The semantics of object drop in Baule

Martha Larson
Fraunhofer IMK, Sankt Augustin, Germany
larson@imk.fraunhofer.de

Abstract. Null objects in Baule are unique because their distribution is lexically conditioned. Certain verbs require null objects, and certain verbs prohibit them. Additionally, null objects are always third person singular inanimate pronouns and can only appear phrase finally. This paper argues that these disparate constraints can be accounted for by a single requirement on the presupposition triggered by a verbal predicate. It proposes a Condition on Continuous Identification, which states that in a given verbal predicate the object pronoun is dropped if and only if that verbal predicate triggers the presupposition that the object is solely and uniquely identified by its governing verb and that this identification is continuous throughout the course of the event expressed by the predicate. This condition is demonstrated to account for the distribution of null objects in the full range of Baule verbal predicates.

1 Introduction

Baule, a Kwa language spoken in the Côte d'Ivoire, displays an intriguing pattern of object drop.

(1)a. A n klèli fluwa'n?
you write-PAST letter-DEF
'Did you write the letter?'

(1)b. Een, n klèli.
yes I write-PAST
'Yes, I wrote it'

In Baule, null objects are obligatory wherever they are permissable. An object pronoun must fulfill three conditions in order to drop. First, the only candidate for object drop is a third singular object (3so) which refers to an inanimate. Second, the null object can appear only in phrase final position. If an argument, complement or adjunct follows a 3so object, it must be overtly realized. Third, only certain verbs license null objects. The verb *klè*, 'to write', in (1), is an example of such a verb. Baule null objects can have linguistic antecedents, or they can refer to contextually salient entities. Null objects cannot, however, refer to unspecified or indefinite objects. Baule object drop is unique because it is lexically conditioned, required by certain verbs, and prohibited by others.

Proceedings of the Seventh ESSLLI Student Session
Malvina Nissim (editor)

(2)a. A wunni fluwa'n?
you see-PAST letter-DEF
'Did you see the letter?'

(2)b. Een, n wunni i.
yes I see-PAST 3so
'Yes, I saw it'

Example (2) is a typical overt object construction. When used with the verb *wun*, 'to see', the 3so object may never be dropped.

The purpose of this paper is to demonstrate that the three conditions on object drop in Baule, although seemingly disparate, all, in fact, arise from a single restriction on the presupposition triggered by the verbal predicate. A null object is permitted if and only if the verbal predicate triggers the presupposition that the verb solely and uniquely identifies its direct object throughout the entire course of the event. In the second section, I will overview other accounts of object drop and demonstrate why they do not capture the Baule case. In the third section I will introduce a presupposition schema that formally represents the presuppositions of Baule verbal predicates. I define an interval structure that makes it possible to evaluate the influence of the verb along the course of the event expressed by the verbal predicate. In the fourth section I will survey verbal predicates that require or prohibit object drop and demonstrate that only in those predicates in which the verb alone identifies its direct object is that object dropped. The final section contains summarizing remarks and comments on the cross-linguistic perspective.

2 Cross-linguistic approaches to null objects

The original approach to null pronouns in the literature is well characterized by Jaeggli's Identification Hypothesis [Jae82], which restricts the occurrence of a null pronoun to those positions where its reference can be recovered by the morphology of a governing element. The Identification Hypothesis works well for morphology rich languages, such as Pashto, [Hua84], but does not account for object drop in a language like Baule which has no object-agreement morphology. Huang, [Hua84], proposes an movement-based account of Chinese, also lacking morphology necessary for Identification, under which null object pronouns are analyzed as A'-traces bound by empty topic operators. Huang's account does not extend to Baule, however, since the distribution of Baule null objects is not sensitive to Subjacency, and indeed there is no evidence at all for A'- movement in Baule, as Saah, [Saa92], has argued for Akan, a closely related language. Farrell, [Far90], discusses object-dropping languages for which Huang's empty topic analysis also fails to apply, in particular Brazilian Portuguese. Farrell modifies the Identification Hypothesis to allow null pronouns to be intrinsically identified. In Brazilian Portuguese, he claims, object drop is permitted since null objects are necessarily third person, allowing enough of the null semantic content of the pronoun to be

