > *oku-síma*
*-dìtò "heavy" > *-sito*

This variable behaviour of BS depending on the morpheme boundary indicates that morphological structure played an important role in the early conditioning of the sound change. While nearly all 5V languages attest tautomorphemic BS, they manifest considerable variation as regards its heteromorphemic application. As I will discuss in more detail in §9, BS originally applied across-the-board, but it was sometimes subsequently undone by analogy in certain morphological environments. It therefore acquired morphological status in certain languages, while it was totally banned as a morphophonological change in others. In the case of the high front vowel, several authors have observed a hierarchy of morphological contexts for the heteromorphemic application of BS (Bastin 1983, Hyman 2003a, Labroussi 1999). Due to the phonetic naturalness of assibilation in front of a glide, the causative suffix provides the most suitable environment. For reasons developed in §9, the perfect suffix constitutes the least likely environment. Bastin (1983: 28–37) found that BS occurs before the perfect suffix in no more than about 20 languages out of total sample of

about 150, which are fairly well clustered geographically.[16] Agent Noun Spirantization (ANS) takes an intermediate position in terms of Bantu-wide distribution.

7. Agent Noun Spirantization: morphologization and lexicalization

There is considerable variation in the extent to which deverbal agent nouns with the same morphological structure are spirantized across Bantu. In a preliminary study of Agent Noun Spirantization (ANS), I have shown that the present-day reflexes of four agent nouns with a more or less Bantu-wide distribution are not uniformly subject to Bantu Spirantization (BS). They manifest divergent frequency patterns in terms of their inclination towards BS (Bostoen 2005a).

These variable degrees of BS in front of the agentive suffix are interesting from a historical point of view. As observed in the introduction, once derived, agent nouns ending in *-i* become easily conventionalized in the lexicon, where they are no longer subject to morphological alternation and become conceived independently of their original verb. This is certainly not true for the perfect suffix, which is inflectional and thus linked to a particular morphosyntactic context. In the case of the causative, several cases of lexicalization — at their most extreme resulting in so-called 'pseudo-causatives' — have been reported (Bastin 1986, Good 2005, Grégoire 1979). Nevertheless, it is less automatic and frequent than with agent nouns.

Due to this high susceptibility to lexicalization, agent nouns ending in *-i* can often be considered as the fossils of a no longer active process from an earlier stage of the language. This is definitely the case in languages where this derivation type is no longer productive or at least in heavy competition with more recent and active mechanisms. Bemba, for instance, has numerous *-i* final agent nouns (17a), but the morphological structure with prefix *ka-* and final vowel *-a* has become a more productive way to derive agent nouns (17b) (Kula 2002: 108). Such competition between strategies may lead to lexical doublets, as in the case of the 'blacksmith' example below (White Fathers 1954).

(17) a. *-low-a* "to bewitch" → *mu-losh-i* "witch"
-lind-a "to watch, guard" → *mu-linsh-i* "guardian"

16. Bastin (1983) observed BS before the perfect in Sumbwa (F23), Shambala (G23), certain Swahili dialects (G40), Hehe (G62), Nyoro (J11), Nkore (J13), Ganda (J15), Haya (J22), Zinza (J23), Kerewe (J24), Shi (J53), Rwanda (J61), Rundi (J62), Ha (J66), Mambwe (M15), Nyiha (M23), Yao (P21), and Makonde (P23). From the data presented in Labroussi (1999), Fipa (M13), Lungu (M14), Lambya (M201) and Mwanga (M22) can be added. All of these languages are 5V languages spoken in the northeastern part of the Bantu domain, mainly in Tanzania, but also in nearby countries like Burundi, Rwanda, Uganda, Kenya and Mozambique.

	-bamb-a	"to kill game"	→	*mu-bamf-i*	"successful hunter"
	-ful-a	"to forge"	→	*mu-fush-i*	"blacksmith"
b.	*-pingul-a*	"to advise"	→	*ka-pingul-a*	"adviser"
	-tebet-a	"to prepare food"	→	*ka-tebet-a*	"cook"
	-teny-a	"to cause to miss"	→	*ka-teny-a*	"troublemaker"
	-ful-a	"to forge"	→	*ka-ful-a*	"blacksmith"

From this perspective, it can be questioned whether ANS should be considered a true synchronic morphophonemic alternation, as is generally done. Since this type of deverbal nouns tends to be easily lexicalized, it should rather be seen as fossilized evidence of the past impact of BS and its degree of morphologization. The fact that *-i* final agent nouns do not spirantize uniformly across Bantu shows that this process of morphological conditioning seems to have had a deeper impact on certain languages than on others.

8. Typology of Agent Noun Spirantization

This section presents the results of a comparative study of Agent Noun Spirantization (ANS). Instead of focusing on a limited set of agent nouns with a Bantu wide distribution as in Bostoen (2005a), large paradigms of this type of agent nouns (ending in *-i*) from more than 230 Bantu languages are compared. As many languages as possible were considered, from both the so-called 'Savanna' and 'Forest' Bantu languages. The bulk of the data presented in this paper have naturally been taken from 'Savanna' Bantu languages, since Bantu Spirantization (BS) is more common in this area. Such a systematic comparative survey of ANS has never been done and is necessary to gain a better understanding of the evolution of BS morphologization. This comparative study not only confirms that agent nouns are varyingly spirantized across Bantu, but also leads to the observation that different types of conditioning are involved. The variable ways in which agentive nouns are spirantized can be classified in five common ANS types: no ANS, full ANS, phonologically-restricted ANS, limited ANS and extensive ANS.

8.1 No Agent Noun Spirantization

In 'no ANS' languages, none of the *-i* final agent nouns manifests a consonant mutation compared to the verb from which it is derived. This pattern is expected in 7V languages, which do not even manifest BS tautomorphemically. It is also observed, however, in several 5V languages which do attest BS both morpheme-internally and before the causative suffix. As shown in (18), Shona (S10) is such a language.

(18) a. Tautomorphemic BS

*-p̱ìn-	"to squeeze"	>	-*sv̲in-a*		(Hannan 1974)
*-t̲íngà	"artery, vein"	>	*ts̲inga*		

b. Absence of ANS

*-za*r̲*-a*	"to give birth"	→	*mu-za*r̲*-i*	"parent"	(Hannan 1974)
-p̲-a	"to give"	→	*mu-p̲-i*	"giver"	
*-bi*k̲*-a*	"to cook"	→	*mu-bi*k̲*-i*	"cook"	
*-ro*t̲*-a*	"to dream"	→	*mu-ro*t̲*-i*	"(day-)dreamer"	

Causative BS is regular in Shona (Hannan 1974). As regards the perfect suffix *-ide, Shona only has it in residual forms, but these never manifest the effects of BS (Bastin 1983). An earlier study already showed, in fact, that several common Bantu agent nouns which are regularly spirantized in other languages are not spirantized in Shona (Bostoen 2005a). The examples in (18b) confirm this observation. All of the base verbs belong to widespread comparative series, going back to PB or early post-PB proto-forms, i.e. *-bíad- "to give birth to" (PB), *-pá- "to give"(PB), *-jìpık- "to cook, to boil", and *-dóot- "to dream" (PB). At least one of the derived nouns is known to be common in Bantu, i.e. *-bíad-i "parent". Bastin & Schadeberg (2003) have reported it in zones F, J, and M, but cognates can be found in at least three more zones, i.e. E, G, and S, all unvaryingly with the meaning "parent" (referring to both mother and father). It is thus likely to be a derived noun which Shona inherited as such, namely lexicalized, from an ancestor language. Agent nouns of *-dóot- and *-jìpık- also occur in several languages, but less frequently and with less standardized meanings. In Nyakyusa (M31), for instance, *undotí* means "astrologer" (Felberg 1996), while *umurôsi* in Rundi (J62) means "visionary (the one who makes dreams)" (Rodegem 1970) and *nloteri* in Sena (N44) "diviner", including the applicative suffix *-il-* (Albano 1939: 165). These are more likely to be independently derived nouns.

8.2 Full Agent Noun Spirantization

At the other extreme of the ANS continuum are the languages attesting full ANS. In these languages, the final consonant of agent noun ending in *-i* is consistently different from that of their basic verbal derivational stem. As can be seen in (19b), full ANS is found in Rundi (J62), where the adjunction of the suffix *-i* is the most productive derivational process for agent nouns (Meeussen 1959: 45). Rundi (J62) also manifests fully regular synchronic BS before the causative and perfect suffixes (Meeussen 1959) as well as diachronic BS tautomorphemically (19a).

(19) a. Tautomorphemic BS (Rodegem 1970)

*-b̲ímb-	"to swell"	>	-*vy̲îmb-a*

	*-dìbà	"pool"	>	*uru-ziba*
	*-pìk-	"to squeeze"	>	*-shik-a*
	*-tínà	"base tree trunk"	>	*igi-tsína*

b. Full ANS (Rodegem 1970)

-rób-a	"to fish"	→	*umu-róvy-i*	"fisherman"
-rer-a	"to educate"	→	*umu-rez-i*	"educator, tutor"
-tég-a	"to set a trap"	→	*umu-téz-i*	"s.o. who ambushes"
-rind-a	"to protect"	→	*umu-rinz-i*	"guardian"
-têk-a	"to cook"	→	*umu-têts-i*	"cook"
-mok-a	"to roar, to bawl"	→	*umu-mots-i*	"bawler"
-timb-a	"to beat"	→	*umu-timvy-i*	"drummer, drum-major"
-ûbah-a	"to respect"	→	*umw-ûbash-i*	"someone courteous"[17]
-bûr-a	"to prevent"	→	*im-bûz-i*	"prophet"
-búg-a	"to eat vulgarly"	→	*umu-búz-i*	"s.o. who eats vulgarly"
-ânk-a	"to oppose"	→	*umw-âns-i*	"enemy, opponent"

A systematic examination of the Rodegem (1970) dictionary confirms that all oral stops followed by the agentive suffix undergo BS in Rundi, voiced as well as voiceless, simple as well as pre-nasalized. As regards the first four examples of (19b), both the base verbs and the derived nouns are widely distributed throughout Bantu. Some of these verbs definitely go back to PB. Both their proto-forms and distribution areas are given in (20, Bastin & Schadeberg 2003). The distribution zones enumerated after the '+' sign are those not reported in Bastin & Schadeberg (2003).

(20)	Proto-form	Distribution
a.	*-dób- "to fish with line"	A B C F G H J K L M R S
	*-dóbì "fisherman"	J L + F M N S
b.	*-dèd- "to bring up"	B C E F G H J K L M N P R S
	*-dèdì "parent, wet-nurse, caretaker"	C J K L M + D E F G N R S
c.	*-tég- "to set a trap"	B D E F G H J L M P S
	*-tégì "trapper"	J L + P S
d.	*-ɗınd- "to wait, watch"	B C G H J M N P S
	*-ɗındì "guardian, protector"	J F M + G N P S
e.	*-tédık- "to cook, to boil"	B F G H K L M P R
	*-téek- "to put on fire, to cook"	C D F J L M S
f.	*-mòk- "to chat, to bark"	A B C F H J

It can be safely assumed that Rundi inherited the first five agent nouns in (19b) together with their base verbs from an earlier language stage. This is possibly also true for the noun *umutetsi* "cook", whose base verb is derived from one of the

17. /h/ is a reflex of *p: *-ûbaha* < *-jóbap- (Bastin & Schadeberg 2003).

common Bantu verbs in (20e). So far, I have observed cognates of this particular agent noun in zones J, L, F, and P. The base verb of *umumotsi* "bawler" is also a reflex of a common Bantu root (20f), but the agent noun itself has so far not been reported far beyond Rundi (J62). This is also the case for all the other verbs and derived nouns in (19). Although they might be attested outside Rundi, none of them seems to have a common Bantu distribution. They must have been recently created. This again suggests that in the 5V language Rundi, unlike Shona, BS has become a morphologized phonological marker of agent noun derivation. Recent neologisms such as those in (21) confirm this fact. They were proposed by a national team of linguists and were seemingly not derived from pre-existing agent nouns through semantic shift (LETAC 1983).

