



# The semantics of applicativization in Kinyarwanda

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## Abstract

This article explores the role of semantics in argument realization by providing a lexical semantic account of the contribution of applicative morphology in the Bantu language Kinyarwanda (Rwanda). I propose that applicativization is best analyzed through a constraint on the paradigmatic relationship between applied and non-applied variants of a verb. Specifically, I argue that the applied variant requires an increase in lexical entailments associated with an internal argument of the predicate, and verb classes have varying lexicalized strategies for how they satisfy this constraint. Building on earlier work on Bantu applicatives, I argue that the syntactic and semantic contributions of an applicative operate independently but with all outputs being subject to the constraint on applicativization that I propose. Taking these facts together, this predicts a typology of three possible outputs for applicativization: one in which the applicative adds a new argument and associated thematic role (the function that is most frequently discussed), one in which the applicative has the effect of giving license to an unrealized participant entailed by the meaning of the verb, and one in which the applicative does not increase valence but rather modifies the thematic role of an existing internal argument. I describe three verb classes in Kinyarwanda which exemplify these three predicted types of output of applicativization. This approach thus subsumes previous observations about the varied functions of applicative morphology under a single analysis as well as builds on earlier work on paradigmatic argument alternations (such as the oblique alternations) by extending such approaches to valency-changing morphology.

**Keywords** Argument realization · Verb meaning · Applicative morphology · Bantu languages · Kinyarwanda

## 1 Introduction

The applicative morpheme has been traditionally understood as marking an operation which adds a new object to the argument structure of a verb and assigns one of

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a set of thematic roles to that object. Applicative morphology is found throughout several of the world's language families (see e.g., Dixon and Aikhenvald 1997; Peterson 2007; Pacchiarotti 2017: 39–42 for a cross-linguistic overview) and has been of ongoing importance in work on morphosyntax and argument structure. Consider the example in (1) from Kinyarwanda (Bantu JD61; Rwanda), where the Beneficiary applied object *umwana* 'child' in (1b) is licensed via the applicative suffix *-ir*.<sup>12</sup>

- (1) a. Umu-gabo a-r-andik-a in-kuru.  
 1-man 1S-NON.PST-write-IMP 9-story  
 'The man is writing the story.'
- b. Umu-gabo a-r-andik-ir-a umw-ana in-kuru.  
 1-man 1S-NON.PST-write-APPL-IMP 1-child 9-story  
 'The man is writing the story for the child.'

While the transitive verb *kw-andika* 'write' in (1a) licenses a single verbal object *inkuru* 'story,' the applied variant in (1b) has two post-verbal dependents: the verbal object *inkuru* 'story' from (1a) as well as an additional Beneficiary applied object *umwana* 'child' licensed by the applicative.

A considerable amount of theoretical work on applicatives has investigated the syntactic status of applied objects as compared to the status of verbal objects. While there has been considerable debate on what the difference in grammatical function is between the two kinds of objects in different languages and, moreover, how to derive these similarities and differences (Gary and Keenan 1977; Kisseberth and Abasheikh 1977; Kimenyi 1980; Baker 1988; Bresnan and Moshi 1990; Alsina and Mchombo 1993; McGinnis and Gerds 2003; Jeong 2007; Ackerman et al. 2017; van der Wal 2017; Jerro 2021; *inter alia*), these views have generally focused on cases where the applicative marks the addition of an object and associated thematic role into the argument structure of the verb, as the case in (1).

However, various other functions of the applicative have been observed across the Bantu language family. On the one hand, there are cases for which the applied object's interpretation is determined in part by verb meaning (Schaefer 1985; Plessis and Visser 1992; Rugemalira 1993; Creissels 2004; Thwala 2006; Cann and Mabugu 2007; Jerro 2016a,b; Sibanda 2016; Pacchiarotti 2017), and thus the applicative does not necessarily determine the thematic role of the applied object. Furthermore, there is not always a valence-increasing function, and instead the applicative indicates some other semantic/pragmatic function (Guthrie 1962; Trithart 1983; Harford 1993; Rugemalira 1993; Kawasha 2003; Marten 2003; Poeta 2011; Jerro 2016b; Marten and Mous 2016; Pacchiarotti 2017). Taken together, these two facts indicate that applicativization is more varied than the function of the type in (1), which has been at the center of most formal accounts of applicativization; crucially, however, I show

<sup>1</sup>The data presented here come from interviews conducted with fifteen native speakers of Kinyarwanda from Muhanga and Kigali, Rwanda as well as two expatriate speakers (who were also from Kigali) living in Austin, TX, USA since 1996.

<sup>2</sup>Abbreviations: 1–23 = Noun Class; 1SG = First-person Singular; APPL = Applicative; CL = (Locative) Clitic; FV = Final Vowel; IMP = Imperfective; INF = Infinitive; NON.PST = Non-Past; O = Object; PASS = Passive; PRFV = Perfective; PST = Past; S = Subject.

that the various possible outputs of applicativization are predictable and follow from a single semantic account.

Building on lexical entailment-based approaches to argument realization (Ladusaw and Dowty 1988; Dowty 1989, 1991; Primus 1999; Beavers 2008, 2010; Grimm 2010, 2011), I propose that an applicative marks an increase in lexical entailments associated with an internal argument in the applied variant. I argue that applicativization is best analyzed as a paradigmatic output condition on the applied variant of a verb, and this constrains the space of possible kinds of lexicalization and thus the possible outputs of the applied variant. I show that this general output condition, coupled with the fact that the syntactic increase in valence is not a necessary condition to applicativization, predicts a three-way typology in the kind of output an applicative can have: (i) an additional argument and associated thematic role; (ii) an additional argument used to give license to an existing thematic role; and (iii) no argument is added, but an additional entailment arises on the non-Theme argument. The first case is the most general and appears with a range of different verb types. The second and third cases are exemplified by motion predicates and a subclass of ditransitives in Kinyarwanda, respectively.

The structure of this paper is as follows. In the next section I describe the verb classes which will serve as case studies for entailment-based account of applicatives I develop. Specifically, Sect. 2.1 describes motion verbs in Kinyarwanda, where the thematic role of the applied object varies depending on the subclass of verb; in Sect. 2.2, I describe a subclass of ditransitive verbs where the applicative does not mark an increase in the valence of the verb but rather indicates a change in the interpretation of the non-Theme object. Section 3 situates entailment-based approaches to argument structure within broader work on argument realization, setting the stage for my proposal in Sect. 3.2 of applicativization as an output condition on the lexical entailments associated with an internal argument—the Applicativization Output Condition. Section 4 shows how the constraint proposed in Sect. 3 correctly captures all the described cases of applicativization in Kinyarwanda. Section 5 concludes the discussion.

## 2 The applicative *-ir* in Kinyarwanda

Kinyarwanda, like many other Bantu languages, has a variety of derivational morphemes which affect verbal valence, including the detransitivizing *-ik* ~ *-ek* (Jerro 2018), the syncretic causative-instrumental *-ish* ~ *-esh* (Kimenyi 1980: 79–83, 164–172; Jerro 2017), and the applicative *-ir* ~ *-er*, of interest here. The applicative follows the verbal root, and the vowel shows height harmony with the vowel of the preceding syllable. (For exposition, I use *-ir* as the citation form). The applied object can have a variety of thematic roles in Kinyarwanda, including Beneficiary, Locative, Manner, and Reason (Kimenyi 1980: 30–52):<sup>3</sup>

<sup>3</sup>Kinyarwanda has various morphophonological interactions which are pertinent to the data presented here. First, vowel harmony determines the quality of the vowel of the applicative morpheme, which surfaces as *e* or *i*. Second, the perfective suffix causes various consonant mutations at the end of the verbal stem,

- (2) a. Mukamana y-a-tets-e.  
Mukamana 1S-PST-cook-PRFV  
'Mukamana cooked.'
- b. Mukamana y-a-tek-ey-e                      mu gi-koni.  
Mukamana 1S-PST-cook-APPL-PRFV 18 7-kitchen  
'Mukamana cooked in the kitchen.'                      Locative
- (3) a. Umu-yobozi y-Ø-bats-e                      in-zu.  
1-chief              1S-PST-build-PRFV 9-house  
'The chief built the house.'
- b. Umu-yobozi y-Ø-ubak-iy-e                      umw-ana in-zu.  
1-chief              1S-PST-build-APPL-PRFV 1-child      9-house  
'The chief built the house for the child.'                      Beneficiary

In these cases, the verb increases the valence of the verb by one, licensing a new applied object and assigning a thematic role to that object; see Kimenyi (1976: 20–22, 58–61) for discussion regarding the grammatical function Locative and Beneficiary applied objects. This function of the applicative has been the most widely discussed and analyzed (see citations above) and appears across multiple verb types in Kinyarwanda. For the rest of this section, I describe two classes of verbs for which the function of the applicative diverges from the traditionally-discussed case: motion verbs (where the applicative does not determine the thematic role of the applied object), and a subclass of ditransitives (where there is no increase in the valence under applicativization). I discuss each in turn.

## 2.1 Motion verbs: Thematic role determined by verb

For motion verbs in Kinyarwanda, the thematic role of the locative applied object is a particular component of a path (Source, Route, or Goal; see Sect. 4.1 for formal definitions) but individual verbs show a preference for which path role arises with the applied object. In this section I describe the relationship between the different path roles and the verb classes that they appear with, and in Sect. 4.1.2 I use the pattern described here as evidence that it is not the applicative that is determining the semantic interpretation of the applied object in these cases but rather the verb itself. Before proceeding, however, it is necessary to provide a discussion of the status of the prefixes that mark locative phrases in Kinyarwanda, since the cognate forms in other Bantu languages show considerable variation in their grammatical status. Specifically, I argue (with Ngoboka 2016) that the locative-marked phrases are (optional) arguments of the verb in Kinyarwanda.

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which often turns the applicative /-ir/ to /-ij/ (represented orthographically as “iy”), and in some cases it deletes the consonant of the applicative morpheme. Past tense is the segment *a-* before the verb stem; with vowel-initial stems, this segment is not represented in the orthography, but for clarity I will represent this information with Ø. Finally, there are various allomorphs of the perfective suffix (*-e*, *-ye*, *-eye*, *-eye*), and the form corresponds to the consonant of the stem. I use standard Kinyarwanda orthography, which does not indicate tone.



- b. Mw' i-shyamba h-a-tem-e-w-e                      igi-ti n' umu-higi.  
 18 5-forest 16S-PST-cut-APPL-PASS-PRFV 7-tree by 1-hunter  
 'In the forest was cut the tree by the hunter.'

In (4), the locative phrase is in subject position and triggers subject agreement on the verb—both of which are properties generally ascribed to arguments. Note that this is the case both when the locative phrase appears with a non-applied verb in (4a) as well as when the locative phrase is introduced by the applicative, as in (4b).

Further evidence for the analysis of locatives as arguments in Kinyarwanda is that a locative object may be marked on the verbal stem as an object prefix (Bresnan and Mchombo 1987: 743–752; Bresnan and Moshi 1990: 150–152; though see Riedel and Marten 2012 for critical discussion). For example, in (5), a location that has been previously mentioned in the discourse, such as *mu nzu* 'in the house,' may be replaced with the class 16 object marker *ha-*.

- (5) a. N-a-ha-bon-ye                      umw-ana.  
 1SGS-PST-16O-see-PRFV 1-child  
 'I saw the child there.'
- b. Umu-higi y-a-ha-tem-ey-e                      igi-ti.  
 1-hunter 1S-PST-16O-cut-APPL-PRFV 7-tree  
 'The hunter cut the tree there.'

The fact that the locative appears as an object prefix in (5) further supports the conclusion that locative phrases are arguments in Kinyarwanda. In (5b), the applicative morpheme licenses the locative argument that is in turn indexed by the object prefix, which indicates that the Locative applied object is an argument just like the locative phrase with a non-applied verb.

With some verbs, the locative is permitted without licensing via the applicative, such as the locative *mw'ishyamba* 'in the forest' in (6):

- (6) N-a-bon-ye                      umw-ana mw' i-shyamba.  
 1SGS-PST-see-PRFV 1-child 18 5-forest  
 'I saw the child in the forest.'