recovered for Identification to go through. Farrell's insight comes closer to accounting for Baule, where object drop is also restricted exclusively to third person pronouns. Although, this account is promising, it would fail to capture a critical difference between Brazilian Portuguese and Baule, namely that null objects in Brazilian Portuguese are part of the structure of the discourse, whereas null objects in Baule are part of the syntax. An account of null objects that seems readily available to explain (1) and (2) is that the possibility of object drop is available to those verbs that affect their objects. Such a factor has been conjectured by Rizzi, [Riz86], to play a role in object drop in Italian. At first blush this account seems transferable to Baule. The verb *klè*, 'to write', in (1), is a verb of creation and permits drop, whereas the verb *wun*, 'see', in (2), is a perception verb, does not affect its object and prohibits drop. Examples (3) and (4), however, demonstrate that other Baule verbs display exactly the opposite pattern.

(3)a. A kundèli fluwa'n?
you seek-PAST letter-DEF
'Did you look for the letter?'

(3)b. Een, kundèli.
yes I seek-PAST 3so
'Yes, I looked for it'

(4)a. A yrali fluwa'n?
you burn-PAST letter-DEF
'Did you burn the letter?'

(4)b. Een, n yrali i.
yes I burn-PAST 3so
'Yes, I burnt it'

A final possible explanation for the pattern of Baule object drop can be sought in Resnik's ([Res93], [Res96]) information-theoretic account of selectional constraints. Resnik quantifies the selectional restriction that a verb places on its object by calculating the mutual information between objects and verbs on a large corpus. Is it possible that Baule null objects are identified by semantic selection? Overt object verbs such as *wun*, 'see', in (2) certainly seem not to impose any particular semantic constraints on their objects. Compare *wun*, 'see', to *klè* , 'write', (1), which is something that can only be done to a letter, paper, book or the like. Semantics cannot be the sole licenser of Baule null objects, however, since many verbs that permit object drop do not seem to exercise particularly strong selectional restrictions over their objects. Examples include *kundè*, 'to seek', (3), *yi*, 'to pull', *yaci* 'to leave', *nian*, 'to watch'. I will argue that in Baule object drop is licensed in verbal predicates that trigger the presupposition that the verb is the sole identifier of the object throughout the course of the event. In the next section I present a formal mechanism that will capture this generalization.

3 The Condition on Continuous Identification

The formal representation of the presupposition of Baule verbal predicates consists of three components. First, an interval structure, second, a definition of a legitimate interval partition and third, the Condition on Continuous Identification, the formal condition on verb predicate presupposition that constrains the distribution of the null object. I define the interval structure I to be a a triple $\langle I, <, \sqsubseteq \rangle$. On this structure intervals precede each other as defined by the precedence relation, $<$, and can be nested as defined by the subset relation, $\sqsubseteq$, the interval structure is thus linear and atomic. This interval structure is adopted from [Bla94]. Event partitions are required to respect event structures. As my event structure, I adopt the event nucleus proposed by [Moe88]. An event nucleus consists of three event phrases, the preparatory phrase, the culmination and the consequent state. Some aspectual classes do not instantiate all three phases. A legitimate segmentation is required to have at least one interval properly contained in each phase instantiated by the event. The Condition on Continuous Identification insures that a null object is identified by the governing verb continuously throughout the event. An object is identified by a verb in a time interval when it enters into a relationship with the verb on that time interval. Most typically the object undergoes the process expressed by the verb.

