

Prominence Mismatches and Differential Object Marking in Bantu*

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Abstract

Majority of Bantu languages encode subjects by head-marking and objects by positional licensing. This reflects a point in the historical process whereby positional licensing of objects becomes obligatory due to the loss of inflectional morphology. What we observe in synchronic grammar is considerable variation both across and within languages in the use of head-marking morphology for objects. This paper examines this variation under the general concept of DIFFERENTIAL OBJECT MARKING (DOM). I show that an Optimality-Theoretic LFG account of DOM in Bantu enables us to provide a unified account of differential marking of objects across typologically diverse languages—realized by case, agreement, or by lexical choice—which is conditioned by the same semantic/pragmatic factors (animacy and definiteness/specificity). The present analysis also illustrates that cross-linguistic variation and language-internal variation (= ‘optionality’) operate within a single typological space made available by the system of universal, violable constraints.

1 Differential Object Marking

DIFFERENTIAL OBJECT MARKING (DOM), in which only some direct objects are case marked due to their semantic and pragmatic properties, has been extensively documented in functional and typological studies on case marking languages (e.g. Silverstein 1976, Comrie 1979, 1980, Croft 1988, among others). According to earlier studies, DOM takes many forms. For example in Sinhalese, animate-referring objects may be optionally case-marked (Gair 1970). In Hebrew definite objects are obligatorily case marked (Givón 1978). In Romanian, object case marking is obligatory for animate-referring personal pronouns and proper nouns, optional for others, and excluded for a third set (Farkas 1978). In recent work, Aissen (2000) proposes a single generalization of these seemingly disparate facts, and provides a systematic account of previously documented instances of DOM within Optimality Theory (Aissen 1999, Bresnan 2000, Sells 2001a,b). Aissen's key generalization is stated in (1).

- (1) The higher in prominence a direct object the more likely it is to be overtly case marked—where the dimensions along which prominence is assessed include animacy (1a) and definiteness (1b).
 - a. Animacy: Human > Animate > Inanimate
 - b. Definiteness: Pronoun > Name > Definite > Indef. Specific > Non-specific

Despite the impressive body of work on DOM, this phenomenon has received relatively little attention outside case marking languages. In this paper, I present data from Bantu languages, which are primarily head marking, and argue that DOM in case marking languages and previously observed variation in the use of object agreement in some Bantu languages are one and the same phenomenon conditioned by the single generalization in (1).

The present discussion proceeds as follows. In section 2, I present the core facts on object marking in Bantu. The two crucial points will be the following: (i) object marking in Bantu is conditioned by animacy and definiteness, just as DOM is in case marking languages, and hence deserves a unified explanation; and (ii) we find considerable variation both across and within Bantu languages as to whether, and/or when, object marking is (not) used. The discussion in section 3 identifies theoretical issues raised by the observed facts in Bantu object marking: the cross-linguistic variation and optionality, and notions of 'iconicity' and 'economy' that are central in Aissen's (2000) OT analysis of DOM. In section 4, I first outline briefly a set of theoretical assumptions adopted in my analysis for morphosyntactic realization of arguments before turning to my OT analysis. The final section includes a summary of the findings and a brief discussion of potential extension of the present approach to DOM beyond case marking and agreement languages.

2 Object Marking in Bantu

Bantu languages are characterized primarily as head marking languages, where the subject and object marker on a verb cross-reference the verb's arguments by agreeing in person, number and gender. The nature of object marking, however, is rather complex: majority of Bantu languages make use of word order rather than agreement for licensing objects, and object marking on the verb appears only when it is topic-anaphoric (like English pronouns). In some of these languages, however, both object agreement and positional licensing are required for particular types of object. In this section, I present these facts from some representative samples of the Bantu family.

No Object Agreement

Bresnan and Mchombo (1987), whose detailed study of the head-marking morphology focuses on Chicheŵa subject and object markers, show conclusively that the subject marker (SM) functions either as a topic-anaphoric pronoun or an agreement marker coindexing a clause-internal, non-topical subject NP, whereas the object marker functions only as a topic-anaphoric pronoun, being in complementary distribution with a clause-internal, non-topical object NP. In their theory of agreement developed within the LFG framework (Bresnan 1982, 2001, Dalrymple et al. 1995, Falk 2001), the subject marker is said to be ambiguous between ANAPHORIC and GRAMMATICAL AGREEMENT, while the object marker is unambiguously anaphoric agreement. One piece of evidence for their claim about these markers comes from word order. In simple transitive sentences, the object must immediately follow the verb when the verb contains no OM while the subject can be freely re-ordered (Bresnan and Mchombo, p.744–745). This is illustrated in (2), where only (2a) and (2b) with the V-O order are acceptable.

- (2) a. SVO: Njũchi zi-ná-lúm-a alenje. Chicheŵa
bees SM-PAST-bite-INDIC hunters
'The bees bit the hunters.'
- b. VOS: Zínálúma alenje njũchi.
c. OVS: *Alenje zínálúma njũchi.
d. VSO: *Zínálúma njũchi alenje.
e. SOV: *Njũchi alenje zínáluma.
f. OSV: *Alenje njũchi zínáluma.

On the other hand, when the OM is present, all the word order permutations become acceptable, as shown in (3).

- (3) a. SVO: Njũchi zi-ná-wá-lúm-a alenje. Chicheŵa
bees SM-PAST-OM-bite-INDIC hunters
'The bees bit them, the hunters.'
- b. VOS: Zínáwálúma alenje njũchi.
c. OVS: Alenje zínáwálúma njũchi.
d. VSO: Zínáwálúma njũchi alenje.
e. SOV: Njũchi alenje zínáwáluma.
f. OSV: Alenje njũchi zínáwáluma.

Bresnan and Mchombo argue that the contrast between (2) and (3) can be explained under the following assumptions: (i) the object NP must be inside VP requiring strict adjacency with V, (ii) the OM functions only as a incorporated pronominal argument, and (iii) the object NP appearing with the OM in (3) is a floating topic which is outside the minimal clause containing the OM. A number of tests Bresnan and Mchombo present clearly show that the OM is systematically prohibited to co-occur with an object NP that cannot be a topic, such as a *wh*-phrase, a non-referential object that is part of a verb-object idiom (e.g. *a-ku-nóng'ónez-a bôndo* 'whisper-to his knee' meaning 'feeling remorse' in Chicheŵa), and a focused object (e.g. in cleft). The SM, on the other hand, co-occurs with all such elements. For example, when the object of a verb-object idiom (= a non-referential object) is passivized, the subject marker co-occurs with it.

