

DEFINING THE DOMAIN OF NASALITY IN EDO

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In Aikhionbare [1986], it is demonstrated that nasality spread in Edo is most evident in alternations between verb stems and their suffixes. In other words, nasality spreads beyond the segment (across morpheme boundaries). This paper seeks to establish whether or not nasality spreads beyond the verb stem and its suffixes onto an object NP. Having defined the domain of nasality spread, evidence for the autosegmental status of nasality in Edo is advanced. Finally, a brief autosegmental analysis of the facts of nasality in the language is attempted in line with evidence from Guarani [Lunt 1973], Gokana [Hyman 1982], Ogberia [Chumbow 1986], and Igbo [Ihionu 1986].

0. Introduction

Evidence from Guarani [Lunt 1973], Gokana [Hyman 1982], Ogberia [Chumbow 1986], and Igbo [Ihionu 1986] show that nasality in some languages is better viewed as a suprasegmental rather than a segmental feature. This means that for these languages, nasality is a feature of units larger than the segment. In such languages, nasality could be accounted for within the autosegmental framework as outlined in Goldsmith [1976], Kiparsky [1982], and Pulleyblank [1983].

Examining data from Edo,¹ we shall first attempt to establish the fact that nasality spreads beyond the segment. Then we shall determine the domain of this spread. In section 1, an analysis of the facts of nasality in Edo is attempted. In section 2, we advance a definition of the domain of nasality spread in Edo. A brief autosegmental phonology perspective to the facts of Edo nasality is then

¹We refer to the language all through this paper as Edo. Reference is to the same language that has been characterized as Edo (Bini) in the literature. To the extent that the word Bini is non-existent in contemporary usage, and to the extent that native speakers of the language refer to themselves as speakers of Edo, we prefer to refer to the language by the same label.

presented. Finally, we examine the implications of the manifestation of nasality for the phonology of Edo.

1. Nasality in Edo

As demonstrated in Aikhionbare [1986], nasality spread in Edo is most evident in alternations between verb stems and their suffixes. The verb system of Edo manifests only two suffixes, a simple past tense suffix² and a plural/reiterative³ suffix, each of which has different phonologically conditioned reflexes. The data below illustrate this.

- (1) a. $d\epsilon^A$ 'to buy'
 b. $\dot{\sigma}$ $d\acute{\epsilon}\text{-}\acute{r}\grave{e}$ 'he/she (3 sg.) bought'
 3 sg. buy+PAST
 c. $\dot{\sigma}$ $d\grave{e}\text{-}l\acute{\epsilon}$ $\grave{e}b\acute{\epsilon}$ 'he/she bought books'
 3 sg. buy+PL book
- (2) a. $gb\acute{\epsilon}$ 'to write'
 b. $\dot{\sigma}$ $gb\acute{\acute{\epsilon}}\text{-}\acute{r}\grave{e}$ 'he/she wrote'
 3 sg. write+PAST
 c. $\dot{\sigma}$ $gb\grave{e}\text{-}n\acute{\acute{\epsilon}}$ $\grave{e}b\acute{\epsilon}$ 'he/she wrote books/letters'
 3 sg. write+PL book/letter
- (3) a. gbe 'to kill'

²Aikhionbare [1987] argues that /re/ serves the dual function of depicting intransitivity as well as serving as the simple past tense marker. The symbol /r/ is used to represent the lateral approximant /r/. In the speech of most younger generation speakers of the language, the sound is virtually non-existent.

³In Aikhionbare [1987] we also argue for /lo/ as the plural/reiterative suffix. In most of our examples, the suffix evidently indicates plurality on the object NP. In 6(c), 11(c) and 12(c) however, it marks reiterated or repeated action. Hence we prefer to refer to it as a plural/reiterative morpheme.

⁴Edo verbs are conceived of as being underlyingly toneless. Unlike nouns which have lexical tone, verbs only acquire tone in grammatical contexts. We have therefore decided to leave our verb stems toneless. The language also displays the phenomenon of downstep, where high tones preceded by low tones get reduced in height or "downstepped". Our examples do not reflect this fact since tone is not crucial to the subject of this paper.