(21)

Neologism (LETAC 1983)		Base verb (Rodegem 1970)
umu-kabuz-i "radio reporter"	←	*-kabur-a* "to excite"
umu-simvy-i "sprinter"	←	*-simb-a* "to jump, cross, leap"
umu-tégets-i "manager"	←	*-tégek-a* "to order"

The morphologized nature of BS as agent noun derivation marker is further corroborated by the existence of a phonetically identical deverbal suffix *-i*, which does not trigger BS. The examples in (22) do not have an agentive meaning, nor do they have the *umu-* noun prefix which is most typically found with agent nouns.

(22)

in-tender-i	"a cow with hanging horns"	←	*-tendeer-a* "to hang" (Rodegem 1970)
in-twâr-i	"an intreprid, valiant person"	←	*-twâr-a* "to reign"
i-hŏr-i	"a right of way"	←	*-hŏr-a* "to receive a right of way"

8.3 Phonologically restricted Agent Noun Spirantization

A first type of intermediate ANS is observed in those languages where the agentive suffix *-i* only triggers BS of certain consonants, and not of all consonants like in Rundi. The phonological conditioning of BS is a relatively well-known phenomenon (Downing 2001, Hyman 1997, 2003a, Labroussi 1999), but there exists considerable variation in the way it operates and in the way it interacts with the morphological conditioning of the sound change.

The situation regularly observed in 7V languages with phonologically restricted BS is one whereby certain consonants are systematically spirantized, others are never spirantized, while still other consonants are spirantized in certain morphological contexts, but not in all. In Lega (D25), /l/ (< *d) is spirantized both tautomorphemically and before the causative and agentive suffixes, while *t only undergoes BS morpheme-internally. All other consonants remain unaffected before the

high front vowel, as shown in (23). In Mongo (C61), /t/ (< *t) and /nd/ (< *nd) are systematically spirantized, while /l/ (< *d) is only subject to tautomorphemic (24a) and causative BS, but not to ANS (24b). All other stops remain unaffected.

(23) a. Tautomorphemic diachronic BS of *d and *t (Botne 1994)

	*-d̲ím-	"to be extinguished"	>	*-z̲ím-a*
	*-kòt̲ì	"neck"	>	*i-kos̲i*
but:	*-b̲ímb-	"to swell"	>	*-b̲ímb-a*
	*-p̲ígò	"kidney"	>	*m-p̲íko*
	*-g̲ìdá	"blood"	>	*mi-k̲ilá*
	*-k̲ígè	"eyebrow"	>	*lu-k̲íg*ɛ

b. Phonologically restricted ANS (only *d) (Botne 1994)

	-lɛl̲-	"to tend an infant"	→	*mo-lɛz̲-i*	"nursemaid" (< *-dèd̲-)
	-kɔ́sɔl̲-	"to cough"	→	*ke-kɔ́sɔz̲-i*	"cough" (< *-kócʊd̲-)
but:	*-bór̲-*	"to give birth"	→	*ba-bór̲-i*	"parents" (< *-bùt̲-)[18]
	-íb̲-	"to steal"	→	*mw-ĭb̲-i*	"thief" (< *-jíb̲-)
	-gyék̲-	"to cook"	→	*mo-gyék̲-i*	"cook" (< *-jìpɪk̲-?)

(24) a. Tautomorphemic diachronic BS of *t, *nd and *d (Hulstaert 1957, 1961)

	*-t̲ím-	"to dig"	>	*-t̲s̲ím-*
	*-t̲íg-	"to leave behind"	>	*-t̲s̲íg-*
	*-kòn̲dì	"stake, post"	>	*li-kon̲j̲i*
	*-t̲índí	"heel"	>	*li-t̲s̲ín̲j̲í*
	*-gèd̲ì	"stream"	>	*i-kɛj̲i* (dial. var.: *i-kɛl̲i*)[19]
	*-kád̲í	"wife"	>	*w-aj̲i* (dial. var.: *w-al̲i*)
	*-dìd-	"to wait"	>	*-j̲il-* (dial. var.: *-l̲il-*)
	*-d̲íng-	"to wind round"	>	*-j̲ing-* (dial. var.: *-l̲ing-*)

b. Phonologically restricted ANS (only *t and *nd) (Hulstaert 1957, 1965)

	-tút̲-	"to care for"	→	*bo-tút̲s̲-i*	"nurse" (< *-tút̲-)
	-bót̲-	"to give birth"	→	*m-bót̲s̲-i*	"fertile woman" (< *-bùt̲-)
	-kɛn̲d-	"to walk"	→	*bɔ-kɛn̲j̲-i*	"traveller" (< *-gèn̲d-)
	-kún̲d-	"to beat"	→	*bo-kún̲j̲-i*	"drummer"
but:	*-túl̲-*	"to forge"	→	*bo-túl̲-i*	"smith" (< *-túd̲-)
	-bál̲-	"to marry"	→	*m-bál̲-i*	"husband" (< *-bád̲-)
	-íy̲-	"to steal"	→	*w-ĭy̲-i (wĭbi)*	"thief" (< *-jíb̲-)
	-émb̲-	"to sing"	→	*n-jémb̲-i*	"good singer" (< *-jímb̲-)
	-lɔk̲-	"to bewitch"	→	*bɔ-lɔk̲-i*	"sorcerer" (< *-dòg-)
	-lan̲g-	"to love"	→	*n-dan̲g-i*	"lover, devotee" (< *-dàn̲g-)

18. In Lega (D25), /r/ is the regular reflex of *t. This sound shift has nothing to do with BS.

19. The tautomorphemic BS of /l/ (< PB *d) and in front of the causative suffix is not systematic. It only occurs in certain Mongo dialects (Hulstaert 1961).

A similar situation is observed in Sukuma (F21), where only the reflex of *d attests ANS, while *p, *d, *t, and *k spirantize morpheme-internally (Batibo 2000). There are thus generally more consonants spirantized morpheme-internally than in front of one of the PB high vowel morphemes.

The situation is somewhat different in 5V languages, where the phonological conditioning of BS is generally only observed across morpheme boundaries, but never morpheme-internally. In Jita, for example, all PB oral consonants are exposed to BS tautomorphemically, but in front of the causative and the agentive suffix only liquids undergo BS (Downing 2001, 2007). (See (9), above, for examples of liquid spirantization in Jita). In other 5V languages, the phonological conditioning of ANS is less strict and more consonants are spirantized. This is the case in Shi (J53), where both coronal (*d/*t) and velar (*g/*k) stops undergo BS before the agentive suffix (25b). The same phonological restrictions are observed before the other PB high vowel morphemes (Polak-Bynon 1975: 53). Only tautomorphemically are the bilabial stops (*b/*p) spirantized (25a) too.

(25) a. Tautomorphemic BS in Shi (Polak-Bynon 1978)

*-dì	"root"	>	*óomu-zii*
*-tíg-	"to leave behind"	>	*óoku-sig-á*
*-bíì	"excreta"	>	*áama-zii*
*-pígà	"cooking-stone"	>	*íi-sigà*
*-gìdò	"taboo"	>	*óomu-ziro*
*-kígè	"eyebrow"	>	*éeci-sike*

b. Phonologically restricted ANS (*d, *t, *g, *k) (Polak-Bynon 1975, 1978)

-yaabul- "to herd cow"	→	*oomw-aabuz-i*	"cowherd" (< *-jàbʊd-)
-burh- "to have child"	→	*aaba-bus-í*	"parents" (< *-bʊ̀t-)
-log- "to bewitch"	→	*óomu-loz-i*	"sorcerer" (< *-dʊ̀g-)
-jinik- "to be a miser"	→	*óobu-jinis-i*	"avarice"
but: *-lééb-* "to foretell future"	→	*óomu-lééb-í*	"prophet" (< *-dèeb-)
-buúmb- "to make pots"	→	*oomu-buúmb-í*	"potter" (< *-bʊ́mb-)
-zih- "to play instrument"	→	*óomu-zih-i*	"musician" (< *-dìp-)

In Jita and Shi, the phonological conditioning of BS is identical in front of the high front vowel causative and agentive suffixes. This is also the case in, for instance, Ganda (J15) (*d, *t, *g, *k) (Hyman 1997) and Haya (J22) (*d, *t) (Bostoen 2005a). In all of these languages except Jita, the same conditioning is also observed before the perfect suffix. In the latter language, no BS at all is observed in this context, as the examples in (16) illustrate.

In Nkore (J13), the situation is slightly different again. There is no real opposition between full BS morpheme-internally and partial phonologically restricted BS at (certain) morpheme boundaries. One finds, however, a gradual decrease in

the number of spirantized consonants depending on the morphemic context. All PB plosives spirantize when the following high front vowel belongs to the same morpheme. In front of the causative suffix, all consonants but *b mutate. The agentive suffix and the perfect suffix, in contrast, just affect *d and *t (data from Poletto 1998, Taylor 1959). In Nkore, the number of consonants spirantized thus varies according to the morpheme that follows. Only *d and *t undergo BS in all morphemic contexts involving an originally high front vowel. Hyman (1997) describes a similar conditioning pattern for Kiga (J14).

This overview shows that the phonological and morphological conditioning of BS can be interwoven in different ways. In 'phonologically restricted ANS' languages, certain consonants are more readily spirantized than others. Several studies have, for instance, argued that coronals — in Bantu generally reflexes of *d and *t — are crosslinguistically more easily affected before high front vowels than other segments (see Kim 2001, Bhat 1978, Downing 2001, Hall & Hamann 2006, Hall et al. 2006). This is in line with the phonological hierarchy of heteromorphemic BS which Hyman (1997: 171) observed in the Great Lakes Bantu languages: coronals (*t/*d) are more readily spirantized than velars (*k/*g), which in turn undergo BS more easily than labials (*p/*b).

Another implication for assibilation, proposed by Hall & Hamann (2006: 1201), is more problematic in light of the data presented above, namely that voiced stops cannot undergo assibilation unless voiceless ones do. Within morphemes, this implication is generally respected, but not always. In 7V languages, phonological constraints on BS are more often observed morpheme-internally, but then both the voiced and voiceless stop of a same place of articulation are spirantized, as is the case in Lega and Mongo (see (23) and (24) above). In 5V languages, tautomorphemic BS is almost always observed before all PB stops. However, in Kiga, for instance, the labial *p escaped BS morpheme-internally, while *b is subject to it (Hyman 1997: 172). Heteromorphemically, the implication seems to be obeyed in most Bantu languages. If only coronals are subject to BS, most often both *t and *d undergo it. There are several instances, however, where only *d undergoes BS heteromorphemically. This is for instance the case in 5V language Jita (see (9) above) and the 7V languages Lega (D25) (see (23) above) and Sukuma (Batibo 2000). Unambiguous cases of the inverse, i.e. only *t undergoing BS, have not been found. In Mongo, *t undergoes BS in front of the agentive suffix and not *d, but *nd undergoes it. The facts are maybe not strong enough to claim that voiced stops just spirantize more readily than voiceless stops, but Hall & Hamann's (2006: 1201) second implication clearly does not apply consistently in Bantu, not morpheme-internally and even less across morpheme boundaries.