At a first pass, (6) might suggest that locative phrases are adjuncts. However, I argue that for cases as (6) in which there is no locative applicative to license the locative phrase, the locative is in fact an argument of the verb. First, as already seen in (4a) and (5a), the locative behaves as an object, despite the absence of an applicative, in triggering agreement and being replaced by an object prefix.<sup>6</sup>

Furthermore, it is not the case that a locative-marked phrase can productively appear with any verb, thus providing additional evidence that locative phrases are arguments of the verbs with which they appear. For example, in (7) it is not possible to have a locative with the verb *ku-vuga* 'to talk' without the use of an applicative.

<sup>6</sup>An anonymous reviewer points out that the optionality of the locative argument in some cases could point to a false dichotomy between arguments and adjuncts, as claimed in Creissels (2014). While the findings here are consistent with this view, I assume that locatives in Kinyarwanda are arguments (given their behavior, when overt, with argument diagnostics) and leave a more detailed discussion of the viability of the distinction between arguments and adjuncts to future research.

- (7) Habimana a-ri ku-vug-\*(ir)-a mu n-zu.  
 Habimana 1S-be INF-talk-APPL-IMP 18 9-house  
 ‘Habimana is talking in the house.’

In (7), the fact that the applicative is obligatory to license the locative *mu nzu* ‘in the house’ is evidence that for those verbs which *do* allow the locative without the applicative, the locative phrase is an argument selected (perhaps optionally) by the verb. I take the fact that the locative is only permitted without the applicative with certain verbs, as well as the fact that when it does occur, it behaves like an object (as shown by, e.g., its ability to passivize, above), to be evidence that the locative is an (optional) argument of those verbs which allow a locative phrase in their non-applied form.

The final piece of evidence that locatives are arguments in Kinyarwanda is that the number of locatives permitted within a single clause is restricted. Consider the following examples in which there are two locative phrases. If locatives are adjuncts, it should be possible to have multiple locative phrases with underived verb forms; the data in (8) and (9), however, show that this is not the case. While one locative is permissible in the (a) sentences, an additional locative is not permitted in the (b) sentences.

- (8) a. Nkusi a-ri kw-ambuka mu n-yanja  
 Nkusi 1S-be INF-cross 18 9-ocean  
 ‘Nkusi is crossing the ocean.’  
 b. \*Nkusi a-ri kw-ambuka mu n-yanja i Mombasa.  
 Nkusi 1S-be INF-cross 18 9-ocean 23 Mombasa  
 ‘Nkusi is crossing the ocean at Mombasa.’ (on intended reading)
- (9) a. Nkusi a-ri kw-injira mu n-zu.  
 Nkusi 1S-be INF-enter 18 9-house  
 ‘Nkusi is entering the house.’  
 b. \*Nkusi a-ri kw-injira mu mu-ryango mu n-zu.  
 Nkusi 1S-be INF-enter 18 3-door 18 9-house  
 ‘Nkusi is entering the door at the house.’ (on intended reading)

In (8) and (9), the number of locative phrases is restricted, though note that this is not a semantic or pragmatic issue: there is nothing contradictory or pragmatically odd in increasing the number of locative phrases in this way (and additional arguments can in fact be licensed via the applicative, as I show below), from which I conclude that the restriction on the number of locative phrases is a syntactic restriction on the number of arguments. This provides further evidence that locatives are not adjuncts in Kinyarwanda since adjuncts in principle are not limited in number. Thus, for the duration of this paper, I assume that locative phrases in Kinyarwanda are (optional) object arguments of the verb.<sup>7</sup>

<sup>7</sup>As pointed out by an anonymous reviewer, the syntactic facts here are consistent with what Rugemalira (1993) observes in the closely related language Runyambo. Namely, over 70% of verbs in Runyambo require an applicative to license a locative phrase, and whether an applicative is needed for licensing a locative is determined by verb class.

### 2.1.2 Verbs of motion: “Path” and “departure” verbs

Returning to the larger point, I now turn to describing how the three subparts of a path (Source, Route, and Goal) arise as the applied object with different classes of motion verbs.<sup>8</sup> Beyond Bantu, motion predicates have received considerable attention, and the classes of motion verbs throughout the following discussion parallel established classes discussed in the literature (Talmy 1976, 1985; Slobin 1996; Talmy 2000; Croft et al. 2001; Zlatev and Yangklang 2004; Folli and Ramchand 2005; Beavers 2008; Beavers et al. 2010; Son 2007; Ameka and Essegbey 2013). While much of this literature focuses on the coding of path with different grammatical categories (i.e., whether path is coded by the verb or by a “satellite” such as a preposition or adverbial), a comprehensive analysis of motion in Kinyarwanda is outside the scope of the present paper. Here, I show that the various path roles that arise with the applied object, focusing on the variation which appears with verbs from different motion subclasses. In this section I describe two classes of motion verbs where the locative applied object is one of a particular subpart of a path: either a Route or a Source, respectively. In Sect. 2.1.3, I discuss manner of motion verbs, where the applied object is a Goal.

First, with the class of verbs I will refer to as “path verbs,” the applied object encodes the Route through which the motion happened. This class includes verbs such as *kw-injira* ‘to enter,’ *gu-sohoka* ‘exit,’ *ku-manuka* ‘descend,’ *ku-zamoka* ‘ascend,’ and *ku-rira* ‘to climb.’ Consider the data in (10) for the verb *kw-injira* ‘to enter’; the applied object *mu muryango* ‘CL18 door’ in (10b) is interpreted as the Route. Note that for this verb, speakers judge the verb to have variable transitivity, with the verbal object being optional in the non-applied variant (and in the applied variant as well), and for some speakers, it sounds redundant when present.

- (10) a. N-di kw-injir-a (mu n-zu).  
 1SGS-be INF-enter-IMP 18 9-house  
 ‘I am entering the house.’
- b. N-di kw-injir-\*(ir)-a mu mu-ryango (mu n-zu).  
 1SGS-be INF-enter-APPL-IMP 18 3-door 18 9-house  
 ‘I am entering the house through the door.’

Crucially, the Locative applied object with this class requires a Route reading; the sentence in (11a) shows that the applied object cannot have the reading that Mukamana is entering the house from the yard (i.e., Source) and the sentence in (11b) shows that there cannot be a reading that Mukamana entered into the house (i.e., Goal).<sup>9</sup>

<sup>8</sup>The observation that the applied object varies with motion predicates has been described in various other Bantu languages: Doke (1938: 188–189) for Lamba; Bentley (1887: 628) for Kikongo; Cole (1955: 202–203) for Setswana; Fortune (1955: 210) for Chishona; Sambeek (1955: 86) for Chibemba; Dugast (1971: 233) for Tūnen; Ziervogel et al. (1972: 113) for Tshivenda; and Trithart (1983) and Pacchiarotti (2017) for cross-linguistic discussion.

<sup>9</sup>Other readings of (11a), such as ‘Mukamana entered through the yard’ would be felicitous, supporting the generalization that for the verb *kw-injira* ‘to enter,’ the applied object describes the Route.



- (11) a. # Mukamana y- $\emptyset$ -injir-iy-e                      mu gi-kari.  
 Mukamana 1S-PST-enter-APPL-PRFV 18 7-yard  
 ‘Mukamana entered from the yard outside. (on intended reading)’  
 b. # Mukamana y- $\emptyset$ -injir-iy-e                      mu ru-go.  
 Mukamana 1S-PST-enter-APPL-PRFV 18 11-home  
 ‘Mukamana entered into the house.’ (on intended reading)

Thus, for path verbs, the applied object only describes the Route; it cannot have a Goal or Source interpretation. A similar pattern has been described for verbs in Luba-Kasai (D. R. Congo; De Kind and Bostoen 2012: 110) and Citumbuka (Malawi; Chavula 2016: 127).

The second subclass is what I refer to as “departure verbs”: *kw-ambuka* ‘to cross,’ *gu-hagaruka* ‘to arise, alight,’ and *ku-guruka* ‘to fly.’ With these verbs, the locative applied object is the Source. In (12b), for example, the applied object *Mombasa* is the source of the crossing event.<sup>10</sup>

- (12) a. Y- $\emptyset$ -ambuts-e                      (mu) n-yanja.  
 1S-PST-cross-PRFV 18 9-ocean  
 ‘He crossed the ocean.’  
 b. Y- $\emptyset$ -ambuk-\*(iy)-e                      (mu) n-yanja i Mombasa.  
 1S-PST-cross-APPL-PRFV 18 9-ocean 23 Mombasa  
 ‘He crossed the ocean from Mombasa.’

With departure verbs, the only permitted interpretation of the applied object is as a Source; the applied object cannot be the Goal, as in (13a), nor the Route, as in (13b).<sup>11</sup>

- (13) a. # Mukamana y- $\emptyset$ -ambuk-iy-e                      kw’ Ijwi.  
 Mukamana 1S-PST-cross-APPL-PRFV 17 Ijwi  
 ‘Mukamana crossed to Ijwi Island.’ (on intended reading)  
 b. # Mukamana y- $\emptyset$ -ambuk-iy-e                      i Kivu.  
 Mukamana 1S-PST-cross-APPL-PRFV 19 Kivu  
 ‘Mukana crossed Lake Kivu.’ (on intended reading)

Thus, for verbs of departure like *kw-ambuka* ‘to cross,’ the applied object can only be the Source. This pattern has also been described for verbs in Nyamwezi (Tanzania; Maganga and Schadeberg 1992: 157) and Basa (Cameroon; Schürle 1912: 67).

### 2.1.3 Manner of motion verbs

I now turn to cases in which the applied object is a Goal—a pattern which appears with manner of motion verbs such as *kw-iruka* ‘run,’ *gu-tembera* ‘to go about,’ and

<sup>10</sup>The locative prefix in (12) is optional. I take this to be an idiosyncratic selectional restriction of the verb *kw-ambuka* ‘to cross’.

<sup>11</sup>Note that (13a) does have an available reading, i.e. that Mukamana crossed the lake and the origin is Ijwi Island. The speakers consulted regarding the data in (13a) do not require that the route (in this case, Lake Kivu, which contains Ijwi Island) be explicit in the applied variant. Similarly, (13b) is acceptable on a reading where Lake Kivu is the Source of motion.

*gu-simbuka* ‘to jump’ in Kinyarwanda. In (14b) the verb *kw-iruka* ‘to run’ has an applied object which can only be interpreted as the Goal.

- (14) a. Mukamana a-ri kw-iruk-a.  
Mukamana 1S-be INF-run-IMP  
‘Mukamana is running.’
- b. Mukamana a-ri kw-iruk-ir-a kw’ isoko.  
Mukamana 1S-be INF-run-APPL-IMP 17 market  
‘Mukamana is running to the market.’  
# ‘Mukamana is running at the market.’

In (14b), the applied object cannot be a general description of where the event took place; furthermore, the applied object cannot be interpreted as a Source (15a) or as a Path (15b).

- (15) a. # Mukamana y-Ø-iruk-iy-e kw’ i-suli.  
Mukamana 1S-PST-run-APPL-PRFV 17 5-school  
‘Mukamana ran from the school.’ (on intended reading)
- b. # Mukamana y-Ø-iruk-iy-e ku mu-handa.  
Mukamana 1S-PST-run-APPL-PRFV 17 3-road  
‘Mukamana ran on the road.’ (on intended reading)

Thus, the pattern which emerges is that the applied object is a Goal with manner of motion verbs—a fact described for several other Bantu languages (Trithart 1983: 160–161; Pacchiarotti 2017: 168–170), such as Setswana (Botswana; Schaefer 1985), Chichewa (Malawi; Trithart 1983: 168), and Lunda (Zambia, Angola; Kawasha 2003: 160–161, 261), as well as languages outside the Bantu family, such as the isolate Ainu (Japan; Bugaeva 2010: 783).

A defining characteristic of the manner of motion class in Kinyarwanda is that with this class, the locative in the non-applied variant is ambiguous between a located motion reading and a directed motion reading (i.e., having a Goal), which contrasts with the other two motion subclasses where the applicative is the only way to license their corresponding locative sub-role. Consider the verb *gu-simbuka* ‘to jump’ in (16a) which is ambiguous between located motion reading and a directed motion reading. On the other hand, the applied variant in (16b) can only have the directed motion reading.