- b. ò gbé-rè 'he/she killed'
3 sg. kill+PAST
- c. ò gbè-1é èwé 'he/she killed goats'
3 sg. kill+PL goat
- (4) a. tǎ 'to spread'
- b. ò tǎ-řè 'he/she spread'
3 sg. spread+PAST
- c. ò tǎ-nǎ ùkpò 'he/she spread clothes'
3 sg. spread+PL cloth
- (5) a. fi 'to shoot'
- b. ò fí-řì 'he/she shot'
3 sg. shoot+PAST
- c. ò fí-1ó áhiámè 'he/she shot birds'
3 sg. shoot+PL bird
- (6) a. tí 'to fly'
- b. ò tí-řì 'he/she flew'
3 sg. fly+PAST
- c. ířá tí-nǎ kpàá 'they flew away'
they fly+PL go
- (7) a. bǔú 'to break'
- b. ò bǔú-řù- 'he/she broke'
3 sg. break+PAST
- c. ò bǔ-nǎ àbǔ-èrǎ 'he/she broke tree branches'
3 sg. break+PL branch-tree

- (8) a. *bɔ* 'to build'
- b. *ɔ bɔ-rɛ̀* 'he/she built'
3 sg. build+PAST
- c. *ɔ bɔ-ɪɔ òwá* 'he built houses'
3 sg. build+PL house
- (9) a. *dʒʒ* 'to snap'
- b. *ɔ dʒʒ-rɛ̀* 'he/she snapped'
3 sg. snap+PAST
- c. *ɔ dʒ-nʒ ìfí* 'he/she snapped traps'
3 sg. snap+PL trap
- (10) a. *sa* 'to sting'
- b. *ɔ sárɛ̀* 'he/she stung'
3 sg. sting+PAST
- c. *ɔ sà-ɪɔ ima* 'he/she stung us'
3 sg. sting+PL us
- (11) a. *so* 'to shout'
- b. *ɔ sɔ-rò* 'he/she shouted'
3 sg. shout+PAST
- c. *ìbjékà sò-ɪɔ* 'children shout/are shouting'
children shout+PL
- (12) a. *tu* 'to cry'
- b. *ɔ tú-rù* 'he/she cried'
3 sg. cry+PAST
- c. *ìbjékà tù-ɪɔ* 'children cry/are crying'
children cry+PL

The data above show the verb stem displaying inflections to mark the simple past and plurality. In Aikhionbare [1987], it is argued that the basic forms of the suffixes are /-re/ and /-lo/ respectively. The choice of /-re/ and /-lo/ as being the basic forms was predicated on the principles of frequency of occurrence and predictability of the other reflexes from either of them.

1.1. The /-re/ suffix. The /re/ suffix has the following reflexes.

- (13) *re* when preceded by vowels /e/, /ɛ/, /ɔ/, /a/
 (14) *ɾɛ* when preceded by vowels /ɛ/, /ǣ/, /ɔ/
 (15) *ri* when preceded by vowel /i/
 (16) *ɾi* when preceded by vowel /i/
 (17) *ru* when preceded by vowel /u/
 (18) *ɾu* when preceded by vowel /u/
 (19) *ro* when preceded by vowel /o/.

Taking /re/ as our basic morpheme, we need rules to explain the alternations in (14) through (19). Before attempting an analysis, we shall first characterize the vowels of Edo using distinctive features.

Figure 1: the vowels of Edo

	<i>i</i>	<i>ĩ</i>	<i>e</i>	<i>ɛ</i>	<i>ɛ̃</i>	<i>a</i>	<i>ǣ</i>	<i>ɔ</i>	<i>ɔ̃</i>	<i>o</i>	<i>u</i>	<i>ũ</i>
HIGH	+	+	-	-	-	-	-	-	-	-	+	+
ROUND	-	-	-	-	-	-	-	+	+	+	+	+
BACK	-	-	-	-	-	+	+	+	+	+	+	+
LOW	-	-	-	+	+	+	+	+	+	-	-	-
NASAL	-	+	-	-	+	-	+	-	+	-	-	+

Examining the alternations involving oral vowels, a rule that would derive /ri/, /ru/, and /ro/ from our basic suffix /re/ needs to be posited. A look at Figure 1 shows that all three vowels, along with /e/ itself, are the [-low] oral vowels in Edo. Our rule could be formulated thus:

