

# Derived subjects in Kinyarwanda locative constructions\*

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## 1 Introduction

This paper examines the syntax of locative constructions in Kinyarwanda, a Bantu language spoken in Rwanda and its neighbouring countries. In Kinyarwanda, certain verbs such as *oomeka*, 'stick', or *ta*, 'throw, drop', allow for alternations of the following type (see Kimenyi 1980, 1995; Ngoboka 2005):<sup>1</sup>

- (1) a. Umufuundi y-oome-tse amatafaari ku rukuta.  
builder SP-(PST)-stick-ASP bricks on wall  
'The builder stuck bricks on the wall.'
- b. Umufuundi y-oome-tse-ho urukuta amatafaari.  
builder SP-(PST)-stick-ASP-LOC wall bricks  
'The builder stuck bricks on the wall.' (Ngoboka 2005: 46)
- c. \*Umufuundi y-oome-tse-ho amatafaari ku rukuta.  
builder SP-(PST)-stick-ASP-LOC bricks on wall
- (2) a. Umwaana y-a-taa-ye igitabo mu maazi.  
child SP-PST-throw-ASP book in water  
'The child has thrown the book into the water.'
- b. Umwaana y-a-taa-ye-mo amaazi igitabo.  
child SP-PST-throw-ASP-LOC water book  
'The child has thrown the book into the water.' (Kimenyi 1980: 91)
- c. \*Umwaana y-a-taa-ye-mo igitabo mu maazi.  
child SP-PST-throw-ASP-LOC book in water

(1a) and (2a) are locative constructions in which the goal argument is realised as the complement of a preposition inside a PP. (1b) and (2b) are the corresponding double object constructions, which realise the goal as an NP-object preceding the theme. In these constructions, the clitics *-ho* and *-mo* (underlined in (1b-c) and (2b-c) respectively) are attached to the verb. These clitics bear an obvious cognate relationship to the prepositions *ku* and *mu* in the (a)-examples (see Baker 1988; Kimenyi 1980, 1995). (1c) and (2c) illustrate that the clitics *-ho* and *-mo* are not

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<sup>1</sup> The verbal morphology of Kinyarwanda is quite complex and characterised by various morphophonological processes that change the form of the verb and inflectional affixes in particular morphological contexts. For example, the past tense morpheme is deleted in front of vowel-initial verbs such as *oomeka*, but is overtly realised as *-a-* in front of consonant-initial verbs like *ta*. In the text I refer to the verbs in the form stem + final vowel. In my examples, I have glossed morphemes as follows: APPL = applicative; ASP = aspect; FV = final vowel; LOC - locative clitic; OC = object clitic; PASS = passive; PST = past tense; SP = subject prefix. The examples have not been marked for tone, since pronunciation is irrelevant for my analysis.

possible when the locative argument appears inside a PP; if the clitic attaches to the verb, then the goal has to be realised as an NP-object.

In the literature on Kinyarwanda, double object constructions such as (1b) and (2b) are often called locative *applicative* constructions (see e.g. Baker 1988, 1992; Nakamura 1997; McGinnis 2000, 2001; Ngoboka 2005). Although I have also referred to these constructions as applicatives in other work (see Zeller & Ngoboka forthcoming; Zeller 2005), I now believe that this term should be used with more caution. The locative clitics *-ho* and *-mo* bear no synchronic or diachronic relation to the applicative suffix *-ir-* (or its cognates and allomorphs), which is normally used to derive applicative constructions in Kinyarwanda as well as in other Bantu languages. Furthermore, there are significant morphological and syntactic differences between locative constructions such as (1b) and (2b) and e.g. benefactive and instrumental applicative constructions, which are derived by means of *-ir-* in Kinyarwanda (see Kimenyi 1980; Ngoboka 2005; Zeller & Ngoboka forthcoming). In the light of these differences, I adopt the terminology of Kimenyi (1980) and use the term "locative" for constructions such as (1b) and (2b). However, this terminological choice has no implications for the validity of those analyses in which these examples are referred to as applicatives.

Although the double object locative constructions in (1b) and (2b) are perfectly well-formed, it is impossible to derive *transitive* locative constructions such as (3b) from corresponding constructions such as (3a), in which an intransitive base verb combines with a locational PP:

- (3) a. Amabuye y-a-guu-ye            ku mategura.  
       stones    SP-PST-fall-ASP on tiles  
       'The stones fell on the tiles.'  
       b. \*Amabuye y-a-guu-ye-ho            amategura.  
       stones    SP-PST-fall-ASP-LOC tiles

In (3b), as in (1b), the verb has been extended by means of the locative clitic *-ho*, and the goal argument is realised as an NP-object. But in contrast to (1b), (3b) is ungrammatical, which seems to suggest that transitive locative constructions cannot be formed in Kinyarwanda.

However, at closer inspection, it turns out that transitive locatives are not generally excluded. (4) is similar to (3b), with the exception that the goal is not realised as a full object-NP, but as an incorporated object clitic (in italics).<sup>2</sup> In contrast to (3b), this locative construction is well-formed:

- (4)        Amabuye y-a-*ya*-guu-ye-ho.  
           stones    SP-PST-OC-fall-ASP-LOC  
           'The stones fell on them.'

To the best of my knowledge, contrasts such as the one between (3b) and (4) have not been systematically discussed in the existing literature on Kinyarwanda. In this paper, I therefore examine the syntax of transitive locative constructions such as (3b) and (4) within the framework of the Minimalist Program (Chomsky 1995, 2000, 2001, 2005). My analysis is based on the idea that the NP *amabuye*, 'stones', in examples such as (3b) and (4) is a *derived* subject: the base position of this NP is inside the VP, and it

<sup>2</sup> I follow Kimenyi (1980, 1995) and Ngoboka (2005) and assume that object markers in Kinyarwanda are incorporated pronouns (and not agreement markers).

has reached the sentence-initial subject position via movement. Importantly, I suggest that the VP-internal position of these derived subjects is *below* the position of the locative object-NP. Therefore, movement of *amabuye* to the subject position in (3b) had to cross the intervening goal-NP *amategura*, 'tiles', a step which violates syntactic locality constraints and thus makes the sentence ungrammatical. In contrast, no such constraints are violated by the movement of *amabuye* in (4), since in this example, the goal is not represented as an NP, but as an object marker which has incorporated into the verb.

The paper is organised as follows. In section 2, I present the basic data and show under which conditions transitive locative constructions can be derived. In section 3, I briefly discuss the analysis of ditransitive locative constructions offered in Zeller (2005). This analysis was developed to explain the asymmetrical behaviour of the two NP-objects in locative constructions such as (1b) and (2b); however, as I show in section 4, it also explains the syntactic properties of transitive locatives. My crucial claim is that the subjects of locative constructions derived from intransitive verbs are always introduced as VP-internal arguments and that the syntax of these constructions is therefore unaccusative. In section 5, I argue that this situation holds even for transitive locative constructions derived from verbs which are lexically specified as unergative. Finally, section 6 concludes the paper with a few remarks on locative constructions with pronominal subjects.