In 5V languages, BS is almost always total within the morpheme, but may be phonologically constrained heteromorphemically. In 7V languages, in contrast,

phonological constraints on BS are observed both morpheme-internally and heteromorphemically. This indicates that BS is first and foremost phonologically conditioned, and that this conditioning applies across the board. Morphologization is only secondary, connected with 7>5V reduction and is grafted onto this phonological conditioning. In variable degrees across Bantu, the initial BS of certain stops was subsequently levelled out in front of (certain) morpheme boundaries (see §9 below). One finds lexicalized residues, however, that indicate that this retraction of BS in front of certain stops was not complete. In Jita, for instance, where normally only liquids undergo heteromorphemic BS before the causative and agentive suffix, some instances of non-liquid BS have been noted:

(26) a. Cases of non-liquid ANS in Jita (Downing 2001: 4)

oku-log-a	"to bewitch"	→	*omu-los-i*	"witch"	(< *-dòg-)
okw-í: β-a	"to steal"	→	*omw-í: f-i*	"thief"	(< *-jɨb-)
oku-le: β-a	"to tend herd"	→	*omu-le: f-i*	"shepherd"	(<*-dèeb-)
oku-βág-a	"to slaughter"	→	*omu-βáj-i*	"slaughterer"	(< *-báag-)

b. Cases of non-liquid causative BS in Jita (Downing 2001: 5)

okw-á: t-a	"to break"	→	*okw-á: sy-a*		(< *-ját-)
oku-βat-a	"to be sticky"	→	*oku-βasy-a*		(< *-bát-)
okw-ó: g-a	"to bathe (intr.)"	→	*okw-ó: sy-a*		(< *-jóg-)

Admittedly, borrowing from nearby languages where BS took place in other contexts might be another plausible explanation for certain of the irregularities in Jita, even though no possible source language(s) has been identified to date.[20] On the other hand, the fact that the noun for "slaughterer" has /j/ as spirantized out of /g/, while in the examples "witch" and "to bathe" /g/ becomes /s/ could be seen as an indication that the former is a loanword after all. However, the data presented in the following section will reinforce the proposal that the other agent nouns and causative forms mentioned above must have been spirantized and lexicalized before the morphophonological constraint on BS came into effect in Jita.

8.4 Limited Agent Noun Spirantization

A second type of intermediate ANS occurs in languages where both agent nouns with and without spirantized final consonant are found, but where the ones attesting ANS are far less common. Unlike the first type of intermediate ANS, no phonological restrictions are found. Consider the example of Ciluba shown in (27).

20. Neighbouring and closely related languages, like Nyambo (J21) and Kerewe (J24), also only attest regular liquid BS, while other nearby languages of the E40 group, such as Ngurimi (E401), Kuria (E43), Zanaki (E44), Ikoma (E45), are 7V languages which do not attest BS at all.

(27) Limited ANS (Kabuta 2006)

	-kèb-	"to look for"	→	*mu-kèb-i*	"searcher" (< *-kéb-)
	-amb-	"to speak"	→	*mu-amb-i*	"orator" (<*-gàmb-)
	-p-	"to give"	→	*mu-p-ì*	"sponsor" (< *-pá-)
	-dil-	"to cry"	→	*mu-did-i*	"s.o. who cries" (< *-dí̱d-)
	-it-	"to paddle"	→	*mu-ic-i*	"rower"
	-bèy-	"to shave"	→	*mu-bèy-i*	"barber" (< *-bég-)
	-dìng-	"to lie"	→	*mu-dìng-i*	"liar" (< *-dìng-)
	-bùk-	"to consult spirits"	→	*mu-bùk-i*	"diviner" (< *-bók-)
but:	*-low-*	"to bewitch"	→	*mu-loj-i*	"witch" (< *-dòg-)
	-iib-	"to steal"	→	*mu-ìv-i*	"thief" (< *-jíb-)
		BUT ALSO		*mu-ìb-i*	

Only two cases of ANS have been recorded in Ciluba, i.e. the words for "witch" and "thief", the latter having a non-spirantized variant.[21]

As the examples in (28) show, a very similar situation exists in Cokwe (K11), where only a very small minority of agent nouns manifest signs of BS.

(28) Limited ANS (Van den Eynde 1960)

	-iimb-	"to sing"	→	*n-jiimb-i*	"singer" (< *-jímb-)
	-tah-	"to consult spirits"	→	*tháh-i*	"soothsayer"
	-taang-	"to read"	→	*thaang-i*	"reader" (<*-táng-)
	-wuk-	"to cure"	→	*m-buk-i*	"healer" (< *-bók-)
	-kuul-	"to redeem"	→	*khúul-i*	"savior" (< *-kúud-)
	-pit-	"to be rich"	→	*phíc-i*	"rich man"
	-fuz-	"to blow"	→	*fuuʒ-i*	"wind"
but:	*-íy-*	"to steal"	→	*mw-iíʒ-i*	"thief" (< *-jíb-)
	-lel-	"to feed"	→	*n-deʒ-i*	"wet nurse" (< *-dèd-)
	-fwiil-	"to spit"	→	*n-fwiiʒ-i*	"spitting snake" (< *-túɪ̱d-)

Only three spirantized agent nouns have been recorded, with "thief" being cognate to the Ciluba noun given above. Although the verb *-lowa* "to bewitch" occurs in Cokwe, its derived agent noun is not attested (any longer). However, it is still attested in the closely related Lwena (K14) language, where it is spirantized:

21. Although certain consonant mutations can be observed in the first eight examples of (27), they are not the result of BS. The change t → c/_i, whereby /c/ stands for the affricate [tʃ], is a regular synchronic morphophonological process in Ciluba not limited to morphemic contexts involving a PB high front vowel. Such is the case for l → d/_i, whereby /d/ stands for the affricate [dʒ]. The output of this palatalization is different from that of diachronic BS: *di > ji and *ti > ʃi.

mu-lòj̲-i < *-lòv̲a* (Horton 1953: 168). None of the other forms in (28) underwent BS.[22]

In languages with limited ANS, BS does not seem to have been a productive sound change within the morphological class of agent nouns. The instances of ANS in such languages are limited to a small set of nouns, which are relatively similar across 'limited ANS' languages: *-dògì, "witch", *-jíbì, "thief" and to a much lesser extent *-dèdì, "parent, wet nurse, caretaker". In (29), an overview is given of the distribution of their spirantized reflexes in languages where agent nouns generally do not undergo BS.

(29) Distribution of *-dògì, *-jíbì and *-dèdì in 'limited ANS' languages
  a. *-dògì: Punu (B42), Nsong (B85F), Mbuun (B87), Kimbundu (H21), Luchazi (K13), Lwena (K14), Luyi (K31), Kwangali (K33), Dciriku (K332), Mbukushu (K333), Pende (L11), Kete (L21), Songye (L23), Ciluba (L31a), Sanga (L35), Kaonde (L41), Lunda (L52), Ruund (L53), Nkoya (L62), Kwanyama (R21), Ndonga (R22)
  b. *-jíbì: Kikongo (H16b), Yaka (H31), Suku (H32), Cokwe (K11), Ngangela (K12b), Luchazi (K13), Lwena (K14), Mbunda (K15), Dciriku (K332), Kete (L21), Songye (L23), Ciluba (L31a), Kanyok (L32), Kiluba (L33), Songye (L23), Kaonde (L41), Ruund (L53), Nkoya (L62)
  c. *-dèdì: Cokwe (K11), Sanga (L35)

All languages listed in (29), except Nsong (B85F) and Mbuun (B87), are 5V languages attesting diachronic morpheme-internal BS. Moreover, all three nouns listed above have a Bantu-wide distribution. The former two probably even date back to PB. The fact that only early Bantu agent nouns have spirantized reflexes in these languages probably indicates that ANS never was productive as a form of heteromorphemic BS. Given the assumed age of these agent nouns, they were undoubtedly already lexicalized before any of the languages concerned or any of their (common) ancestors underwent 7>5V reduction and thus before the morphological conditioning of BS became pertinent. Their BS behaviour was not necessarily different from that of non-derived nouns ending in *-i*, such as *-bódì "goat", *-gòdí "string", *-kádí "string", *-kápí "paddle", *-kòtì "neck" and several others, which are systematically spirantized in the 5V languages where they occur. Therefore, it can be assumed that in these languages, BS has never been a marker of agent

22. The mutations observed, i.e. t → c, z → ʒ (voiced postalveolar fricative), and s → ʃ (voiced postalveolar fricative), are instances again of regular synchronic palatalization, independent of the original degree of aperture of the front vowel. The last three nouns in (28) also underwent this change subsequent to BS. The reflex of *d in front of PB *u, for instance, is /z/, e.g. *-d̲úʊd- "undress" > -z̲ul- (Mac Jannet 1949: 104).

noun morphology. In this respect, 'limited ANS' languages are similar to 'no ANS' languages.

Borrowing could be considered as another explanation for the presence of some spirantized agent nouns in these otherwise no ANS languages, but this is rather unlikely for several reasons. Firstly, the 'limited ANS' languages cover such a large and continuous area that one wonders where they would have borrowed the agentives from and why they would all have borrowed more or less the same limited set of spirantized agent nouns. Secondly, the agent nouns concerned refer to notions which are so commonplace in Bantu that there appear to be no pragmatic grounds for borrowing. Thirdly, and most importantly, the agent nouns in question are also phonologically regular in all respects. It can thus be safely assumed that they belong to a common Bantu inherited vocabulary, which is reconstructible to a considerable time depth. For that matter, in each of these languages, the final consonant of the few spirantized agent nouns always corresponds to the regular phonetic output of diachronic tautomorphemic BS, which one would not expect if they really were loanwords. Consequently, borrowing or language mixture does not account satisfactorily for these facts.

8.5 Extensive Agent Noun Spirantization

In languages with extensive ANS, the number of spirantized *-i* final agent nouns is significantly higher than in languages with limited ANS. BS in this morphological context is not consistent throughout the language, but is not phonologically determined either. Several exceptions may occur. In Swahili (G42), for instance, the agentive suffix *-i* generally causes a mutation of the preceding consonant, as can be seen in the examples in (30a). These changes are the same as those triggered by the causative suffix (Schadeberg 1984: 5). Nevertheless, Swahili vocabulary also contains several agent nouns ending in *-i* without mutation of the preceding consonant, like the examples in (30b).

(30) a. ANS in Swahili (Johnson 1939, Sacleux 1939)

-le̲w-a	"to be drunk"	→	*m-le̲v-i*	"drunkard" (< *-deb̲-)
-gom̲b-a	"to quarrel"	→	*m-gom̲v-i*	"brawler"
-li̲p-a	"to pay"	→	*m-li̲f-i*	"payer" (< *-dɪ̀p̲-)
-li-a	"to cry"	→	*m-li̲z-i*	"shouter" (< *-dɪ̀d̲-)
-fuat̲-a	"to follow"	→	*m-fuas̲-i*	"follower"
-log̲-a	"to bewitch"	→	*m-lo̲z-i*	"sorcerer" (< *-dòg̲-)
-fund̲-a	"to learn"	→	*fu̲nz-i*	"tutor"
-chim̲b-a	"to harm"	→	*m-chim̲v-i*	"witch"
-pok-e-a	"to receive"	→	*m-pok-ez̲-i*	"receiver" (< *-pòkɪd̲-)

	-pi<u>k</u>-a	"to cook"	→	*m-pi<u>sh</u>-i*	"cook" (< *-jìpɪ<u>k</u>-)
	-andi<u>k</u>-a	"to write"	→	*mw-andi<u>sh</u>-i*	"writer"
b.	No ANS (Johnson 1939, Sacleux 1939)				
	-pa<u>mb</u>-a	"to adorn"	→	*m-pa<u>mb</u>-i*	"decorator"
	-ko<u>p</u>-a	"to borrow"	→	*m-ko<u>p</u>-i*	"debtor" (< *-kóp-)
	-ka<u>t</u>-a	"to cut"	→	*m-ka<u>t</u>-i*	"cutter" (< *-ka<u>t</u>-)
	-fu<u>nd</u>-a	"to learn"	→	*fu<u>nd</u>-i*	"tutor"
	-chi<u>mb</u>-a	"to harm"	→	*m-chi<u>mb</u>-i*	"witch"
	-andi<u>k</u>-a	"to write"	→	*mw-andi<u>k</u>-i*	"writer"

The examples in (30) show that the absence or presence of BS is not phonologically motivated. The same consonants display contrasting behaviour in front of the agentive suffix. The higher number of spirantized agent nouns suggests that in the 5V language Swahili, this consonant mutation must have been a marker of morphological structure until relatively recently, irrespective of the nature of the preceding consonant. The comparatively small number of non-spirantized forms, such as those in (30b), indicates however that this is currently no longer the case. Modern derivations leave the consonant unchanged (Schadeberg 1984: 5). The fact that this morphophonemic change has become unproductive has also led to the creation of new agent nouns without consonant mutation next to the older spirantized forms, leaving lexical doublets in the vocabulary, like the last three examples in (30a, b). One possible incentive for the loss of this morphological marker might be found in the agent nouns derived from verbs of Arabic origin already having *-i* as default inflectional final vowel. Some examples are given in (31).