Sensitivity to Animacy

Bresnan and Mchombo (1987) further note the following variation on object marking across the Bantu family: in the Imithupi dialect of Makua studied by Stucky (1981, 1983), the OM is obligatory for the human classes (classes 1 & 2) even when the overt object NP is not topical. This is best illustrated by the example in (4), in which the focus of *wh*-question is the object, and the OM is obligatory.

- (4) a. Aráárima a-n-líh-íre mpáni? Makua
 Araarima SM-OM-feed-T/A who
 ‘Who did Araarima feed?’
- b. *Aráárima a-líh-íre mpáni?
 Araarima SM-feed-T/A who human object

In KiSwahili, the OM is optional when the object NP is inanimate, but obligatory when it is animate (originally noted by Bokamba 1981; also Wald 1979). In (5), the OM agrees with *watoto* ‘children’. We see in (5b) that in KiSwahili, the object can be questioned in situ, and co-occurs with the agreeing OM. The point about the optionality of object marking with inanimates will be returned to shortly.

- (5) a. Bakari a-na-wa_i-som-e-a watoto_i hadithi maktaba-ni. KiSwahili
 Bakari SM-PRES-OM-read-APPL-INDIC children stories library-LOC
 ‘Bakari is reading stories to/for the children in/at the library.’
- b. Bakari a-na-wa_i-some-e-a nani_i hadithi maktaba-ni?
 Bakari SM-PRES-OM-read-APPL-INDIC who stories library-LOC
 ‘To/for whom is Bakari reading stories in/at the library?’ human object

The sentences in (6) more clearly illustrate the animate-inanimate (rather than the human-nonhuman) opposition; they exemplify the presence of object marking with a non-human animate object but not with an inanimate object (Vitale 1981:123–124, (16a) & (19a)).

- (6) a. Juma a-li-m-piga risasi tembo jana usiku. Swahili
 Juma SM-PST-OM-hit bullet elephant yesterday night
 ‘Juma shot an/the elephant last night.’ animate object
- b. risasi i-li-piga mti karibu na sisi.
 bullet SM-PST-hit tree near us
 ‘The bullet struck the tree near us.’ inanimate object

Sensitivity to Definiteness

In addition to the effects of animacy on object marking, other Bantu languages display sensitivity to definiteness. Bresnan and Moshi (1993:52) note that in Kichaga, the object marker is obligatory when the object NP is an independent pronoun—the highest element in the definiteness hierarchy shown earlier in (1b). In (7a), the beneficiary (class 1) is pronominalized and triggers the class 1 object agreement *m*; in (7b), the theme (class 7) is pronominalized and co-occurs with class 7 object agreement *kí*; in (7c), both theme and beneficiary are pronominalized and co-occurs with their respective agreement markers.

- (7) a. N-ä-ï-m-lyì-á k-èlyá ò OMⁱ ... NP_{pro}ⁱ
 FOC-1S-PR-1O-eat-AP-FV 7-food 1PRO
 ‘He/she is eating food for/on him/her.’
- b. N-ä-ï-kì-lyì-à m-kà kyô OMⁱ ... NP_{pro}ⁱ
 FOC-1S-PR-7O-eat-AP-FV 1-wife 7PRO
 ‘He/she is eating it for/on the wife.’
- c. N-ä-ï-kì-m-lyì-à òó kyò OMⁱ OM^j ... NP_{pro}^j NP_{pro}ⁱ
 FOC-1S-PR-7O-1O-eat-AP-FV 1PRO 7PRO
 ‘He/she is eating it for/on him/her.’ Kichaga

Along the dimension of definiteness, facts in Kiyaka reveal another pattern: Kidima (1987) reports that Kiyaka requires object agreement when the object NP is a personal name—the second highest element in the definiteness hierarchy, as exemplified in (8). The ungrammaticality of (8b) shows that object marking is obligatory (and not optional) with a personal name.

- (8) a. tu-n-telelé Maafú. b. *tu-telelé Maafú. Kiyaka
 2SM-1OM-call.PAST Maafú 2SM-call.PAST Maafú Proper Name
 ‘We called Maafú.’

Object marking in Kiyaka is optional, however, when the object NP is definite, as illustrated in (9) (Kidima, p.180). Without the OM, the object can be interpreted as either definite or indefinite, as indicated by the translation in (9b). Put differently—and more accurately—when the OM is present, the object cannot be interpreted as indefinite.¹

- (9) a. ba-aná ba-n’-súumb-idi khoomboó Kiyaka
 2child 2SM-1OM-buy-P 1goat
 ‘The children bought the goat.’
- b. ba-aná ba-suúmb-idi khoomboó
 2child 2SM-buy-P 1goat
 ‘The children bought a/the goat.’ Definite object

As also noted by Bresnan and Mchombo (1987), Takizala (1973) reports that in Kihung’an the OM is used for definite objects, as exemplified in (10) (Takizala 1973, (11a) & (19)). Example (10a) is without the OM, and the object receives the indefinite interpretation; in (10b) on the other hand, the presence of the OM induces the definite reading of the object. The same contrast is reported in Zulu (Wald 1979).

¹It should be noted that the Kiyaka facts cited here are only part of a much more complex picture of object marking in this language (Kidima 1984, 1987). In addition to object prefixes, which are instantiated only for classes 1 and 2 (animate singular and plural respectively), there are enclitics and full pronouns that may also co-occur with object NPs. Which form of coindexing is used and whether coindexing is obligatory or optional are apparently determined, in part, by interaction of the semantic and person hierarchy. Another conditioning factor seems to be discourse prominence. A clear picture of the complex interaction of these factors in Kiyaka object marking is yet to emerge.

- (10) a. Kipese ka-swiim-in kit zoon. Kihung'an
 Kipese SM-buy-PST chair yesterday
 'Kipese bought a chair yesterday.'
- b. Kipese ka-**ki**-swiim-in kit zoon.
 Kipese SM-OM-buy-PST chair yesterday
 'Kipese bought the chair yesterday.'