## 2 Locative constructions derived from intransitive verbs

Intransitive verbs such as *gwa*, 'fall', *gera*, 'arrive', or *eera*, 'grow', can be combined with PPs which express the goal or the location of the event, (5a-7a). However, as the examples in (5b-7b) show, if the goal or location is realised as a locative NP-object in a transitive locative construction, the result is ungrammatical:<sup>3</sup>

- (5) a. Amabuye y-a-guu-ye            ku mategura.  
       stones    SP-PST-fall-ASP on tiles  
       'The stones fell on the tiles.'  
       b. \*Amabuye y-a-guu-ye-ho            amategura.  
       stones    SP-PST-fall-ASP-LOC tiles
- (6) a. Abaguzi b-aa-ge-ze            ku nzu.  
       buyers    SP-PST-arrive-ASP at house  
       'The buyers arrived at the house.'  
       b. \*Abaguzi b-aa-ge-ze-ho            inzu.  
       buyers    SP-PST-arrive-ASP-LOC house

<sup>3</sup> Notice that the co-occurrence of the locative clitic and a full PP is excluded again (compare (1c) and (2c) above):

- (i) \*Amabuye y-a-guu-ye-ho            ku mategura.  
       stones    SP-PST-fall-ASP-LOC on tiles  
       (ii) \*Abaguzi b-aa-ge-ze-ho            ku nzu.  
       buyers    SP-PST-arrive-ASP-LOC at house  
       (iii) \*Inyaanya z-eer-a-mo            mu busitaani.  
       tomatoes SP-grow-FV-LOC in garden

- (7) a. Inyaanya z-eer-a mu busitaani.  
 tomatoes SP-grow-FV in garden  
 'The tomatoes grow in the garden.'  
 b. \*Inyaanya z-eer-a-mo ubusitaani.  
 tomatoes SP-grow-FV-LOC garden

The ungrammatical examples in (5b-7b) contrast with the locative constructions in (8)-(10), which are well-formed:

- (8) Amabuye y-a-guu-ye-ho.  
 stones SP-PST-fall-ASP-LOC  
 'The stones fell there.'  
 (9) Abaguzi b-aa-ge-ze-ho.  
 buyers SP-PST-arrive-ASP-LOC  
 'The buyers arrived there.'  
 (10) Inyaanya z-eer-a-mo.  
 tomatoes SP-grow-FV-LOC  
 'The tomatoes grow there.'

The locatives in (8-10) are formed exactly like the ungrammatical examples in (5b-7b), except that the locative NPs have been *omitted* in (8-10) (the clitics *-ho* and *-mo* are therefore interpreted as prepositional proforms/intransitive prepositions in (8-10)). The fact that locatives can be derived from the verbs in (5)-(7) when the resulting constructions remain intransitive suggests that the ungrammaticality of (5b-7b) has something to do with the presence of the locative object.

However, omitting the locative object is not the only way to derive grammatical locatives from constructions such as (5a-7a). As was already mentioned in the introduction, if the goal or location is realised as a pronominal *object marker*, transitive locatives become acceptable:

- (11) Amabuye y-a-ya-guu-ye-ho.  
 stones SP-PST-OC-fall-ASP-LOC  
 'The stones fell on them.'  
 (12) Abaguzi b-aa-yi-ge-ze-ho.  
 buyers SP-PST-OC-arrive-ASP-LOC  
 'The buyers arrived at it.'  
 (13) Inyaanya zi-bw-eer-a-mo.  
 tomatoes SP-OC-grow-FV-LOC  
 'The tomatoes grow in it.'

Furthermore, although the transitive locatives in (5b-7b) above are impossible, the corresponding *passive* constructions, in which the locative NP has become the subject of the sentence, are grammatical:

- (14) Amategura y-a-guu-w-e-ho n'amabuye.  
 tiles SP-PST-fall-PASS-ASP-LOC by stones  
 Lit.: 'The tiles were fallen on by the stones.'

- (15) Inzu y-a-ge-z-w-e-ho n'abaguzi.  
house SP-PST-arrive-ASP-PASS-ASP-LOC by buyers  
Lit.: 'The house was arrived at by the buyers.'
- (16) Ubusitaani bw-eer-w-a-mo n'inyaanya.  
garden SP-grow-PASS-FV-LOC by tomatoes  
Lit.: 'The garden was grown in by the tomatoes.'

Finally, genuine transitive locatives based on (5a-7a) above can also be formed, but only in so-called *subject-object reversal* constructions. Subject-object reversal, which is possible in many Bantu languages including Kinyarwanda (see Kimenyi 1980; Ura 1996; Ndayiragije 1999; Morimoto 2000), resembles the passive in that the thematic object of a transitive construction becomes the subject of the sentence. However, the original subject is not realised as a *by*-phrase (as is the case in the examples in (14-16)), but as the object of the verb. Moreover, in contrast to the passive, subject-object reversal is not marked morphologically on the verb. As illustrated in (17-19), the subject-object reversal variants of (5b-7b) are grammatical:

- (17) Amategura y-a-guu-ye-ho amabuye.  
tiles SP-PST-fall-ASP-LOC stones  
'The stones fell on the tiles.'
- (18) Inzu y-a-ge-ze-ho abaguzi.  
house SP-PST-arrive-ASP-LOC buyers  
'The buyers arrived at the house.'
- (19) Ubusitaani bw-eer-a-mo inyaanya.  
garden SP-grow-FV-LOC tomatoes  
'The tomatoes grow in the garden.'

Notice that subject agreement on the verbs in (14-19) is determined by the locative NPs, which shows that these NPs are indeed in subject position. In the light of the ungrammaticality of the corresponding constructions in (5b-7b), the well-formedness of the passivised locatives in (14-16) and the subject-object reversal constructions in (17-19) is surprising.

In section 4 I offer an explanation for the data presented in this section which is based on the fact that the syntax of the constructions in (5-19) is unaccusative. Before I turn to this analysis, however, I take a close look at certain object asymmetries attested with ditransitive locative constructions in Kinyarwanda. As it turns out, these asymmetries provide important insights into the structural properties of the constructions discussed in (5-19) above.

### 3 Object asymmetries in ditransitive locatives

(20) repeats example (1) from the introduction:

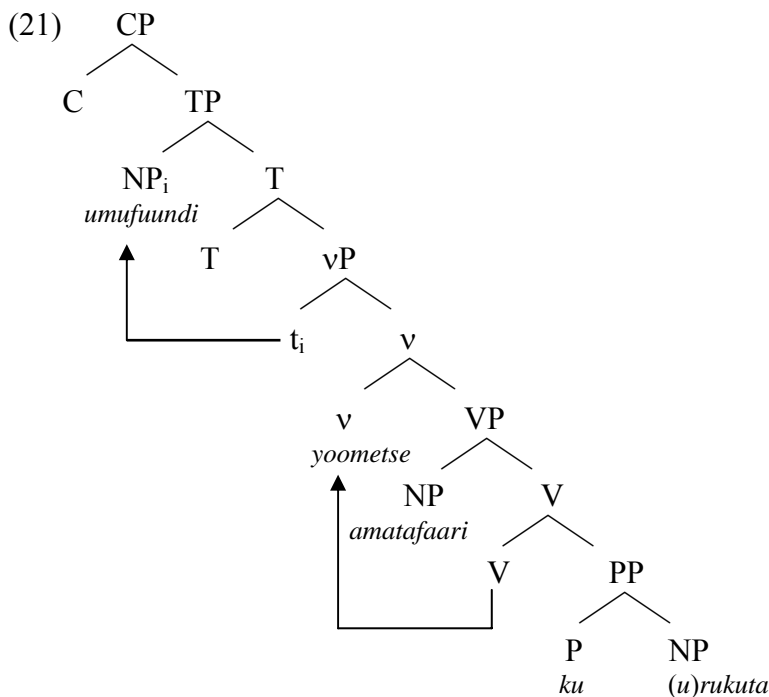
- (20) a. Umufuundi y-oome-tse amatafaari ku rukuta.  
builder SP-(PST)-stick-ASP bricks on wall  
'The builder stuck bricks on the wall.'