(31) Agent nouns derived from verbs of Arabic origin (Johnson 1939)

-fadhili	"to do a kindness to"	→	*m-fadhili*	"benefactor"
-hajiri	"to emigrate"	→	*m-hajiri*	"emigrant"
-kaidi	"to be obstinate"	→	*m-kaidi*	"an obstinate"
-kidhi	"to grant"	→	*m-kidhi*	"one who grants, title of God"
-fariki	"to depart"	→	*m-fariki*	"one who separates himself from his home"

The influx of these foreign verbs and deverbal nouns created a new set of agent nouns, devoid of any consonant mutation but still ending in *-i*. Although analogical pressure could have led to the BS of these foreign agent nouns, the inverse may just as well have happened, i.e. offering a model for non-spirantized *-i* final agent nouns. Not only foreign words, but also new language-internal derivation mechanisms may have had an impact on BS as a way of signalling agent noun morphology. Swahili has two productive innovative strategies for the creation of agent nouns, i.e. suffixation of *-aji* (32a) and the complemented agent noun whereby a

deverbal noun ending in *-a* is followed by an object (32b). None of these competitive strategies involves BS.

(32) a. Agent nouns ending in *-aji* (Johnson 1939)

-tangaz-a	"to advertise"	→	*m-tangaz-aji*	"one who divulges"
-pok-e-a	"to receive"	→	*m-pok-e-aji*	"receiver"
-pik-a	"to cook"	→	*m-pik-aji*	"cook"
-andik-a	"to write"	→	*mw-andik-aji*	"writer"

b. Complemented agent noun (Johnson 1939, Schadeberg 1984)

-uza	"to sell"	→	*mwuza tumbako*	"tobacco seller"
		→	*mwuza samaki*	"fishmonger"

These alternative strategies — especially the first one — are not only used to create new agent nouns, but they also attract pre-existing agent nouns. Such a generalization of a pattern of morphological relationship to forms that did not manifest this pattern before is a classical case of 'analogical extension' or 'four-part analogy' (Hock 1991, McMahon 1994). The last three agent nouns in (32a) are such semantically undifferentiated alternatives for already existing agent nouns exhibiting BS (30a). This competition has resulted in the presence of synonymous doublets, or even triplets as in the case of "writer", in the lexicon, marginalizing the agentive *-i* suffix as a productive strategy without banning it entirely. Moreover, these alternative derivational mechanisms have led to paradigms without morphophonemic alternations at the right edge of the verb stem. This and the reduced productivity of the *-i* morpheme may have led to a growing dissociation from the consonant mutation traditionally accompanying it. Neologisms are not spirantized any longer, and older spirantized forms may undergo analogical levelling. In this way, the paradigm in front of the *-i* suffix has gradually become more uniform, due to the analogical extension of alternative morphological patterns.[23] This is exemplified with the agent nouns derived from the verb stem *-andik-* "to write" in (33) (Johnson 1939):

(33) a. Old form
ku-andi<u>k</u>-a "to write": *mu-andi<u>sh</u>-i* "writer"

b. Analogical extension of the *-aji* pattern
ku-pa<u>k</u>-a "to plaster, paint": *m-pa<u>k</u>-aji* "plasterer, painter", *ku-andi<u>k</u>-a* "to write": *mu-andi<u>sh</u>-i* ≈ *mu-andi<u>k</u>-aji* "writer"

c. Analogical levelling of the paradigm in front of agentive *-i*
ku-andi<u>k</u>-a "to write": *mu-andi<u>k</u>-aji* "writer"
ku-andi<u>k</u>-a "to write": *mu-andi<u>sh</u>-i* ≈ *mu-andi<u>k</u>-i* "writer"

23. It could be checked whether there is any historical textual evidence for Swahili that backs up the proposed historical progression, but this has not been done so far.

Swahili is of course spoken over a very large area with numerous dialects and many second language speakers. It is obvious then that some of these changes may have been induced by contact between different dialects or through interference from first languages without ANS. In this respect, non-spirantized agent nouns will be less frequent for example in the standard Swahili variant of Zanzibar, where native speakers will judge them as improper, but much more common in the more northern dialects or in certain 'upcountry' variants, where BS-less languages like Gikuyu (E51) had a greater impact. A word like *fundi* "craftsman, expert, tutor" is most likely a loan from a northern Swahili dialect into the standard Zanzibar dialect, which actually belongs to the southern dialect cluster. In the northern dialect of Lamu, it is used with the specific meaning of "tutor" (Sacleux 1939).[24]

Similar phenomena have been observed in closely related North-East Coast Bantu languages, such as Nyika (E72), Digo (E73) and Zigula (G31). At the beginning of the last century, Meinhof (1904, 1905, 1906) and Woodward (1902) recorded that the formation of *-i* final agent nouns had become rare and was not regular any more. Meinhof (1905) observed that by analogy with the verb, speakers no longer felt the need to modify the consonants in front of the agentive suffix as they used to do traditionally, leading to the co-existence of older and newer forms like those given in (34).

(34) Agent noun doublets in Nyika (E72) (Meinhof 1905)

-umb-a	"to mould pots"	→	*mu-umf-i*	"potter" (< *-bómb-)
		→	*mu-umb-i*	"potter"
-fug-a	"to breed"	→	*mu-fus-i*	"breeder" (< *-túg-)
		→	*mu-fug-i*	"breeder"

On the other hand, descriptions of closely related languages dating from the same period, such as Roehl (1911) on Shambala (G24), report full ANS. This gives support to the idea that extensive ANS occurs in those languages where the agentive suffix *-i* once triggered BS consistently. The most likely reason why it no longer did so at some point is the fact that the morpheme became marginalized as a derivational device for agent noun formation just like in Swahili. Unfortunately, unlike for Swahili, the descriptions necessary to check this hypothesis are still lacking, although similar alternative derivation mechanisms have been documented sketchily (see for instance Mwalonya et al. (2004: 207) for Digo).

Corresponding cases of BS regression in the agent noun context in favour of non-spirantizing forms have been reported in the Bantu languages of the corridor area between Lakes Tanganyika and Malawi (Labroussi 1999). Nyakyusa (M31),

24. My thanks go to Derek Nurse, Thilo Schadeberg and Martin Walsh for bringing this fact to my attention.

for instance, shows synchronic preference for the non-spirantizing tendency, but its vocabulary contains several spirantized agent nouns as well. Schumann (1899) noted the lexical doublet in (35), which indicates that this variation existed already at the end of the 19th century.

(35) Agent noun doublets in Nyakyusa (Schumann 1899: 3)
-bo<u>mb</u>-a "to work" → *um-bo<u>mb</u>-i* "worker"
→ *um-bo<u>f</u>-i* "worker"

As cited in Labroussi (1999: 344), Wolff (1905) described the same kind of variation in neighbouring Kinga (G65), claiming that consonant mutation occurred in the older forms, while the consonant remained unchanged in more recent forms. Unlike the North-East Coast Bantu languages treated above, which are 5V languages, both Nyakyusa and Kinga are 7V languages. This means that the original opposition between the two high vowel heights has been maintained and that it has not been transphonologized yet to a consonantal opposition between plosives and spirants. As a consequence, the functional load of BS as a marker of agentive morphology is lower here than in 5V languages. Under these conditions, the competition of alternative derivational devices was not necessary to trigger the analogical pressure in order to restore uniformity at the right edge of the verb stem and to induce the retraction of BS.

9. The role of analogical change in the blocking and retraction of Agent Noun Spirantization

The Agent Noun Spirantization (ANS) typology worked out above clearly shows that agent nouns ending in *-i* do not undergo Bantu Spirantization (BS) uniformly throughout Bantu. To understand why certain languages attest ANS, while others do not, one needs to work out why the morphological conditioning of BS is not identical across Bantu. Why does the morpheme boundary between the root and the agentive suffix constitute an obstruction to BS in certain languages, but not in others? At the same time, one should account for the fact that this specific boundary forms a bigger obstacle to BS than the one formed by the causative suffix which has the same initial vowel, but a lesser obstacle than the perfect suffix. Finally, it is important to consider the link between heteromorphemic BS and the 7>5V, which many Bantu languages underwent, since it is only in 5V languages that BS can become a significant marker of morphological structure. Most synchronic work in 5V languages has tackled heteromorphemic BS by assuming that the vowel *-i* of morphemes exerting a contrasting effect on the preceding consonant is identical in the output, but different in the input (Herbert 1975–6, Hyman

1994, Mould 1972, Zoll 1995). It is somehow believed that the original 7V system was maintained underlyingly, but not in the surface realisation. Translating this diachronically, it is clear that such an approach only holds when BS applies uniformly across all morphemic borders, i.e. only in full BS languages. As soon as one of the possible morphological contexts is exempted, an analysis only taking into account the phonetic features of the high front vowel is doomed to fail.

'No ANS' languages attesting systematic BS in front of the causative, such as Shona in (18) above, manifest the only category of heteromorphemic BS for which an explanation in purely phonetic terms is satisfying. As explained above, the stronger tendency towards BS before the causative suffix can be attributed to the glide formation it generally involves as a hiatus resolving strategy. This creates the most favourable phonetic environment for BS (assibilation/spirantization in general). The fact that more languages spirantize in front of the causative suffix than before the agentive suffix is thus a matter of phonetic naturalness rather than of morphological structure. The specific segment sequence constitutes a phonetic context so liable to BS that the morpheme boundary following the target consonant only very rarely forms a motivation to block the sound shift.