> **Condition on Continuous Identification**
> Drop an object pronoun iff $\exists I$, a legitimate segmentation of the event expressed by the verbal predicate, $\forall i' \sqsubseteq I[V(x, i')]$

This formalization is intended to capture an intuitive segmentation of an event into intervals. The segmentation must be intuitive, since speakers use these intervals to calculate presupposition. Once the existence of a legitimate partition has been established, evaluation of the Condition on Continuous Identification amounts to evaluating:

(5) $\forall i' \sqsubseteq I[V(x, i')]$

The expression in (5) represents the structure of the presupposition that a verbal predicate must have in order to license object drop. Since event intervals are used to capture the conditions on presuppositions of verbs, it is not surprising that verbs often seem to 'suggest' a reasonable partition. For example, when partitioning the event 'to search for', the intervals could be places looked. Relying on the verb to determine the sub-intervals automatically guarantees that they indeed have a basic relational structure, like the one specified for I. Reasonable sub-intervals such as these tend to be ordered, they tend not to overlap and non-punctual events are composed of multiple sub-intervals. The Condition on Continuous Identification is formulated to be consistent with semantically motivated partitions, but

requires only a legitimate partition, I. In the following discussion, I will use reasonable partitions of the events described by verbal predicates to evaluate (5), and assess if these predicates indeed license object drop.

4 Baule verbal predicates

The first class of Baule verbal predicates I analyze are those expressing processes, in the terminology of [Moe88], and activities, according to Vendler's [Ven67] original aspectual typology. *Did you watch the game? Did you pull the rope? Did you play the drum? Did you pound the yam? Did you look for the letter? Did you hear the message?* In Baule the 3so pronoun is null in the answers to the questions. Reasonable partitions for these events are the minutes of the match, yanks of the rope, beats of the drum or strokes of the pestle. Processes have an event structure which has only a single phase, the preparatory process. Therefore, these reasonable partitions are legitimate. Using these partitions, it can be seen that processes fulfill the Condition on Continuous Identification. On each interval, a relationship between the verb and the direct object obtains, thus (5) is satisfied. Each moment that I played the drum was a moment in which the drum was played.

Every interval of the reasonable partition contributes to the presuppositions of these predicates. Consider how the statement 'Clio played the drum' can be challenged in discourse. 'Clio played the drum, but he took such frequent breaks, it didn't count as playing'. In this example issue is taken with the universal quantification over event intervals. The appropriateness of the verb 'play', V in the presupposition structure, can also be called into question, 'Clio played the drum, if you call that playing'. A challenge such as 'Clio played the drum, but not the whole drum,' can not be formulated. Quantification over parts of the object is not part of the presupposition of the verbal predicate.

Verbal predicates belonging to the aspectual category that [Bla94] term points require object drop. *Did you set down the book? Did you take the car? Did you leave the house? Did you buy the chicken?* Points only have a single phase in their event structure, the culmination. The only admissible partition of a point event is one in which the culmination constitutes the one and only interval. Under this partition (5) is satisfied, in fact rather trivially. The moment I put down the book was a moment in which the book was put down.

Causative verbs take an agent which brings about a change in a patient. *Did you break the chair? Did you shrink the shirt? Did you ripen the mango? Did you rip the cloth? Did you burn the letter?* In Baule if the answers to these questions contain a pronoun, it must necessarily be overt. Although these verbal predicates might be classified as culminated processes in the [Bla94] typology, in Baule there is a readily evident delimitation of

the causative verb class from other aspectual classes. All of these verbs in Baule undergo the causative/inchoative alternation as illustrated in (6a.).

(6)a. N buli bia'n
I break-PAST chair-DEF
'I broke the chair'

(6)b. Bia'n buli
chair-DEF break-PAST
'The chair broke'

Causative verbs contain all three phases of the event nucleus, a preparatory process, a culmination and a consequent state. Reasonable partitions of answers like *I broke it. I shrunk it. I ripped it.* include hits with a hammer, or washings of the shirt during the preparatory process and the culmination. The presupposition of the causative verbal predicate dictates that there was at least one of those intervals during which the chair broke or the shirt shrank. It can be represented:

(7) $\exists i' \sqsubseteq I[V(x, i')]$

This presupposition does not meet the requirements of the Condition on Continuous Identification. The expression in (5) is not satisfied since the verb does not apply to the object in every interval of the event, but only in the interval that represents the culmination. Notice how (7) encodes the presuppositions of the causative, which can be challenged in the discourse. 'I shrank the shirt. I really did everything they told me to do to make it shrink. But the shirt didn't shrink one bit.' In this case the speaker is taking issue with the existential quantifier. The speaker is using the verb, but asserting there was no moment of actual shrinking. On the other hand, 'I shrank the shirt, but I took frequent breaks,' sounds funny, because shrinking the shirt does not carry with it the presupposition that something relevant to shrinking has to be happening at each interval of the event, therefore the contrast of 'but' is out of place.

