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The causative-instrumental syncretism[1]

KYLE JERRO

The University of Texas at Austin

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Causative and applicative morphemes have been central in work on the morphosyntax of argument structure. However, several genetically unrelated languages use a single, syncretic form for both functions, which complicates the traditional view that a causative adds a new subject and an applicative adds a new object. In this paper, I propose an analysis of a morphological syncretism found in the Bantu language Kinyarwanda where the morphological causative and instrumental applicative are both encoded with the morpheme *–ish*. I argue for Kinyarwanda that both causation and the introduction of an instrument are analyzable as two outgrowths of the same semantic notion of introducing a new link into the causal chain described by the verb. The different causative and instrumental readings derive from underspecification of the position of the new link in the causal chain, though its placement is restricted via general constraints on possible event types as well as constraints on verb meaning and argument realization. This analysis provides an explanation for the presence of the causative-instrumental syncretism as well as provides insight into the interface between verb meaning and valency-changing morphology.

1. INTRODUCTION

Languages employ a variety of means for licensing new arguments. Morphologically, two strategies for argument addition are the applicative and causative, and both have independently received considerable attention in the literature on argument structure (see Dixon & Aikhenvald 1997 for a typological overview of valency-changing morphology). Traditionally, morphological causatives are analyzed as operations in which a new causer subject is added to the argument structure of the base predicate, and the introduction of this new causer in turn forces the previous subject to be demoted to some lower grammatical function (Comrie 1985, Alsina 1992, Dixon & Aikhenvald 1997). Consider an example from Japanese in (1), where the causative morpheme *–sase* licenses a causer subject.

(1) a. *Yasai-ga* *kusa-tta.*
vegetable-NOM rot-PAST
'The vegetable rotted.'

b. *Taroo-ga* *yasai-o* *kus-ase-ta.*
Taro-NOM vegetable-ACC rot-CAUSE-PAST
'Taro caused the vegetable to rot.' Pylkkänen 2008:81,(2)

In this example, the morpheme *sase–* licenses the new subject *Taroo-ga* in (1b), while the subject in the base predicate in (1a) is demoted to object.

Applicatives, on the other hand, have been analyzed as object-adding operations, and the additional applied object may or may not have the same grammatical status as the object of non-applied transitive sentences (Gary & Keenan 1977, Baker 1988, Bresnan & Moshi 1990, Pylkkänen 2008, McGinnis & Gerdts 2003, Jerro 2015). The data in (2) from Hakha Lai (Tibeto-Burman) provide an example of an applicative, where the morpheme *–naak* in (2b) licenses the object *tiiloo*ŋ 'boat', which is the instrument with which the event is performed.

(2) a. *tiiloo*ŋ*=ʔi*n *tivaa (khaa) kan-tan*
boat=INST river DEIC 1PS-cross
'We used the boat to cross the river.'

b. *tiiloo*ŋ *khaa tivaa kan-*∅*-tan-naak*
boat DEIC river 1PS-3SO-cross-INST
'We used the boat to cross the river.' Peterson 2007:22,(48-49)

In both sentences in (2), *tiiloo*ŋ 'boat' is the instrument of the event of crossing the river. The difference is whether the argument is licensed as an oblique phrase, as in (2a), or as an object by the applicative *–naak*, as in (2b). Languages vary with respect to which thematic roles are assigned to the applied object (i.e. the object licensed by the applicative morpheme), though several common roles are beneficiary/recipient,[2] instrumental, and locative.

Several genetically unrelated and geographically non-contiguous languages have morphological forms which subsume both causative and applicative uses, such as Hualapai (Ichihashi-Nakayama 1996), Francisco-Leon Zoque (Engel & Allhiser de Engel 1987), Náhuatl (Tuggy 1988), Wolof (Comrie 1989:183), Caquinte (Swift 1988), Yidiny (Dixon 1977), Malay (Hemmings 2013), Indonesian (Son & Cole 2008), Mbuun (Bostoen & Mundeke 2011), and several Great Lakes Bantu languages, such as Runyambo (Rugemalira 1993) and Haya (Byarushengo et al. 1977). However, there are few, if any, formal semantic accounts of a syncretism between the causative and the instrumental applicative. In this paper, I investigate the semantic and argument structural underpinnings of the syncretic[3] morpheme *–ish* in Kinyarwanda, a Great Lakes Bantu language spoken in Rwanda, which has been often pointed to as a quintessential example of causative-instrumental applicative syncretism (Croft 1991, Ichihashi-Nakayama 1996, Shibatani & Pardeshi 2001). In this language the morpheme *–ish* functions as both a causative and an instrumental applicative, given in (4a) and (4b), respectively, as originally noticed by Kimenyi (1980).[4]

(3) *Habimana y-a-men-a igi-kombe.*
Habimana 1.SBJ-PST-break-IPFV 7-cup
'Habimana broke the cup.'

(4) a. *Habimana y-a-men-esh-eje umw-ana igi-kombe.*
Habimana 1.SBJ-PST-break-ISH-PFV 1-child 7-cup
'Habimana made the child break the cup.'

b. *Habimana y-a-men-esh-eje igi-kombe in-koni.*
Habimana 1.SBJ-PST-break-ISH-PFV 7-cup 9-stick.
'Habimana broke the cup with a stick.'