Unlike causative BS, the (non-)application of heteromorphemic BS in front of the agentive and perfect suffixes cannot be accounted for in purely phonetic terms. In §8, I have relied on analogy as an explanatory principle for cases where BS applies irregularly within the morphological category of agentives, see e.g. in (33) above. The role of analogical change in the morphologization of BS is far more encompassing than those cases of 'extensive ANS'. More generally, speakers tend to ban morphophonemic alternations within paradigms that do not convey important semantic differences, according to the isomorphism principle of 'one meaning, one form'. The notion of 'paradigm' stands here for 'the set of inflected forms of a given word' (Hock 1991: 168). The failure of a phonologically predictable alternation to apply at a morpheme boundary can then be considered a classical case of analogical impact on sound change, namely 'analogical levelling' (McMahon 1994: 73) or 'paradigm levelling' (Hock 1991: 168). In this regard, not only the deactivation of once fully productive BS within the morphological class of agentives, but also the complete absence of ANS or of BS before the perfect suffix in a language can be accounted for as an instance of analogical levelling. If BS originally applied as an across-the-board phonological process (Hyman 2003a: 53), analogical pressure may be held responsible for the morphological restrictions it acquired subsequently. It is thought natural for sound shifts to start to operate across-the-board and BS can also be assumed to have initially applied with the widest possible scope, but gradually retracted to narrower morphological domains (Downing 2007). This proposal contradicts Labroussi (1999), who proposes just the opposite, namely that BS originally only applied tautomorphemically and

gradually extended across different morphological boundaries. Downing (2007), in contrast, has contended that the morphological continuum, on which BS applies across Bantu, i.e. more readily before the causative than before the agentive than before the perfect suffix, is the result of domain retraction. According to her analysis, the varying heteromorphemic application of BS across related languages results from the operation of differing morpho-prosodic constraint domains. Her approach is inspired from Optimality Theory, which has formalized the analogical pressure to level paradigms as constraints on 'paradigm uniformity' or 'uniform exponence' (Downing et al. 2005, Kenstowicz 1996, Steriade 2000).

Without necessarily adopting all of Downing's theoretical assumptions, I will make use of the distinction she makes between morphological and prosodic domains as a descriptive framework in which to understand the levelling processes that affect the application of BS. Downing (2007) has seized upon the discrepancy between the morphological and prosodic structure of the Bantu verbal inflectional stem to contend that the operation of BS is conditioned prosodically in the languages that lack BS before the perfect suffix, but attest it in front of the other BS triggering morphemes. As established in work by, amongst others, Downing (1999), Hyman (1993), Myers (1998) and Mutaka (1994), the verbal inflectional stem in Bantu is a highly pertinent domain for the operation of phonological rules. Morphologically, this inflectional stem has two necessary components: a derivational stem and an inflectional final suffix, which is generally a single vowel but not always (Meeussen 1967). Nevertheless, the morphological structure of the inflectional stem does not necessarily coincide with its prosodic structure (Downing 1999, Hyman 1998, Hyman & Inkelas 1997, Kula 2002). As Downing (2007) claims, this is especially the case with the disyllabic perfect suffix *-ide. As an inflectional final suffix, it always occurs at the right of the morphological derivational stem, just like the causative and agentive suffixes. However, unlike the latter morphemes, which are monosyllabic, the initial high vowel of the perfect suffix falls within the prosodic derivational stem and not at the right edge of it. While the morphological and prosodic structures of the inflectional stem are isomorphic in the case of the causative and agentive suffixes, they are not with the perfect suffix. The application of BS in front of this morpheme can thus be conditioned morphologically or prosodically leading to different outputs. It can therefore be assumed that in those languages where heteromorphemic BS applies in all contexts except with the perfect suffix, all morphophonological alternations in front of this morpheme were banned to obtain uniformity within the paradigm of the prosodic derivational stem. BS marks the edge of a prosodic rather than of a morpheme boundary.

Consequently, if BS originally applies as an across-the-board sound shift, analogical pressure makes it gradually retract from more morpho-prosodic domains. The wider the paradigm in which uniformity is sought, the fewer morphemes

trigger BS. If only the prosodic derivational stem is targeted, BS is blocked in front of the perfect suffix. This must have happened rather frequently given the limited number of languages attesting the sound shift in this context. If however the entire inflectional verb stem is put under pressure to be uniform, BS may be banned in front of the agentive suffix too. This apparently happens less frequently, since more languages attest ANS than BS before the perfect suffix. According to this proposal, one would expect that the levelling of ANS before the agentive automatically implies its banning in front the causative, since in both cases BS marks the same morphological boundary. However, the fact that the causative constitutes an environment that is phonetically more susceptible to BS shows this implication does not hold.

In sum, the different types of ANS can be accounted for in terms of analogical pressure on the regular application of BS. In 'full ANS' languages also attesting BS before the perfect suffix, no analogical levelling at all took place and BS became fully morphologized. In 'full ANS' languages lacking BS in front of the perfect suffix BS, pressure was exerted to ban BS from within the prosodic derivational stem, but not from within the entire inflectional stem, so that it could morphologize as a marker of agentive morphology. In 'no ANS' languages, on the other hand, the analogical pressure to level out BS at the boundary between the morphological derivational stem and the final suffix must have taken place in a very early phase, since no lexicalized traces of its across-the-board application in this context have remained. In 'limited ANS' languages, a similar evolution must have taken place, except that the levelling started somewhat later or was less effective, so that a limited set of spirantized agent nouns could become lexicalized. It was early and/or effective enough however to prevent BS from becoming entrenched as a marker of agentive morphology. In 'extensive ANS' languages, in contrast, the analogical pressure to wipe out morphophonological alternations only intervened at a stage where a high number of spirantized agent nouns had become lexicalized. The North-East Coast Bantu 5V languages discussed in §8.5 above were actually 'full ANS' languages when this paradigm levelling started. BS had already become a morphophonemic alternation characteristic of agent noun morphology. The banning of ANS here is the result of interparadigmatic analogy as opposed to intraparadigmatic analogy (i.e. paradigm uniformity effects). Competing derivational strategies providing the possibility of analogical extension and/or contact with 'no ANS' languages were necessary to activate the analogical levelling of ANS. In the 7V 'extensive ANS' languages discussed in the same paragraph, in contrast, the analogical levelling of ANS began without such an external trigger. The conservation of a 7V system impeded the full morphologization of BS.

The table in (36) summarizes the different gradations of BS morphologization based on the targeted morphological constraint domains outlined above.

(36)

	m-i BS	caus. BS	ANS	perfect. BS	VS	targeted morphological constraint domain	representative language
a)	no	yes	no	no	7V	none	Tswana (S31)
b)	yes	no	no	no	7/5V	inflectional stem (infl. stem)	Mbuun (B87)
c)	yes	yes	no	no	7/5V	infl. stem, but causative BS due to phonetic naturalness (CiV-sequence)	Shona (S10)
d)	yes	yes	limited	no	5V	infl. stem, at an early stage, only leaving some spirantized agent nouns	Ciluba (L31a)
e)	yes	yes	full	no	5V	prosodic derivational stem (der. stem)	Bemba (M42)
f)	yes	yes	extensive	no	7/5V	prosodic der. stem and later on infl. stem, but only after long period of full ANS	Nyakyusa (M31)
g)	yes	yes	full	yes	5V	morphological der. stem	Rundi (J62)
h)	yes	yes	extensive	yes	5V	infl. stem, but only after long period of full ANS	certain Swahili dialects (G40)

The languages in (36a) are those that actually do not manifest BS, except when the high vowel is followed by another vowel, before the causative suffix and whenever such sequence occurred morpheme-internally. As regards the languages in (36g, h), I simply adopted Bastin's (1983) Bantu wide overview of 'perfect BS' without checking whether the languages in (36h) testifying to the regression of BS in front of the agentive suffix also do so in front of the perfect suffix. Languages missing from this overview are those in which BS in general or ANS in particular is phonologically restricted. In those languages, the primary conditioning is phonetic in nature and not morpho-prosodic. As a matter of fact, these languages may occur in any of the above categories, since the restriction of BS with respect to the plosives affected is one that may interact with its morphological conditioning, but actually has an independent evolution. The fact that languages, such as Nyoro (J11), Nkore (J13), Ganda (J15), Haya (J22), Zinza (J23), Kerewe (J24), and Shi (J53) attest BS before the perfect suffix (Bastin 1983: 28–37), but only in front of a limited number of consonants corroborates this proposal.

10. The historical significance of the geographical patterning of Agent Noun Spirantization types

In §4 above, I explained why Bantu Spirantization (BS) is not such a useful indicator of major Bantu subgroups, if one only takes into account the strictly phonetic

aspects of its diachronic evolution. In this section, I argue that the historical development of its morphologization is more telling in this respect. As can be concluded from the typology in §8, this process has visibly taken place in different steps and its output is not uniform across Bantu. Interestingly, the geographical patterning of these Agent Noun Spirantization (ANS) types in the Bantu domain is distributed in such a way to be revealing of early Bantu history. This is in contrast to causative BS, which is too common, and BS in front of the perfect suffix, which is too restricted to reveal major subgroupings. In (37), a representative, though non-exhaustive, overview of languages is given according to the ANS typology developed in §8.

(37) Geographic distribution of ANS types

a. 'No ANS' languages
   - zone A: 7V: Duala, Ngumba
   - zone B: 7V: Myene, Pove, Nzebi, Mbete
     5V: Tsaangi
   - zone D: 7V: Mituku, Enya, Bali, Kumu, Holoholo, Bira, Nyanga, Bembe
   - zone E: 7V: Gusii, Kuria, Gikuyu, Embu, Meru, Tharaka, Kamba
   - zone F: 7V: Nilamba, Rimi, Rangi
   - zone H: 5V: Mbala
   - zone J: 7V: Konzo, Nande
   - zone L: 5V: Salampasu
   - zone N: 5V: Nyanja-Cewa, Sena
   - zone P: 7V: Matumbi
     5V: Mwera, Mawiha, Makua[25]
   - zone R: 5V: Umbundu, Nyaneka, Herero
   - zone S: 5V: Shona, Venda, Xhosa, Zulu, Swazi, Ndebele, Tsonga, Ronga, Chopi, Tonga
     7V: Tswana, N-Sotho

b. 'full ANS' languages
   - zone F: 5V: Sumbwa
   - zone G: 5V: Shambala, Ruguru, Hehe
   - zone J: 5V: Rwanda, Rundi, Ha
   - zone M: 5V: Fipa, Lungu, Mambwe, Lambya[26], Mwanga, Nyiha, Bemba, Biisa, Lala, Lamba

25. Makua (P31) has originally been described with a 5V system, but there seem to be dialects (still) having 7V (Kisseberth 2003)

26. Labroussi (1999) distinguishes two variants of Lambya, i.e. Nyiha-like Lambya where ANS is consistent and Ndali-like Lambya, where ANS is irregular. Both variants attest BS in front of the perfect suffix. She also distinguishes two Fipa-variants, i.e. one with 5V where ANS is

c. 'phonologically restricted ANS' languages
   zone C: 7V: Mongo (*nd/*t), Tetela (*t,*d,*b)
   zone D: 7V: Lega (*d), Bangubangu (*d)
   zone F: 7V: Sukuma (*d), Nyamwezi (*d, *nj)
   zone J: 5V: Nyoro (*d/*t), Nkore (*d/*t, *j), Kiga (*d/*t, *j), Ganda (*d/*t, *g/*k), Haya (*d/*t), Kerewe (*d), Jita (*d), Shi (*d/*t, *g/*k), Tembo (*d/*t, *ng)
   zone P: 5V: Yao (*d/*t, *g/*k)
d. 'limited ANS' languages
   zone B: 7V: Nsong, Mbuun
   5V: Punu
   zone H: 5V: Kongo, Kimbundu, Yaka, Suku
   zone K: 5V: Cokwe, Ngangela, Luchazi, Lwena, Mbunda, Luyana, Kwangali, Dciriku, Mbukushu, Totela
   zone L: 5V: Pende, Kete, Songye, Ciluba, Kanyok, Kiluba, Sanga, Kaonde, Ruund, Lunda, Nkoya
   zone M: 5V: Ndali
   zone R: 5V: Kwanyama, Ndonga
e. 'extensive ANS' languages
   zone E: 5V: Digo
   zone F: 5V: Bende, Bungu
   zone G: 5V: Zigula, Swahili
   7V: Kinga
   zone L: 5V: Hemba
   zone M: 5V: Taabwa, Lenje, Ila, Tonga
   7V: Safwa, Nyakyusa
   zone N: 5V: Tumbuka

The geographical distribution of ANS types and their repartition in terms of assumed historical classification is pictured on Map 4. This map clearly shows that ANS types are not distributed randomly over the Bantu domain. The most widespread type is 'no ANS' languages, especially if one includes all 7V languages which generally show no signs of BS at all, even not morpheme-internally. As discussed in §4 above, most of these languages are so-called 'Forest Bantu' languages, but also in the rest of the Bantu area, 7V languages represent the bulk of languages not attesting ANS. All 5V languages without ANS are situated in a southern belt, notably among the southernmost East Bantu languages.