PR1: $\begin{bmatrix} +\text{syll} \\ -\text{high} \\ -\text{low} \end{bmatrix} \rightarrow [\alpha\text{F}] / \begin{bmatrix} +\text{syll} \\ -\text{low} \\ \alpha\text{F} \end{bmatrix} + r$ —Past Suffix

PR1 claims that /e/ copies the features of a preceding [-low] vowel across morpheme boundary. This is illustrated below:

(20) /fi + re/ → *firi* 'shot'

(21) /he + re/ → *hérè* 'refused'

(22) /wu + re/ → *wúrù* 'died'

(23) /so + re/ → *sórò* 'cried'

Since our condition for the application of PR1 is not met by /ɛ/, /ɔ/ and /a/, which are all [+low], they do not trigger off any alternations.

(24) /dɛ + re/ → *dérè* 'bought'

(25) /bɔ + re/ → *bórè* 'built'

(26) /ka + re/ → *kárè* 'counted'

In examining the nasal vowel alternations, it should first be noted that /e/ and /o/ have no nasal counterparts in Edo. /ɪ/ and /ʊ/ are therefore our only [-low] nasal vowels and in line with the behaviour of the [-low] oral vowels, (16) and (18) can be accounted for by PR1. Nasality also spreads to the lateral approximant /r/.

The other three nasal vowels—/ɛ/, /ɔ/, and /a/—all surface with *rɛ* (see (2b), (4b), and (9b)). Recall that their oral counterparts occur with /re/ and recall that neither /e/ nor /o/ have a nasal counterpart. It means that we require a phonetic rule which stipulates that when /e/ or /o/ are [+nas], they come out as [ɛ] and [ɔ] respectively. An alternative to a rule will be a morpheme structure condition (MSC) to the same effect. We would prefer an MSC because it makes a significant claim about the sound system of the language. We could then posit our MSC thus:

MSC1: If $\begin{bmatrix} +\text{syll} \\ -\text{low} \\ -\text{high} \\ +\text{nas} \end{bmatrix}$
 \downarrow
 Then [+low]

We also need to posit a general rule of nasal assimilation across morpheme boundary which would necessarily be ordered before MSC1.

PR2: [+son] \rightarrow [+nas] / $\begin{bmatrix} +\text{syll} \\ +\text{nas} \end{bmatrix}$ +__

Our two phonological rules, in conjunction with MSC1, adequately account for all the alternations we have.

1.2. The /*lo*/ suffix. As evident from (1c) through (12c), the /*lo*/ plural reiterative suffix has the reflexes outlined in (27) below:

- (27) a. *lo* when preceded by any of /*i*/, /*u*/, /*o*/
 b. *lɔ* when preceded by any of /*a*/, /*ɔ*/
 c. *le* when preceded by any of /*e*/
 d. *lɛ* when preceded by any of /*ɛ*/
 e. *nɔ* when preceded by any of /*ɪ*/, /*ʊ*/, /*ɔ*/, /*ã*/
 f. *nɛ* when preceded by any of /*ɛ*/

The /*l*/ \rightarrow [*n*] alternation of (27e) and (27f) can be taken care of by our PR2 of nasal assimilation. /*l*/ never occurs in nasal environments.

To account for (27b), (27c), and (27d), i.e. /*lo*/ \rightarrow [*lɔ*], [*le*], and [*lɛ*] respectively, we could formulate a rule thus:

$$\text{PR3: } \begin{bmatrix} +\text{syll} \\ -\text{high} \\ -\text{low} \\ +\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha\text{low} \\ <-\text{round}> \end{bmatrix} / \begin{bmatrix} -\text{high} \\ \alpha\text{low} \\ <-\text{back}> \end{bmatrix} + 1 \text{---Plural/reiterative suffix}$$

$$o \rightarrow \begin{bmatrix} e \\ o \\ \epsilon \\ \text{ɔ} \end{bmatrix} / \begin{bmatrix} e \\ o \\ \epsilon \\ \text{ɔ} \\ a \end{bmatrix} + 1 \text{---Plural/reiterative suffix}$$

PR3 thus accounts for all the oral vowel alternations. Note that vowels /i/, /u/, and /o/ (to which PR3 applies vacuously) do not trigger off any alternations:

(28) /fi + 1o/ → fi1ó 'to shoot'

(29) /wu + 1o/ → wù1ó 'to die'

(30) /so + 1o/ → sò1ó 'to cry'

Our nasal vowel alternations can be accounted for by a lowering rule or our MSC1 and our nasal assimilation rule, PR2. Observe that each of /i/ and /u/, whose oral counterparts occur with vowel /o/, occur with vowel /ɔ/. Also, recall that Edo has no nasal counterparts for /o/ and /e/. MSC1 above accounts for */ɔ/ surfacing as /ɔ/. This is illustrated in the sample derivation below.