The sentence in (3) has two participants, while the *–ish*-marked sentences in (4a) and (4b) both have three. In (4a), the reading is causative; Habimana acts on the child, causing the child to break the cup. In (4b), there is instead an instrumental reading; Habimana acts directly on the cup, crucially by using a stick to bring about the change of state of the cup becoming broken.

Neither traditional analyses of causatives nor applicatives can naturally be extended to syncretic morphemes such as *–ish* since causativization is an operation that adds a new causer subject, while applicativization is an operation that adds a new object. The question that arises for sentences with *–ish* like those in (4) is what is the argument structure that is contributed by the *–ish* morpheme? One possible answer is to assume accidental homophony between the causative and instrumental uses. While this is a tenable analysis for some languages (based on, for example, historical evidence of phonological merger), in §3 I argue against a homophony analysis for Kinyarwanda, providing semantic, grammatical, and diachronic evidence that the two putatively distinct uses are best analyzed as outgrowths of the same operation of underspecification. Ultimately, I analyze the syncretic morpheme in Kinyarwanda as neither a traditional applicative nor traditional causative.

Instead, I analyze *–ish* as a valency-changing operation in which a new causal subevent is added into the causal chain of the event without specification for where in the causal chain this new event appears. Constraints on event types, argument realization, and idiosyncratic verb meanings conspire to restrict the position of the novel causal link, thus deriving the possible readings for *–ish*-marked verbs. On this analysis, the shared grammatical function and semantic contribution of the two uses of the morpheme follows naturally without having to posit unmotivated separate structures for the two. In order to exemplify the effect of verb meaning on argument realization, I focus on two particular cases of interaction: the unavailability of an instrumental reading with unaccusative verbs and the lack of a causative reading with instrument verbs like *gu-kata* 'to cut'. Broadly speaking, I make the case that syncretistic morphology should be investigated in its own right, separately from morphemes which may overlap with certain uses of the syncretistic form (in this case, separately from traditional causatives and applicatives).

The structure of the remainder of this paper is as follows. In the next section, I give a brief overview of the Kinyarwanda language and a descriptive summary of the functions of *–ish*. In section 3 I argue against a homophony analysis of the

–ish morpheme, and in Section 4 I provide an analysis of the syncretism based around the shared semantics of causees and instruments. Section 5 concludes.

2. Overview of Kinyarwanda

In this section, I provide a brief description of the relevant linguistic features of Kinyarwanda. The language is spoken as the official language of Rwanda by roughly 12 million people, and approximately one million people also speak the language natively in parts of the Democratic Republic of Congo and Uganda. It is closely related to and mutually intelligible with Kirundi — the national language of Burundi — and Giha — spoken in Western Tanzania (Lewis et al. 2016).

Kinyarwanda has a default SVO word order, and there is a rich agreement system in which nouns are marked with one of sixteen semantically-categorized noun classes. These classes indicate various semantic features such as plurality and animacy (see Jerro & Wechsler 2015 for discussion of agreement in Kinyarwanda). In Bantuist convention, odd class numbers indicate the singular, and even class numbers generally indicate the corresponding plural. For example, classes 1 and 2 indicate the singular and plural for nouns referring to humans. The verb obligatorily agrees with the class of the subject, as shown in (5) where the subject differs in number between the two examples.

(5) a. *Umu-gabo a-z-iruk-a ejo.*
1-man 1.SBJ-FUT-run-IPFV tomorrow
'The man will run tomorrow.'

b. *Aba-gabo ba-z-iruk-a ejo.*
2-man 2.SBJ-FUT-run-IPFV tomorrow
'The men will run tomorrow.'

Tense is obligatorily marked by a prefix between the subject marker and verb stem, but this is sometimes deleted to resolve vowel hiatus; aspect (perfective or imperfective) is marked by a final vowel. The perfective (*–e*) has several allomorphs (*–eje*, *–ije*, *–eye*, *–iye*) and often causes a mutation of the final consonant of the stem (e.g. the stem *andik* 'write' becomes *andits* in the perfective aspect).[5] Infinitives in Kinyarwanda are marked with the prefix *ku–* or the allomorphs *gu–* (before a stem with an initial voiceless consonant) or *kw–* (before vowel-initial stems). When a verb is mentioned in prose, I include the infinitive marker with the verb, but this prefix is absent in tensed clauses.

As is typical of Bantu languages, Kinyarwanda has several valency-changing morphemes which appear between the verb stem and the aspect suffix (Kimenyi 1980). These include reciprocal (6a), benefactive applicative (6b), and the instrumental applicative/causative morpheme at issue in this paper (6c).

(6) a. *Karemera a-ra-vug-an-a na Mukamana.*
Karemera 1.SBJ-PRS-talk-RECIP-IPFV with Mukamana
'Karemera is talking with Mukamana.'

b. *Karemera a-ra-tek-er-a umw-umbati umw-ana we.*
Karemera 1.SBJ-PRS-cook-BEN-IPFV 3-cassava 1-child 1.his
'Karemera is cooking a cassava for his child.'

c. *Karemera a-ra-kubit-ish-a uru-kuta in-koni.*
Karemera 1-PRS-hit-ISH-IPFV 10-wall 9-stick
'Karemera is hitting the wall with a stick.'