All South-West Bantu languages lacking ANS are surrounded by 'limited ANS' languages. This is hardly surprising, since a 'limited ANS' language needs only few

entirely regular and another with 7V which is closer to Sukuma and where there are not sufficient data to judge ANS regularity.

changes to become a 'no ANS' language. As we have seen above, ANS is limited in this type of languages to a small number of early Bantu agent nouns, such as *-jíb-ì "thief" and *-dòg-ì "witch". It suffices for these particular nouns to be replaced for the language to lose all traces of ANS. This is undoubtedly what happened in languages such as Salampasu (L51), Umbundu (R11), Nyaneka (R13), Herero (R31) which have alternative nouns for the concepts "thief" and "witch", but are surrounded by languages having spirantized reflexes of *-jíb-ì and/or *-dòg-ì.

The situation is different in the southern East Bantu 5V languages of zones N, P and S that lack ANS. Most of these languages do have reflexes of these particular early Bantu agent nouns, but none of these is ever spirantized. In contrast to the South-West Bantu languages, the absence of ANS can thus not be explained by the lexical loss of the early agent nouns attesting ANS. Hence, if BS ever applied as an across-the-board sound shift in the history of these languages, the number of spirantized agent nouns was not large enough for BS to become a distinctive marker of agentive morphology at the time that 7>5V reduction took place. Signs of BS were wiped out under analogical pressure in the few agent nouns that might possibly have been affected by the sound change. None of these languages attests BS in front of the perfect suffix either (Bastin 1983), which follows from the proposal that languages do not have BS with the perfect if they do not have ANS. Causative BS does occur in these languages, but as I have explained above, the application of BS across this morpheme boundary is facilitated by the phonetic naturalness of assibilation in this context. The fact that none of these geographically clustered languages attests ANS suggests that this levelling of heteromorphemic BS — except in front of the causative suffix — did not happen in each of the languages separately, but rather at an earlier stage of their common history. This does not necessarily imply that they form a single genealogical subgroup, but the total absence of ANS is in glaring contrast with the variety of ANS types that occur in northern East Bantu. Given that both categories of languages, i.e. those attesting ANS in one way or the other, and those lacking it completely, belong to same East Bantu subgroup, the southern East Bantu languages must have broken away from their northern relatives before BS could ever become a meaningful marker of agentive or perfect morphology. The historical evolution of the East Bantu subgroup has been in broad outline from north to south (Nurse & Philippson 2003b). This means that in the northern part of the East Bantu area, BS only started to undergo morphologization after the ancestor(s) of the southern East Bantu languages had left this area. The preservation of 7V systems among some of these languages, i.e. the P10, P30 and S30 languages, indicates moreover that this separation happened before 7>5V to which the remainder of the southern East Bantu were subject possibly at several independent instances. On the other hand, this southern group of East Bantu languages has been sufficiently isolated from their more northerly relatives to not

have undergone areal influences leading to the intrusion of individual spirantized agent nouns into their lexicon. Such a scenario is in line with the hypothesis that at least part of the southern East Bantu languages descend from the language(s) spoken by early farming, pot-making and iron-using/producing village communities that dispersed during first few centuries C.E. along the Indian Ocean from present-day southern Kenya and northern Tanzania in the north into present-day KwaZulu-Natal in South-Africa in the south (Bostoen 2005b, Bostoen & Grégoire 2007, Phillipson 1985).

Languages that were categorized as 'limited ANS' languages belong almost exclusively to the South-West and West-Coastal Bantu subgroups. As argued above, the rare 'no ANS' languages occurring in this area can be easily considered former 'limited ANS' languages. Other than that, no other ANS types are attested in this region. Given the very limited number of spirantized agent nouns and the fact that all of them are early Bantu nouns, it can be safely assumed that BS never developed into a distinctive marker of agent noun morphology here. The few spirantized agent nouns underwent BS at a time when it still applied as an across-the-board phonological change. They became conventionalized and entered the lexicon, thus escaping the analogical levelling that prevented the morphologization of BS in this context. No languages in this group attest BS in front of the perfect suffix either (Bastin 1983), which is in line again with the observation that BS does not act as a morphophonological change before the perfect suffix, if it does not apply before the agentive. In §2, we saw that the West-Coastal and South-West Bantu languages are assumed to go back, together with the Inner Congo Basin Bantu languages, to an intermediate 'Narrow West Bantu' common ancestor (Vansina 1995). BS is rather a marginal phenomenon in the Inner Congo Basin Bantu subgroup, which consists moreover exclusively of 7V languages. We have observed that BS affects, as an across-the-board phonological change, certain plosives while it leaves untouched others in 7V languages like Mongo (see examples in (24) above) and Tetela. However, the early agent nouns which systematically attest ANS among the West-Coastal and South-West Bantu languages, i.e. *-jíb-ì "thief" and *-dòg-ì "witch" do not attest it here. Given the inherited properties of the PB highest vowels, BS most probably arose independently in Mongo and Tetela. Hence, if West-Coastal, South-West and Inner Congo Basin Bantu are offshoots of a common 'Narrow West Bantu' ancestor stage, the last group must have broken away before BS became a productive sound shift. In the two other subgroups, the situation is rather mixed as regards BS and 7>5V. The South-West Bantu languages all display signs of diachronic BS tautomorphemically and have reduced their vowel system to 5V. In West-Coastal Bantu, all languages attest tautomorphemic BS, but several languages of Guthrie's B50, B60 and B80 groups have retained the original 7V system. Consequently, the latest common ancestor of the South-West

Bantu languages must have reduced its vowel system and levelled out BS in front of the agentive and perfect suffix before it split up. The noun and verb stems having undergone tautomorphemic BS and the few conventionalized agent nouns attesting ANS were inherited by its daughter languages. This explains why early Bantu agent nouns, like *-jíb-ì "thief" and *-dòg-ì "witch", systematically attest ANS in South-West Bantu. In West-Coastal Bantu, however, 7>5V clearly occurred after the latest common ancestor fell apart, but the analogical levelling of BS before the agentive suffixes must also have happened early enough afterwards to prevent many spirantized agent nouns from becoming institutionalized in the lexicon. The fact that early Bantu words, like *-jíb-ì "thief" and *-dòg-ì "witch", do not systematically attest ANS in the West-Coastal Bantu languages, as opposed to the South-West Bantu languages, indicates that they did not inherit them as spirantized agent nouns from their latest common ancestor.

All other ANS types occur among the northern and central East Bantu languages with Tonga (M64) as the most southern and western outlier. In all of these East Bantu languages, BS thus developed at some stage into a regular indicator of agent noun morphology, even if its morphological markedness was restricted to certain phonological contexts in some languages, i.e. the 'phonologically restricted ANS' languages, or lost its pertinence and regularity in others, i.e. the 'extensive ANS' languages. Without going as far as to claim that all languages that share this innovation necessarily constitute a single historical subgroup originating from a common ancestor, its clustered occurrence in one particular area of the Bantu domain cannot be considered as historically trivial either. If this kind of morphologization could be so easily accomplished in a convergent way, one would expect it to have a more random geographical distribution, since nearly all Bantu languages have the morphological prerequisites for it to have happened.

As regards the diachronic evolution of ANS, 'phonologically restricted ANS' seems to represent an initial stage in the morphological conditioning of the sound change. As can be observed in (37c), heteromorphemic BS seems to have started with certain plosives before affecting others, i.e. first the coronals *t/*d and thereafter the velars *k/*g. It is only when BS finally also affects the labials *p/*b before the agentive suffix *-i* that a language develops full-fledged ANS. According to Hyman (1997: 171), this phonologically stepwise BS across morpheme boundaries happens only after BS has become regular morpheme-internally. The existence of current-day 7V languages, such as those in (37c), where BS is phonologically restricted both tauto- and hetero-morphemically contradicts this claim. On the other hand, in all 5V languages in (37c), the number of plosives that underwent diachronic BS morpheme-internally are always more numerous than the ones that

are synchronically subject to BS across morpheme boundaries.[27] This means that BS had become generalized within the morpheme, but was wiped out through analogical levelling heteromorphemically when these languages underwent 7>5V, thus transforming BS into a morphological marker before some but not all consonants. Sporadic exceptions to the phonological restrictions on heteromorphemic BS that were conventionalized into the lexicon, like the Jita examples of non-liquid BS in (26), suggest that BS originally affected all plosives across the board, but only became morphologized in the case of the most commonly spirantized plosives. If BS effectively affects coronals first before affecting velars and eventually labials, then it seems plausible that at a certain stage, the majority of spirantized agent nouns were derived from verb roots with a final coronal consonant. If at that same stage the 7>5V merger occurred, it is quite possible that BS only became a marker of agent noun morphology before coronal (and velar) final verb roots and was wiped out through analogical pressure before the other plosives. Only the few that already were lexically institutionalized escaped such levelling. The intervening of 7>5V at this stage in the development of BS only happened in the J10, J20 and J50 languages, which are relatively closely related Great Lakes Bantu languages (Bastin 2003, Nurse 1999, Schoenbrun 1998).

In many other northern and central East Bantu languages, like those presented in (37b), 7>5V must have interfered with the evolution of BS at a later stage, i.e. when all stops were sufficiently affected in front of the agentive suffix for BS to become a phonologically unrestricted marker of agent noun morphology. Unfortunately, most of the languages situated along this strip are insufficiently documented to allow a judicious estimation of their state of BS morphologization.

Two more striking observations are firstly that all of these languages are 5V languages and secondly that all except the most southern M40–50 languages also attest BS in front of the perfect suffix. Nearly all other 'perfect BS' languages in Bastin (1983: 28–37) are contiguous to the north and west of this main strip of 'full ANS' languages, i.e. the 'phonologically restricted ANS' languages of the J10, J20 and J50 groups. Two more are also more or less contiguous but situated more southerly: Yao (P21) and Makonde (P23).[28] More to the east, 'perfect BS' has been noted in Shambala (G23), Hehe (G62) and certain Swahili dialects (G42). In the former two, ANS is fully productive, while in the latter it has regressed to 'extensive

27. As noted above, in language like Kiga, the labial *p even escaped BS morpheme-internally (Hyman 1997: 172), indicating that the 7>5V merger must have happened before BS was generalized to all plosives within the morpheme.

28. In the former, ANS also seems to be phonologically conditioned, but agent noun derivation has become unproductive. Such is the case for the latter language, which may explain why the data are insufficient to judge whether ANS has ever been productive.

ANS' status in some varieties, as discussed in §8.5. As can be seen on Map 4, all other 'extensive ANS' languages are situated, like Swahili, in the immediate neighbourhood of 'full ANS' languages. This corroborates the assumption that all 'extensive ANS' languages, at least the ones with 5V, once had 'full ANS', but lost it for reasons developed above. However, only very few of these other 'extensive ANS' languages seem to have developed 'perfect BS'. This might indicate that languages which morphologized BS to the fullest extent, i.e. by narrowing the constraint domain to the morphological derivational stem, are less susceptible to the loss of BS as a productive morphophonemic change than those languages which never narrowed the constraint domain further than the prosodic derivational stem (cf. the table in (36) in §9).