- b. Umufuundi y-oome-tse-ho urukuta amatafaari.  
 builder SP-(PST)-stick-ASP-LOC wall bricks  
 'The builder stuck bricks on the wall.'
- c. \*Umufuundi y-oome-tse-ho amatafaari ku rukuta.  
 builder SP-(PST)-stick-ASP-LOC bricks on wall

As noted above, the locative construction in (20b) differs from the construction in (20a) in two important respects: the locative marker *-ho* is attached to the verb stem, and the goal-NP *urukuta*, 'wall', which is the complement of the preposition *ku* in (20a), is realised in (20b) as an object-NP that precedes the theme-NP *amatafaari*, 'bricks'.

In the following I briefly review the analysis of the constructions in (20) that I present in Zeller (2005), which is based on the theoretical concepts and principles assumed in recent versions of the Minimalist Program (MP) (Chomsky 2000, 2001, 2005). I do not discuss every formal aspect of this analysis here; in my illustration, I have instead tried to keep technical details to a minimum and to focus rather on those points which are crucial for an understanding of the contrasts discussed in section 2.<sup>4</sup>

In the phrasal architecture of the MP, a ditransitive sentence such as (20a) is represented by the syntactic structure in (21):



As shown in (21), the theme-NP *amatafaari*, 'bricks', is introduced in the specifier of the VP while the PP-argument *ku rukuta*, 'on the wall', is the complement of the verb. The agent-NP *umufuundi*, 'builder', is introduced as the so-called "external" argument in the specifier of the light verb *v*, which selects the VP as its sister (see Chomsky 1995, based on Larson 1988 and Hale & Keyser 1993; for related claims, see also

<sup>4</sup> For example, I do not represent noun phrases as DPs (i.e. as projections of determiners; Abney 1987), although this is standard in the MP. Furthermore, I do not discuss the operation *Agree* (Chomsky 2000, 2001), which determines agreement and case-checking relations between NPs/DPs and functional heads like T and v, and I also pass over the function of case features and the mechanisms of case checking, as this would complicate matters unnecessarily (see, however, note 6).

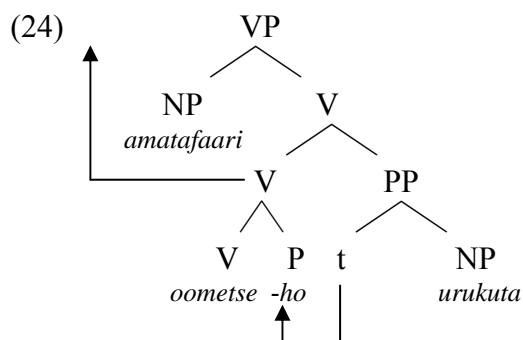
Kratzer 1996). The light verb is responsible for certain aspects of voice; in the passive, for example, *v* does not select an agent-NP in its specifier. The *vP* is selected by *T*(ense), a functional head which specifies the inflectional properties of the clause (which are realised by the inflectional morphology on the verb in Kinyarwanda). The specifier position of *T* is the position to which subjects move in order to agree with *T* and to receive (or check) nominative case; in (21), the agent-NP has moved from [Spec, *v*] to [Spec, *T*] and become the subject. *TP* is the complement of *C*, which provides a position for complementisers in embedded clauses and functional information about sentence type. All sentences are projections of the complementiser position, i.e. *CP*s. Finally, note that the verb in Kinyarwanda moves from *V* to *v* (and possibly further to *T*).

In Kinyarwanda ditransitive constructions such as (20a), in which the goal-NP is realised inside a *PP*, the theme object-NP in [Spec, *V*] has what Bresnan & Moshi (1990) call "primary object" properties: the theme-NP can be passivised, (22), and it can be realised as a pronominal object marker, (23):

- (22) Amatafaari y-oome-ts-w-e ku rukuta n'umufuundi.  
 bricks SP-(PST)-stick-ASP-PASS-ASP on wall by builder  
 'The bricks were stuck on the wall by the builder.'
- (23) Umufuundi y-a-y-oome-tse ku rukuta.  
 builder SP-PST-OC-stick-ASP on wall  
 'The builder stuck them on the wall.'

In the passive construction in (22), the external  $\theta$ -role has been absorbed, and no NP is selected in [Spec, *v*]. Therefore, the theme-NP can move from [Spec, *V*] to the subject position [Spec, *T*]. In (23), the theme is the pronominal clitic *-y(a)-*, which I assume has moved from [Spec, *V*] to *v*, where it incorporates into the verb (which has also moved to *v*).

In Zeller (2005), I explain the properties of locative constructions such as (20b) on the basis of the *preposition incorporation* (PI)-analysis originally proposed for applicative constructions by Baker (1988). According to the PI-analysis, (20b) is derived from a structure very similar to (21). The locative marker *-ho* in (20b) is a clitic-like preposition which projects its own *PP* and selects the goal argument as its complement. From its position inside the *PP* (the complement of the verb), the locative clitic incorporates into the verb and then moves with the verb to *v* (Baker 1988, 1992, 1997; Nakamura 1997):



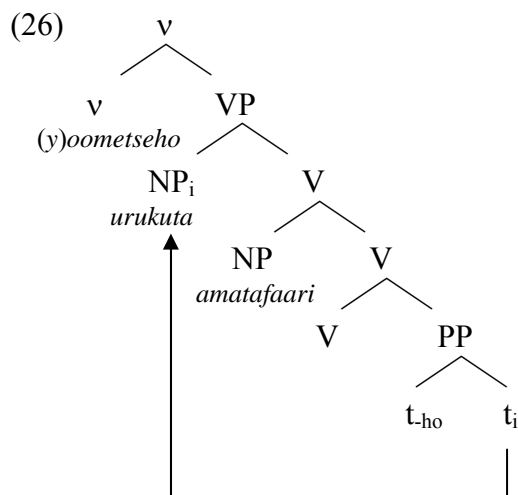
Since the locative clitic *-ho* in (24) is a preposition which starts out as the head of a *PP*-complement of the verb, no other *PP*-complement can be added to the structure of a

locative. This explains why examples such as (20c), in which the locative verb combines with the PP *ku rukuta*, 'on the wall', are ungrammatical.

The structure in (24) does not yet reflect the word order of ditransitive locatives in Kinyarwanda. If the goal stayed inside the PP whose head has incorporated, it would follow the theme-NP, which is in [Spec, V]. However, as (20b) shows, the goal-NP precedes the theme-NP in locative constructions; the reverse order of objects is not possible, (25):

- (25) \*Umufuundi y-oome-tse-ho amatafaari urukuta.  
 builder SP-(PST)-stick-ASP-LOC bricks wall  
 'The builder stuck bricks on the wall.'

According to Baker (1997) and Nakamura (1997), the correct word order of locative constructions such as (20b) is derived by movement of the goal-NP from its position inside the PP to a position above the theme. In Zeller (2005), I suggest that this position is a second specifier of the VP:<sup>5,6</sup>



The movement step in (26), which brings the goal-NP into a position from where it c-commands the theme, derives the word order [goal > theme] of Kinyarwanda locatives.