The benefactive and instrumental/causative morphemes each have two allomorphs, with the vowel matching the height of the preceding vowel of the stem. When the vowel in the stem is a mid vowel (i.e. [o] or [e]), the allomorphs *–esh*/*–er* are used, for high or low vowels (i.e. [i], [u], and [a]), the allomorphs *–ish*/*–ir* are used (Kimenyi 1979). For applicative morphemes, the palatalization triggered by perfective morphology results in the /r/ being pronounced as a palatal glide [j], represented orthographically as "y." For the duration of the paper, I will use the *–ir*/*–ish* forms as citation forms.

Although Kinyarwanda has a contrastive tone system (Myers 2003), standard Kinyarwanda orthography represents neither tone nor vowel length. I use Kinyarwanda orthographic conventions in all examples. The data collected for this paper come from linguistic interviews conducted by the author during two three-month trips to Muhanga and Kigali, Rwanda as well as ongoing interviews with two expatriate speakers living in the U.S.

2.1 *The morpheme* –ish

First described by Kimenyi (1980), the *–ish* morpheme has uses as both a morphological causative and an instrumental applicative. With many verbs, both causative and instrumental uses are available, there are also certain classes which prohibit particular readings. Consider the data in (8) where the causative and instrumental readings are both available with the verb *kw-andika* 'to write'.

(7) *Umw-arimu y-a-ndits-e in-kuru.*
1-teacher 1.SBJ-PST-write-PFV 9-story
'The teacher wrote the story.'

(8) a. *Umw-arimu y-a-ndik-ish-ije in-kuru i-karamu.*
1-teacher 1.SBJ-PST-write-ISH-PFV 9-story 5-pen
'The teacher wrote the story with a pen.'

b. *Umw-arimu y-a-ndik-ish-ije umw-ana in-kuru.*
1-teacher 1.SBJ-PST-write-ISH-PFV 1-child 9-story
'The teacher made the child write the story.'

In this example, the verb marked with *–ish* has an additional argument compared to the bare verb in (7). In (8a) one of the objects is an instrument that is used to bring about the event; in (8b), there is a causee who is made to perform a

writing event. Many transitive verbs from a variety of verb classes allow both interpretations, e.g. creation verbs, such as *ku-baka* 'to build'; ingestive verbs such as *ku-rya* 'to eat' and *ku-nywa* 'to drink'; and caused change-of-state verbs such as *ku-mena* 'to break', *ku-vuna* 'to break/snap' and *kw-ica* 'to kill'.

Both readings can also be found with unergative verbs. Consider, for example, the verb *gu-kora* 'to work' in (10).

(9) *Umu-gabo y-a-koz-e.*
1-man 1.SBJ-PST-work-PFV
'The man worked.'

(10) a. *Umu-gabo y-a-kor-esh-eje i-suka.*
1-man 1.SBJ-PST-work-ISH-PFV 5-hoe
'The man is working with the hoe.' cf. Overdulve 1975:209

b. *Umw-arimu y-a-kor-esh-eje umw-ana.*
1-teacher 1.SBJ-PST-work-ISH-PFV 1-child
'The teacher made the child work.'

Unaccusative verbs, such as *ku-rumbura* 'bloom', however, do not allow the instrumental reading, such as in (12a).

(11) *In-dabyo z-a-rumbuy-e.*
10-flowers 10.SBJ-PST-bloom-PFV
'The flowers bloomed.'

(12) a. *#In-dabyo zi-ra-rumbur-ish-ije ibi-babi bya-zo.*
10-flowers 10.SBJ-PST-bloom-ISH-PFV 8-petals 8-theirs
Intended: 'The flowers used their petals to bloom.'

b. *I-mana y-a-rumbur-ish-ije ibi-babi.*
9-god 9.SBJ-PST-bloom-ISH-PFV 8-petals
'God made the flowers bloom.'

Other verbs, on the other hand, do not allow the causative reading. Specifically, verbs which entail the use of an instrument — such as *gu-kata* 'to cut' and *gu-kubita* 'to hit' — do not permit the causative reading.

(13) *Umu-silikari y-a-kas-e igi-ti.*
1-soldier 1.SBJ-PST-cut-PFV 7-tree
'The hunter cut the tree.'

(14) a. *Umu-silikari y-a-kat-ish-ije igi-ti umu-horo.*
1-soldier 1.SBJ-PST-cut-ISH-PFV 7-tree 3-machete
'The soldier cut the tree with a machete.'

b. *#Umu-silikari y-a-kat-ish-ije umw-ana igi-ti.*
1-soldier 1.SBJ-PST-cut-ISH-PFV 1-child 7-tree
Intended: 'The soldier made the child cut the tree.'

In (14b), the causative reading cannot arise with the verb *gu-kata* 'to cut'.

Thus two questions emerge regarding *–ish*. First, given the two uses, what is the appropriate argument structure of *–ish*? To assume either a purely causative or purely instrumental reading would fail to capture the full spectrum of uses of the morpheme, unless one proposes that the two uses correspond to two homophonous morphemes. Second, why are certain readings ruled out with specific verbs? Generally it is assumed that causative and instrumental morphology increases valency in a monotone fashion without consideration for the meaning of the verb, but the data in this section suggest that verb meaning does in fact affect the realization of *–ish*. Before I present my analysis of the data in §4, I argue against a homophony analysis of *–ish* in the next section.[6]

3. Against Homophony

One way to preserve traditional analyses of the causative and instrumental uses of *–ish* (the former adding a causer subject and the latter adding an instrumental object) is to assume that there are two separate operations which overlap phonologically. In Proto-Bantu, the forms for the causative and instrumental applicative are distinct (Meeussen 1967, Bastin 1986, Schadeberg 2003), and thus in order to capture synchronic Kinyarwanda, a homophony account must assume that the two distinct forms in Proto-Bantu merged phonologically at an earlier stage of the language. Such a proposal has been suggested for the distantly related Bantu language Mbuun (B87; Democratic Republic of Congo), where, synchronically, both causative and benefactive applicative are marked by gemination of the final consonant of the verbal root, as shown in (15).