Homogenous verbs are culminated processes with incremental culmination. They are characterized by the fact that they steadily 'use-up' their objects over the course of the event they express. In Baule homogenous verbs include the following: *Did you read the book? Did you write the letter? Did you drink the water? Did you prepare the food? Did you dig the hole? Did you eat the mango?* The answers to all these questions can never include an overt pronoun. Homogenous verbs do not fulfill the Condition on Continuous Identification as expressed in (5), however. The presupposition of homogenous verbs is captured in the following expression, and it can be seen that at each time interval, the verb does not identify the entire object, as is necessary in (5), but rather only a sub-part thereof.

(8) $\forall i' \sqsubseteq I[\exists x' \sqsubseteq x[V(x', t')]]$

I claim that the reason why homogenous verbs do fulfill the expression in

(5) and force object drop is because homogeneity encodes a systematic correspondence between the intervals of the event and the sub-parts of the direct object. Homomorphism between events and objects has been treated in depth in the literature. I will make use of a mapping from intervals to objects proposed by Krifka, [Kri89]. R is the relationship between the object of the verb and the event expressed by the verbal predicate.

(9) MAPPING TO OBJECTS
$\forall i, i', x[R(i, x) \wedge i' \sqsubseteq i \rightarrow \exists x'[x' \sqsubseteq x \wedge R(i', x')]]$

Kiparsky [Kip95] supplements (9) by stating explicitly a condition requiring complete coverage of the domain (the event) to mean complete coverage of the range (the object).

(10) If an event bears R to an object, then the whole object is eventually subjected to the event

These conditions formalize the fact that in homogenous verbal predicates, intervals and object sub-parts stand in a bijective relation and progressing through all intervals guarantees that all sub-parts of the object have likewise been covered. During every interval of the event a relationship between the verb and part of the direct object obtains, with a net result that the entire direct object is identified by the verb. The presuppositions of homogenous verbs thus fulfill the requirements of the Condition on Continuous Identification.

Baule has four simple experiencer verbs. *Did you love the house? Did you hate the school? Did you know the truth? Did you fear the thunder?* The answer to all these questions in Baule must contain an overt pronominal object. Experiencer verbs have been characterized as lacking a spatio-temporal variable [Die92], and I argue that they fail to fulfill the Condition on Continuous Identification, simply because they have no legitimate partition.

Baule has two simple verbs of perception *wun* 'see' and *kan* 'feel'. These verbs both disallow null pronominal objects. This fact is odd, since both of these verbs would seem to be processes and fulfill the Condition on Continuous Identification just as the processes described above. I argue that the core meaning of seeing in Baule is seeing something and realizing what it really is. The presupposition of 'see', therefore more closely resembles that of one of the verbs belonging to the causative class. The presupposition of 'see' does not preclude the existence of time intervals preceding this realizing, when you were effectively seeing something else. This account is supported by the fact, that the verb *wun*, 'see', presupposes the existence of the object seen in Baule.

Baule bipartite verbs consist of a main verb and a bound verb complement (BVC) and they are used extensively. Examples include the following:

n yoli i atè, 'I sold it', and *n suanni i bo*, 'I supported it'. *n yoli i atè* could be literally rendered, 'I make it sale', but it is exceptionally transparent, and the rule is more consistent with examples like *n suanni i bo* which might be literally represented as 'I teach it bottom'. Here the direct object pronoun must always be overt, since the verb complement must be expressed in the sentence final position, where the object must be to be dropped. The following expression captures the presupposition of bipartite verbs.