- (16) a. Uwase y-a-simbuts-e mu ma-zi.  
Uwase 1S-PST-jump-PRFV 18 6-water  
‘Uwase jumped while in the water.’ or  
‘Uwase jumped into the water.’
- b. Uwase y-a-simbuk-iy-e mu ma-zi.  
Uwase 1S-PST-jump-APPL-PRFV 18 6-water  
‘Uwase jumped into the water.’  
# ‘Uwase jumped while in the water.’

**Table 1** Three Subclasses of Motion Predicate in Kinyarwanda, with Respective Applied Object Thematic Roles

Motion Verb Subclass	Example Verb	Thematic Role of A.O.
Path Verbs	<i>kw-injira</i> 'to enter'	Route
Departure Verbs	<i>kw-ambuka</i> 'to cross'	Source
Manner of Motion Verbs	<i>kw-iruka</i> 'to run'	Goal

For reasons of space, I leave a detailed discussion of directional readings with non-applied verbs as in (16a) for future work (see Folli and Ramchand 2005, Nikitina 2008, Tham et al. 2012; Bassa Vanrell 2013 for analyses of comparable directed motion readings with manner of motion verbs in other languages). What is crucial for the present discussion is that in the applied variant, the applied object is interpreted as a Goal.

### 2.1.4 Interim summary: Motion predicates

This section has described three subclasses of motion verbs in Kinyarwanda: path verbs such as *kw-injira* 'to enter,' departure verbs such as *kw-ambuka* 'to cross,' and manner of motion verbs such as *kw-iruka* 'to run' (see Table 1). For each subclass, the interpretation of the locative applied object is different, with a particular class licensing each logically possible subpart of a path meaning (Route, Source, or Goal, respectively). For each class, no other interpretation is available. I return to these data in Sect. 4.1.2, where I argue that with these verbs, the applied object's meaning is determined by verb and not the applicative.

## 2.2 Lexical ditransitives: No applied object added by the applicative

It has been assumed in many theoretical accounts that the core function of applicative morphology is to increase syntactic valence by addition a new applied object; however, several authors have described cases where the applicative does not mark an increase the number of syntactic arguments (for Bantu languages, see Guthrie 1962; Trithart 1983; Harford 1993; Rugemalira 1993; Kawasha 2003; Marten 2003; Poeta 2011; Marten and Mous 2016; Pacchiarotti 2017; for other language families, see, e.g., redirective applicatives in Salish; Kiyosawa and Gerdtz 2010: 117ff.). In this section, I describe a subclass of ditransitive verbs in Kinyarwanda which do not mark an increase in valence.

Kinyarwanda has various subclasses of ditransitive verbs (see Beavers et al. 2019), but for reasons of space, I discuss two relevant subclasses here. The first is comprised of the verbs *gu-tera* 'to throw at,' *gu-siga* 'to leave something,' *ku-nyana* 'to take something,' and *ku-zana* 'to bring something,' which I will refer to as the *guter*-class. For these verbs, the non-applied variant is ditransitive and the applied variant involves no increase in valence; instead, it marks a change in interpretation of the indirect object. Consider the verbs *gu-tera* 'to throw at' and *gu-siga* 'to leave' in (17) and (18).<sup>12</sup>

<sup>12</sup>The word order between the objects is flexible with ditransitives in Kinyarwanda. The morphological root of the verb *gu-siga* 'to leave something' changes to *siz* when it appears before the perfective suffix *-e*.

- (17) a. Karemera y-a-tey-e i-buye Nkusi.  
Karemera 1S-PST-throw-PRFV 5-rock Nkusi  
'Karemera threw the rock at Nkusi.'
- b. Karemera y-a-ter-ey-e i-buye Nkusi.  
Karemera 1S-PST-throw-APPL-PRFV 5-ball Nkusi  
'Karemera threw the rock to Nkusi.'
- (18) a. Nkusi y-a-siz-e igi-tabo i Kigali.  
Nkusi 1S-PST-leave-PRFV 7-book 23 Kigali  
'Nkusi left the book in Kigali.'
- b. Nkusi y-a-sig-iy-e Habimana igi-tabo.  
Nkusi 1S-PST-leave-APPL-PRFV Mary 7-book  
'Nkusi left Habimana the book'

While both variants have three arguments, the difference between the two is the interpretation of the indirect object. For example, in (17a), the rock is being thrown *at* Nkusi, perhaps with the intention of harming him; in (17b), on the other hand, Nkusi is the intended recipient of the throwing, and the action judged to be done with the intention of transferring possession of the rock. In (18a), the Theme is being left at a Goal, while in (18b), it is being transferred into possession of another person.

By means of comparison, the applicative with other ditransitives, such as *gu-ha* 'to give,' *gu-hereza* 'to hand,' and *ku-raga* 'to bequeath' (which I refer to as the *guha*-class), introduces a new applied object with an associated thematic role, such as in (19b), where *Nkusi* is a Beneficiary applied object.

- (19) a. Uwase y-a-ha-ye Mukamana igi-tabo.  
Uwase 1S-PST-give-PRFV Mukamana 7-book  
'I gave Mukamana the book.'
- b. Uwase y-a-h-er-eye Nkusi igi-tabo Mukamana.  
Uwase 1S-PST-give-APPL-PRFV Nkusi 7-book Mukamana  
'Uwase gave the book to Mukamana for Nkusi.'

Unlike the *gutera*-class, ditransitives in the *guha*-class have the traditional function of applicativization wherein the applied object increases the valence by one, and a thematic role is assigned to that object.

Returning to the broader point, the applicative with verbs in the *gutera*-class does not mark an increase in the valence of the verb; instead, the applied variant shows a difference in interpretation in the non-Theme argument (which I argue in Sect. 4.1.3 comes from an additional entailment of transfer of possession). Before moving ahead, it is worth considering the valence of these verbs in more detail, especially considering that ballistic motion verbs show variable transitivity in other languages (e.g., *throw* in English). In particular, as pointed out by an anonymous reviewer, an alternative possibility is that the applied variant of these verbs adds an additional applied object to a putative transitive sense of the verb.<sup>13</sup> For most of the verbs in this class,

<sup>13</sup>On such a view, the applied variant is built from the transitive sense of the verb, and the applicative licenses a new object with the thematic role of Recipient. There are various ways that a Recipient ap-

including *gu-siga* ‘to leave something’ in (18), there does not seem to be an available transitive sense of the verb in the first place.

The verb *gu-tera*, on the other hand, does have a transitive sense; however, the meanings of the transitive and ditransitive variant are different. Crucially, the meaning of the transitive is not consistent with the meaning of the applied variant, and I argue that the applied variant is related to the ditransitive base and not the transitive one. The central difference is that the ditransitive sense is a ballistic motion verb which entails displacement of the Theme, while the transitive sense is an activity verb which does not entail displacement. As I show in the rest of this section, the translation of the transitive sense is best thought of as something like ‘to play around with something.’ For perspicuity, these meanings are captured by the following denotations for the two homophonous senses of *guter* (see Sect. 4.1.3 for further discussion and Sect. 4.1 for the formal implementation I adopt in this paper).

- (20) a.  $\llbracket \text{guter}_{Tr} \rrbracket := \lambda y \lambda x \lambda e [ \text{playing.around.with}'(e) \wedge \text{ag}'(e, x) \wedge \text{th}'(e, y) ]$   
 b.  $\llbracket \text{guter}_{Dir} \rrbracket := \lambda z \lambda y \lambda x \lambda s \lambda e [ \text{throwing}'(e) \wedge \text{cause}'(e, s) \wedge \text{ag}'(e, x) \wedge \text{leave}'(e, y, x) \wedge \diamond \text{arrive}'(s, y, z) ]$

The contrast in whether the base form entails displacement is crucial since the applied ditransitive also entails displacement, and I return to the implications this has for applicativization at the end of this subsection. Before this, I provide evidence that the transitive sense does not entail displacement of the Theme.

Ballistic motion verbs like English *throw* do have such an entailment that the theme has been displaced from the location of the Agent; see Beavers (2011:33ff) for work on English and Croft et al. (2001) for cross-linguistic discussion. The transitive sense of *gu-tera* ‘to throw’ in Kinyarwanda, however, has a more basic meaning that has no implication of displacement of a theme whatsoever. First, the reading of transitive *gu-tera* is translated as something like ‘to play around with something’ (often a ball, either with one’s hands or one’s feet) as in (21), which is compatible with, but crucially does not entail, loss of possession.

- (21) Karemera y-a-tey-e                      umu-pira.  
 Karemera 1S-PST-throw-PRFV 3-ball  
 ‘Karemera played with the ball (using his feet).’

When asked how to convey an unambiguous displacement reading—i.e., one in which the ball is no longer at the location of the Agent—speakers provided a sentence with the dummy object *ishoti* ‘shot,’ as in (22). The presence of *ishoti* ‘shot’ is obligatory for the directional reading, thus further supporting the conclusion that transitive *gu-tera* ‘to throw’ does not entail displacement.

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plied object could in principle be added. One is that the Recipient role can be productively assigned by a Recipient applicative (though this Recipient applied objects are not productively found in the language; namely, Recipient applied objects are only found with the verbs described in this section). Another is that the argument is given syntactic license in a parallel way to the case that I will make for motion predicates in Sect. 4.1.2. None of these, however, come to bear on the data here, since I show in this section that the applied variant is related to the ditransitive use of the verb.

- (22) Nkusi y-a-tey-e                      \*(ishoti) umu-pira.  
 Nkusi 1S-PST-throw-PRFV shot 3-ball  
 ‘Nkusi threw/kicked the ball [away].’

Further evidence that there is no entailed displacement away from the Agent in the transitive sense of *gu-tera* ‘to throw/play (ball)’ is that the transitive verb cannot be used in contexts which emphasize loss of possession. Consider (23) where the context is one that focuses on the Agent’s desire to throw the knife away (i.e., not to anyone or anywhere specifically, but explicitly to rid oneself of it).

- (23) [Context: I walk up to a crime scene and see a knife. I pick up the knife, but then realize that this makes it look like I committed the crime and so I want to toss it away from me.]

# N-a-tey-e                      icy-uma.  
 1SGS-PST-throw-PRFV 7-knife

‘I threw the knife [away from me].’

The infelicity of (23) is evidence that transitive *gu-tera* is not in fact a ballistic motion verb because it cannot be felicitously used in contexts which emphasize loss of physical possession.

The ditransitive senses (both applied and non-applied), on the other hand, are ballistic motion verbs in that they both convey displacement of a Theme, cf. the data in (17). Thus, I conclude that the applied ditransitive with the transfer of possession meaning is related to the non-applied ditransitive verb—and not the transitive verb—due to the fact that the non-applied ditransitive variant is the only sense which has the appropriate semantics of ballistic motion with which to relate the applied variant. If the applied ditransitive in (17b) were based on the transitive, the applicative derivation would require a one-off rule licensing a Recipient applied object (not found with any other verb in the language) as well as an *ad hoc* lexical rule which converts the meaning of the transitive verb into a loss-of-possession predicate. The more economical account is that the applied ditransitive is derived from the non-applied ditransitive, which shares the entailment of loss of possession and is more consistent with the output of applicatives with other verbs in the language—i.e., the other verbs in the subclass, such as *gu-siga* ‘to leave’ in (18). More broadly, this subclass of verbs in Kinyarwanda is proof-of-concept that there exist outputs of applicativization for which there is no change in valence between the non-applied and applied variants.