<sup>5</sup> Baker (1997) and Nakamura (1997) assume that the word order [goal > theme] in constructions such as (20b) is derived by movement of the goal-NP to the specifier of a functional category "Asp", which selects the VP. In Zeller & Ngoboka (forthcoming), we extend this analysis by proposing that both the goal and the theme move to specifiers of Asp (the theme moves to a lower and the goal to a higher [Spec, Asp]). In Zeller (2005), the idea that locative constructions involve multiple specifiers is elaborated further, and it is argued that the goal and the theme both occupy specifiers of the verb, with the theme base-generated in the lower and the goal moving to the higher [Spec, V], as shown in (26). A separate category Asp is therefore no longer required and does not need to be postulated (a welcome result perhaps, given minimalist assumptions).

<sup>6</sup> As discussed in detail in Zeller (2005), the movement step depicted in (26) is necessary in order to allow for the goal-NP to agree with *v*. Baker (1988) shows that an incorporated preposition cannot assign oblique case to its complement. The goal-NP in (26) must therefore be licensed by structural case, but in the MP, structural case assignment (or checking) requires agreement between the respective NP and a functional head. The goal-NP must therefore enter an agreement relation with the functional head *v*. In current versions of the MP, agreement between functional heads and NPs no longer requires both elements to be in a Spec-Head-relation. Instead, in order to agree with *v*, it is sufficient for the goal-NP to move to a position in which it is closer to *v* than the theme. This position is the higher [Spec, V], which asymmetrically c-commands the theme-NP.



The movement operations depicted in (24) and (26) have an interesting effect on the object properties of the theme- and the goal-NP. As was shown in (22) and (23), the theme can be passivised and can incorporate as an object marker in ditransitive constructions such as (20a), where the goal is realised inside the PP. In a locative construction like (20b), however, it is instead the locative argument which has "primary object" properties; as (27a-28a) show, the goal can be passivised and incorporate into the verb. Importantly, these operations are now no longer available for the theme, (27b-28b):

- (27) a. Urukuta rw-oome-ts-w-e-ho amatafaari n'umufuundi.  
 wall SP-(PST)-stick-ASP-PASS-ASP-LOC bricks by builder  
 Lit.: 'The wall was stuck bricks on by the builder.'
- b. \*Amatafaari y-oome-ts-w-e-ho urukuta n'umufuundi.  
 bricks SP-stick-ASP-PASS-ASP-LOC wall by builder  
 'The bricks were stuck on the wall by the builder.'
- (28) a. Umufuundi y-a-rw-oome-tse-ho amatafaari.  
 builder SP-PST-OC-stick-ASP-LOC bricks  
 'The builder stuck bricks on it.'
- b. \*Umufuundi y-a-y-oome-tse-ho urukuta.  
 builder SP-PST-OC-stick-ASP-LOC wall  
 'The builder stuck them on the wall.'

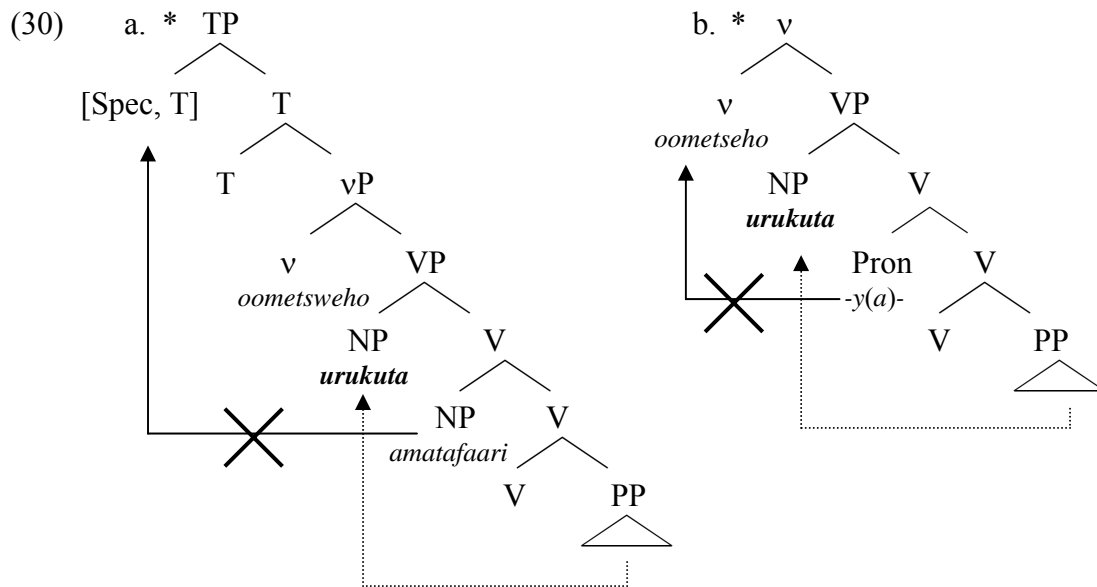
Following the analyses of these and similar asymmetries presented in Ura (1996), McGinnis (1998, 2000, 2001) and Anagnostopoulou (2003), I argue in Zeller (2005) that the ungrammaticality of (27b-28b) is due to the violation of *locality constraints* on syntactic movement. Recall that both incorporation and passivisation involve movement operations - a VP-internal NP moves to [Spec, T] in a passive, and a pronominal object undergoes head movement to *v* and incorporates into the verb. Such movement operations cannot apply completely freely, however: an object-NP or pronoun can only move to a particular landing site if no other NP intervenes between the landing site of movement and the base position of the object (see Rizzi 1990; Chomsky 1995; Ura 1996). This movement constraint has been formally implemented in the Minimalist Program in the form of the *Minimal Link Condition* (Chomsky 1995: 311):

(29) *The Minimal Link Condition* (MLC)

K attracts  $\alpha$  only if there is no  $\beta$ ,  $\beta$  closer to K than  $\alpha$ , such that K attracts  $\beta$ .

The idea behind (29) is that movement operations are triggered by features associated with the target of movement. These features are said to *attract* features associated with the closest matching element in the c-command domain of the target. Movement to [Spec, T] or to *v* is therefore triggered by features of T or *v*, which attract the closest nominal expression and force it to move (either as a phrase or as a head). In locative constructions, which are represented by the structure in (26), it is clear that the goal-NP in the higher [Spec, V] is closer to both *v* and T than the theme in the lower specifier. Therefore, although the theme can move to [Spec, T] and *v* in constructions such as (20a) (since here, the goal-NP is located inside the PP-complement of V), it can no longer move to these positions in locative constructions such as (20b), since the

respective movement steps would illegitimately cross the goal-NP in the higher [Spec, V]:<sup>7</sup>



(30a) shows that the theme cannot be passivised, due to the presence of the locative NP, which has moved out of the PP to the higher [Spec, V] from where it intervenes between the theme in the lower [Spec, V] and [Spec, T]. The same idea explains the impossibility of theme incorporation in (28b). Since the goal is in the higher [Spec, V], it blocks movement of the theme from the lower specifier position to v, (30b).

Interestingly, the following examples show that theme passivisation and incorporation are not generally ruled out in double object-locatives, but are permitted under certain conditions:

- (31) a. Amatafaari y-oome-ts-w-e-ho n'umufuundi.  
bricks SP-stick-ASP-PASS-ASP-LOC by builder  
'The bricks were stuck there by the builders.'
- b. Umufuundi y-a-y-oome-tse-ho.  
builder SP-PST-OC-stick-ASP-LOC  
'The builder stuck them there.'
- (32) a. Amatafaari y-a-rw-oome-ts-w-e-ho n'umufuundi.  
bricks SP-PST-OC-stick-ASP-PASS-ASP-LOC by builder  
'The bricks were stuck on it by the builder.'
- b. Umufuundi y-a-ya-rw-oome-tse-ho.  
builder SP-PST-OC-OC-stick-ASP-LOC  
'The builder stuck them on it.'
- (33) Urukuta rw-aa-y-oome-ts-w-e-ho n'umufuundi.  
wall SP-PST-OC-stick-ASP-PASS-ASP-LOC by builder  
Lit.: 'The wall was them stuck on by the builder.'