Conflicting Data in Swahili

KiSwahili presents conflicting data with respect to definiteness. Bresnan and Mchombo (1987:760) note that KiSwahili shows sensitivity to definiteness in addition to the effects of animacy: an indefinite object does not require the OM while a definite object does. For example in (11a) there is no OM, and the object NP has the indefinite reading. As shown in (11b) the presence of an OM induces the definite reading of the co-occurring (clause-internal) object NP, displaying the same pattern as Kihung'an (cf. (10)). Additional Swahili data showing that the presence of the OM induces the definite reading of the object NP are also found, for example, in Vitale (1981) and more recently in Zwart (1997).

- (11) a. U-me-let-a kitabu? Swahili
 you-PERF-bought-INDIC book
 'Have you bought a book?' indefinite reading
- b. U-me-ki-let-a kitabu?
 you-PERF-OM-bought-INDIC book
 'Have you bought the book definite reading'

On the other hand, Wald (1979) cites examples that contain indefinite objects co-occurring with the agreeing OM (discussed in Nicolle 2000:682).

- (12) a. a-ka-m-kuta mzee mwingine ndugu wa yule. Swahili
 SM-ASP-OM-meet old.person other sibling of that.one
 'then she met another old lady, sister of the first one.'
- b. si-ja-ki-ona chochote.
 SM-NEG-OM-see anything
 'I haven't seen anything.'

In (12a), the object NP *another old lady* is indefinite specific; in (12b) the object NP *anything* is indefinite non-specific. These definiteness values are the second lowest and the lowest elements in the definiteness hierarchy respectively.

Seidl and Dimitriadis (1997, hereafter S&D) argue that variable object marking observed in Swahili is conditioned by the information status of the object—in the sense of Prince (1992),² rather than definiteness or animacy. According to their findings, object markers coreferential with animate objects

²In their study, Seidl and Dimitriadis (1997) adopt the following cross-classification of discourse referents proposed by Prince (1992):

represent 72% of the total of 312 sentences, and those coreferential with inanimates represent 12% (see Table 4 of Seidl and Dimitriadis 1997). When classified according to their hearer status, hearer-new objects are rarely (only 5%) pronominalized or doubly marked by agreement (see tables 5 of S&D, p.379). Based on these figures, S&D conclude that hearer status is a more significant than animacy status.

While S&D’s findings highlight the importance of information status in the grammar of Swahili—a notion that has been found to figure prominently in Bantu grammar (cf. Morimoto 2000), one crucial element is missing in their picture of object marking—namely, the functional distinction between the bound pronominal object and object agreement. They state that the difference between ‘object agreement’ and ‘object pronouns’ is only “terminological”, and not a morphological (formal) one. Indeed, as Bresnan and Mchombo (1987) point out, the crucial distinction between the two is not a formal one but a functional one: a topic-anaphoric pronoun and object agreement are one and the same morphological category (= affix) with two distinct morphosyntactic functions. That there need not be one-to-one correspondence between form and meaning is captured straightforwardly by LFG’s parallel architecture, for the categorial information and morphosyntactic content of linguistic elements are represented independently of each other, and are only related through corresponding principles. Thus, based on an analysis which conflates topic-anaphoric and grammatical agreement, it is difficult to assess just how significant information status is in predicting the presence/absence of object agreement.

On the other hand, these data are perhaps not enough to conclude that Swahili object marking is sensitive to the definiteness hierarchy in the same way as, for example, Kihung’an is. Note that it is possible to account for these data by reference to animacy. For example in (12a), the object NP *another old lady* is human, and co-occurs with the OM; the object NPs in (11a,b) and (12b) are inanimates and, as we see, they appear with or without the corresponding OM. We might then conclude that these data can be attributed to the animacy effects: the OM co-occurs with the object NP when the object is human, but is optional when the object is inanimate. We already saw earlier in (6) that with inanimates, the OM is optional.

Optionality of object marking with lower elements on a prominence hierarchy is in fact quite commonly observed. In a study of a Bantu language Chi-Mwi:ni, which is closely related to Swahili and displays the same agreement pattern for objects, Kisseberth and Abasheikh (1977:182, fn.3) also note that although the language permits object marking for both animate and inanimate objects, the OM is not commonly used for inanimates.

Now it is possible that effects of both animacy and definiteness collectively determine the presence/absence of Swahili object marking. But until more data becomes available, I will assume that Swahili object marking can be explained solely in terms of animacy. It is nonetheless important to note that when the OM is optionally present, there is a strong preference for the definiteness reading of the object NP; the question of how this is brought about in the synchronic grammar of Swahili is worth considering (discussed in section 3).

To summarize, based the core data presented in this section, we can draw the following generalizations: (i) Bantu object marking is conditioned by animacy and definiteness, just as in DOM in case

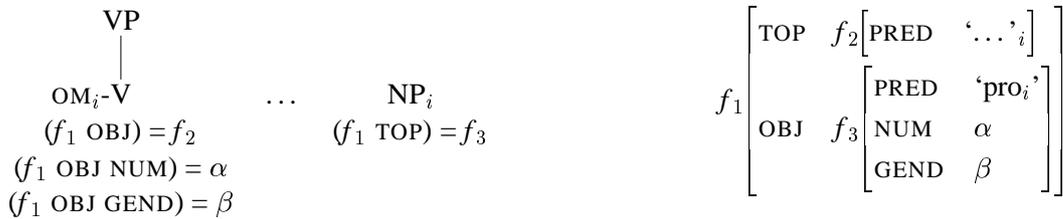
(i) Information statuses (Prince 1992)

| | Discourse-new | Discourse-old |
|-------------------|----------------------|----------------------|
| Hearer-new | Brand-New | — |
| Hearer-old | Unused | Evoked |

Hearer-new information includes newly mentioned discourse entity as well as entities not mentioned by can be inferred from the discourse. Hearer-old information includes discourse entities that are newly introduced but already familiar to the hearer (e.g. *President of the United States*) and those that have already been evoked in previous discourse.