(31)	/tĩ+1o/	/fi+1o/	/bũ+1o/	/wu+1o/
PR2:	/tĩnɔ/	-	/bũnɔ/	-
MSC1:	tĩnɔ	-	bũnɔ	-
OUTPUT:	[tĩnɔ]	[fi1o]	[bũnɔ]	[wulo]

Following are some further derivations illustrating the interaction of PR2, PR3, and MSC1:

(32)	/tã+1o/	/dʒʒ+1o/	/gbɛ+1o/	/sa+1o/	/gbe+1o/	/tĩ+1o/	/bũ+1o/
PR2:	tãnɔ	dʒʒnɔ	gbɛnɔ	-	-	tĩnɔ	bũnɔ
PR3:	tãnɔ	dʒʒnɔ	gbɛnɛ	salɔ	gbele	-	-
MSC1:	-	-	-	-	-	tĩnɔ	bũnɔ
OUTPUT:	[tãnɔ]	[dʒʒnɔ]	[gbɛnɛ]	[salɔ]	[gbele]	[tĩnɔ]	[bũnɔ]

1.3. Summary. With three rules and two morpheme structure conditions, we are able to account for all the alternations displayed by the two verbal suffixes in Edo within a linear phonology framework, as in Chomsky and Halle [1968].

2. Domain of Nasality

Our data so far show nasality spreading beyond a segment unto an entire morpheme. Thus we have the following examples:

- (33) /gbɛ+re/ → gbɛ́rɛ̀ ‘wrote’
 (34) /gbɛ+lo/ → gbɛ̀nɛ́ ‘to write’ (PL)
 (35) /tɪ+re/ → tɪ́rɪ̀ ‘flew’
 (36) /tɪ+lo/ → tɪ́nɔ̀ ‘to fly’ (PL)

There are instances where both morphemes co-occur. Some examples are given below:

- (37) /gbɛ+lo+re/ → gbɛ̀nɛ́rɛ̀
 write+PL+PAST
 (38) /mɪɛ+lo+re/ → mɪɛ̀nɛ́rɛ̀
 squeeze+PL+PAST

As opposed to

- (39) /gbe+lo+re/ → gbɛ̀lɛ́rɛ̀
 kill+PL+PAST
 (40) /de+lo+re/ → dɛ̀lɛ́rɛ̀
 buy+PL+PAST

Since Edo nasal vowels never occur word or morpheme initially, one can say that nasality spreads from left to right since it is the nasality of the vowel(s) of the verb stem which cause(s) nasality on the suffixes. So far, we can define the domain of nasality spread in Edo as a phonological word, viz. a verb stem and its dependent suffixes. Does nasality spread beyond our phonological word onto, say, an object NP? We shall examine this using the examples below:

- (41) ð *dṣṣ* *ìfí* [ð dṣṣ ìfí]
 3 sg. snap trap
 'he snapped a trap'
- (42) ð *gbènḗ* *èbé* [ð gbènḗbé]
 3 sg. write+PL book
 'he wrote books'
- (43) ð *gbènḗ* *èṃḗ* *hyá* *ye* *òtò* [ð gbènḗ èṃḗ hyáyótò]
 3 sg. write+PL word all on ground
 'he wrote all the words down'
- (44) ð *sá* *èré* [ð sá éré]
 3 sg. fetch it
 'he fetched it'
- (45) ð *sǎǎ* *èré* [ð sǎǎ ɛʔɛ]
 3 sg. jump it
 'he jumped it'
- (46) ð *sǎǎ* *ógbà* [ð sǎǎ ógbà]
 3 sg. jump fence
 'he jumped (over) the fence'
- (47) ð *tṣ* *òré* [ð tṣṣ ʔɛ]
 3 sg. roast it
 'he roasted it'

In (41), (43), and (46), it is apparent that nasality does not spread onto an object NP. If it did, we would have expected (42) for example to come out as *[ð gbènḗ bé] (that is, assuming that the obstruent may block nasality spread) or *[ð gbènḗ bɛ]. In (45) and (47) however, nasality spreads beyond our phonological word as defined above to an object pronoun. We therefore need to redefine the phonological word. But before that, it will be insightful to examine the behaviour of other object pronouns vis-a-vis nasality.