### 2.3 Descriptive summary: Three outputs of applicativization

This section has described three types of output of applicativization in Kinyarwanda. First, a new argument position is added with a corresponding thematic role; the valence in the base predicate is increased by one in the applied predicate. Second, there is an increase in valence with the applied argument structure, but the role is one that exists is idiosyncratic to the verbal subclass (as summarized in Table 1). In Sect. 4.1.2, I argue that the applicative gives syntactic license to a participant that is entailed to exist by the verb. Finally, there are cases for which there is no increase in valence,

**Table 2** Three Types of Output of Applicativization in Kinyarwanda

Addition Type	Ex.	Base Arg. Struc.	#ArgsBase	Applied Arg. Struc.	#ArgsAppl
AO & Role	(2)	<ag>	1	<ag, loc>	2
AO	(10)	<ag, rt, <i>src</i> , <i>goal</i> >	2	<ag, rt, <i>src</i> , <i>goal</i> >	3
Role	(17)	<ag, goal, pt>	3	<ag, rec, pt>	3

but rather the applied variant involves an additional entailment on the non-Theme internal argument; while there is no change in valence between the base argument structure and the applied argument structure, the nature of the thematic entailments associated with the non-Theme argument differs between them.

Table 2 summarizes these three types of output. For each output type, an argument structure with the semantic roles is given for both the non-applied (base) form and the applied output as well as the number of syntactically-realized arguments that appears with the specific verb. Because it will be important to keep track of the semantically-entailed but syntactically-unrealized participants of a verb, these are included as italicized role labels in the argument structure; non-italicized role labels correspond to arguments that are syntactically realized.

The descriptive generalization, then, is that the applicative in Kinyarwanda may add a new argument position (the second row in Table 2), a new semantic role via an additional lexical entailment (the third row), or both simultaneously (the first row). In the next section, I develop a theory which subsumes all three of these different types of possible outputs (as well as rules out the unattested case in which neither an argument position nor an entailment is added) under a single analysis which treats applicativization as a paradigmatic output condition.<sup>14</sup>

### 3 Applicativization as a paradigmatic output condition

In this section I make the case for treating applicativization as a paradigmatic contrast in the lexical entailments associated with the applied and non-applied variants of a verb. I start by discussing work on verb meaning and argument realization from the perspective of event structures; I then summarize work on the role of lexical entailments of verbal arguments in argument realization. It is within this context that I then situate my analysis of applicatives.

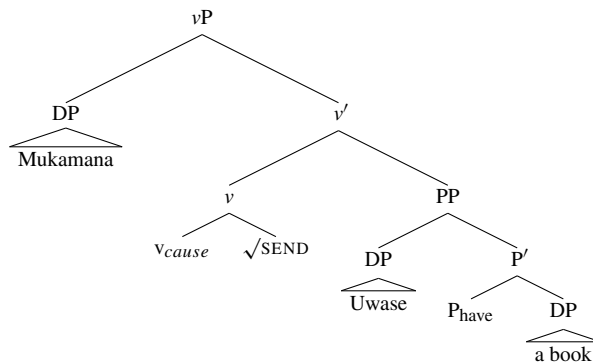
<sup>14</sup>This typology overlaps in some respects with the typology proposed in Pacchiarotti (2017), in which applicatives are classified as those which add an applied phrase (“Type A” being those with no corresponding oblique realization, and “Type B” being those for which there is an alternation with an oblique alternative), add an applied phrase with an additional semantic/pragmatic function on the applied phrase or clause (“Type C”), do not add an applied phrase but instead state that the event described by the verb is done with intensity, repetition, etc. (“Type D”), or are irregular and non-productive (“Type E” or “Pseudo-Applicatives”). Types A and B fall under the first row of Table 2. Type C are not judged to be felicitous for the speakers I have consulted, however Kimenyi (1980: 36–37) gives an example of this in Kinyarwanda, which I discuss in Sect. 5. To my knowledge, Type D readings have not been described in Kinyarwanda despite their prominence across the family (see, e.g., Trithart 1983; Pacchiarotti 2017), and I discuss how my account may be extended to cover these types in Sect. 5. I describe potential examples of Pacchiarotti’s pseudo-applicatives in Kinyarwanda in Sect. 3.3.

### 3.1 Entailment-based approaches to argument realization

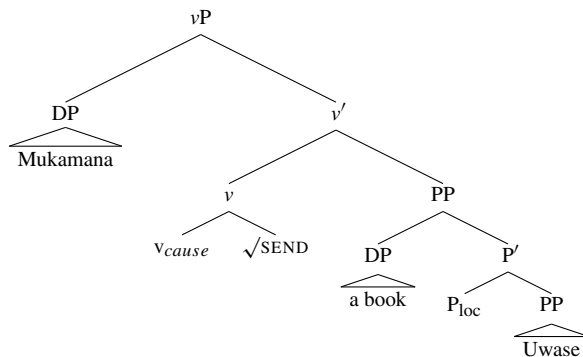
A large body of work on the nature of verb meaning has proposed that the meaning of a verb is decomposed into what are generally referred to as event structures (Lakoff 1965; Dowty 1979; Hovav and Levin 1988; Jackendoff 1990, 1996; Hale and Keyser 1993, 1997; Levin and Rappaport Hovav 1995; Wunderlich 1997; Rappaport Hovav and Levin 1998; Davis and Koenig 2000; Harley 2003, 2012; Koenig and Davis 2006; Ramchand 2008; Beavers et al. 2021; *inter alia*). While theories differ in the details of whether event structures are lexical or syntactic (see Levin and Rappaport Hovav 2005: 68–75 and Wechsler 2015 for discussion), the central idea is that event structures model the basic subevents and the broader causal structure of the event. Consider, for example, Harley's (2003) analysis of the dative alternation in English, in which the syntactic and semantic differences between an alternating verb like *send* in (24) are captured via a difference in their event structure. The double object sentence in (24a) corresponds to the structure in (25a) and the *to*-oblique in (24b) corresponds to the structure in (25b).

- (24) a. Mukamana sent Uwase a book.  
b. Mukamana sent a book to Uwase.

(25) a.



b.



These event structures decompose ditransitive verbs into a *v<sub>cause</sub>* head with a manner root complement (in this example, the root SEND) and a PP complement which defines possession via *P<sub>have</sub>* in (25a) and co-location via *P<sub>loc</sub>* in (25b). This thus captures various syntactic differences (such as asymmetrical c-command facts; Bars and Lasnik 1986; Larson 1988) and the difference in interpretation of the non-Theme



argument. While the two P heads in (25) state the meaning associated with each structure (co-location or transfer of possession) as well as the syntactic asymmetries between arguments, Beavers (2010) shows that semantic prominence systematically covaries with morphosyntactic prominence in the domain of various alternations in English. The semantics of transfer of possession coincides with its realization in the double-object construction, and in fact across many alternations, the direct object realization is shown to have the more restricted semantics (which I discuss in more detail in the rest of this section). Thus, while event structures are able to describe the differing semantics associated with each alternant, they are not designed to explain the semantic contrasts *between* the alternants in a way that captures the observed prominence facts (such as the dative alternation in (29)). A stream of research which compares the lexical entailments associated with arguments within and between predicates has developed alongside the literature on event structures, and this literature makes central the goal of accounting for the semantic prominence facts that arise between alternants. I provide a brief summary here on how entailment-based approaches analyze argument realization patterns before turning to my account of applicatives in the next section.

Entailment-based approaches propose that a verb has a particular predicate argument structure, and each of the verb's arguments is associated with a set of entailments that must hold of that argument for the event to be appropriately described, called L-thematic roles (Dowty 1989). Building on this notion, Dowty (1991) argues that grammatical functions like subject and object are likely not linked to necessary and sufficient lexical entailments (i.e., L-thematic roles); rather, the entailments relevant to subject and object selection cluster around certain Proto-Roles. The Proto-Roles are linked to argument selection via an Argument Selection Principle in which the argument with more Proto-Agent entailments is lexicalized as subject and the argument with more Proto-Patient entailments as object. Crucially, this approach is not a derivational in nature, but rather, this approach predicts the kinds of predicates that exist in natural language out of many imaginable ones that do not (see Dowty 1991: 576 for discussion of impossible verb meanings). While these different entailments resemble various earlier definitions of Agent and Patient (see, for example, the definitions of Agent in Cruse 1973; Jackendoff 1983; and Lakoff 1977; as cited in Dowty 1991), on Dowty's view these entailments contribute to the determination of an argument as mapping to Subject or Object without any necessary or sufficient conditions. This resolves a variety of issues that Dowty raises in response to the notion of thematic roles (Dowty 1991: 553–559), such as what he calls 'role fragmentation,' i.e. the issue of how narrowly to define a particular role such as Agent.

Ackerman and Moore (2001) extend Dowty's framework by treating alternations as paradigmatically-related argument structures associated with a particular verb. Beavers (2010) develops this idea and links the notion of a paradigmatic contrast between alternating variants to an account in which truth conditions are ranked in a hierarchy of minimally-contrasting L-thematic roles, with "minimal contrast" as defined in (26).

(26) **Minimal Contrast:**

$Q$  is minimally weaker than  $R$  ( $Q \subseteq_M R$ ) on a hierarchy of L-thematic roles iff  $Q = R$  or  $Q \subset R$  and there is no role  $P$  on the hierarchy such that  $Q \subset P \subset R$ .  
(Beavers 2010: 848, (68))

With such a definition of minimal contrast, Beavers (2010) proposes the Morphosyntactic Alignment principle in (27):

(27) **Morphosyntactic Alignment Principle (MAP)**

When participant  $x$  may be realized as either a direct or oblique argument of verb  $V$ , it bears L-thematic role  $R$  as a direct argument and L-thematic role  $Q \subseteq_M R$  as an oblique. (Beavers 2010: 848, (69))

The MAP captures those verbs for which two different argument structures are possible, and it predicts that in these cases, the direct object realization will have a stronger set of entailments than the oblique realization. Beavers shows how this approach captures the semantic differences of various argument alternations, including the locative *spray/load* alternation and the conative alternation (Beavers 2010: 848–850). Regarding the alternation between the indirect object and oblique realization of the ditransitive event structures in (25a) and (25b), respectively, the relevant hierarchy is between Recipient (defined as containing entailments of ‘arrival into the possession of’ and ‘being arrived at’) and Goal (defined as just ‘being arrived at’), where the entailments of the Recipient role are a superset of the entailments of Goal, as in (28).

(28) RECIPIENT  $\supset$  GOAL

Beavers shows that for those ditransitive verbs with a truth-conditional contrast between the direct object and oblique realizations (such as verbs of physical or electronic motion, e.g., *mail, send, ship, throw, toss*), the *to* variant encodes simple arrival of the Theme at a Goal, while the double object variant encodes both arrival *and* arrival into the possession of the recipient. For example, in (29b) the direct object variant encodes arrival of the letter as well as transfer into Mary’s possession, while the oblique variant in (29a) only encodes arrival of the letter (a generalization going back to at least Green 1974).

- (29) a. Kim mailed the letter to Mary/London, #but it never left her hand.  
 b. Kim mailed Mary/#London the letter, #but it never left her hand.

(Beavers 2010: 854, (89))

The alternation in (29) is captured by the MAP in that the direct object variant is associated with the more restricted (through having additional entailments) variant than the role associated with the oblique variant. Thus the MAP predicts possible argument structure realizations available to an alternating verb, and it captures the fact that for cases where an argument may be realized as an indirect object or oblique, the role associated with the object realization will have a stronger role (here, Recipient) than the role associated with the oblique realization (here, Goal).

The benefit of an entailment-based account of argument alternations comes from the fact that event structures, by nature, do not provide an explanation for the various semantic contrasts between an alternating argument in two related predicates. So, while event structural approaches readily capture the within-clause nature of syntactic and semantic prominence of arguments (e.g., via the two structures in (25a) and (25b) which model the two alternants of the English dative alternation), they do not speak to the relationship *between* these two structures, *vis-à-vis* prominence hierarchies. Thus, Beavers (2010) concludes that entailment-based approaches, coupled with a notion

of the event structure of a particular verb, offer a means of addressing the question of argument alternations and, specifically, the mapping of an alternating argument to variable positions. It is in the spirit of this approach that I develop an analysis of applicatives in the next section.