Furthermore, there is an apparent link between BS morphologization and the vowel system. All 'full ANS' languages, both those which also developed 'perfect BS' and those which did not, only have 5V. While this correlation is remarkable, it does not necessarily corroborate Labroussi's (1999: 374) assumption that 'the deeper this spirantizing action has been in the morphophonemic domain, — 'deeper' refering to the most productive spirantizing *-ịde — the more it entails the reduction of the vowel system'. The 7>5V merger can easily take place as an innovation independent of the far advanced morphologization of BS either as a language-internal evolution or through areal diffusion. The numerous 'no ANS' or 'limited ANS' 5V languages provide the best possible support for this proposal. The relationship between 7>5V and BS morphologization should rather be thought of in the other way around. It is only when the vowel system loses its original opposition between the two highest aperture degrees that BS can become fully morphologized. As long as this does not happen, it is easier for a language to level out morphophonological alternations at the right edge of the verb stem, in front of both the agentive and perfect suffix. Given that the former suffix is derivational and agent nouns may become lexicalized and escape analogical levelling, the restoration of 'paradigm uniformity' may lead to the total banning of BS before the inflectional perfect suffix and result in a state of 'extensive ANS', as observed in 7V languages like Kinga and Nyakyusa.

In sum, 'full ANS' as well as 'phonologically restricted ANS' and 'extensive ANS' attest to a narrowing of the morphological constraint domain for BS activation to the prosodic derivational stem. If one admits this and takes into account the distribution of 'perfect BS', then the area stretching from the western Great Lakes Region via the Lake Corridor region to central and southern Zambia should be considered a zone of far advanced BS morphologization. Given that this geographically clustered innovation is quite exceptional for Bantu and that it is difficult to imagine how such a regular morphological conditioning may have spread through contact, it can be considered the result of an inherited ancestral tendency

and thus indicative of common descent. Whether the scattered strip of languages between the Lake Corridor region and the Indian Ocean should be joined is difficult to say, since poor documentation of the languages does not warrant such a speculation. In any event, Bostoen (2005a: 410–2) documents several innovations in the field of pottery vocabulary with a similar geographic distribution as the main ANS strip. Since lexical innovations are more liable to diffusion through contact, no strong claims were made at that stage with respect to common ancestry, in spite of the phonological regularity of the comparative series concerned.[29] However, in the face of this corresponding morphophonological innovation, less prone to areal diffusion, their status as indicators of shared descent is considerably reinforced.

11. Conclusions

Bantu Spirantization (BS) and 7-to-5-vowel merger (7>5V) are two common Bantu sound shifts that are strictly speaking independent, but happen to be intimately connected in Bantu language history. Nearly all current-day 5V languages have undergone BS in one way or the other. Since the opposite is not true, i.e. that not all languages showing signs of BS have reduced their vowel inventory, BS must generally have started before 7>5V. Even if BS does not necessarily induce the vowel merger, it greatly facilitates 7>5V, since the original opposition between the two highest vowel heights can be cancelled without losing phonological distinctiveness. If this happens, 7>5V not only transforms BS from an allophonic variation into a source of phonological distinctiveness, but also creates the conditions for BS to become morphologized as a synchronic morphophonological alternation. Subsequent to 7>5V, the mutated stem consonant is no longer predictable on the basis of phonological context and may become an indicator of morphological structure. The most advanced stages of BS morphologization, i.e. full Agent Noun Spirantization (ANS) with or without regular 'perfect BS', are only found in 5V languages. In 7V languages, BS remains somehow phonologically predictable and cannot become entirely morphologized. Its effects are more easily blocked or levelled out heteromorphemically. It therefore does not apply in front of the agentive or perfect suffixes, or only irregularly. However, 7>5V does not automatically lead to the morphologization of BS. Rather the opposite must be true, since only a

29. One of these innovations, i.e. °-bómbɪdo, also has reflexes among some of the more eastern ANS languages, e.g. Shambala. At the time of this study, they were considered as being most likely independent derivations of the verb *-bómb-, "to fashion in clay". However, in the light of the ANS distribution, the assumption of them being inherited cognates gains plausibility.

minority of the 5V languages attest fully regular ANS and 'perfect BS'. Much depends on how rapidly 7>5V is accomplished after the emergence of BS. Considering the different ANS types across Bantu, the vowel merger must have intervened at different stages of the across-the-board application of BS. The earlier it takes place, the easier analogical levelling may intervene to ban the morphophonological alternations which BS originally triggered as an across-the-board phonological change, either leaving no traces of heteromorphemic BS in the lexicon ('no ANS') or only a few lexicalized ones that escaped analogical levelling ('limited ANS'). At a later stage, analogical levelling may ban the heteromorphemic BS of the least commonly spirantized stops, while it becomes morphologized in the case of the most readily spirantized stops ('phonologically restricted ANS'). However, even in 5V languages, which have morphologized BS to its fullest extent, analogical pressure may start to operate and wipe out morphophonological alternations through language contact or the language internal emergence of competing BS-free derivation strategies ('extensive ANS'). The different steps in the morphologization of BS in front of the agentive suffix are summarized in the table in (38).

(38) Historical evolution of Agent Noun Spirantization

ANS type	**Interaction with 7>5V and analogical levelling**
no ANS	7>5V took place shortly after the activation of BS. All signs of BS in front of the agentive suffix could still be wiped out under analogical pressure.
↓	
limited ANS	7>5V took place shortly after the activation of BS. All signs of BS in front of the agentive suffix could still be wiped out under analogical pressure, except in the few lexicalized cases, e.g. *-jíb-ì "thief" and *-dòg-ì "witch", which the daughter languages subsequently inherited.
↓	
phonologically restricted ANS	7>5V took place when BS had already deeply affected the lexicon and all plosives had already been targeted. Heteromorphemically, however, BS could still be levelled away before the latest affected plosives, except in those few lexicalized cases (cf. Jita ex. in 26). Hence, BS only became a marker of agentive morphology in front of certain plosives (always coronals, sometimes also velars).
↓	
full ANS	7>5V took place when BS had already deeply affected the lexicon of a language. BS became a general marker of agentive morphology.
↓	
extensive ANS	7>5V took place when BS had already deeply affected the lexicon of a language. BS had become a regular marker of agentive morphology, but it subsequently became irregular, because it was wiped out from certain words due to interparadigmatic analogy with competing derivational strategies providing the possibility of analogical extension and/or contact with 'no ANS' languages.

These distinct ANS types show not only how the variable degrees of BS morphologization have become entrenched in the lexicon, they also have a geographic distribution across Bantu that has historical significance. While BS as a phonological change is too widespread to distinguish major Bantu subgroups, its development as a morphophonemic change is telling with respect to early Bantu divergence. The early transmission of BS and its progressive morphologization seem to have been a matter of common inheritance and language dispersal. Contrary to the assumption of Janson (2007), its overall current-day distribution cannot be seen as the result of an areal change, even if contact phenomena may have played a role in the spreading of the sound change and in its regression from certain morphophonemic domains at subsequent stages and on a more local level. The way BS morphologization is currently distributed across the Bantu area clearly reflects major subgroups among the main spirantizing languages. Among the South-West and West-Coastal Bantu languages, BS never gained importance as a morphophonemic fact. This is also true for the southern East Bantu languages, suggesting that they must have broken away from their northern relatives before BS ever became a significant change across morpheme boundaries. ANS and BS morphologization before the perfect suffix turn out to be innovations typical of a language cluster stretching from the western Great Lakes region through the Lake Corridor area into Central Zambia west of Lake Malawi. These morphophonemic innovations, together with several lexical innovations, indicate that these languages are historically more closely related amongst each other than with the rest of Bantu. More data are needed to examine their precise historical relationship with the cluster of languages stretching from the Lake Corridor area to the Indian Ocean for which the available documentation only allows scattered instances of ANS and 'perfect BS' to be observed.

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Résumé

Cet article examine l'application irrégulière, devant certains morphèmes bantous fréquents d'un type particulier d'assibilation connu sous le nom de 'Bantu Spirantization (BS) '. Cette irrégularité s'explique en grande partie par la morphologisation (ou 'déphonologisation') et la lexicalisation progressives que ce changement phonologique a subies dans diverses langues bantoues. L'interaction avec un autre changement phonologique qui se retrouve souvent en bantou, à savoir la réduction du système vocalique de 7 à 5 voyelles, a créé les conditions nécessaires pour la morphologisation de la BS, tandis que l'analogie a joué un rôle important dans son bloquage et sa disparition de certains domaines morphologiques. Des contraintes morpho-prosodiques

différentes sont à l'origine du caractère variable de son conditionnement hétéromorphémique dans les langues contemporaines. Ces modes de morphologisation irréguliers, particulièrement devant le suffixe agentif -i, ont été enracinés dans le lexique par la lexicalisation des noms d'agent. La typologie de l'Agent Noun Spirantization (ANS), que l'on examine dans cet article, pourrait contribuer à une meilleure compréhension des mécanismes historiques qui sous-tendent la diversité des processus de morphologisation et de lexicalisation de BS. Elle pourrait aussi permettre d'affiner la classification interne du bantou. Les différents types d'ANS présentent une distribution géographique qui a une importance historique, en ce qu'ils permettent de distinguer d'importants sous-groupes bantous. D'un point de vue méthodologique, cet article illustre donc comment des modes divergents de morphologisation et de lexicalisation peuvent être utilisés comme outils pour la classification historique.

Zusammenfassung

Dieser Beitrag untersucht die irreguläre Anwendung des Lautwandels, welcher allgemein als „Bantu-Spirantisierung (BS)" bezeichnet wird. Es handelt sich dabei um einen besonderen Typus von Assibilierung vor einigen recht häufigen Bantu-Morphemen. Diese Unregelmäßigkeit kann größtenteils als das Ergebnis eines Vorgangs progressiver Morphologisierung (durch „Dephonologisierung") und Lexikalisierung erklärt werden, welchem der Lautwandel in der ganzen Bantu-Familie unterlag. Das Zusammenspiel mit einem weiteren häufigen Lautwandel im Bantu, der Zusammenfall von Vokalen und die nachfolgende Reduzierung des Systems von sieben auf fünf Vokale, bildete die nötige Voraussetzung für die Morphologisierung von BS, während Analogie eine wichtige Rolle bei der Blockierung und dem Rückgang von BS in einigen morphologischen Domänen spielte. Verschiedene morphoprosodische Restriktionen liegen der variablen heteromorphen Konditionierung des BS zugrunde. Diese unregelmäßigen Morphologisierungsmuster, insbesondere vor dem Agentivsuffix -i, haben sich dank der Lexikalisierung von Nomina agentis im Lexikon festgesetzt. Die Typologie der Spirantisierung bei Nomina agentis (ANS), die in diesem Artikel entwickelt wird, trägt zum besseren Verständnis sowohl der historischen Prozesse, welche den variablen Mustern der BS-Morphologisierung und (-)Lexikalisierung zugrunde-liegen, als auch der internen Klassifikation des Bantu bei. Die verschiedenen Typen von ANS sind in einer solchen Weise geographisch verteilt, dass es möglich ist, die wichtigsten Bantu-Untergruppen zu unterscheiden. Von einem methodologischen Gesichtspunkt aus (gesehen) zeigt dieser Artikel demnach auf, wie unterschiedliche Morphologisierungs- und Lexikalisierungsmuster als innovative Mittel der historischen Klassifikation genutzt werden können.