(15) a. *Applicatives Uses*
ka-ból 'to beat' → *ka-bólle* 'to beat for'
ka-kón 'to plan → *ka-kónne* 'to plant for

b. *Causative Uses*
ka-bel 'to boil (intr.)' → *ka-belle* 'to boil (tr.)'
ka-kóon 'to lose weight' → *ka-kóónne* 'to make lose weight'

(Bostoen & Mundeke 2011:180,(3))

In the examples in (15), the form on the right of the arrow is derived from the root on the left, and specific lexical items idiosyncratically take causative and applicative readings (among others, such as "reversive" and "separative"). Bostoen & Mundeke (2011) provide a diachronic account in which the reversive suffix **–ʊd* in Proto-Bantu (which has a lexically causative use in other closely related languages) and the applicative **–ɪd* in Proto-Bantu merged phonologically to become synchronically marked by gemination in Mbuun, concluding that the syncretism in Mbuun arises from morphophonological merger.

The diachronic and synchronic facts for Kinyarwanda, however, differ from Mbuun. In the case of Mbuun, two formally distinct morphemes become

homophonous via commonly observed phonological changes. For Kinyarwanda, however, there is no evidence for such an analysis, as there is no clear phonological path in the historical development of the language which would result in homophony. Of course, it is still technically possible that synchronically there are two separate homophonous *–ish*'s, though in this section I argue that there is no syntactic, semantic, or diachronic evidence for proposing two distinct operations.

3.1 *Semantic Vagueness*

A homophony analysis assumes that there are two (or more) distinct senses that share phonological shape. On such a view, it is expected that the two uses are distinctly categorizable as causative and instrumental. In Kinyarwanda there are readings associated with *–ish* that are not easily distinguishable between instrumental and causative interpretations. One such example is a dictation reading, where an animate object is manipulated to bring about an event.

(16) *Umw-arimu y-a-ndik-ish-ije umw-ana in-kuru.*
1-teacher 1.SBJ-PST-write-ISH-PFV 1-child 9-story
'The teacher made the child write the story.'

In the sentence in (16), there are several possible interpretations, one of which is a typical causative reading where the teacher is commanding the student to write a story, and the student is creating the story on his or her own accord. Another available interpretation, however, is that the teacher is dictating a story to the child, and the child is writing down verbatim the story orated by the teacher. In this scenario, the child is being acted upon in a way that shows properties of both instruments and causees: although animate, the child is not acting volitionally, functioning more in line with a prototypical instrument.

Another reading that is difficult to categorize is where the intermediary causee is a machine or robot, such as the sentence in (17). In this case, a robot is used to bring out the writing of the story, and the ambiguous level of volitionality of the robot results in neither a clear causative nor instrumental reading.

(17) *Umu-gabo y-andik-ish-ije i-mashini in-kuru.*
1-man 1.SBJ-write-ISH-PFV 9-robot 9-story
'The man made the machine write the story.'

While in (16) there is an animate causee that is being acted on, in (17) there is an inanimate entity that is acting autonomously. In neither case is the intermediary caused entity a prototypical causee or instrument (contra e.g. Peterson 2007, who assumes that the difference between a causee and an instrument is the animacy of the caused entity). While in principle these facts are compatible with a homophony analysis, the lack of a sharp distinction puts into question the need to posit two separate forms. With a generality account of the type I propose in §4, on

the other hand, there is no expectation that there should be categorically distinct uses, and it is natural that there are cases where the morpheme has readings that are not categorically causative or instrumental. To put it another way, the semantics of the notions of causee and instrument are not categorically distinct and there are blurred boundaries between the two (see Schlesinger 1989), and thus there is no semantic evidence for positing two homophonous forms for the different readings associated with *–ish*.

3.2 *No Syntactic Distinction*

Another related expectation of a homophony account is that there might be grammatical differences between the causative and instrumental uses. For example, in several languages, demoted causees of transitives are marked with oblique morphology, while applied objects are marked similarly to direct objects. As is typical of Bantu, Kinyarwanda does not have case marking on DPs (Diercks 2012), but one way to probe the grammatical properties of the two forms is the syntactic behavior of the causee and applied instrument, looking at whether the objects in applicative and causative sentences can appear in positions traditionally restricted to objects. Several diagnostics used in the Bantuist literature to observe the syntax of objects include pronominal object marking on the verb (Diercks 2010, Diercks & Sikuku 2013) and passivization (Gary & Keenan 1977, Kimenyi 1980, Bresnan & Moshi 1990, Alsina & Mchombo 1993, Marten et al. 2007).[7] Before continuing, it is worth noting that the data in this section do not necessarily falsify the homophony analysis of *–ish*, since Kinyarwanda is often a symmetrical language across several applicative types (Kimenyi 1980, Wunderlich to appear), and thus it is expected that any argument-adding morpheme will result in symmetry between the applied and thematic objects (though see Gerdts & Whaley 1993 for complexities which arise for verbs with multiple applicatives). Crucially, the goal here is to show that there is no clear-cut syntactic difference between the putatively distinct readings of *–ish*. In the absence of any syntactic or semantic evidence to the contrary, an analysis of underspecification is preferred in that it provides an explanation for *why* such a syncretism should appear at all.