<sup>7</sup> It is important to note that the movement of the goal to a second specifier of VP (illustrated in (26)) does not violate the MLC, although this movement crosses the theme-NP. The reason is that the theme-NP already occupies a specifier of VP and is therefore not in the c-command domain of the attracting head, which is V.

The examples in (31) are locative constructions without a locative NP, in which the locative marker is interpreted as a prepositional proform (see section 2). As (31a) shows, the theme can be passivised in these constructions; (31b) demonstrates that theme incorporation is possible as well. This follows from the analysis of (27b) and (28b) that was given in (30): since the impossibility of theme passivisation or incorporation is due to the presence of a goal-NP in the higher [Spec, V], the absence of such an NP implies that the theme-NP can now be attracted by T and *v* and can move to [Spec, T] or incorporate into the verb in *v*.

In (32), the goal is realised as an object marker. Again, this means that there is no NP in the higher [Spec, V], since the goal has incorporated into the verb. Therefore, the MLC does not block movement of the theme from [Spec, V] to either [Spec, T] or to *v*, and passivisation ((32a)) and incorporation ((32b)) of the theme are therefore possible.

Finally, (33) demonstrates that the theme can also incorporate when the locative object has been passivised. Again, this follows from locality and the MLC: since the goal-NP has become the subject in these constructions, it is located in [Spec, T] and therefore does not intervene between *v* and the theme. Consequently, the theme-NP can move and incorporate into the verb as an object marker.<sup>8</sup>

In sum, when the goal-NP in Kinyarwanda locatives moves to a specifier position of V above the theme, it blocks theme passivisation and incorporation, because the theme would have to cross the goal when moving to *v* or [Spec, T]. In contrast, in locative constructions where the goal does *not* occupy [Spec, V] (because it has been omitted, moved to [Spec, T], or incorporated into the verb), the theme-NP is allowed to move, since nothing intervenes between the theme and its landing site *v* or [Spec, T]. In the next section I show how these assumptions also explain the data discussed in section 2.

#### 4 Locatives derived from unaccusative verbs

Since Perlmutter (1978), it is recognised that intransitive verbs fall into two classes, *viz.* *unergative* and *unaccusative* verbs. The main difference between these two kinds of verbs concerns the syntactic position of their subject NPs: whereas unergative verbs select their subjects as true external arguments in [Spec, *v*], the subjects of unaccusative verbs are internal arguments and originate in the VP. Subjects of unaccusative constructions hence behave more like the objects of transitive verbs than like the subjects of transitive or unergative verbs (Burzio 1986; Grewendorf 1989; Levin & Rappaport-Hovav 1995).

A typical example of an unaccusative verb is the intransitive variant of the so-called causative alternation. The  $\theta$ -role of the subject in (34b) is identical to that of the direct object of the corresponding transitive causative construction in (34a):

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<sup>8</sup> In Zeller (2005) I argue that in examples such as (32) and (33), the goal does not move to a second specifier of VP. Instead, it incorporates into the verb in (32) by moving from inside the PP to V, and it moves to [Spec, T] in (33) also in one step from inside the PP. As a result, a second [Spec, V] is never projected in these examples, and the locative NP does not intervene between the theme and the theme's potential landing site at any stage of the derivation. Notice that in (33), the goal is only allowed to move from its base position to [Spec, T] in one step *because* the theme incorporates into *v* and therefore ends up in a position from which it no longer c-commands the goal inside the PP. In constructions in which the theme is realised as a full NP in [Spec, V], however, movement of the goal across the theme-NP directly to [Spec, T] would violate the MLC. This means that, in contrast to (33), passivisation of the goal in examples such as (27a) involves two movement steps: the goal first moves to a second [Spec, V] above the theme, and then further to [Spec, T] (for details of this analysis, see Zeller (2005)).

- (34) a. John grows the tomatoes.  
 b. The tomatoes grow.

According to most generative analyses of (34), the NP *the tomatoes* is an internal argument and originates inside the VP in both (34a) and (34b). In (34a), the light verb *v* introduces the agent-NP *John* in its specifier, and the NP *the tomatoes* is licensed as the object of the causative construction. In contrast, the functional head *v* in the unaccusative construction in (34b) does not select a causative subject. Therefore, the NP *the tomatoes* must move to [Spec, T] to become the subject of the sentence.<sup>9</sup>

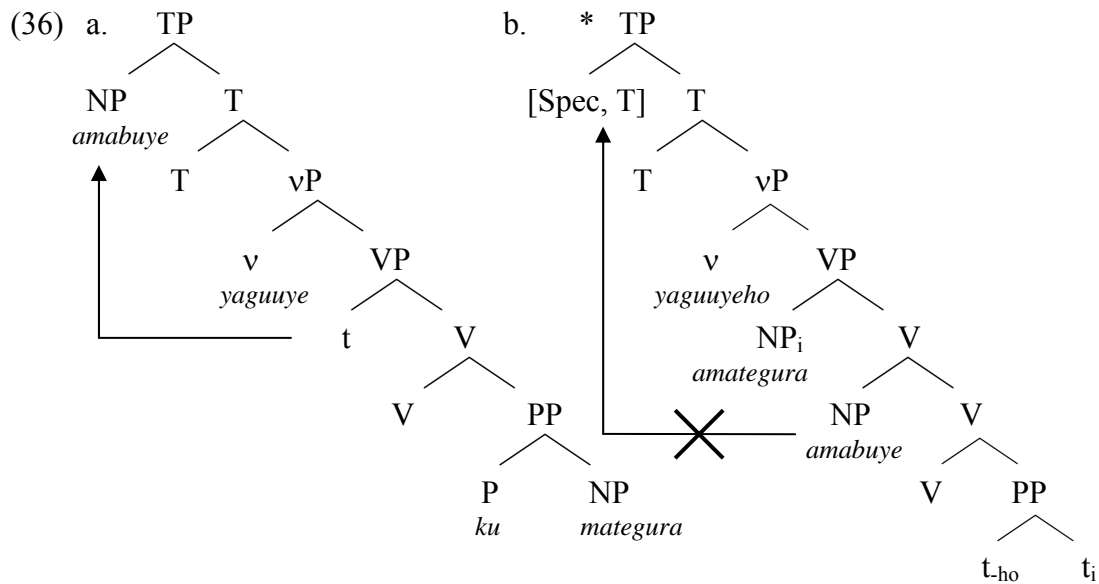
The syntactic representation of unaccusativity is the key to the analysis of the data discussed in section 2. It was shown that, although certain intransitive verbs can combine with a full PP expressing the goal of the event, the corresponding locative constructions, in which the goal is realised as an object-NP, are ungrammatical. (35) repeats example (5) from section 2:

- (35) a. Amabuye y-a-guu-ye            ku mategura.  
           stones    SP-PST-fall-ASP on tiles  
           'The stones fell on the tiles.'  
 b. \*Amabuye y-a-guu-ye-ho            amategura.  
           stones    SP-PST-fall-ASP-LOC tiles