### 3.2 Applicativization

Many views have analyzed applicative morphology as part of the event structure, often treating applicatives as an argument-licensing head (e.g., Marantz 1993; Jeong 2007; Pykkänen 2008; Jerro 2021; *inter alia*). However, parallel to the discussion in the previous subsection, an event structural approach does not by itself illuminate the semantic relationship between the applied and non-applied alternant. Building on the entailment-based paradigmatic approaches in the previous section, I propose that applicativization is a paradigmatic output condition which constrains possible meanings observed in the applied variant of verbs. Specifically, I propose that the applied predicate has a monotonically stronger set of truth conditions pertaining to the non-Theme internal argument than the corresponding non-applied variant.<sup>15</sup> I formulate this constraint as the Applicativization Output Condition in (30).

- (30) **Applicativization Output Condition (AOC):** In alternations between applied and non-applied forms of a verb,
- (i) the applied variant has at least one internal non-Theme argument, and
  - (ii) the truth conditions associated with that internal argument are a strict superset of those associated with the non-Theme argument (if present) of the non-applied variant.

The AOC constrains the space of possible outputs of applicativization, thus predicting possible and impossible applied verb types. So, while the actual contribution of the applicative may differ among verb classes, the commonality across all instances of applicativization is that the applied variant of a verb will always have a stricter set of lexical entailments (i.e., more entailments associated with an argument, which thus more narrowly defines the truth conditions of the event) associated with the non-Theme internal argument than in the non-applied variant.

It is worth noting that applicatives in Kinyarwanda (and Bantu languages more generally) are underspecified, with various roles, such as Beneficiary or Locative, being disambiguated via various semantic and morphological facts of the applied object (see e.g., Ngonyani 1998; Schadeberg 2003; Jerro 2021 for discussion). For sake of ease in the following discussion, I use terminology like “locative applicative” or “benefactive applicative” as a shorthand for a particular instance of applicativization in which the applied object has a Locative or a Beneficiary thematic role, respectively.

The AOC shares many components to the MAP in (27), though there are two important differences, related to the empirical differences of the phenomena they are intended to explain. First, argument alternations (such as the conative or dative) allow that the two variants may have the same entailments, and the generalization captured

<sup>15</sup>By “monotonic” I mean that any new meaning is added without removing any prior meaning in the base predicate (Koontz-Garboden 2007, 2012).

by the MAP is that *if* there is an alternant with stronger truth conditions, it is the direct object realization. With applicatives, however, this is not the case; the applied variant always has stronger truth-conditional content than the non-applied variant. Second, a core function of an applicative is to add *something*, whereas argument alternations relate two possible realizations of the same participant. I take the additive nature of applicatives as arising via the Principle of Contrast (Bolinger 1977; Clark 1987; Carstairs-McCarthy 1994; *inter alia*) wherein “any difference in form in a language marks a difference in meaning” (Clark 1987: 2). In other words, by adding additional morphological material to the stem of the verb, it follows that there must be some corresponding functional material added. In the case of applicatives, the proposal here is that this additional functional material must satisfy the AOC.

The formulation of the AOC in (30) relies on the assumption that there are two interrelated components to the output of an applicative. In some cases, there is a syntactic function (i.e., the licensing of a new argument position), in others there is a semantic function (i.e., assigning a thematic role to some argument), and in others there is both (i.e., adding a new argument position and assigning that new argument a thematic role). Furthermore, the AOC relies on the assumption that an argument licenser can separately have a syntactic or semantic function (or both, simultaneously). This idea has precedent in previous work; for example, Pylkkänen (2008) discusses so-called non-voice bundling languages, where the head that licenses the causal argument and the head that introduces causal meaning are separate. Similarly, Alexiadou et al. (2006) delegate the semantic contribution of causation and the licensing of a causer argument to separate heads.

Two observations about applicatives from the literature on Bantu languages naturally follow from the AOC in (30): first, it has been long observed that the applicative is determined in part by verb meaning (Schaefer 1985; Plessis and Visser 1992; Rugemalira 1993; Creissels 2004; Thwala 2006; Cann and Mabugu 2007; Jerro 2016a,b; Sibanda 2016; Pacchiarotti 2017). That is, while some syntactic work analyzes applicativization as a productive operation in which an applied object and associated role are indiscriminately added into the argument structure of the verb, other work from several Bantu languages (and Sect. 2.2 above) has shown that the verb to which an applicative is attached determines the interpretation of the applied object. These cases follow from the AOC since it permits that different verbs will lexicalize distinct ways of marking an increase in entailments in the applied variant.

Second, there is not always a valence-increasing function of an applicative morpheme (Guthrie 1962; Trithart 1983; Harford 1993; Rugemalira 1993; Kawasha 2003; Marten 2003; Poeta 2011; Jerro 2016b; Marten and Mous 2016; Pacchiarotti 2017). While several kinds of outputs exist where there is no necessary increase in the valence, all described cases in the literature involve some kind of semantic or pragmatic increase in the specifications of the applied object, as will be discussed for Kinyarwanda in Sect. 4.1.3.<sup>16</sup> Thus, a theory of applicativization must capture the

<sup>16</sup>Other authors have observed the variation in function of the output of applicativization (Trithart 1983; Pacchiarotti 2017), focusing in particular on how the suffix *\*-td* in Proto-Bantu evolved into various functions across the Bantu family. My goal here is distinct but complementary; I focus on a specific language and provide a lexical semantic analysis of applicativization which can capture the observed uses of applicatives in Kinyarwanda. While the approach and ultimate goals are different, I think that the perspective I put forward here dovetails naturally with the findings in these works from a functional-historical perspective.

fact that in many cases the valence of the verb is not increased, which follows from the AOC.

### 3.3 Productivity and lexicalization

Before going into the formal details of the analysis in Sect. 4, I briefly discuss the nature of productivity of applicative morphology. Applicatives have often been assumed to apply productively without consideration for the meaning of the verb and its associated participants (for an explicit claim of this kind, see Bosse 2015),<sup>17</sup> but this assumption has been challenged in work on Bantu languages (Pacchiarotti 2017: 60–62)<sup>18</sup> as well as in other language families (e.g., in Yucatec Maya; Lehmann and Verhoeven 2006). For Kinyarwanda, the data in Sects. 2.1.2 and 2.2 show that there exists productivity within particular verb classes (comparable to the criteria-governed productivity in Pinker 1989; see also Dowty 1979: Chap. 6 for discussion of rule-governed lexicalization).

Beyond verb-class internal productivity, certain verbs in Kinyarwanda have idiosyncratic meanings in the applied variant (“pseudo-applicatives” in the terminology of Pacchiarotti 2017), and these verbs block a more productive function of the applicative (be it specific to a particular verb class or productive more generally across multiple verb classes). Consider (31) and (32); while there is a possible conceptual relatedness between the applied and non-applied forms, it is crucially not the case that the applied variant is transparently composed of the non-applied verb plus, e.g., a Beneficiary meaning (see Coupez 1985 for similar data). Crucially, the productive benefactive reading is not available for the (b) sentences.

- (31) a. Karekezi a-ri gu-sek-a.  
Karekezi 1S-be INF-laugh-IMP  
‘Karekezi is laughing.’
- b. Karekezi a-ri gu-sek-er-a umw-ana.  
Karekezi 1S-be INF-laugh-APPL-IMP 1-child  
‘Karekezi is fond of the child.’  
# ‘Karekezi is laughing for the child.’
- (32) a. Ejo n-ar-eguy-e.  
yesterday/tomorrow 1SGS-PST-resign-PRFV  
‘I resigned yesterday.’

<sup>17</sup>It is worth noting that the empirical domain covered in Bosse (2015) and that discussed here is quite different; she analyzes null benefactive applicative constructions in English and German, and she explicitly sets aside overt applicative morphology of the type found in Bantu. Ultimately, I contend that the data presented here constitute evidence against Bosse’s treatment of applicatives, at least for Kinyarwanda applicative morphology.

<sup>18</sup>Idiosyncratic outputs of applicativization are sometimes referred to as “pseudo-applicatives” in the Bantuist tradition. Pacchiarotti (2017: 251–442) gives a detailed analysis of possible historical paths of shift in meaning from Proto-Bantu to synchronic Setswana for 72 different pseudo-applicatives. How the diachronic generalizations of her work and synchronic account of applicatives made here intersect is a question I leave to future work.

- b. Ingabire y-a-bi-mw-egur-iy-e by-ose.  
 Ingabire 1S-PST-8O-1O-resign-APPL-PRFV 8-all  
 ‘Ingabire bequeathed everything to him.’  
 # ‘Ingabire resigned for him.’

In (31b), there is no literal laughing taking place, and similarly, in (32b) there is no literal resignation; in both cases, the meaning of the applied variant is not predictable from the meaning of the non-applied verb.

Bringing together the data in Sects. 2.1.2 and 2.2 and cases like (31) and (32), applicatives in Kinyarwanda exist in three degrees of productivity: (i) completely lexicalized, as in (31) and (32); (ii) productive within specific verb classes, such as the data discussed in Sects. 2.1.2 and 2.2; and (iii) elsewhere cases that apply broadly across most verbs (the addition of a Beneficiary applied object being a good candidate for such a case). I assume (building on, e.g., Dowty 1979 and Pinker 1989) that there exists a blocking relationship among these three varying degrees of productivity; specifically, the presence of a lexicalized use blocks the application of any productive rule, and the possibility of a verb-class specific applicative may block a fully productive output. The AOC in (30) constrains possible productive outputs, both verb-class specific and more general.

## 4 Analyzing the applicative in Kinyarwanda

### 4.1 The formal framework

I implement my analysis of the semantic contribution of applicatives using a typed lambda calculus. I assume a domain of discourse  $U$  that consists of two major sorts: the subset  $U_I$  of individuals and  $U_E$  of eventualities. I take a neo-Davidsonian approach in which thematic roles are relations relating individuals to eventualities (Parsons 1990; Rothstein 2004), and I assume that the thematic role labels in the denotations below (e.g., *ben'*, *loc'*, etc.) are sets of lexical entailments associated with particular L-thematic roles which describe clusters of linguistically-relevant entailments (cf. Dowty 1989, 1991). However, unlike Kratzer (1996), I do not assume that subjects are licensed separately from the verb (nothing hinges on this here, though see Wechsler 2005 and Jerro 2021 for critical discussion of the licensing of arguments by external heads). For motion events, I assume that there is a moving entity, or Figure, that travels along a series of locations,  $l_1 \dots l_n$ . The initial and final points in the sequence are defined as the Source and Goal, respectively. The Route is the sequence of locations between the Source and Goal, but which includes neither the Source nor Goal.<sup>19</sup> Source, Goal, and Route are subtypes of Location (see (43) below).

<sup>19</sup>Asher and Sablayrolles (1995) distinguish between a *path* and a *strict internal path*, the latter being the path that contains no locations that overlap with the source or goal. For the present discussion, I use the term Route to refer to what they define as *strict internal path*. In another vein of literature, it has been argued that a path preposition selects for a locative head in a layered PP (van Riemsdijk 1990; Rooryck 1996; Koopman 2000; Svenonius 2007; van Riemsdijk and Huijbregts 2008). Similar to the present analysis, these works decompose complex motion events (see also Jackendoff 1990), though these analyses

Building on insights from Wunderlich (1997), I assume that the final participant (i.e., the innermost lambda-abstracted argument) to be picked up is mapped to subject. All other arguments are objects and are picked up in the order they appear after the verb.<sup>20</sup> This framework thus captures the prominence of arguments by deriving a particular participant's role in the event from the order of composition. Consider the denotations of the individual lexical items in (33) as defined in (34). The derivation in (35) shows the composition of each argument with the verb.<sup>21</sup> The arguments in (34a) correspond to the ditransitive verb *gu-ha* 'to give' in (33).

(33) Karemera y-a-ha-ye                      Habimana igi-tabo.  
Karemera 1S-PST-give-PRFV Habimana 7-book  
'Karemera gave Habimana the book.'