First, consider the passive, which is marked morphologically after the verb stem as the suffix *–w*. The data in (18) show that the causee object and the thematic object licensed by the verb are both equally viable candidates for being subjects of a passive.[8]

(18) Causative Passives

a. *Umw-ana y-a-men-esh-ej-we igi-kombe na*
1-child 1.SBJ-PST-break-ISH-PERF-PASS 7-cup by
mw-arimu.
1-teacher
'The child was made to break the cup by the teacher.

b. *Igi-kombe cy-a-men-esh-ej-we* *umw-ana na*
7-cup 7.SBJ-PST-break-ISH-PERF-PASS 1-child by
mw-arimu.
1-teacher
'The cup was made to be broken by the child by the teacher.'

The data in (19) show that the same situation holds for the instrumental reading; both the instrumental object and the thematic object can be subjects of a passive.

(19) Instrumental Passives

a. *Igi-kombe cy-a-men-esh-ej-we* *in-koni na mw-ana.*
7-cup 7.SBJ-PST-break-ISH-PERF-PASS 9-stick by 1-child
'The cup was broken with a stick by the child.'

b. *In-koni y-a-men-esh-ej-we* *igi-kombe na mw-ana.*
9-stick 9.SBJ-PST-break-ISH-PERF-PASS 7-cup by 1-child
'The stick was used to break the cup by the child.'

Another test for object status in Bantu languages is the ability for the object pronoun to incorporate onto the verb. Bantu languages vary with respect to the exact behavior of the object marker (Bresnan & Mchombo 1987, Baker 1988, Alsina & Mchombo 1993, Bax & Diercks 2012, Reidel 2007), but for many languages (including Kinyarwanda), the ability for a DP to appear as a morpheme on the verb is a sign of object status (as opposed to an oblique or secondary object which cannot, cf. Gary & Keenan 1977, Kimenyi 1980, Dryer 1983). In the causatives in (20), both the causee and the patient can be marked on the verb; similarly, both the instrument and the patient can be marked in (21).

(20) a. *Umw-arimu y-a-mu-men-esh-eje* *igi-kombe.*
1-teacher 1.SBJ-PST-1.OBJ-break-ISH-PFV 7-cup
'The teacher made her (i.e. the child) break the cup.'

b. *Umw-arimu y-a-ki-men-esh-eje* *umw-ana.*
1-teacher 1.SBJ-PST-7.OBJ-break-ISH-PFV 1-child
'The teacher made the child break it (i.e. the cup).'

(21) a. *Umw-ana y-a-ki-men-esh-eje* *in-koni.*
1-child 1.SBJ-PST-7.OBJ-break-ISH-PFV 9-stick
'The child broke it (i.e. the cup) with a stick.'

b. *Umw-ana y-a-yi-men-esh-eje* *igi-kombe.*
1-child 1.SBJ-PST-9.OBJ-break-ISH-PFV 7-cup
'The child broke the cup with it (i.e. the stick).'

The data from passivization and object marking are the same for both causative and instrumental uses of the morpheme, suggesting that there is no distinction in

the grammatical status of the two. For some speakers, one difference between the two is the default word order (cf. Kimenyi 1980). For these speakers, the causee must come before the patient, while the instrumental object must follow it, as shown in (22) and (23).

(22) *Umw-arimu y-a-men-esh-eje umw-ana igi-kombe.*
1-teacher 1.SBJ-PST-break-ISH-PFV 1-child 7-cup
'The teacher made the child break the cup.'

(23) *Umw-ana y-a-men-esh-eje igi-kombe in-koni.*
1-child 1.SBJ-PST-break-ISH-PFV 7-cup 9-stick
'The child broke the cup with a stick.'

For many Bantu languages, however, the animacy of the two objects has been cited as the crucial factor for determining word order (Morolong & Hyman 1972, Hyman & Duranti 1982, Aranovich 2009). The preference for the animate object to precede the inanimate object suggests that the word order differences in (22) and (23) are not due to a grammatical distinction between causative and instrumental structures, but a separate restriction on the prominence of specific arguments. In the cases just mentioned, this means that the causee will precede the theme because the causee is animate.

As with semantic vagueness, the absence of any clear grammatical differences of the causative and instrumental uses is expected on an account where the two putatively distinct uses are in fact outgrowths of the same grammatical operation. While the syntactic facts are also technically compatible with the homophony approach, there is no obvious case where the causative and instrumental uses are distinct in their grammatical behavior. Furthermore, with the causative reading, there is no evidence (morphologically or syntactically) of the causee being a demoted or oblique argument; instead, it patterns exactly with the object of a monotransitive verb.

3.3 *Diachronic Evidence*

The strongest piece of evidence against a homophony account is that there is no phonological change that can explain why the instrumental reading of the applicative *–*ɪd* in Proto-Bantu would change to become *–ish* in modern Kinyarwanda. First, it would be surprising for a phonological change to target only one reading of a particular morpheme (since *–*ɪd* is reconstructed as a general applicative covering various roles, though only the instrumental reading was folded under *–ish*). Second, there is no obvious pathway in Kinyarwanda for the phonological change from *–*ɪd* in Proto-Bantu to synchronic *–ish*.