I now suggest that the ungrammaticality of examples such as (35b) is due to the fact that verbs such as *gwa*, 'fall', *gera*, 'arrive', or *eera*, 'grow', which were discussed in section 2, are unaccusative. The subjects of these verbs are non-agentive, and the corresponding verbs in languages such as Italian, Dutch or German pass the usual syntactic tests for unaccusativity (see Burzio 1986; Grewendorf 1989; Levin & Rappaport-Hovav 1995). Therefore, I assume that the subject-NPs in these examples originate VP-internally rather than in [Spec, *v*]. In (35a), for example, the subject *amabuye*, 'stones', has moved to the [Spec, T]-position from its base position in [Spec, V]. This movement step is possible, since the goal argument is located inside the PP and does not intervene between the theme in [Spec, V] and [Spec, T], as shown in (36a). (35b), however, is a locative construction, and the goal argument is now realised as an object-NP. As was discussed in section 3, although the goal-NP of a locative construction originates inside a PP-complement of the verb, it moves from inside the PP to a second specifier of V. In this position, it intervenes between the lower [Spec, V] and [Spec, T] and therefore blocks movement of the theme-NP to the subject position. Constructions such as (35b) are therefore excluded by the MLC, in the same way as passivisation of a theme object-NP is ruled out in the presence of a goal object-NP in double-object locatives (compare (27b) in section 3):

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<sup>9</sup> Movement of the internal argument to the subject position is forced by the requirement to fill the subject position (formally implemented through the so-called EPP-feature of T in the MP) and to check the case feature of the internal argument.



The analysis of ditransitive locatives provided in section 3 now also explains why locative constructions derived from unaccusative verbs become possible whenever the locative NP is omitted, realised as an object marker, or when it has been promoted to the subject position. (37-40) repeat examples (8), (11), (14) and (17) from section 2:

- (37) Amabuye y-a-guu-ye-ho.  
stones SP-PST-fall-ASP-LOC  
'The stones fell there.'
- (38) Amabuye y-a-ya-guu-ye-ho.  
stones SP-PST-OC-fall-ASP-LOC  
'The stones fell on them.'
- (39) Amategura y-a-guu-w-e-ho n'amabuye.  
tiles SP-PST-fall-PASS-ASP-LOC by stones  
Lit.: 'The tiles were fallen on by the stones.'
- (40) Amategura y-a-guu-ye-ho amabuye.  
tiles SP-PST-fall-ASP-LOC stones  
'The stones fell on the tiles.'

In (37), there is no locative NP, and hence no second specifier of VP. Consequently, movement of the NP *amabuye*, 'stones', to [Spec, T] is not blocked by the MLC. The same holds for (38), where the goal is pronominal; as an object clitic, it has incorporated into the verb and is therefore not located in [Spec, V]. Consequently, the theme-NP can move to [Spec, T].

(39) is a passive construction. This is interesting, since it shows that Kinyarwanda permits the passivisation of unaccusative verbs, an option which does not exist in languages such as Italian, Dutch or German, but which has been attested for other Bantu languages (e.g. by Baker 1996 for Sotho) as well as for Turkish and Lithuanian (see Baker 1988 for references). In (39), the internal  $\theta$ -role has been absorbed, and the theme *amabuye*, 'stones', is therefore realised inside a *by*-phrase. The goal-NP has moved to [Spec, T] and become the subject.

Finally, the possibility of (40) follows from the fact that in locative constructions with two VP-internal object-NPs, the goal is in the higher [Spec, V]. As was shown in

(36b), this configuration rules out movement of the theme-NP to [Spec, T], since this movement step would cross the goal-NP. However, the fact that the locative NP has moved to a position from where it c-commands the theme implies that the goal can now move further to [Spec, T], since the theme-NP is located in the lower [Spec, V] and therefore does not intervene between the goal and the subject position. The locality approach illustrated and defended in section 3 hence correctly predicts that transitive locative constructions with two NP-arguments are possible, but only if the goal is in subject position.<sup>10</sup>

## 5 Unergative base verbs, PP-complements and inner subjects

The analysis presented in section 3 explains the object asymmetries observed with ditransitive locatives as well as the grammatical and ungrammatical instances of locative constructions derived from unaccusative verbs. In this section I discuss locatives derived from intransitive verbs which are lexically specified as unergative. I show that, despite this *lexical* specification, the *syntax* of locative constructions derived from these verbs is unaccusative, and I suggest that the respective structural property (viz. the selection of the subject as an *internal* argument-NP) is brought about by the locational PP which is a complement of the verb in the derivation of a locative construction.

The intransitive verbs *sinziira*, 'sleep', and *kora*, 'work', are normally classified as unergative, which means that in sentences such as (41) and (42), their subjects originate as external arguments in the specifier of *v*, from where they move to [Spec, T]:

(41) Umwaana y-a-sinziir-ye.  
 child SP-PST-sleep-ASP  
 'The child slept.'

(42) Umugabo y-a-kor-ye.  
 man SP-PST-work-ASP  
 'The man worked.'

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<sup>10</sup> Notice that examples such as (40) provide evidence against Baker's (1996) conjecture that unaccusative constructions with goal-NPs in subject position are universally excluded. (40) is also interesting because it shows that a transitive construction can be derived from an unaccusative verb. Since structural objective case is usually not available in unaccusative constructions, I assume that the object *amabuye*, 'stones', in (40) has inherent case. See Zeller (2005) for a discussion of structural and inherent case assignment in locative constructions.

A reviewer points out that in examples such as (40), the theme-NP in object position cannot be considered a genuine object, since it cannot be realised as an object marker:

(i) (\*)Amategura y-a-ya-guu-ye-ho.  
 tiles SP-PST-OC-fall-ASP-LOC

Ungrammatical on the intended reading: 'They (the stones) fell on the tiles.'

(Notice that (41) is grammatical with the meaning 'The tiles fell on them (the stones)', in which case (41) would be equivalent to (38), with an incorporated goal and the theme in [Spec, T].)

I assume that the impossibility of (i) does not raise a problem for the analysis suggested here, but rather is a consequence of independent syntactic properties of subject-object reversal constructions. I follow Ndayiragije (1999) and assume that in these constructions, the object (the theme-NP *amabuye*, 'stones', in (40)) must move from [Spec, V] to the specifier of a focus phrase FocP in order to license the specific functional force associated with subject-object-reversals (in examples such as (40), the goal-NP is the topic and the theme-NP the focus of the sentence). Since Foc is located higher in the tree than *v*, incorporation of the theme from [Spec, Foc] into *v* is excluded on independent grounds.

In the examples in (43) and (44), however, the same verbs have combined with PP-complements expressing the location of the event, and I suggest that the addition of these PPs makes the constructions unaccusative:

- (43) a. Umwaana y-a-sinziir-i-ye mu gikooni.  
 child SP-PST-sleep-APPL-ASP in kitchen  
 'The child slept in the kitchen.'  
 b. \*Umwaana y-a-sinziir-i-ye-mo igikooni.  
 child SP-PST-sleep-APPL-ASP-LOC kitchen
- (44) a. Umugabo y-a-kor-e-ye mu ishuuri.  
 man SP-PST-work-APPL-ASP in class  
 'The man worked in class.'  
 b. \*Umugabo y-a-kor-e-ye-mo ishuuri.  
 man SP-PST-work-APPL-ASP-LOC class

As (43b) and (44b) show, transitive locatives cannot be derived from the verbs in (41) and (42), although the corresponding constructions with *mu*-PPs in (43a) and (44a) are grammatical. This follows from my claim that the constructions in (43) and (44) are unaccusative. The subjects in these examples do not originate in [Spec, v], but in [Spec, V], and since the locative object-NPs in (43b) and (44b) are located in a higher [Spec, V], movement of the subject-NPs from the lower [Spec, V] to [Spec, T] is blocked by the MLC. In other words, (43b) and (44b) are excluded because they have the same syntax as the corresponding constructions with unaccusative verbs discussed in section 4.