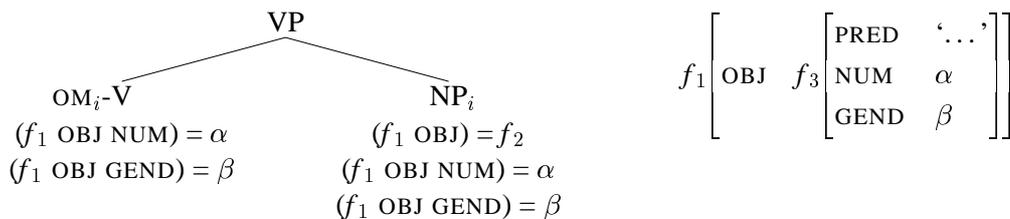
We can characterize more concretely the changes in the morphosyntactic properties of the OM using f-structure representation. The f-structure in (15) represents the situation in which the bound pronominal on the verb is topic-anaphoric to the dislocated topic object; the grammaticized discourse function TOPIC (f_2) anaphorically bounds the OBJ function (f_3).

(15) OM = topic-anaphoric pronoun



The f-structure in (16) reflects the situation in which the bound pronominal on the verb has lost the pronominal content and functions as grammatical agreement (16): it contributes morphosyntactic information such as number and gender, which unifies with the information contributed by the VP-internal object NP.

(16) OM = grammatical agreement



The structure in (17) represents the morphosyntactic information contributed by the object NP internal to VP. Note that the f-structure representation corresponding to the VP with object agreement (16) and the one without object agreement (17) are identical. That is, object agreement in (16) only provides redundant number and gender information that the object NP contributes to its f-structure. This naturally leads to the loss of the agreement marker that contributes the redundant information.

(17) non-topical object (without the OM)



If we accept the process of historical change described by Givón and take the representations shown in (15)–(17) to be different stages in the historical process, it is rather easy to see how the definiteness reading is induced by the optional presence of an OM: historically, the OM was used only topic-anaphorically (as in the current state of Chicheŵa). Even if topic-anaphoricity was lost in the course of the change in the morphosyntactic properties of the OM, it could still be induced in the synchronic

grammar by the optional presence of the OM.

Viewing these facts from the historical perspective also helps us understand that the transitory stages in the process display high variability both across the Bantu family and within individual languages. Nicolle (2000:683) also reports, reexamining the results of Seidl and Dimitriadis (1996), that in written texts (novels, plays, journals), animate objects co-occur with object agreement nearly 100%, while in spoken sources, co-occurrence of animate objects with object agreement is far less frequent. The register variation observed here is typical of what happens during language change. Given that most linguistic changes are gradual,³ the old and new linguistic forms naturally co-exist, and they do so in a predictable fashion: written language is generally more resistant to change. Thus the older form persists longer in written language while the new form replaces the old in spoken language; the older forms are preferred for formal speech, and the newer forms are reserved for informal speech. When such distributional patterns of new and old forms across different registers (written vs. spoken language; formal vs. informal speech) are of course also observed across geographic boundaries, which we identify as dialectal variation. I have not been able to identify any dialectal variation in the use of object marking within an individual Bantu language. What we clearly observe, however, is the variation *across* the languages of the close-knit Bantu family that resembles dialectal variation within a single language.

3.2 On ‘Iconicity’ vs. ‘Economy’

One of the key ideas expressed in Aissen’s analysis is that DOM represents a tension between ICONICITY and ECONOMY. ICONICITY generally favors iconic relations between form and content (or function). In DOM (in case marking languages), the form refers to morphological case, and the content refers to the semantic properties of objects (e.g. human objects, definite objects). Iconicity constraints thus favor marked object types to be formally marked by morphological case.

Relative markedness of object types is expressed through HARMONIC ALIGNMENT of the relational hierarchy (18a) either with the animacy hierarchy (18b) or the definiteness hierarchy (18c). The left-most (= the most prominent) element in the animacy and definiteness hierarchy is most marked for objects, and the right-most (= the least prominent) element in the respective hierarchies is the least marked, or the most prototypical objects.

- (18) a. Su(bject) > Non-Subject (or Obj(ect) for simplicity)
b. Hum(an) > Anim(ate) > Inan(imate)
c. Pron(oun) > Name > Def(inite) > Indef(inite) Spec(ific) > Non-spec(ific)

In order to derive the relevant markedness constraints to account for DOM from these hierarchies, what we need is the alignment of Obj, the lower element in the relational hierarchy with the animacy/definiteness hierarchy. This yields the markedness subhierarchies in (19). The order of the markedness constraints in each subhierarchy is universally fixed.

³—with the exception of the development of pidgin languages, in which we observe rapid simplification and reduction of contact languages (e.g. Holm 1988).

(19) Markedness Subhierarchies

- a. *Hum-O \gg *Anim-O \gg *Inan-O
b. *Pron-O \gg *Name-O \gg *Def-O \gg *IndefSpec-O \gg *NSpec-O

The constraint subhierarchy in (19a) more severely penalizes Hum(an) O(bject) than Anim(ate) O(bject), because the constraint penalizing the former, *Hum-O is always ranked above the one penalizing the latter, *Anim-O. Similarly the top-most constraint in (19b), *Pron-O penalizes Pro(nominal) O(bject), and the second highest constraint penalizes Personal Name Object, and the violation of the former is universally worse than the violation of the latter.

In DOM, however, marked object types that are dispreferred by the markedness constraints in (19) are nonetheless admitted so long as they are morphologically marked. In Aissen's analysis, morphological case on objects is forced by a constraint against absence of morphological case, given in (20). The subscripted *c* indicates CASE.

- (20) * \emptyset_c 'Star Zero': Penalizes the absence of a value for the feature CASE. (Aissen 2000)

The relation between markedness and morphological complexity is formally expressed by LOCAL CONJUNCTION⁴ of the markedness constraints and the Star Zero constraint. For example, the constraint subhierarchy in (21) illustrates the local conjunction of Star Zero and the markedness constraints on the animacy dimension. The locally conjoined constraints are violated only if both elements of the conjunct are not satisfied. The constraints are thus satisfied by all object types as long as they have overt case morphology.