This leaves a semantic explanation for the overlap between causative and instrumental readings — a change that has been observed and proposed for other languages. While my intention is not to provide an elaborated theory of

the diachronic origins of *–ish* here, I assume that given the synchronic and diachronic form and functions of the morpheme, the more tenable explanation for the syncretism is that the causative morpheme spread to cover the instrumental applicative. Specifically, I assume the approach of Shibatani & Pardeshi (2001), who argue that causatives often extend to include applicative readings; with instrumental meanings, reanalysis occurs via a 'sociative causative' meaning. Sociative causation is a causal relation in which the agent causes the patient to perform an action and performs the action alongside the patient. To cite their example, the Japanese lexical causative form *asoba-seru* 'to make someone play' describes a situation in which the causer is playing with the causee, such as in the case of a caregiver and child. Semantically, the use of an instrument is parallel for Shibatani & Pardeshi (2001); an agent acting on a knife to cut bread is acting with the knife to bring about the change on the bread.

Although the sociative meaning is not obligatory for causative interpretations of *–ish* synchronically, this analysis accounts for the direction of change — namely, that the causative morpheme extended to cover the instrumental applicative. Many closely related Bantu languages have an applicative morpheme cognate to *–ir* which licenses several thematic object types, such as benefactive, locative, reason, and, crucially, instrumental (Wald 1998:97, Bostoen & Mundeke 2011). This general applicative, traceable to Proto-Bantu *–*ɪd* (Meeussen 1967, Schadeberg 2003), is the default for all applied objects, including the instrumental. The morphological causative in these languages is cognate to *–ish*, traceable to Proto-Bantu *–*ici* (Bastin 1986, Schadeberg 2003). The most natural analysis of the synchronic uses of the morpheme is that the morphological causative extended to the instrumental applicative in Kinyarwanda. This historical account does not technically rule out the possibility that in the modern language, the instrumental and causative are different morphological operations. However, the simpler analysis is that the diachronic extension of the causative to the instrumental applicative remains as a single operation synchronically.

The use of the *–ish* as both the causative and an instrumental applicative in Kinyarwanda follows the proposed cline of grammaticalization proposed by Shibatani & Pardeshi (2001). On an account that analyzes *–ish* as an instance of accidental homophony, there is no explanation for the historical extension of the causative to the instrumental applicative.

3.4 *Further Evidence*

Another piece of evidence against the homophony view is that the doubling of *–ish* is prohibited, as in (24).[9]

(24) **N-a-ndik-ish-ish-ije umw-ana i-karamu in-kuru.*
1SG-PST-write-ISH-ISH-PFV 1-child 6-pen 9-story
'I made the child write the story with a pen.'

A possible explanation of (24) is to propose that the doubling of all valency-adding morphology is blocked. On this view, the ungrammaticality in (24) is not due to the semantics of instruments and causees, but rather a syntactic blocking of two valency-increasing operations. This restriction is not found, however, when the applicative *–ir* (which licenses locative and benefactive applied objects) and the morpheme *–ish* are both used, as shown in (25) which has both *–ish* and the locative applicative use of *–ir*.

(25) *N-a-ndik-ish-ir-ije in-kuru mw-ana mu n-zu.*
1SG-PST-write-ISH-APPL-PFV 9-story 1-child 18 9-house
'I made the child write the story in the house.'

The unacceptability of the doubling of *–ish* in (24) does not follow from a general constraint against the use of multiple valency-changing morphemes, which suggests that the ungrammaticality of (24) comes from a dispreference to repeat two instances of the same morphological form. A homophony account cannot explain this restriction on doubling, which provides further evidence for analyzing *–ish* as as having a single operation from which the different readings are derived.

In fact, this kind of prohibition is also found in the related language Chichewa (Bantu; Malawi) where the causative *–its* and instrumental applicative *–ir* are formally distinct (Mchombo 2004). Simango (1999) observes that the two forms cannot co-occur:

(26) a. **Ulemu a-na-gw-ets-er-a mtsikana chibakera.*
Ulemu 1.SBJ-PST-fall-CAUS-APPL-FV girl punch
'Ulemu floored the girl with a punch.'

b. **Chimwemwe a-na-d-ets-er-a mwana matope.*
Chimwemwe 1.SBJ-PST-dirty-CAUS-APPL-FV child mud
'Chimwemwe made the child dirty with mud.'

(Simango 1999:78,(14)-(15))

In both examples in (26), the simultaneous uses of a causative and instrumental morpheme is disallowed. The data in (27) show that there is also a restriction against the doubling of causatives in Chichewa, paralleling the restriction on doubling a causative and instrumental in (26).[10]

(27) **Chikondi a-na-ndi-dy-ets-ets-a mwana chakudya*
Chikondi 1.SBJ-PRS-O-eat-CAUS-CAUS-FV child food
chozizila.
cold
'Chikondi made me make the child eat cold food.'

(Simango 1999:82,(22))

Simango (1999) thus concludes that the causative and instrumental overlap in meaning, and this results in the inability to double the morphemes.

As with Kinyarwanda, the doubling of other valency-adding morphology is permitted in Chichewa; benefactive and locative applicatives may co-occur with causative morphology, as in (28).