- (48) ɔ́ ɾ́ ɪ̀r̀á [ɔ́ ɪ̀r̀á]
 3 sg. roast them
- (49) ɔ́ káá́ ùwà [ɔ́ káá́wá]
 3 sg. touch you(pl)
- (50) ɔ́ káá́ ùwé [ɔ́ káá́wé]
 3 sg. touch you(sg.)
- (51) ɔ́ káá́ i mɛ́ [ɔ́ káá́mɛ́]
 3 sg. touch me
- (52) ɔ́ káá́ i yɛ́ [ɔ́ káá́yɛ́]
 3 sg. touch him/her/it
- (53) ɔ́ káá́ i m̀à [ɔ́ káá́m̀à]
 3 sg. touch us
- (54) ɔ́ kú èrɛ́ [ɔ́ kúèrɛ́]
 3 sg. craft it
- (55) ɔ́ ká èrɛ́ [ɔ́ káèrɛ́]
 3 sg. nail it
- (56) ɔ́ dɔ́ɔ́ ɪ̀r̀á [ɔ́ dɔ́ɔ́ɪ̀r̀á]
 3 sg. snap them

Looking at our examples above, it is obvious that usually nasality does not spread onto an object pronoun. In (48), when V_1 gets elided it appears as if V_2 acquires the nasality of V_1 . This is only further proof of the autosegmental status of nasality in Edo. According to Omozuwa [1987] and in personal communication, the nasal feature is not a feature of V_2 . Instead, it exists on its own tier, even though it does not get lost with the elision of V_1 .

If (48) and (56) are compared, we observe that with the elision of the final vowel of the verb stem in (56) we have a nasal vowel in collocation with an oral, the initial vowel of the object pronoun. Example (57) below gives further evidence that even though nasality remains when a final nasal vowel is deleted, it does not necessarily become a feature of the following oral vowel across morpheme or word boundary.

(57) *Úyì gbé èbé* [*úyì gbébé*]
 Uyi write book

Recall that vowels /e/ and /o/ do not have nasal counterparts in Edo and they do not get nasalized. In (57), the elision of the final vowel of the verb stem leaves us with /e/ which is not a nasality bearing unit. However, nasality is still perceived. Since nasality cannot reside on /e/, it follows that it exists on a separate tier and it is not necessarily a feature of the following vowel segment.

An examination of (48) through (56) shows that apart from the third person singular object pronoun, all other object pronouns in the language have their initial segments as close vowels: /i/ or /u/. There is the general tendency for open vowels to be more susceptible to nasality than close vowels. Evidence from Edo lends credence to this fact. The third person singular object pronoun in either of its variants has an initial open vowel, i.e. [*ðré*] or [*èré*]. It is therefore not surprising that nasality would spread to the third person singular but not to other object pronouns.

In other words, we are making the claim that with the third person singular object pronoun, we have a case of cliticization. That is, the object pronoun gets cliticized to the verb and forms part of the phonological word as the domain of nasality spread in Edo. This would necessitate a redefinition of the domain of nasality spread in Edo as the verb stem and its dependent suffixes and clitics.

3. An Autosegmental Perspective

3.1. Mapping nasalization. Evidence has been given to show that nasality in Edo is not a feature of the segment but one that exists on a tier distinct from the segmental tier. It is a feature of units larger than the segment. Having defined the domain for nasality spread in Edo, we need to determine those segments which can occur with the feature [+nas]. Hyman [1982] refers to such segments as nasality bearing units (NBU's).