- (21) Local conjunction of * \emptyset_c with the animacy subhierarchy
*Hum-O & * \emptyset_c \gg *Anim-O & * \emptyset_c \gg *Inan-O & * \emptyset_c

Now, DOM arises precisely because only some objects are obligatorily case-marked. To capture this, Aissen proposes an ECONOMY constraint against having morphological case, shown in (22). Forms without morphological case are less complex and thus more economical (in terms of the morphological structure) than those with case marking. The cross-linguistic variation is derived by interpolating the economy constraint at different points in the markedness constraints in (21).

- (22) *STRUC_c: penalizes a value for the morphological category case.

While the notions of iconicity and economy that motivate her analysis are quite general and intuitive, the formal expressions of these notions in her OT analysis (* \emptyset for iconicity and *STRUC for economy), also adopted by much of the subsequent OT work on markedness, are problematic and undermine the nature of constraints and their interaction that OT is designed to explain.

First, note that the Star Zero constraint and the economy constraint *STRUC state exactly the opposite conditions. The two types of constraints familiar in OT, faithfulness and markedness, are of course often in conflict. However, given that grammatical phenomena and cross-linguistic variation are explained solely in terms of resolutions of constraint conflict, and given that each constraint must be grounded

⁴—originally proposed by Smolensky 1995; see for example early work by Arstein (1998) and Aissen (1999) for application of local conjunction to syntactic problems.

conceptually and/or typologically, it is not desirable to propose constraints that directly contradict with each other. In order to circumvent this problem, Aissen (1999, 2000) stipulates that the use of Star Zero is restricted within local conjunction. But technically (and conceptually), if a constraint is used as an element of local conjunction, then it must exist independently in the constraint system.

Aissen (2000:9, footnote 10) makes an interesting point that Star Zero that enforces presence of case marking does not fall into a faithfulness constraint. The primary role of case marking is to signal grammatical function. Thus, the motivation for the constraint requiring case marking must be sought in the listener-oriented functional principle “Minimization of Perceptual Confusion” (Boersma 1998). However it is not difficult to find configurations in which there is no potential “perceptual confusion”, yet case (or head) marking is still required. For example, sentences like those in (23) obviously cause no perceptual confusion as to the (default) argument-function mapping. But in terms of animacy, (23b) exhibits the marked animacy configuration (inanimate subject, human object).

- (23) a. The knife cut the bread S = Inan; O= Inan
 b. the needle pierced the child S = Inan; O = Hum

Thus in languages that require case marking for human objects, (23b) would still require case marking. Along the dimension of definiteness, it is not entirely clear how the notion of “minimizing perceptual confusion” explains obligatory case marking. In short, listener-oriented functional principles like Minimization of Perceptual Confusion, at best, offers only partial explanation for DOM, and seems to be providing rather shaky grounding for the constraint $*\emptyset_c$.

In recent work, Grimshaw (2001) takes up the question of whether the notion of economy should be expressed as a constraint, or it is a by-product of the system of constraints on structure. Through the discussion of a word order typology, she shows that the right set of constraints on phrase structure will yield a more economical structure as an optimal output among a set of possible structures without positing additional ‘economy constraints’.

In the present work I propose a simpler analysis that eliminates $*\emptyset$ and $*STRUC$ without losing the basic insight articulated in Aissen’s analysis. The current analysis exemplifies the fundamental way in which conflicts are resolved by interaction of markedness and faithfulness constraints. Economy is indeed a by-product of markedness constraints.

4 An OT Account of DOM in Bantu

As represented by Aissen’s work, previous OT syntax work has shown that prominence hierarchies play an important role in determining the forms of expression in various domains of grammar, and it demonstrated that OT successfully models both the universality of prominence hierarchies and variability in the effects of those hierarchies.⁵ In this respect, the idea explicated in the present work for Bantu object marking is not a novel one. Rather, the central argument is that the OT analysis analogous to that of DOM in case marking languages proposed by Aissen (2000) allows us to highlight the striking parallelism between these phenomena and to illuminate a more general picture that what has been taken to be independent instances of variable object marking across the Bantu family is in fact a specific way in which languages structurally mark non-prototypicality, using the resources available in the language(s) in question.

⁵For earlier representative work dealing with the role of prominence hierarchies, see Sells (2001).

4.1 Hierarchy of Morphological Features for Argument Roles

In this section I motivate the use of the argument hierarchy and use of binary features for expressing argument roles rather than the relational hierarchy as in Aissen's analysis.

Researchers working in Lexical Decomposition Grammar (LDG; Joppen and Wunderlich 1995, Kaufmann 1995, Wunderlich 1997a,b, 2000, 2001, Kaufmann and Wunderlich 1998, Stiebels 1999, 2000) have developed a principled approach to argument structure and a typology of argument structure linking. LDG provides a means of systematically deriving the ARGUMENT HIERARCHY, in which argument roles are strictly ordered, from the 'Semantic Form' (SF). The SF is a level of representation that serves as the interface between morphosyntactic structure and semantics on the one hand, and semantic structure and conceptual structure on the other. It includes the semantic information of a lexical item in the form of a set of lexically-decomposed primitive predicates, as well as the information that is relevant for deriving the argument structure of the predicate. The argument structure is derived by means of λ -abstraction of the argument variables in the SF, as shown in (24).

| | | | |
|------|-----------|---------------------------------|-----------------------------|
| (24) | | Semantic Form | |
| | a. sleep: | λx | SLEEP(x) |
| | b. kiss: | $\lambda y \lambda x$ | KISS(x,y) |
| | c. give: | $\lambda z \lambda y \lambda x$ | {ACT(x) & BECOME POSS(y,z)} |

The λ -abstracted argument roles are assigned ABSTRACT CASE FEATURES [\pm hr] ("there is a/no higher role") and [\pm lr] ("there is a/no lower role"), as illustrated in (25).

| | | | | |
|------|-----------|---------------------------------|--|-----------------------------|
| (25) | | Theta Str | | Semantic Form |
| | a. sleep: | λx | | SLEEP(x) |
| | | [−hr] | | |
| | | [−lr] | | |
| | b. kiss: | $\lambda y \lambda x$ | | KISS(x,y) |
| | | [+hr] [−hr] | | |
| | | [−lr] [+lr] | | |
| | c. give: | $\lambda z \lambda y \lambda x$ | | {ACT(x) & BECOME POSS(y,z)} |
| | | [+hr] [+hr] [−hr] | | |
| | | [−lr] [+lr] [+lr] | | |