(28) a. *Chimwemwe a-na-phik-its-ir-a mwana dzungu.*
Chimwemwe 1.SBJ-PST-cook-CAUS-APPL-FV child pumpkin
'Chimwemwe made (someone) cook pumpkin for the child.'

b. *Chikondi a-na-gw-ets-er-a mwana pa mchenga.*
Chikondi 1.SBJ-PST-fall-CAUS-APPL-FV child on sand
'Chikondi made the child fall on(to) the sand.'
(Simango 1999:78,(12)-(13))

The parallel ungrammaticality of causative-instrumental and causative-causative doubling in a language like Chichewa where the causative and instrumental are formally distinct is expected on the view that causatives and instrumental applicatives share an overlapping semantics.

4. Explaining the Syncretism

4.1 *Theoretical Preliminaries*

In this section I propose an analysis of *–ish* in which a participant is introduced via an operation which adds a novel link and associated participant into the causal chain denoted by the verb. The key insight is that this new causal link can be interpreted either as initial in the overall causal structure — deriving a causative reading — or intermediary — deriving an instrumental reading. The idea that causatives introduce a new initial causal event is the standard analysis, and the idea that instruments are intermediary causees has been claimed in several previous works (Talmy 1976, Comrie 1989, Croft 1991, Ichihashi-Nakayama 1996, Goldberg 2002, Peterson 2007, Koenig et al. 2008). For example, Van Valin & Wilkins (1996) argue that *agent*, *force* (cause), and *instrument* all derive from a broader *effector* role and differ only in both properties of the NP and their position in the causal sequence described by the verb. Similarly, Croft (1991:190-191) shows that in Chechen-Ingush, instruments pattern with causees with respect to case assignment when they appear within specific classes of verb. Thus I follow this work in treating causees and instruments as two outgrowths of the same semantic category.

With respect to *–ish*, the two different readings arise in turn from how the new causal subevent interacts with the existing events in the causal chain described by the verb, restricted by general constraints on possible event types — and the link between lexical semantics and argument realization — that ultimately conspire to rule out one reading or another in certain cases with certain verbs. Below I provide

two case studies of how two particular verb types constrain the possible readings that arise with *–ish*.

In the formal analysis I propose here, I assume a domain of discourse U that consists of two major sorts: the subset U_I of individuals and U_E of eventualities. Variables in the set U_I are x, y, and z. I will utilize the variables v, r, s, e, and e' to represent all subevents.[11] The event variable e is a complex event that is the summation of all subevents of the predicate, and each subevent is causally linked to the other subevents in e, which I notate in the denotations of verbs with the subset operator (e.g. $v \subset e$ means that v is a subevent in e). In cases where a derivational morpheme adds a new subevent to a verbal predicate (such as with a causative), the subevent added by the derivational morphology will also be a subevent of the larger event e. Subevents within e are causally ordered with respect to one another. Note that causal precedence is not the same as temporal precedence, and even if one subevent causally precedes another, it is possible that the two subevents temporally overlap (even completely).

In most work, subevent structure is represented through hierarchical organization of what is often referred to as an event structure. Perspectives differ as two whether event structures are lexical (Dowty 1979, Jackendoff 1990, Levin & Rappaport Hovav 1995, Wunderlich 1997), syntactic (Lakoff 1965, Hale & Keyser 1993, Harley 2003, Ramchand 2008), or constructional (Goldberg 1995, Kay 2005), but the hierarchical structure is useful for capturing this like sublexical scope (e.g. Dowty 1979) and correlating hierarchical relations in the syntax (e.g. Wunderlich 1997). However, the choice of notation does not bear on the generalizations I discuss here, and thus I instead take the common thread across all event structural approaches — the formalization of relations between subevents and their associated participants — and directly encode them as conditions on truth conditional content without utilizing a hierarchical representation. The benefit of the framework I implement is that it provides a way of stating that causal structure is underspecified in certain verb meanings — something more difficult to state using hierarchical event structures which rigidly restrict the position of arguments.

With this framework in mind, I propose that the argument introduced by *–ish* may be either the initial causer or an intermediary participant in the causal chain. Before discussing the details of this analysis, I first outline one key background assumption that will be important here, namely by assuming that arguments may be reordered. The insight for this approach comes from Zwicky (1986) and Dowty (1991b), who challenge the dominant assumption in syntactic theory that constituent structure must be rigid in all languages. Dowty, for example, uses a categorial grammar with a compositional semantics in which syntactic operations are built up from words into a set of larger expressions. Crucially, the set of words is unordered, unless evidence for a specific ordering constraint is present in the language. In these cases, he adopts linear precedence principles which limit the relative ordering of specific expressions (Pollard 1984, Gazdar et al. 1985). Using

this framework, he can capture several syntactic phenomena, such as the relatively free word order of Finnish and extraposition in English, without having to appeal to hierarchical syntactic structures.

As noted above in §3.2, Kinyarwanda is parallel to the Finnish data presented by Dowty in that Kinyarwanda allows scrambling in certain domains, specifically with the flexibility of ordering with multiple objects. However, rather than using a categorial grammar with linear precedence conditions, I adopt a typed lambda calculus for semantic representation and assume that arguments can be reordered lexically (subject to a few constraints which I discuss below), preserving the insight that arguments can in principle combine freely with the verb.[12] Instead of linear precedence conditions, I assume that there are general and lexical constraints on the order of causal subevents, and these constraints in turn rule out specific orderings of arguments.