Notice that the ungrammaticality of (43b) and (44b) would not be expected if the constructions in (43) and (44) were unergative. Movement of the NPs *umwaana*, 'child', and *umugabo*, 'man', to the subject position should be possible, because a locative object in [Spec, V] does not intervene between the position of an external argument (= [Spec, v]) and [Spec, T]. The impossibility of (43b) and (44b) therefore supports the view that the subjects in these constructions are derived from VP-internal positions.

It could be claimed, however, contrary to what I argue here, that the ungrammaticality of (43b) and (44b) is not caused by the base position of the subject-NPs, but by the syntactic status of the locational PPs. Recall that locative constructions are derived via incorporation of the prepositional locative clitics *-ho* or *-mo*, which undergo head movement out of the locational PP and adjoin to the verb (see (24) in section 3 above). Baker (1988) shows that head movement out of adjuncts is excluded. Therefore, if the PPs in (43) and (44) were adjuncts, then these examples would be ruled out because of the locative clitic's inability to undergo PI, and their ungrammaticality could not be interpreted as showing that the unergative verbs in (41) and (42) have become unaccusative in the presence of a locational PP.

However, there is morphological evidence that the PPs in (43) and (44) are actually arguments. Notice that in (43) and (44), the applicative suffix *-ir-* (in the form of its allomorphs *-i-* and *-e-*) is attached to the verb. According to Kimenyi (1995), the applicative suffix in these constructions introduces a so-called 'event localiser'; i.e. a PP-argument which specifies that the event denoted by the verb takes place in the location expressed by the PP (e.g. that the man worked while being in the classroom etc.). The PPs in (43) and (44) are hence arguments introduced by the applicative morpheme. Structurally, they are complements of the verb, and incorporation of their

heads in (43b) and (44b) is permitted. The reason for the ungrammaticality of these examples must therefore be sought elsewhere, and I suggest that it can be found in the fact that the syntax of these constructions is unaccusative.

If this claim is correct, we expect that the verbs discussed above behave like unaccusative verbs not only with respect to the impossibility of deriving transitive locative constructions such as (43b) and (44b), but also with respect to the contexts in which locative formation becomes possible. As was shown in section 2, locatives can be derived from unaccusative verbs whenever the locative object is either not realised as a full NP (i.e. when it has been omitted or when it is an object marker) or when it is an NP which has moved to [Spec, T] (either in a passive or in a subject-object reversal construction). As the following examples demonstrate, it is exactly under these conditions that the formation of locative constructions derived from the verbs in (41) and (42) also yields grammatical results:

Locative argument omitted:

- (45) Umwaana y-a-sinziir-i-ye-mo.  
 child SP-PST-sleep-APPL-ASP-LOC  
 'The child slept there.'
- (46) Umugabo y-a-kor-e-ye-mo.  
 man SP-PST-work-APPL-ASP-LOC  
 'The man worked there'.

Locative argument = object marker:

- (47) Umwaana y-a-gi-sinziir-i-ye-mo.  
 child SP-PST-OC-sleep-APPL-ASP-LOC  
 'The child slept in it.'
- (48) Umugabo y-a-ri-kor-e-ye-mo.  
 man SP-PST-OC-work-APPL-ASP-LOC  
 'The man worked in it'.

Locative argument in subject position:

- (49) a. Igikooni cy-a-sinziir-i-w-e-mo n'umwaana. (passive)  
 kitchen SP-PST-sleep-APPL-PASS-ASP-LOC by child  
 Lit.: 'The kitchen was slept in by the child.'
- b. Igikooni cy-a-sinziir-i-ye-mo umwaana. (OVS)  
 kitchen SP-PST-sleep-APPL-ASP-LOC child  
 'The child slept in the kitchen.'
- (50) a. Ishuuri ry-a-kor-e-w-e-mo n'umugabo. (passive)  
 class SP-PST-work-APPL-PASS-ASP-LOC by man  
 Lit.: 'The class was worked in by the man.'
- b. Ishuuri ri-kor-er-a-mo umugabo. (OVS)  
 class SP-work-APPL-FV-LOC man  
 'The man works in the class.'

The obvious parallels between the data discussed in section 2 and the examples in (43-50) suggest that the properties of locative constructions derived from verbs such as *sinziira*, 'sleep', and *kora*, 'work', are determined by the same factors that govern the



derivation of locatives based on unaccusative verbs. I assume that this follows from the fact that the syntax of the examples in (43-50) is indeed unaccusative; although the verbs in these constructions are lexically specified as unergative, their subjects are introduced in [Spec, V]. Consequently, the analysis presented in sections 3 and 4 can be extended to the data in (43-50). The obvious question which remains to be answered is *why* the single NP-argument of an unergative verb is realised as an internal argument in constructions such in (43-50).

My answer to this question is based on Hoekstra & Mulder's (1990) analysis of similar, well-studied cases in which the lexical specification of an unergative verb is overridden by the syntactic properties of the construction in which it appears. For example, the base position of the subjects in (51) and (52) is not determined by the lexical properties of the verb, but rather depends on the syntax of the whole VP:

- (51) a. Jan heeft gesprongen.  
       Jan has jumped  
       b. Jan is *in de sloot* gesprongen.  
       Jan is in the ditch jumped               (Dutch)
- (52) a. Gianni ha corso.  
       Gianni has run  
       b. Gianni è corso *a casa*.  
       Gianni is run to home                    (Italian)

(Hoekstra & Mulder 1990: 4)

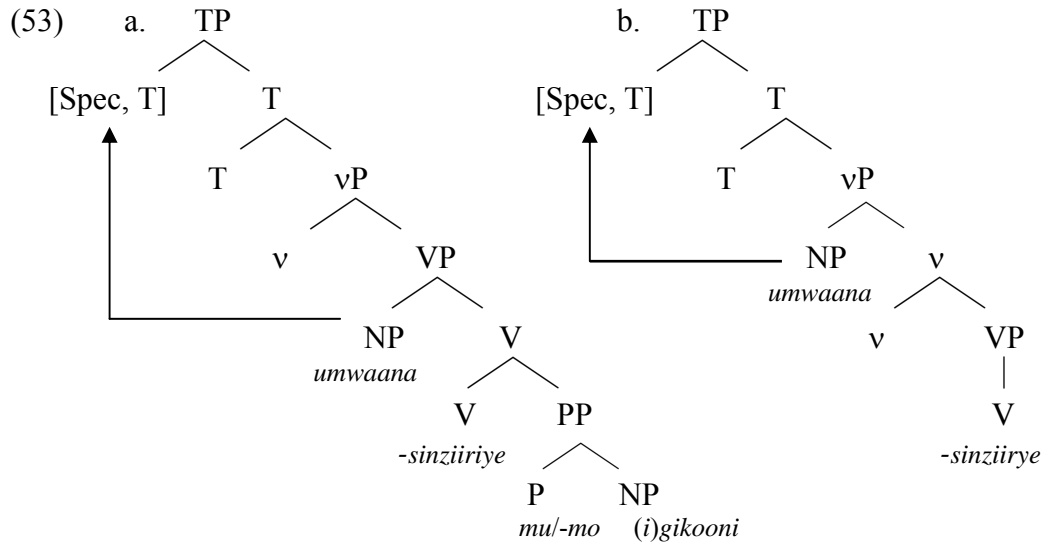
In languages such as Dutch and Italian, auxiliary selection in the perfect tense is an important test for unaccusativity (Burzio 1986; Grewendorf 1989; Hoekstra & Mulder 1990). Whereas unergative and transitive verbs select a form of 'have' (Dutch *hebben*, Italian *avere*), unaccusative verbs require the auxiliary 'be' (Dutch *zijn*, Italian *essere*). It follows that (51a) and (52a) are unergative, whereas (51b) and (52b) are unaccusative. Since the verbs in the (b)-examples are the same as in the (a)-examples, the unaccusativity of the former cannot be the result of the lexical properties of the verbs. Rather, it seems to follow from the presence of the PP-arguments in (51b) and (52b).<sup>11</sup>