The abstract case features are linked to structural case features, which may be realized as morphological case, agreement, or by position. The structural cases are specified in terms of the same set of features [\pm hr] and [\pm lr], shown in (26).

| | | |
|------|-------------------------------|------------|
| (26) | Nominative/Absolute (NOM/ABS) | [] |
| | Accusative (ACC) | [+hr] |
| | Ergative (ERG) | [+lr] |
| | Dative (DAT) | [+hr, +lr] |

According to these feature classifications of structural cases, Nominative is the least marked case, and Dative the most marked. Linking of the abstract case to structural case is achieved by unification of

compatible features, yielding three canonical case patterns for an accusative and ergative system, as shown in (27).

| | | | |
|-------------|------------------|-----------------------------|---|
| (27) | a. Intransitives | b. Transitives | c. Ditransitives |
| | λx | $\lambda y \quad \lambda x$ | $\lambda z \quad \lambda y \quad \lambda x$ |
| | [−hr] | [+hr] [−hr] | [+hr] [+hr] [−hr] |
| | [−lr] | [−lr] [+lr] | [−lr] [+lr] [+lr] |
| ACC-system: | NOM | ACC NOM | ACC DAT NOM |
| ERG-system: | ABS | ABS ERG | ABS DAT ERG |

For intransitive predicates, the sole argument is encoded by the features [−hr, −lr]—there is no higher or lower role, and these features are compatible only with the Nominative case. For transitive predicates, x is the higher role and is specified as [−hr, +lr]—there is no higher role, and there is a lower role. In an accusative system, the argument will be realized by NOM, and the lower argument, specified as [+hr, −lr] (there is a higher role and no lower role), is realized by ACC. In an ergative system, the higher role maps to ERG, and the lower role to ABS. For ditransitive predicates, the medial argument in the SF is specified as [+hr, +lr]—there is a higher role and a lower role, the most marked specifications, and is mapped to Dative.⁶

Within this framework, Stiebels (2000) proposes the markedness scale of the relation between argument roles and their morphosyntactic realizations, shown in (28). It is important to note that [+hr] > [+lr] is not simply equivalent to “lowest argument” > “highest role” as in the (reversed) argument role hierarchy, or to “accusative” > “ergative” as in the case hierarchy (e.g. Comrie 1989, Wierzbicka 1981). It is precisely as it is stated: “accusative marking of the lowest role” > “ergative marking of the highest role”. I will refer to the hierarchy in (28) as the HIERARCHY OF MORPHOLOGICAL FEATURES for argument roles, or simply ‘argument feature hierarchy’.

(28) [+hr] > [+lr]

Read as: “Accusative marking of the lowest role is less marked than ergative marking of the highest role.”

The system of argument linking adopted here therefore directly links argument roles and their morphosyntactic realizations.

4.2 Markedness Constraints

Given the hierarchy of morphological features in (28) we can now formally express the relative markedness of the relation between animacy/definiteness and morphological marking. Harmonic alignment of the argument feature hierarchy with the animacy hierarchy, again repeated here in (29), produces the markedness hierarchies shown in (30).

(29) Animacy: Hum(an) > Anim(ate) > Inan(imate)

⁶Other non-canonical case patterns (e.g. passive and antipassive, one of the arguments being lexically marked) are also possible under this theory of argument linking, and have been rigorously discussed in earlier work (cited at the beginning of this section) with a wide range of cross-linguistic data.

(30) Harmonic Alignment of (28) with the Animacy scale

$H_{[+h]}$: [+hr]/Hum \succ [+hr]/Anim \succ [+hr]/Inan

$H_{[+l]}$: [+lr]/Inan \succ [+lr]/Anim \succ [+lr]/Hum

The harmonic alignment of [+hr] with the animacy scale, referred to as $H_{[+h]}$, states that [+hr]—accusative marking of the lower role—that is human is less marked (more harmonic, prototypical) than accusative marking of the lower role that is animate, and that is less marked than accusative marking of the lower role that is inanimate. In other words, human objects are marked, and as such, overt morphological (or morphosyntactic) marking of these marked objects is expected.

Conversely, the harmonic alignment of [+lr] with animacy, referred to as $H_{[+l]}$, states that [+lr]—ergative marking of the higher role—that is inanimate is less marked than ergative marking of the higher animate role, and that is less marked than ergative marking of the highest human role. In the present discussion, only the harmonic alignment $H_{[+h]}$ will be relevant.

The constraint subhierarchies derived through the harmonic alignment in (30) are given in (31). Starting from the top (left-most), the constraints in the subhierarchy $C_{[+h]}$ is interpreted as “avoid [+hr]—accusative marking of the lower role—that is inanimate”. In other words, an unmarked, prototypical object type such as an inanimate object should not be overtly marked. Given the fixed subhierarchy, accusative marking of inanimate [+hr] will be the most severely penalized, and accusative marking of animate [+hr] is more severely penalized than accusative marking of human [+hr]. Conversely, ergative marking of the higher role should be avoided when it is human, the most prototypical subject type. The constraint subhierarchies for [+lr] thus describes split ergativity in morphologically ergative languages: ergative case marking is avoided for subjects when they are high in animacy (cf. Dixon 1979, 1994).

(31) Constraint subhierarchies on the dimension of animacy

$C_{[+h]}$: *[+hr]/Inan \gg *[+hr]/Anim \gg *[+hr]/Hum

$C_{[+l]}$: *[+lr]/Hum \gg *[+lr]/Anim \gg *[+lr]/Inan

These constraint subhierarchies thus express the same form-function relations as those proposed by Aissen. But while Aissen’s constraint system imposes a positive constraint—that marked objects must be formally marked, the present system imposes a negative constraint: unmarked object type must not be formally marked.

Along the dimension of definiteness, repeated again in (32), we arrive at the harmonic alignment in (33).