(11) $\forall t' \sqsubseteq t[V(x,t') \wedge BVC(x,t')]$

It is not immediately clear why (11) does not satisfy the Condition on Continuous Identification, since (5) should be fulfilled if (11) holds. The reason lies in the fact that the semantics of bipartite verb is not a compositional. The predicate holding of an object in an interval does not entail that the verb also holds.

Animate and plural pronouns

Nouns in Baule are distinguished by a feature generally identified as being animacy. Pronominal objects whose referents are animate must be realized overtly. Animacy in Baule encodes whether or not the entity involved exercises self-control. Animacy is not correlated with life, but rather with volition. The example of the verb 'seek' illustrates how animacy interacts with object drop. If you looked for a chicken that has a habit of hiding itself, you say *n kundèli i*, with an overt direct object pronoun, even though *kundè*, 'seek' forces object drop for a sentence final object with an inanimate referent, as in (3). If you looked for which you suspect someone has hidden, you say *n kundèli* . In Baule the volitionality of the animate referent of a pronoun enters into the calculation of the presupposition. I propose that the influence of the volitional component of the pronoun is reflected in the fact that the verb no longer solely identifies the referent. Concretely the picture is that, when I pull John, there is a chance that John pulls back and my pulling of John thus does not serve to pinpoint John throughout the event. The presupposition of a verbal predicate expressing a culminated process in which the direct object is a pronoun with animate reference, can be encoded as follows:

(12) $\forall t' \sqsubseteq t[V(D(x),t')]$

The relation D encodes the volition of the animate object and the fact that it can exercise an unpredictable and independent influence on the course of the event. Because the verb alone does not identify the direct object, the Condition on Continuous Identification is not satisfied. A point of interest is that homogenous verbs do not occur with animates, probably because animates so strongly resist being conceptualized as a sum of their parts.

Quite a number of process verbs change their meanings when combined with animate objects. The following are examples of verbs that are distinguished by whether they take an animate object or an inanimate object. *n takali* means 'I set it down' and *n takali i* means 'I punished him'.

The second class of pronouns that must always be overt in Baule regardless of which verb they occur with is pronouns that refer to individuated plurals. Individuated plurals are plurals whose compositional parts have the status of entities and can be referred to individually. Let $X = \{x_1, x_2, ...x_n\}$ represent three entities referred to by a plural pronoun. The presupposition of a culminated process with a plural pronominal object is captured by the following expression:

(13) $\forall t' \sqsubseteq t[\exists x \sqsubseteq X[V(x, t')]]$

The expression in (13) encodes the fact that on any given interval, the verb need only identify a single one of the multiple objects. Thus, the Condition on Continuous Identification is not met.

Conclusion and cross-linguistic comments

Null object pronouns in Baule are unique in that the speaker has no choice on whether to use them or not, but rather their distribution is a function of three constraints: null objects must be third person singular inanimate pronouns, null objects must be phrase final and null objects must be governed by a verb requiring object drop. This paper has demonstrated that these constraints can be reduced to a single restriction on the structure of the presupposition triggered by a verbal predicate. An interplay between the aspectual structure of various verb classes in Baule and the influence of animate and plural pronouns on the presuppositions of verbal predicate has been shown to account for the distribution of null object pronouns. The account I present here, meshes nicely with Boadi's account, [Boa76], of Akan, a language closely related to Baule and spoken in Ghana. In Akan all sentence final singular inanimate pronouns get dropped, except with those verbs that undergo the causitive/inchoative alternation. Akan has a weaker Condition on Continuous Identification, possibly one that is insensitive to event intervals. It is interesting to note that in both Akan and in Baule, restrictions on object drop, whatever their underlying reasons, effectively disambiguate surface strings. *o yrali* , 'he/she/it burned', can never be mistakenly interpreted as 'he/she/it burned it', since the latter case requires an overt object pronoun. Burmeister [Bur88] remarks about Anyi, Baule's closest sister language, that verbs '...use the present or absence of objects to distinguish meaning'. Homonym pairs often have one form taking an overt object and one taking a null object. Whatever its cause, the distribution of null objects has the effect of increasing the functional load of verbs in Baule.

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