- (34) a.  $[[guha]] := \lambda z \lambda y \lambda x \lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge have'(s, y, z)]$   
 b.  $[[Karemera]] := karemera'$   
 c.  $[[Habimana]] := habimana'$   
 d.  $[[igitabo]] := book'$
- (35) a.  $\lambda z \lambda y \lambda x \lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge have'(s, y, z)] (habimana')$   
 b.  $\lambda y \lambda x \lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge have'(s, y, habimana')](book')$   
 c.  $\lambda x \lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge have'(s, book', habimana')](karemera')$   
 d.  $\lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, karemera') \wedge have'(s, book', habimana')]$   
 e.  $\exists s \exists e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, karemera') \wedge have'(s, book', habimana')]$

In (35), the first argument to be composed with the meaning of the verb is *Habimana*, then *igitabo* 'book,' and finally *Karemera*. Given the assumptions above regarding the order of composition, the argument *Karemera* is mapped to subject by virtue of being the final participant picked up by the verb. *Habimana* and *igitabo* 'book' are both mapped to objects, of equal status (see fn. 21).

To model the increase in valence and addition of semantic entailments associated with the non-Theme argument, I will use the following function, where  $\phi$  is one of the

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discuss languages with prepositions which contribute rich semantic meaning. In Kinyarwanda, and Bantu more generally, there is not a comparable inventory of specified locative propositions, as discussed in Sect. 2.1.1.

<sup>20</sup>This assumption cannot necessarily be extended to other Bantu languages, cf. the variation in objecthood discussed in Jerro (2015, 2021) and van der Wal (2017). However, for Kinyarwanda, the locative applied objects share the same properties as the verbal object (see Jerro 2016b; Kimenyi 1980: 36–37), and so I assume here that all non-subject arguments discussed in this paper are mapped to object.

<sup>21</sup>I take the standard view that the event variables are existentially bound at a higher node in the derivation, but see Champollion (2015) for critical discussion.

various thematic roles associated with applied objects (such as Benefactive, Locative, etc).<sup>22</sup>

$$(36) \quad \lambda P \lambda y \lambda x_1 \dots \lambda x_n \lambda e [P(x_1 \dots x_n, e) \wedge \phi'(e, y)]$$

Crucially in (36), there is an additional argument  $y$  that is not part of the argument structure of the main predicate. As argued at length above, there are also instances for which there is no increase in valence associated with applicativization; such cases are captured by (37):

$$(37) \quad \lambda P \lambda x_1 \dots \lambda x_n \lambda e [P(x_1 \dots x_n, e) \wedge \phi'(e, x_1)]$$

In (37), the output of the applicative does not increase the valence of the main predicate, but it instead links an additional semantic entailment (qua a thematic role label  $\phi$ ) to the outermost argument of the predicate. In what follows, I show how these applicative types in combination with verb meaning (and constrained by the AOC) derive the three types of applicative described for Kinyarwanda in Sect. 2.

The AOC in (30) restricts the space of possible applied verb meanings by requiring that the applied variant marks an increase in the lexical entailments associated with a non-Theme internal object. As shown above, applicatives in certain cases may not increase valence, suggesting such a valence-increasing function is separate from the semantic component of assigning a thematic role. Combining the possible syntactic and/or semantic components (treating each as either present or absent), there are thus four logically possible combinations: increase valence and add thematic role, increase valence but add no thematic role, do not increase valence but add thematic a role, and neither increase valence nor add thematic role. The first three of these are captured by the AOC, while the lattermost is ruled out by it.

#### 4.1.1 New applied object and new thematic role

In the traditionally described cases of applicatives, there is an increase in the valence of the verb and an increase in the lexical entailments via the assigning of a thematic role to the new argument. As an example, let us consider a Locative applied object that is productively added with non-motion verbs. In Kinyarwanda, such a function appears with verbs for which there is no locative participant in their non-applied meaning, such as *gu-shaka* ‘want, search,’ *gu-teka* ‘to cook,’ *ku-rya* ‘to eat,’ and *ku-nywa* ‘to drink.’ Take, for example, the verb *ku-vuga* ‘to talk’:<sup>23</sup>

<sup>22</sup>In these denotations, the notation of  $x_1 \dots x_n$  indicates that all of the arguments of the predicate to which the applicative attaches are preserved as well as their respective ordering. This shorthand captures the fact that the applicative combines with one-, two-, and three-place predicates in Kinyarwanda without having to separately list an applicative rule for each type.

<sup>23</sup>An anonymous reviewer asks whether for cases like (38a), an analysis could be put forward where the verb gives license to an unrealized general location participant (cf. the analysis of motion verbs in Sect. 4.1.2) on the assumption that all events denoted by verbs happen in a location. I think this is an interesting possibility, though one issue with such an approach is that certain verbs in Kinyarwanda, such as *ku-vuga* ‘to speak,’ can only license a locative when there is an applicative, while others, such as *kw-iruka* ‘to run,’ allow a locative without an applicative. Similar variation of selection of locative participants is also found in Ndebele (Sibanda 2016: 315–316) and Runyambo (Rugemalira 1993: 70ff.). This variation suggests that verbs do not uniformly involve a locative participant in their non-applied meaning. Even if it



- (38) a. Uwase a-ri ku-vug-a.  
 Uwase 1S-be INF-talk-IMP  
 ‘Uwase is talking.’  
 b.  $[[kuvuga]] := \lambda x \lambda e [talking'(e) \wedge ag'(e, x)]$

In (38b), there is one participant corresponding to a single syntactic argument of the verb.

The addition of the applied object and new associated role is implemented by the denotation in (39) for a case in which an applicative licenses a Locative applied object. Recall that the additional argument in the argument structure is reflected by the addition of the lambda abstracted argument  $y$  in (39).

- (39)  $[[ir_{loc}]] := \lambda P \lambda y \lambda x_1 \dots \lambda x_n \lambda e [P(x_1 \dots x_n, e) \wedge loc'(e, y)]$

The meaning of the applicative in (39) composes with the meaning of the verb *ku-vuga* ‘to talk’ in (38b), giving (40b).  $n$  in this case is resolved to 1 (i.e., just  $x$ ) since the verb *ku-vuga* ‘to talk’ is a one-place predicate.

- (40) a.  $\lambda P \lambda y \lambda x \lambda e [P(x, e) \wedge loc'(e, y)] (\lambda x \lambda e [talking'(e) \wedge ag'(e, x)])$   
 b.  $\lambda y \lambda x \lambda e [talking'(e) \wedge ag'(e, x) \wedge loc'(e, y)]$
- (41) a. Uwase a-ri ku-vug-ir-a mu n-zu.  
 Uwase 1S-be INF-talk-APPL-IMP 18 9-house  
 ‘Uwase is talking in the house.’  
 b.  $\exists e [talking'(e) \wedge ag'(e, uwase') \wedge loc'(e, house')]$

Setting aside the treatment of tense and aspect, the resulting combination of the applicative with *ku-vuga* ‘to speak’ in (40c) corresponds to a sentence like that in (41a) where *mu nzu* ‘in the house’ fills a new syntactic object position and is assigned the thematic role of Locative.

The AOC is satisfied in this case by the fact that an internal argument is added into the argument structure, and by nature, the addition of a new participant is an increase in the entailments associated with the predicate; namely, for (41a), the specification of a location more narrowly restricts the truth conditions than the non-applied variant which does not name a specific location. Thus, the traditional cases of applicatives are captured by the AOC.

#### 4.1.2 New applied object and thematic role from verb: Motion verbs

As discussed at length above, not all cases of applicativization involve adding both a new thematic role and additional argument simultaneously. In this subsection, I discuss a subclass of verbs in Kinyarwanda for which I show that while there is an increase of valence, the thematic information is crucially being determined by the

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were preferable to treat all applicatives with Locative applied objects as cases of bringing out an unrealized verbal participant, another class, namely Beneficiary applied objects, would still need to be analyzed as adding a new argument and associated role, since it would be quite controversial to claim that all events entail the existence of a Beneficiary.

verb. In other words, the applicative licenses a syntactically unrealized participant. Recall from Sect. 2 that there is variation among motion verbs in the thematic role of the applied object; depending on the verb, the applied object is either a Source, a Route, or a Goal. What unites these verbs as a class is that they all describe motion, and thus they inherently entail a Path as part of their meaning. Definitionally, a Path entails a Goal, Source, and Route (see the literature cited in Sect. 2.1.2), which I formalize by the meaning postulate in (42).

$$(42) \quad \forall e[\exists p[\textit{path}'(e, p)] \leftrightarrow \exists x\exists y\exists z[\textit{source}'(e, x) \wedge \textit{route}'(e, y) \wedge \textit{goal}'(e, z)]]$$

The meaning postulate in (42) states that there is a Goal, Source, and Route of an event  $e$  iff there is a Path in the event  $e$ ; in other words, each of these participants entailed to exist in any directed motion event. Furthermore, each of these thematic roles is a subtype of the Locative role, a generalization which I formalize in (43).

$$(43) \quad \forall x\forall e[[\textit{source}'(e, x) \vee \textit{route}'(e, x) \vee \textit{goal}'(e, x)] \rightarrow \textit{loc}'(e, x)]$$

Grammatical evidence for the treatment of Goal, Source, and Route as a subtype of Locative is that all four thematic roles share the same morphological marking in Kinyarwanda (Jerro 2016a).

As shown in Sect. 2.1, each subclass of motion verb has an idiosyncratically determined subpart of the path that is brought out by the applicative morpheme, which I refer to in the following discussion as a particular verb's "chosen" participant since it is the verb which determines this role and not the applicative. For some of these, the chosen participant coincides with cross-linguistically observed patterns, e.g., the Goal applied object with manner of motion verbs. For others, the chosen participant is a language-internal, idiosyncratically-specified lexicalized fact of the class. In order to formally track which subcomponent of the path a particular verb takes as the applied object, I assume that a given verb's chosen participant is associated with the outermost argument in its denotation (i.e., first lambda abstracted individual argument to be saturated) in the base (non-applied) variant of the verb.

For the non-applied case, I assume that there is a lexical rule that existentially binds off the chosen argument. This rule is formalized in (44), where the input has a series of individual participants and a series of subevents, and the output existentially binds the first argument to be picked up.<sup>24</sup>

$$(44) \quad \lambda x_1\lambda x_2\dots\lambda x_n\lambda e_1\dots\lambda e_m[P(x_1\dots x_n, e_1\dots e_m)] \Rightarrow \\ \lambda x_2\dots\lambda x_n\lambda e_1\dots\lambda e_m\exists x_1[P(x_1\dots x_n, e_1\dots e_m)]$$

Note that the existential binding of the outermost argument does not affect the truth conditional content of the verb; given (42), the presence of a Path already entails that

<sup>24</sup>The ordering of multiple objects is generally flexible in Kinyarwanda (Kimenyi 1980; Jerro 2016b). There are various ways to capture this formally; one is to assume a default ordering of arguments, and then to propose a lexical reordering operation that freely rearranges them. An alternative is to assume that there is no default ordering and that arguments are lambda-abstracted in any order before the verb is handed off to the syntax. In order to track how specific participants are brought out with the locative applicative when used with motion verbs, I assume the former, though I see no empirical reason that the latter could not be implemented.

each subpart of the Path exists.<sup>25</sup> In what follows, I existentially bind the aspects of motion which are entailed to exist but do not appear as overt arguments, such as the Goal in (45) and the Source in (51).

Consider, for example, the denotation of the verb *kw-ambuka* ‘to cross’ in (45), representative of departure verbs like *gu-hagaruka* ‘to arise, alight’ and *ku-guruka* ‘to fly.’

$$(45) \quad \llbracket kwambuka \rrbracket := \lambda z \lambda y \lambda x \lambda e \exists p [\text{crossing}'(e) \wedge \text{ag}'(e, x) \wedge \text{route}'(e, y) \wedge \text{source}'(e, z) \wedge \text{goal}'(e, p)]$$

There are three open arguments in (45): the Agent, Route, and Source. The existential binding of the syntactically unlicensed argument results in the denotation in (46) via the rule in (44), where the outermost argument  $z$  is existentially bound.

$$(46) \quad \lambda y \lambda x \lambda e \exists z \exists p [\text{crossing}'(e) \wedge \text{ag}'(e, x) \wedge \text{route}'(e, y) \wedge \text{source}'(e, z) \wedge \text{goal}'(e, p)]$$

The composition maps the agent to Subject and the Route to object, as in the non-applied use of the verb *kw-ambuka* ‘to cross’ in (47a).