(32) Definiteness: Pronoun $>$ Name $>$ Definite $>$ IndefSpec $>$ Non-specific

(33) Harmonic Alignment of (28) with the Animacy scale

$H_{[+h]}$: [+hr]/Pro \succ [+hr]/Name \succ [+hr]/Def \succ [+hr]/IndefSpec \succ [+hr]/NSpec

$H_{[+l]}$: [+lr]/NSpec \succ [+lr]/IndefSpec \succ [+lr]/Def \succ [+lr]/Name \succ [+lr]/Pro

Here, the harmonic alignment of [+hr] with definiteness ($H_{[+h]}$) expresses that [+hr]—accusative marking of the lower role is most expected (= most harmonic) when it is a pronoun, because it is the most marked object type. The markedness increases as [+hr] descends the scale of definiteness. For the higher role, the least marked situation is to be marked by ergative, the marked case, when non-specific because that is the most marked subject type. It is most marked for the lower role to be marked by ergative in a pronoun, the least marked subject type. Reversing the harmonic alignment derives the markedness constraints shown in (34).

(34) Constraint subhierarchies on the dimension of definiteness

$C_{[+h]}$: *[+hr]/NSpec \gg *[+hr]/IndefSpec \gg *[+hr]/Def \gg *[+hr]/Name \gg *[+hr]/Pro

$C_{[+l]}$: *[+lr]/Pro \gg *[+lr]/Name \gg *[+lr]/Def \gg *[+lr]/IndefSpec \gg *[+lr]/NSpec

The constraint subhierarchy $C_{[+h]}$ most severely penalizes accusative marking of the lowest argument that is non-specific. The lowest constraint in the subhierarchy penalizes the least marked situation in which there is accusative marking of the lowest argument that is pronominal. Conversely, $C_{[+l]}$ most severely penalizes the highest argument that is marked as ergative when it is a pronoun.

As we see, the constraint subhierarchies in (31) and (34) express the same markedness generalizations as those proposed by Aissen (1999, 2000) without use of \emptyset or local conjunction. Yet these constraints also express the iconic relation between form and content: the unmarked object types should not be marked morphologically. Note that the absence of overt morphological marking for unmarked objects is not only iconic but also more economical. Thus, as argued by Grimshaw for constraints on phrase structure, the proposed constraints also derive economy without an additional economy constraint.

Furthermore, as noted by Stiebels (2000), the constraints based on the argument feature hierarchy [+hr] > [+lr] solve problems for ergative languages that Aissen's analysis suffers, which Aissen (1999) herself also recognizes.

4.3 Deriving a Typology of DOM in Bantu

In Aissen's system, the constraint subhierarchies penalizing objects without morphological mark interact with the economy constraint *STRUC to yield DOM and cross-linguistic variation. In the present proposal, the constraint hierarchies penalizing violation of iconicity (no extra marking for unmarked objects) just discussed interact with a constraint on input-output faithfulness, given in (35). The faithfulness constraint in (35) expresses the idea that the argument roles in the input must be realized and marked overtly in the output. The subscripted *agr* forces realization of [+hr] by agreement.

(35) Input-Output Faithfulness

$MAX(+hr)_{agr}$: The [+hr] role in the input must be realized by agreement.

It is assumed here that MAX constraints include various specific instantiations such as MAX_{agr} , MAX_{case} and MAX_{pos} (for syntactic position). This allows, for example MAX_{agr} and MAX_{case} to have different effects in languages with both dependent marking and agreement (e.g. some Australian languages, Amharic, Hungarian), or MAX_{agr} and MAX_{agr} and MAX_{pos} to have different effects in languages that use both agreement and positional licensing (e.g. Bantu). Amharic, for example, employs both case marking and verbal agreement: while the object marker on the verb is used exclusively for

topic-anaphoricity (as a bound pronominal argument), case marking is used to mark definite objects (Hudson 1997). In contrast in Hungarian, which also employs case marking and agreement, verbal object agreement is used only when the object is definite (see for example, Horvath 1986, Puskás 2000).⁷

We now interpolate the faithfulness constraint in the constraint subhierarchies in (31) to derive the typology of DOM in Bantu along the dimension of animacy. The treatment of the optionality of object marking we observed earlier will be discussed shortly.

(36) Dimension of animacy

| | | | |
|-------------|---|-------------------------|---|
| | ← | MAX(+hr) _{agr} | |
| *[+hr]/Inan | | ← | MAX(+hr) _{agr} Swahili (5)–(6) |
| | | | Chi-Mui:ni (Kisseberth and Abasheikh 1977) |
| *[+hr]/Anim | | ← | MAX(+hr) _{agr} Makua (4) |
| *[+hr]/Hum | | ← | MAX(+hr) _{agr} Chicheŵa (Bresnan and Mchombo 1987) |

Any object type shown above MAX(+hr)_{agr} cannot be marked by object agreement, as it means that form-content iconicity expressed by the markedness constraint is more important than satisfying input-output faithfulness and realizing the lower role by agreement. For example in Chicheŵa, the faithfulness constraint is ranked below all the markedness constraints against object agreement. Thus, object agreement cannot co-occur with any clause-internal object NP (e.g. Bresnan and Mchombo 1987). Interpolating the MAX(+hr) between *[+hr]/Hum and *[+hr]/Anim derives Makua (4), which does not trigger agreement for animate or inanimate objects, and object marking is observed only with human objects. Promoting MAX(+hr) above *[+hr]/Anim but below *[+hr]/Inan derives Swahili (cf. (5)–(6)) and Chi-Mui:ni, in which object agreement is obligatory with humans and animates (in writing) but optional with inanimates.

DOM along the dimension of definiteness is characterized in (37).