In order to explain the effect that the PP-complements in (51b) and (52b) have on the structural properties of these constructions, Hoekstra & Mulder (1990) suggest that the locational PPs in these examples are predicative expressions which require an NP-argument. In both (51b) and (52b), the only NP which can be interpreted as an argument of the locational PP is the single NP-argument selected by the intransitive verb of motion; therefore, this NP must function as the subject of the PP-predicate. Importantly, according to Hoekstra and Mulder, the semantic subject-predicate relation between the NP and the locational PP must be represented syntactically by a structure in which the NP is realised as a VP-internal "inner" subject of the PP. Therefore, even though the NP-arguments of the verbs in (51a) and (52a) are syntactically represented as external arguments (which makes these examples unergative), the presence of the predicative PPs in (51b) and (52b) requires these argument-NPs to be represented inside the VP. As a result, the constructions become unaccusative.<sup>12</sup>

<sup>11</sup> See Hoekstra & Mulder (1990) for evidence that the PPs in (51b) and (52b) are indeed arguments, and not adjuncts.

<sup>12</sup> Hoekstra & Mulder (1990) advocate an analysis according to which the internal argument-NP and the predicative PP form a constituent, i.e. a so-called Small Clause (SC)-complement of the verb:

Hoekstra & Mulder's (1990) analysis provides the answer to the question of why the constructions in (43-50) are unaccusative: the single argument of a verb in Kinyarwanda has to be realised inside the VP in the presence of a locational predicative argument PP. Since the verbs in (43) and (44) select PP-complements, I assume that an NP-argument inside the VP is required to provide the PP with an inner subject. Therefore, the subjects of the sentences in (43) and (44) above are internal arguments; their base position is inside the VP, and the constructions are unaccusative, (53a). In contrast, the syntactic representation of constructions such as (41) and (42), in which the verbs do not select PP-complements, reflects the basic lexical properties of these verbs and is therefore unergative:



The assumption that the base position of the subject-NPs in the examples in (43) and (44) is [Spec, V] explains the data presented in (43-50). The locative clitic has undergone PI, and as a result, the locative NP must move to a second [Spec, V]. From this position, it intervenes between the subject position [Spec, T] and the lower [Spec, V] and therefore blocks the formation of locatives such as (43b) and (44b). However, when the locative object is omitted, or when it incorporates into the verb as an object marker, the inner subject-NP can move from [Spec, V] to [Spec, T]. Consequently, locatives such as those in (45-48) are grammatical. In the passive locative constructions in (49a) and (50a), the  $\theta$ -role of the single NP-argument of the verb has been absorbed, and the locative object has moved to [Spec, T]. Finally, when the locative NP moves to a higher [Spec, V], it can also move on to [Spec, T] in subject-object reversal constructions such as (49b) and (50b), while the NP which acts as the inner subject of the PP has remained inside the VP.

If we compare the relation between a PP-predicate and its inner subject-NP in [Spec, V] with the relation between a VP-predicate and the external argument-NP in [Spec, v], we notice some interesting parallels. The event expressed by a VP is semantically predicated of the external argument, but syntactically, the agent-NP is an argument of the light verb *v*, which selects the subject in its specifier and the VP as its complement. Kratzer (1996) therefore suggests that *v* and its VP-complement form a

(i) V [<sub>sc</sub> NP PRED]

I do not adopt the SC-analysis, but instead follow Larson (1988) in assuming that a structure in which the "inner" subject-NP is located in [Spec, V] is an adequate syntactic reflex of the subject-predicate relation between this NP and the PP-complement of the verb.



- (55) a. \*Amabuye y-a-guu-ye-ho amategura.  
stones SP-PST-fall-ASP-LOC tiles  
'The stones fell on the tiles.'
- b. \*Y-a-guu-ye-ho amategura.  
SP-PST-fall-ASP-LOC tiles  
'They fell on the tiles.'
- (56) a. \*Inyaanya z-eer-a-mo ubusitaani.  
tomatoes SP-grow-FV-LOC garden  
'The tomatoes grow in the garden.'
- b. \*Z-eer-a-mo ubusitaani.  
SP-grow-FV-LOC garden  
'They grow in the garden'

The only difference between the (a)-examples, which were discussed in section 2, and the (b)-examples is that the subject-NPs have been omitted in (55b) and (56b). The ungrammaticality of (55a) and (56a) was explained by the assumption that movement of the subject-NP to [Spec, T] across the locative NP violates the MLC. However, if the same analysis is to be used to explain the ungrammatical examples in (55b) and (56b), then the derivation of (55b) and (56b) must also involve a movement operation in which a syntactic element has illegitimately crossed the locative NP.

There are two ways in which the examples in (55b) and (56b) can be analysed in terms of movement. Either the subject prefix is assumed to be pronominal, in which case it would have to be treated as a syntactic head which combines with the verb via head movement, or the subject in (55b) and (56b) is taken to be *pro*, a pronominal NP with no phonetic content (cf. Chomsky 1982).<sup>13</sup> According to the first view, (55b) and (56b) are ungrammatical because the locative NP blocks head movement of the subject pronoun from [Spec, V] to *v*, and (55b) and (56b) are ruled out by exactly the same configuration which excludes object marking of the theme in ditransitive locative constructions (see (28b) in section 3 above). According to the *pro*-analysis, the (b)-examples in (55) and (56) are ruled out in the same way as the corresponding (a)-examples with full subject-NPs: the locative NP intervenes between the subject position and [Spec, V], and movement of *pro* from [Spec, V] to [Spec, T] violates the MLC.

Whichever view one adopts, the important conclusion that can be drawn from the data in (55) and (56) is that the subject in examples such as (54b), (55b) and (56b) has "syntactic reality"; i.e. even without an overt subject-NP, there must be a syntactically realised element which functions as the subject pronoun and which causes the violation of the MLC in (55b) and (56b). This means, however, that it is not possible to derive the pronominal reading of these examples from some sort of functional discourse principle, according to which a sentence without an overt subject-NP is simply *interpreted* as having a pronominal subject. This assumption cannot explain the ungrammaticality of (55b) and (56b), at least not on the basis of the analysis which I have presented in this paper – if nothing moves, the MLC cannot be violated, and (55b) and (56b) would be predicted to be well-formed. In the absence of an alternative analysis which would explain the ungrammaticality of data such as (55b) and (56b), I therefore conclude that subject pronouns in Kinyarwanda are syntactically represented, either as pronominal subject prefixes or as *pro*-NPs.

<sup>13</sup> The pro-drop properties of Xhosa are analysed along these lines in Visser (1986); arguments against the existence of *pro* in Zulu are provided by van der Spuy (2001).

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