- (47) a. Karemera  $y$ - $\emptyset$ -ambuts-e            in-yanja.  
           Karemera 1S-PST-cross-PRFV 9-ocean  
           ‘Karemera crossed the ocean.’  
 b.  $\exists e \exists z \exists p [\text{crossing}'(e) \wedge \text{ag}'(e, \text{karemera}') \wedge \text{route}'(e, \text{ocean}) \wedge \text{source}'(e, z) \wedge \text{goal}'(e, p)]$

After the existential binding of the argument  $z$ , there are only two overtly realized syntactic arguments of the non-applied verb *kw-ambuka* ‘to cross,’ corresponding to the Agent and the Route.

Returning to the discussion of applied variants of motion verbs, the applicative gives syntactic license to the argument that is existentially bound in the non-applied variant. This function is captured by the meaning in (48), which states that the first argument of the predicate is associated with the *loc* role, thereby associating the chosen participant of the verb to the Locative applied object licensed by the applicative, thus capturing the empirical generalization that the thematic role of the applied object in these cases is determined by the verb.<sup>26</sup>

$$(48) \quad \llbracket -ir_{loc} \rrbracket := \lambda P \lambda x_1 \dots \lambda x_n \lambda e [P(x_1 \dots x_n, e) \wedge \text{loc}'(e, x_1)]$$

<sup>25</sup>The existential binding in (44) can be taken as a formalization of the observation by Creissels (2006) for Niger-Congo languages that verbs in these languages are generally restricted to only allowing one locative argument per non-applied verb.

<sup>26</sup>This approach in essence argues that the applicative adds additional information regarding thematic roles to an existing participant of the event. This proposal may appear a violation of the theta-criterion of Chomsky (1981)—specifically, that a single argument must have only one thematic role. However, the idea that a single argument can be assigned multiple thematic roles has a precedent in the literature—perhaps most famously in Hornstein (1999). Ultimately, though, I contend that the approach here would not in fact count as a violation of the theta criterion given that the thematic role labels I use describe sets of Dowtian L-thematic roles associated with a particular argument, and are thus just clusters of entailments associated with a certain participant; applicativization in this case just adds to the number of entailments associated with an argument.

The case in (48) is similar to that in (39) but with one crucial difference: in (48) there is no new participant added into the event; instead, the outermost argument of the verb (i.e.  $x_1$ ) is linked to the argument of the applicative, and this has the effect of giving syntactic license to a participant of the verb which is unrealized in the non-applied variant.

Consider cases in which the applicative in (48) combines with the meaning of a motion verb like *kw-ambuka* ‘to cross.’ The result of this combination gives the meaning of the applied variant for *kw-ambuka* ‘to cross’ in (49).

$$(49) \quad \lambda z \lambda y \lambda x \lambda e \exists p [\text{crossing}'(e) \wedge \text{ag}'(e, x) \wedge \text{route}'(e, y) \wedge \text{source}'(e, z) \wedge \text{loc}'(e, z) \wedge \text{goal}'(e, p)]$$

The participant linked to the Source is also linked to the Locative argument introduced by the applicative, which, given that the Source is a more specific type of Locative, means that this locative applied object will be interpreted as the source of motion, corresponding to the applied use of the verb *kw-ambuka* ‘to cross’ in (50a).

$$(50) \quad \begin{array}{l} \text{a. Karemera } y\text{-}\emptyset\text{-ambuk-iy-e} \quad \quad \quad \text{i Mombasa (mu) n-yanja.} \\ \text{Karemera 1S-PST-CROSS-APPL-PRFV 23 Mombasa 18 9-ocean} \\ \text{‘Karemera crossed the ocean from Mombasa.’} \\ \text{b. } \exists e \exists p [\text{crossing}'(e) \wedge \text{ag}'(e, \text{karemera}') \wedge \text{route}'(e, \text{ocean}') \wedge \\ \text{source}'(e, \text{mombasa}') \wedge \text{loc}'(e, \text{mombasa}') \wedge \text{goal}'(e, p)] \end{array}$$

Thus, the applicative has the effect here of giving license to an unrealized participant of the non-applied verb.

The same pattern is present with other kinds of motion verbs, but crucially the chosen participant will be different for other subclasses. For path verbs like *kw-injira* ‘to enter,’ *gu-sohoka* ‘exit,’ *ku-manuka* ‘descend,’ *ku-zamoka* ‘ascend,’ and *ku-rira* ‘to climb,’ the outermost argument is linked to the Route participant, as idiosyncratically selected by this class. Consider the denotation of the verb *kw-injira* ‘to enter’ in (51).

$$(51) \quad \llbracket \text{kw-injira} \rrbracket := \lambda z \lambda y \lambda x \lambda e \exists p [\text{entering}'(e) \wedge \text{ag}'(e, x) \wedge \text{goal}'(e, y) \wedge \text{route}'(e, z) \wedge \text{source}'(e, p)]$$

The composition of this verb with the denotation of the applicative in (48) results in (52) for the applied meaning of *kw-injira* ‘to enter.’

$$(52) \quad \lambda z \lambda y \lambda x \lambda e \exists p [\text{entering}'(e) \wedge \text{ag}'(e, x) \wedge \text{goal}'(e, y) \wedge \text{route}'(e, z) \wedge \text{loc}'(e, z) \wedge \text{source}'(e, p)]$$

Thus the applied object for both *kw-injira* ‘to enter’ and the other verbs in this class is a Route (cp. Source for departure verbs).

$$(53) \quad \begin{array}{l} \text{a. Uwase a-ri} \quad \text{kw-injir-ir-a} \quad \quad \quad \text{mu muryango (mu n-zu).} \\ \text{Uwase 1S-be INF-enter-APPL-IMP 18 door} \quad \quad \quad \text{18 house} \\ \text{‘Uwase entered (the house) through the door.’} \\ \text{b. } \exists e \exists p [\text{entering}'(e) \wedge \text{ag}'(e, \text{uwase}') \wedge \text{goal}'(e, \text{house}') \wedge \\ \text{route}'(e, \text{door}') \wedge \text{loc}'(e, \text{door}') \wedge \text{source}'(e, p)] \end{array}$$

Across the different motion subclasses, the same operation brings about the chosen participant of the particular class (for reasons of space, I omit manner of motion verbs like *kw-iruka* ‘to run,’ but the same analysis, *mutatis mutandis*, applies with these verbs, but with a Goal as the participant which arises with the applied object).

This pattern satisfies the AOC in (30) in that the applied variant of a motion verb has a named argument, which by definition is a superset of the truth conditions associated with the existentially bound thematic role in the non-applied variant. An alternative view would be to propose that the applicative both increases the valence of the verb as well as assigns the thematic role of the applied object (as has been generally assumed in the literature on applicatives; see the work cited in Sect. 3.1) for the motion verbs discussed here.<sup>27</sup> I contend that the analysis I present here is preferred for three reasons. First, there is independent evidence of certain verbs having a chosen participant of the path as an applied object. In particular, this is the case with manner of motion verbs like *gu-simbuka* ‘to jump’ and *kw-iruka* ‘to run’—cf. (16b)—where the non-applied variants of these verbs show a predilection for assigning a Goal; this same preference arises when the applicative licenses a Goal applied object. This tells us that, independently of their behavior with applicatives, verbs have a preference for assigning certain subpath meanings to their dependents. Thus, an account which assumes that the applicative is a single operation which productively adds, e.g., a Goal to any verb would have no way of capturing the fact that the Goal reading is restricted to specific verbs.

Second, an analysis that assumes the applicative is adding both the syntactic object as well as assigning the thematic role would be forced to propose that there are three different locative applicatives: a Source-adding applicative, a Route-adding applicative, and a Goal-adding applicative. While in principle it is possible for a language to have such a system, the onus would be on proponents of this approach to explain why these three different applicatives would only be permitted to combine with their respective classes of verb in Kinyarwanda, since it is not the case that any motion verb can appear with any path thematic role, cf. Sect. 2.1. The analysis proposed here—that the applicative gives syntactic license to an unrealized participant of the verb—more naturally captures the observation that specific motion roles appear only with certain verbs.

Third, languages differ as to which applied object type they have, which suggests that there is a degree of verb-class-specific idiosyncrasy in the selection of particular applied object types. For example, Chavula (2016: 127) describes the verb *-enda* ‘go/walk’ as specifying a Route applied object, while in Kinyarwanda, the comparable verb has a Goal applied object. Relatedly, Pacchiarotti (2017: 176), citing data from Rugemalira (1993: 82) and Creissels (2004: 13), observes that the verb for “cook” in Tswana and Runyambo differs in the two languages: in Tswana, the non-applied verb has a locative that describes a general location and an applied variant in which the locative describes the vessel of cooking; however, in Runyambo, the

<sup>27</sup>For example, Pacchiarotti (2017: 172) proposes that “the applicative usually adds an applied phrase with the semantic role of Goal to motion verbs.” Such an view works for only a subset of Kinyarwanda motion verbs, i.e. manner of motion verbs in Sect. 2.1.3. While applied objects with Source and Route thematic roles are discussed in Pacchiarotti (2017), she does not provide an analysis of how the different types of thematic role arise with different subclasses of motion verbs.

opposite is the case, the general location is described in the applied variant and the non-applied variant describes the vessel. Therefore, the variation in the selectional requirements of the same verb across languages is evidence that there is a certain degree of language-specific idiosyncrasy in the kind of role that a particular verb assigns, and this is captured naturally on the proposal that the verb itself can determine the thematic role of applied objects. On the other hand, an analysis of an applicative indiscriminately adding a role across all verbs fails to capture such facts.

#### 4.1.3 No change in valence and increased entailments of existing IO: Ditransitives

Finally, there are verbs for which there is no increase in valence under applicativization. Recall from Sect. 2.2 that for the subclass of ditransitive verbs *gu-tera* ‘to throw at,’ *gu-siga* ‘to leave something,’ *ku-jyana* ‘to take,’ and *ku-zana* ‘to bring’ in Kinyarwanda, the non-applied variant requires an inanimate Goal participant while the applied variant involves a potential possessor, as in (17), repeated in (54).

- (54) a. Habimana y-a-tey-e                      Karekezi i-buye.  
           Habimana 1S-PST-throw-PRFV Karekezi 5-rock  
           ‘Habimana threw the rock at Karekezi.’
- b. Habimana y-a-ter-ey-e                 Karekezi i-buye.  
           Habimana 1S-PST-throw-APPL-PRFV Karekezi 5-rock  
           ‘Habimana threw the rock to Karekezi.’

Consistent with observations from earlier work on the dative alternation (Green 1974; Rappaport Hovav and Levin 2008; Beavers 2011), there are two components of meaning relevant here: ‘arrival at a goal’ and ‘arrival into the possession of,’ which are associated with the non-Theme arguments in (54a) and (54b), respectively. As noted by Beavers (2010: 854–855), these meanings form a hierarchy of truth conditional prominence wherein ‘arrival into the possession of’ subsumes ‘arrival at a goal,’ which will be relevant below in showing how this case of applicativization satisfies the AOC.

The ‘arrival at a goal’ meaning is contributed by verb (given that this is the meaning that arises in the non-applied case), and I assume the denotation in (55) for the non-applied use of the verb *gu-tera* ‘to throw at’ which describes caused ballistic motion wherein a theme is displaced from the location of the agent (indicated by the relation *leave*) and prospectively arrives at a different location (indicated by  $\diamond$ *arrive*).<sup>28</sup>

- (55)  $[[guter_a]] := \lambda z \lambda y \lambda x \lambda s \lambda e [throwing'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge leave'(e, y, x) \wedge \diamond arrive'(s, y, z)]$

<sup>28</sup>Earlier work on the lexical semantics of ditransitives has discussed additional meanings such as the nature of the path described by the event determining the telicity of the event; see, e.g., Beavers (2011: 33ff) and Beavers and Koontz-Garboden (2020: 135–138). For the present purposes, the crucial aspects of the meanings in (55) are (i) the entailment of displacement by the agent, as argued at length in Sect. 2.2 and (ii) the assertion that the theme prospectively arrives at the location of the indirect object. The assertion of displacement is what differentiates this sense of the verb from the transitive (which I argued in Sect. 2.2 does not involve displacement and therefore is not the base form of the applied form), and the assertion of prospective arrival is relevant for with the Recipient semantics that arise as the output of applicativization (built on the prospective arrival meaning associated with the non-applied variant).