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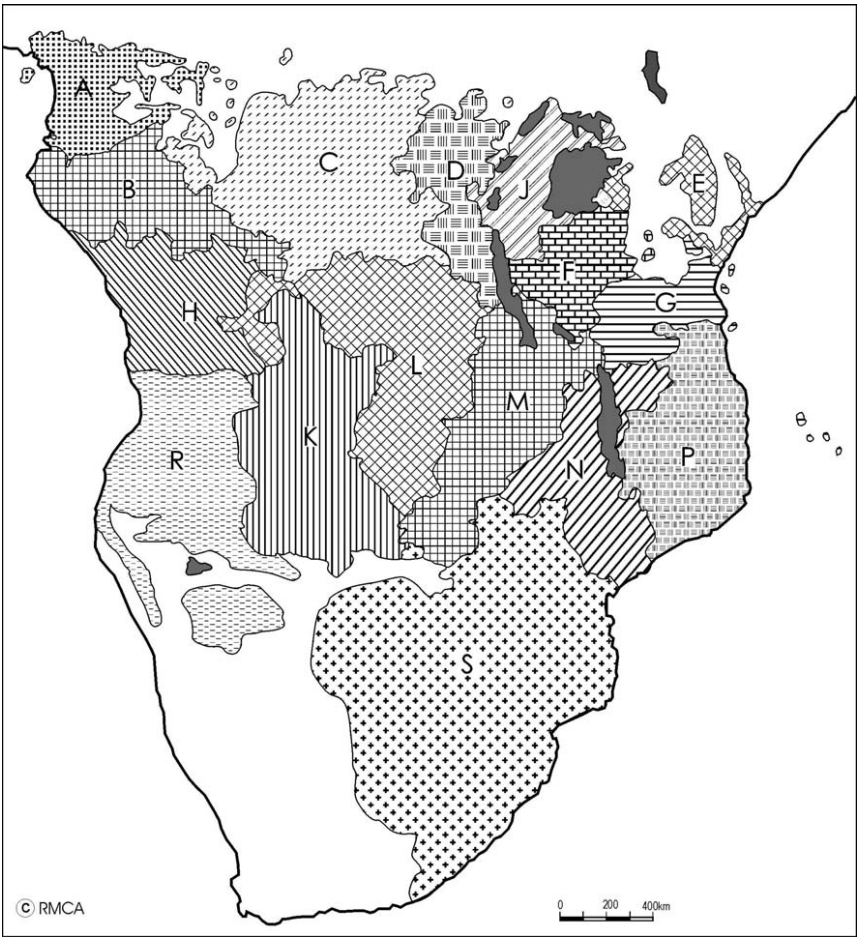
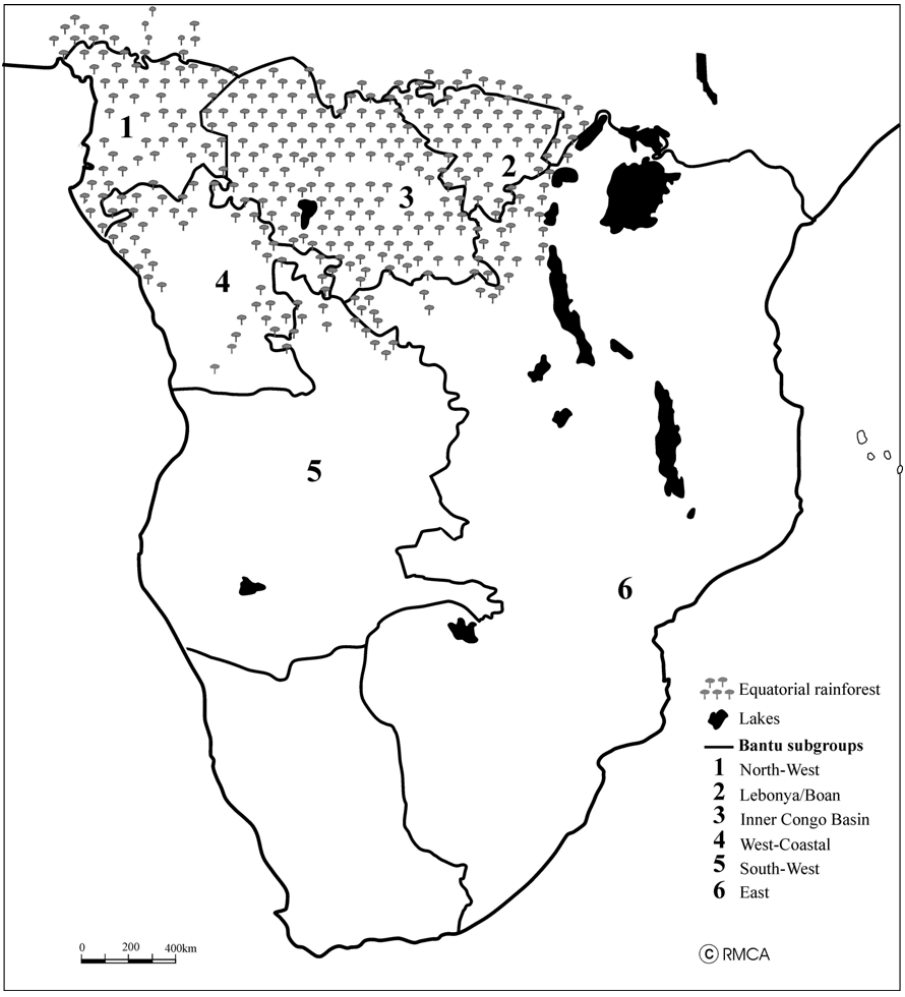
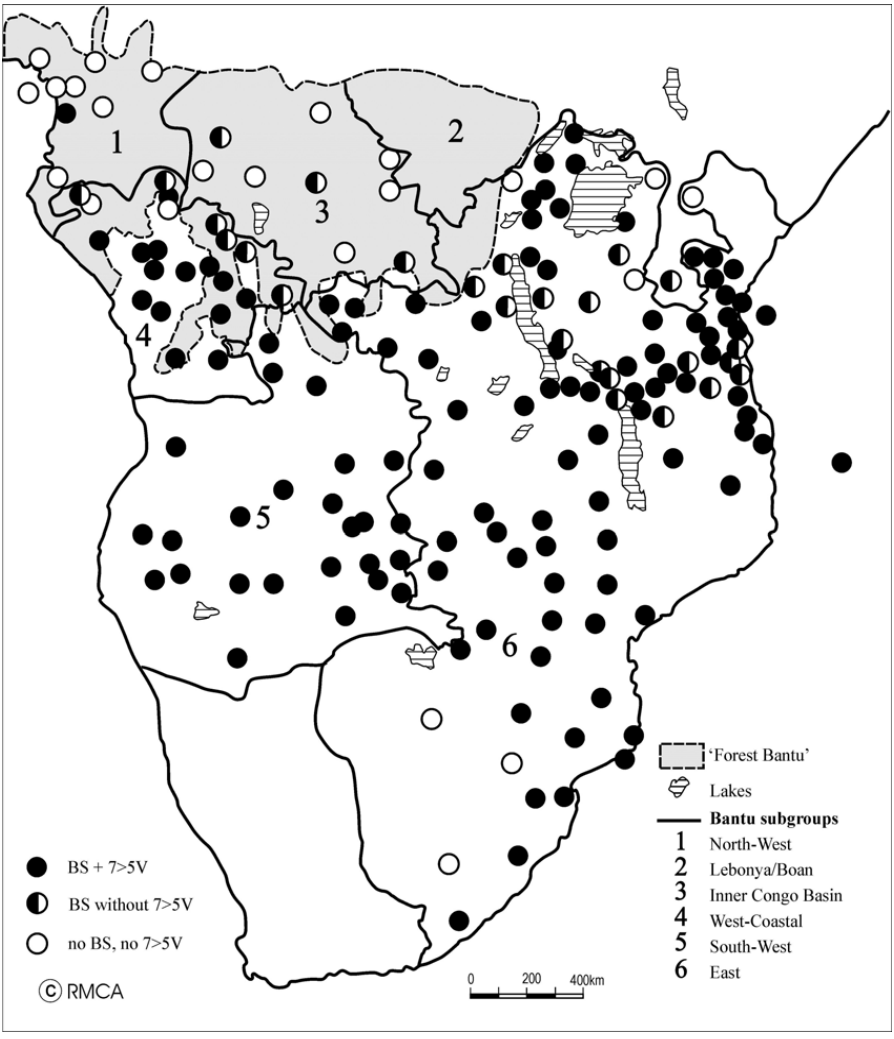
Appendix



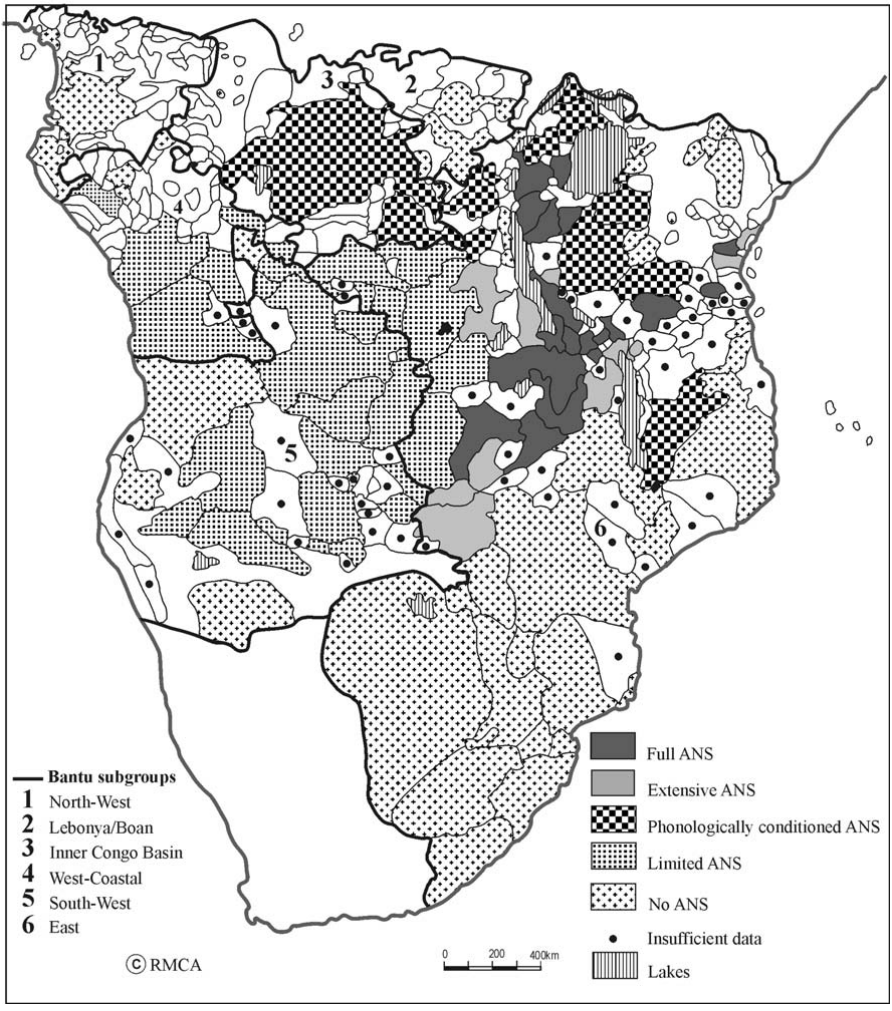
Map 1. Referential classification of the Bantu languages according to Guthrie (1967–71) with addition of Zone J (Bastin 1978)



Map 2. Lexicostatistically based historical classification of the Bantu languages (Bastin et al. 1999, Vansina 1995)



Map 3. Distribution of BS and 7>5V based on the map presented in Schadeberg (1994–5: 74) and completed with data from Janson (2007) and Labroussi (1999) and with personal data



Map 4. Distribution of ANS types (the languages left blank have not been considered, the ones with a dot have been considered but the available data were not sufficient to determine the state of ANS)