(37) Dimension of definiteness

| | | | |
|------------------|---|-------------------------|--|
| | ← | MAX(+hr) _{agr} | |
| *[+hr]/NonSpec | | ← | MAX(+hr) _{agr} |
| *[+hr]/IndefSpec | | ← | MAX(+hr) _{agr} Kihung'an (10), Zulu (Wald 1979) |
| *[+hr]/Def | | ← | MAX(+hr) _{agr} Kiyaka (8) |
| *[+hr]/Name | | ← | MAX(+hr) _{agr} Kichaga (7) |
| *[+hr]/Pro | | ← | MAX(+hr) _{agr} Chicheŵa |

Here again Chicheŵa ranks MAX(+hr) below the constraint subhierarchy of definiteness and hence

⁷Thanks to Aaron Broadwell for providing a description of the relevant facts and reference on Amharic, and to Andrew Spencer for bringing my attention to the facts in Hungarian.

no object NPs trigger object agreement. Interpolating $\text{MAX}(+hr)$ between $*[+hr]/\text{Pro}$ and $*[+hr]/\text{Name}$ yields Kichaga (7), in which object marking is observed for pronominals regardless of its animacy status. Promoting $\text{MAX}(+hr)$ one step up in the hierarchy of the markedness constraints yields Kiyaka (8), in which object agreement is present when the object is a personal name. Placing the faithfulness constraint further up between $*[+hr]/\text{Def}$ and $*[+hr]/\text{IndefSpec}$ derives Kihung'an (10) and Zulu (Wald 1979), in which all definite objects co-occur with object marking.

Modeling Optionality: Stochastic OT

Within this system, optionality in the use of object marking in a single language is easily accommodated by use of stochastic ranking. This allows us to articulate the relation between cross-linguistic variation, optionality, and diachronic change in a uniform fashion.

In stochastic OT (cf. Boersma 1997, 1998, Forthcoming, Keller 1998, Asudeh 2001, Boersma and Hayes 2001, Bresnan and Deo 2001, Bresnan, Dingare, and Manning 2001, among others), constraints are distributed along a continuous scale, each with a ranking value. At every constraint evaluation, the ranking is perturbed by a random variable (either in a positive or negative direction). At a given constraint evaluation, when two constraints are relatively farther away from each other, the results is a categorical ranking of these constraints. Optionality arises when two constraints have close ranking values. Optionality in Bantu object marking can be modeled by the stochastic ranking of $\text{MAX}(+hr)_{agr}$ and markedness constraints. For example, the data from Swahili in (6)–(11) and (12b) and from Chi-Mui:ni (Kisseberth and Abasheikh 1977) suggest that $\text{MAX}(+hr)$ and $*[+hr]/\text{Inan}$ float and have relatively close ranking values. Optional marking of inanimate objects in these languages arises when $\text{MAX}(+hr)$ is promoted above $*[+hr]/\text{Inan}$. The data from Kiyaka in (9) suggest that $\text{MAX}(+hr)$ and $*[+hr]/\text{Def}$ are closely ranked and can float. Optional marking of definite objects arises when $\text{MAX}(+hr)$ is promoted above $*[+hr]/\text{Def}$.⁸

By implementing stochastic ranking, the present analysis allows us to understand cross-linguistic variation and optionality as closely interrelated phenomena, essentially being two sides of the same coin: the analysis shows that the typological space provided by the system of constraints is the space that also allows variation in a single language. A similar point is made by Bresnan and Deo (2001) in their study of *be* across English dialects and inter-speaker variation. In pre-OT generative syntax, much effort has been put into characterizing universal properties as well as cross-linguistic variation. Variation within a single language, however, has not been seriously considered as part of a grammatical system. But once we understand how variation across languages (= typology) and variation within languages (= optionality) exist within one single 'typological' space, it becomes obvious that they are both expected to be systematic and hence equally deserve a principled account in linguistic theory.

5 Concluding Remarks

To summarize, in this paper I hope to have shown that first, object agreement in Bantu languages is sensitive to animacy or definiteness of the object, and the cross-linguistic data can be given a unified account under the general concept of differential object marking. Secondly, DOM is highly variable both across and within languages, but the variability is expected once we situate the synchronic states in the context of diachronic change and view the variability in synchronic grammar as unstable transitory stages in a diachronic process (cf. Greenberg 1969, 1978, Croft, Denning, and Kemmer 1990). Thirdly,

⁸An on-going closer examination of Swahili object marking using a corpus of Swahili made available by the University of Helsinki attempts to articulate the analysis of optionality briefly outlined here by stochastic OT.

the present analysis highlights the idea that cross-linguistic variation and language-internal variation operate within an identical typological space provided by a system of violable, universal constraints. By implementing stochastic ranking, the present analysis can potentially provide a more precise formal model of language-internal variation.

Further Extension

Before I conclude this paper, I briefly mention a recent study reported by Schwenter and Silva (2002) on null vs. overt objects in Brazilian Portuguese, which suggests that differential object marking extends beyond languages with case marking or agreement. Brazilian Portuguese allows null objects, but the choice of null vs. overt expression is conditioned by an interaction of animacy and specificity.

First, the object cannot be null if it is both animate and specific as shown in (38). Here the human object *João* is mentioned in the first utterance, and hence *ele* in the second sentence is both animate and specific, and hence cannot be null.

- (38) Você lembra do João? A gente viu ?* \emptyset /ele na festa da Carla ontem.
'Do you remember J.? We saw him yesterday at C's party.' [+anim, +spec, (+def)]

On the other hand, the object can be optionally be null if it is either animate or specific. In (39a), *a driver* is human but indefinite specific. As a result, in both the original utterance and English translation an indefinite pronoun *one* (*um*) is used. In BP, the pronoun becomes optional. In (39b), *a beautiful old house* is inanimate, but it is specific. Again the object *it* in the subsequent utterance can be either null or overt.

- (39) a. Ela me disse que precisava de um motorista para levar as meninas ao colégio. Contratei \emptyset /um.
'She told me that she needed a driver to take the girls to school. I hired one.' [+anim, -spec, (-def)]
- b. Na minha rua tem uma casa antiga linda, mas eles vão derrubar \emptyset /?ela.
'On my street there's a beautiful old house, but they're going to knock it down.' [-anim, +spec, (-def)]

Finally the object cannot be overtly expressed if it is both inanimate and non-specific—the most prototypical type. In (40), the relevant object is *a ticket*, which is inanimate and non-specific. As a result, it cannot be referred to by the definite pronoun *it* the subsequent sentence (in both BP and English).

- (40) Estava procurando um ingresso para o teatro e finalmente encontrei \emptyset /?*ele.
'I was looking for a ticket for the theater and finally I found one/*it.' [-anim, -spec, (-def)]

These data further corroborate the idea that DOM is only a particular manifestation of the more general tendency observed across languages to mark non-prototypicality overtly by whatever means available in a given language (type)—by case marking, head marking, or lexically.

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