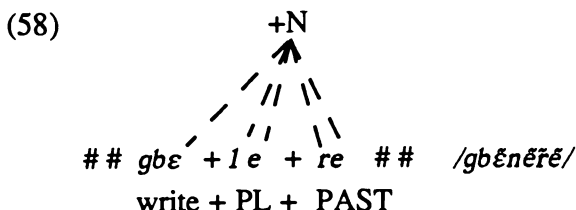
The NBU's in Edo would include all the oral vowels (*e/ and *o/ becoming [*é*] and [*ó*] respectively by MSC1), the liquid, the glides, and the lateral approximant. These we shall represent with the feature [+son].

Each verb stem will be specified for absence or presence of nasality. Those stems which have the feature will have a single [+nas] specification which our mapping rule MR1 below will spread to all NBU's within our defined domain of application.

MR1:
$$\begin{array}{c} +N \\ | \\ \# \# (-NBU) [+NBU]_1^n \dots \# \# \end{array}$$

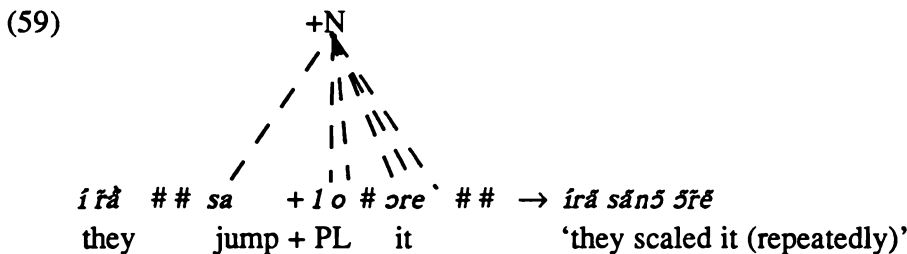
(where [-NBU] specifies all the non-nasality bearing units)

What our mapping rule says is that in a stem which has a single [+N] specification, nasality will spread to all the NBU's (marked [+son]) within our defined domain of application. Such a stem may have a [-NBU] (that is, non-nasality bearing unit) as its initial segment. The schema (58) below illustrates this.



By MSC1: ($\epsilon \rightarrow \epsilon$) $[gb\epsilon n\epsilon r\epsilon]$

Following the association convention [Goldsmith 1976] mapping starts from “left” and goes “rightwards”. In (59) below, our [+N] feature spreads across morpheme and word boundaries.



By MSC1: $[\dot{i}\dot{r}\dot{a} \quad s\dot{a}n\dot{o} \quad ʒr\dot{\epsilon}]$

An advantage of the autosegmental approach is that we are able to dispense with iterative rule application.

3.2. Problems. However, a number of pertinent issues have been glossed over. One is the question of the status of nasal consonants. Our analysis assumes that

[*n*] is the realization of /l/ in nasal environments. This seems fairly straightforward. But there are occurrences of /*n*/, though few, which one would be hard put to explain as realizations of /l/. Examples (60) and (61) below illustrate this point.

(60) *néné* òkpì á 'the particular man...'
Def. man

(61) òkpì á *nè* ɔ re... 'the man who came...'
man REL copy PRO come

/*n*/ in *nene* and *ne* (relative clause marker) cannot possibly be explained as being underlyingly /l/. /*e*/ is one of the two vowels which do not have nasal counterparts. We therefore should expect underlying /*lele*/ and /*le*/ to surface as *[*lele*] and *[*le*] respectively. Since this is not the case, it follows that Edo has phonemic /*n*/, even though its occurrence is limited to only a few items. This calls to question Amayo's [1976] recognition of /*m*/ as the only phonemic nasal consonant in Edo.

Secondly, our explanation for nasality spread onto the third person singular object pronoun to the exclusion of all other pronouns seems ad hoc. But then, it remains the only plausible explanation we can advance to account for the facts of nasality spread within the VP in Edo.

4. Conclusion

Nasality in Edo is evidently a supra-segmental feature whose domain is the verb stem and its dependent suffixes and clitics. The manifestation of nasality spread in the language bears out the fact that open vowels are more amenable to nasal assimilation than close vowels. This claim is supported by evidence from other Edo data in Omozuwa [1987].

We question the designation of /*m*/ as the only phonemic nasal consonant in Edo by Amayo [1976]. Evidence shows that /*n*/, though less frequent than /*m*/, is also phonemic.

A number of details have been left out in this study. What we have done is attempt a definition of the domain of nasality spread in Edo.

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