The ‘arrival into the possession of’ meaning is in turn associated with the applied variant. Specifically, I assume that this is connected to the semantics of Recipient-Beneficiaries, which have been shown cross-linguistically to be a subtype of benefactive readings (Kittilä 2005; Kittilä and Zúñiga 2010). Syntactically, there is no additional argument introduced in these cases, which is captured in the formal system proposed here by linking the additional semantic entailments (qua the thematic role *ben'*) to the first argument of the verb ( $x_1$ ).

$$(56) \quad \llbracket -ir_{ben} \rrbracket := \lambda P \lambda x_1 \dots \lambda x_n \lambda e [P(x_1 \dots x_n, e) \wedge ben'(e, x_1)]$$

The composition of the meaning of the verb *gu-tera* ‘to throw at’ in (55) with the meaning of the applicative in (56) gives rise to the denotation in (57), where the non-Theme argument is associated with both the ‘arrival at a goal’ and Beneficiary meanings, which together give rise to the ‘arrival into the possession of’ semantics of the applied variant in (54b).

$$(57) \quad \exists s \exists e [throwing'(e) \wedge cause(e, s) \wedge ag'(e, habimana') \wedge \diamond arrive'(s, rock', karekezi') \wedge ben'(e, karekezi')]$$

This case is captured by the AOC in that, for the applied variant, there is an additional entailment (here, an entailment of the indirect object being an animate beneficiary) associated with an internal argument than for the non-applied variant.

By means of comparison, let us consider another subclass of ditransitives. Consider the verb *gu-ha* ‘to give,’ for which I assume the denotation in (58b). Crucially, this verb in its non-applied variant entails the ‘arrival into the possession of’ meaning of the non-Theme argument, indicated by *have'(s, y, z)*.

- (58) a. N-a-ha-ye                      Nkusi igi-tabo.  
 1SGS-PST-give-PRFV Nkusi 7-book  
 ‘I gave Nkusi the book.’
- b.  $\llbracket guha \rrbracket := \lambda z \lambda y \lambda x \lambda s \lambda e [giving'(e) \wedge cause'(e, s) \wedge ag'(e, x) \wedge have'(s, y, z)]$

Combining the denotation in (58b) with the meaning in (56), comparably to *gu-tera* ‘to throw at,’ would lead to redundancy; the semantics of transfer of possession is already entailed by the non-applied variant of the verb, and there would be no additional information added in the applied variant. The AOC thus predicts that such a case is unavailable, and this is correctly borne out in (59a), where the applicative cannot have the function of modifying the non-Theme object with *gu-ha* ‘to give.’ Instead, this class of verbs lexicalizes another strategy for satisfying the AOC, which is the traditional case discussed in Sect. 4.1.1; as shown in (59b), the applicative licenses an additional object and assigns the thematic role of Beneficiary.

- (59) a. \*N-a-h-er-eye                      Nkusi igi-tabo.  
 1SGS-PST-give-APPL-PRFV Nkusi 7-book  
 ‘I gave Nkusi the book.’ (on intended reading)
- b. N-a-h-er-eye                      Nkusi igi-tabo Mukamana.  
 1SGS-PST-give-APPL-PRFV Nkusi 7-book Mukamana  
 ‘Uwase gave the book to Mukamana for Nkusi.’

Thus, the AOC provides an explanation for why certain ditransitive verbs have a change in valence in their applied variants, while others increase the entailments associated with the non-Theme argument, and this follows from whether the meaning of the base verb already involves an entailment of transfer of possession.

## 5 Conclusion

This paper has built on entailment-based approaches to argument realization to provide insight into the semantic contribution of applicative morphology in Kinyarwanda. Beyond traditional applicatives, I presented two case studies that typify the variation in the contribution of an applicative across the Bantu family: (1) cases where the applicative brings out an unlicensed participant of the verb, and (2) cases where the applicative adds meaning to an extant syntactic argument of the base verb. I proposed the Applicativization Output Condition, which requires (1) that the applied predicate have at least one internal argument, and (2) that there is an increase of truth conditions associated with the non-Theme argument between the non-applied and applied variants.

This study serves as proof-of-concept that lexical semantic analysis of verb meanings in relation to applicative morphology provides insight into the nature of the realization of applied objects, and this framework opens up a rich program of research into the nature of verbal argument structure and its relationship with valency changing morphology. An ongoing question is how the interaction between the verb and the applicative comes to bear in other languages. For example, it remains to be seen whether the different components of the Path selected by the various classes of motion verbs is similar in other languages to the patterns observed with motion verbs in Sect. 2.1. It may be that the preferred thematic roles of certain verb classes are idiosyncratic, and thus it would be expected that while other languages will have comparable means of bringing out thematic material, the specific thematic role brought out by the applicative may differ from what is observed in Kinyarwanda. On the other hand, it is possible that there is a cross-linguistic tendency to have particular verb meanings pattern with certain locative applied object thematic roles—in other words, that the pattern in Kinyarwanda recurs in other languages. A broader cross-linguistic study of the contributions of applicatives is needed to fill such a gap.

While the present analysis provides an explanation for the variation in applicatives in Kinyarwanda, there are various other uses in other languages that could also be subsumed under this account. For example, in some languages applicatives can add pragmatic information to an extant argument instead of increasing the valence of the clause, such as Kiswahili (Marten and Kempson 2002; Marten 2003), Chishona (Harford 1993: 108, (30); Cann and Mabugu 2007: 18–20), Setswana (Creissels 2004), Luba-Kasai (De Kind and Bostoen 2012: 117) and Cinyanja (Trithart 1983: 270–277)—see also Pacchiarotti (2017: 179–191) for a cross-linguistic discussion of focus readings of the applicative in Bantu. In (60b), there is no additional object beyond what is present with the non-applied verb in (60a); the difference between the two is that in (60b) the object is associated with additional salient information, such



as the clothes being official or formal. The object in (60c) does not describe a pragmatically salient property of the dress, and this makes it incompatible with this use of the applicative.

- (60) a. Juma a-li-va-a                      kanzu  
       Juma 1S-PST-wear-FV kanzu  
       ‘Juma was wearing a Kanzu.’
- b. Juma a-li-val-i-a                      nguo rasmi.  
       Juma 1S-PST-wear-APPL-FV clothes official  
       ‘Juma was dressed up in official/formal clothes.’
- c. #Juma a-li-val-i-a                      kanzu.  
       Juma 1S-PST-wear-APPL-FV kanzu  
       ‘Juma was wearing a Kanzu.’ (on intended reading)
- (Kiswahili; Marten 2003: 9, (14))

While I cannot pursue a full analysis of such facts here, the framework proposed in this paper can in principle be extended to these cases in that the contribution of applicatives is not centered around whether there is change in valency, parallel to, but interestingly distinct from, the analysis of ditransitive verbs in Sect. 4.1.3, where the relevant contrast is truth conditional. Future work can continue to investigate the various semantic and pragmatic factors (and the boundaries between them) which exist between the applied and non-applied variants in Kiswahili and other languages.

Indeed, Kimenyi (1976: 20–22) briefly describes such pragmatic readings in Kinyarwanda; however, for the same verbs that Kimenyi discusses (such as *ku-bona* ‘to see’), the speakers I have consulted judge a difference in the orientation of the locative phrase. Specifically, while the non-applied variant in (61a) necessarily locates the object in the location denoted by the locative, the applied variant in (61b) locates the subject and object in the location denoted by the locative.<sup>29</sup>

- (61) a. Umu-gabo y-a-bony-e                      umw-ana mu mu-jyi.  
       1-man    1S-PST-see-PRFV 1-child 18 3-town  
       ‘The man saw the child in the town.’  
       *Speaker Judgment:* Only the child must be in town
- b. Umu-gabo y-a-bon-ey-e                      umw-ana mu mu-jyi.  
       1-man    1S-PST-see-APPL-PRFV 1-child 18 3-town  
       ‘The man saw the child in the town.’  
       *Speaker Judgment:* The man and the child must be in town

I argue that the change in orientation in (61) falls under the type of output of the applicative in Sect. 4.1.3, where there is no change in the valency between the non-applied and applied variants; instead, there is a truth-conditional contrast in the entailments associated with the non-Theme arguments. For this case, the relevant entailment in (61b) is that all participants are located in the location denoted by the

<sup>29</sup>The contrast in (61) has also been described in other Bantu languages, such as Chishona (Cann and Mabugu 2007: 239, (33)). See Jerro (2020) for further discussion of these kinds of data in Kinyarwanda.

locative phrase. Returning to Kimenyi's (1976) judgments, I assume that the function he discusses is comparable to the pragmatic case I sketch for Kiswahili in (60), but I leave it to future work to analyze such readings in other varieties of Kinyarwanda as well as in other Bantu languages.

Another function that has been associated with the applicative in Bantu languages is the intensification or repetition of the event denoted by the verb (see Trithart 1983: 188–189; Pacchiarotti 2017: 193–198 for discussion). Consider the examples in (62) from Gikūyū and (63) from Lamba.<sup>30</sup>

- (62) a. koma 'sleep' kom-erer-a 'oversleep'  
 b. ũria 'ask' ũr-ĩr-ia 'make close inquiries into'  
 c. thiĩ 'go' thiĩr-ĩr-a 'go on and on'  
 (Barlow 1960: 265)

- (63) a. luŵa 'be lost' luŵ-ilil-a 'be irreparably lost'  
 b. nwa 'drink' nwĩn-inin-a 'drink right up'  
 c. lema 'be heavy' men-enen-a 'be too heavy'  
 (Doke 1938: 209–210)

These kinds of readings have not been described for Kinyarwanda, but there is conceptual similarity between these and the account I provide above. Namely, the applicatives in (62) and (63) and the applicatives in Kinyarwanda all mark an increase in the number of entailments associated with the event denoted by the verb. For Kinyarwanda, the relevant increase appears with the non-Theme internal argument, as captured by the AOC in (30); for the intensification readings in languages like Gikūyū and Lamba, the increase is instead associated with the event itself, indicating a repetition or intensification of that event. In all cases, then, the applicative is marking an increase in the entailments of the event denoted by the verb, though more work is needed to understand the range of truth conditions associated with intensification readings in languages like Gikūyū and Lamba.

That being said, it is worth noting that in the examples in (62) and (63), the intensity reading is associated with a doubling of the applicative morpheme, and in fact, some have analyzed the doubled form as entirely distinct from the applicative. For example, Guthrie (1967: 144) posits the morpheme *\*-idid* in Proto-Bantu as a separate form from the applicative *\*-id*. An anonymous reviewer, on the other hand, argues against Guthrie's account, pointing to data from North Boma (D.R. Congo) where the doubling is phonologically predicted from the nature of the verb root (Stappers 1986: 41), and therefore, the intensity reading arises with a non-doubled applicative. Thus, there is an open question regarding the appropriate treatment of intensification in Proto-Bantu as well as its function in modern Bantu languages.

In sum, I have argued for the treatment of applicative morphology as marking a paradigmatic contrast between the non-applied and applied variants of a particular verb. Specifically, the applicative ensures that there is an internal argument and that the entailments associated with the internal argument are a strict superset of those

<sup>30</sup>In Lamba, the consonants of the suffix change to the alveolar stop [n] when the stem contains a nasal consonant—see Doke (1938: 209).

associated with the non-applied variant. This predicts three general types of applicatives: those which add a new internal argument and associated thematic role, those which add a new internal argument whose role comes from an unrealized participant of the verb, and those where there is no increase in valence but instead a monotonic increase in entailments associated with the non-Theme object. I then showed that these three types are found in Kinyarwanda. This approach has the benefit of subsuming all observed functions of applicatives under a single account, heretofore lacking in previous work. Other languages and varieties show even further possible functions of applicatives, and I have speculated briefly about how the account proposed here could extend to such cases.

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## Declarations

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