One general constraint on the possible ordering of causal elements is that the last argument to be picked up by the verb will be mapped to subject as well as assigned the role of being the initial causer in the event structure of the verb. Wunderlich (1997) proposes a similar method for subject-selection in his Lexical Decomposition Grammar, where there is a level of semantic form in which arguments are related semantically to the verb. In his theory, argument structure relations are determined by the hierarchical position of the argument in the verb's event structure, and the highest argument in the event structure is the subject (i.e. the last to be saturated). For him, the initial causer is always the highest argument semantically, thus deriving the link between subjecthood and initial causers with causative verbs through prominence preservation. Adopting the notion that argument realization is tied to order of composition in the semantics, I likewise assume for active verb forms that the final argument to be saturated (i.e the subject) will be the initial causer of the event (i.e. the causer participant in a causal subevent which has no preceding causal subevent), as stated in (29).

(29) **Initial Causer Realization Principle:** The subject of a causative verb (in the active voice) is the initial causer of the event

One crucial difference, however, between Wunderlich's approach and the one I propose here is that Wunderlich requires that causativization always adds a higher argument. However, in order to incorporate the instrumental uses of *–ish* (i.e. those where there is an intermediary causal link), I allow that the argument introduced by *–ish* is, in principle, unrestricted in its order of composition, though verb-specific constraints on the ordering of subevents will restrict its placement. In short, the final argument to be picked up will be the initial causer, regardless of whether that argument is linked to the causal event of the verb or the causal event introduced by *–ish*. This principle parallels the general assumption in the literature that causers are preferred to appear in subject position.

For clarity, in the denotations below I notate the argument (and associated subevent) that is assigned to initial causer with underlining, and any other

arguments are mapped to objects. The argument mapped to subject will always be the highest (rightmost) λ-abstractor, while all other arguments (apart from the subject) are saturated post-verbally from the inside out. Thus the lowest (leftmost) λ-abstractor corresponds to the object immediately adjacent to the verb. By means of example, consider the sentence in (30) with the ditransitive verb *gu-ha* 'give', and the denotation of the verb in (31).

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

(31) $[\![guha]\!] := \lambda x \lambda y \lambda z \lambda e[giving'(e) \wedge ag'(e, z) \wedge rec'(e, x) \wedge th'(e, y)]$

The denotations of the nouns in (30) are defined in (32). The derivation in (33) shows step-by-step how each of the arguments in turn combines with the verb *gu-ha* 'to give'. I assume that any event variables are existentially bound at a higher node in the derivation.

(32) a. $[\![Karemera]\!] := karemera'$
b. $[\![Habimana]\!] := habimana'$
c. $[\![igitabo]\!] := book'$

(33) a. $\lambda x \lambda y \lambda z \lambda e[giving'(e) \wedge ag'(e, z) \wedge rec'(e, x) \wedge th'(e, y)]$ $([\![Habimana]\!])$
b. $\lambda z \lambda e[giving'(e) \wedge ag'(e, z) \wedge rec'(e, habimana') \wedge th'(e, y)]([\![igitabo]\!])$
c. $\lambda z \lambda e[giving'(e) \wedge ag'(e, z) \wedge rec'(e, habimana') \wedge th'(e, book')]$ $([\![Karemera]\!])$
d. $\lambda e[giving'(e) \wedge ag'(e, karemera') \wedge rec'(e, habimana') \wedge th'(e, book')]$
e. $\exists e[giving'(e) \wedge \underline{ag'(e, karemera')} \wedge rec'(e, habimana') \wedge th'(e, book')]$

In (33), the first argument to be composed with the meaning of the verb is *Habimana*, then *igitabo* 'book', and finally *Karemera*. By virtue of being the final participant picked up by the verb, it is this latter argument which is mapped to subject. Crucially, the order of the λ-abstractors corresponds to the syntactic structure; with the denotation in (33), the order of arguments is that in (34a) and corresponds to the word order in (34b) where the subscripted variables notate which lambda abstracted element that argument corresponds to.

(34) a. $\lambda x \lambda y \lambda z \lambda e$ [...]
b. S_z V O_x O_y

In the system I propose here, lambdas can be reordered, but constraints on verb meaning limit the possible orders of causal subevents (and thus the possible mappings between arguments and semantic representations). I discuss the different relevant constraints in the next subsection.

Before continuing, it is worth noting that there has been considerable discussion on the status of applied and causative objects in Bantu languages, especially Kinyarwanda (Gary & Keenan 1977, Kimenyi 1980, Dryer 1983, Jerro 2015). I largely set aside the question of syntax here and leave a formal analysis of the syntactic facts to future work. However, recall from §3.2 that both the instrumental and causative uses of the *–ish* morpheme behave like objects of monotransitives with respect to several objecthood diagnostics (such as the ability to be the subject of a passive and object-marked on the verb). I take these diagnostics as evidence that both of the post-verbal nouns are objects in sentences where *–ish* appears with a transitive verb. As a result, there is no difference in the grammatical status of any post-verbal nominals in the sentences under discussion here.

4.2 *Caused Change-of-State Verbs*

Specific verb classes may enforce additional restrictions on the possible orders of causal subevents. With caused change-of-state verbs such as *write*, which include a causing subevent and a caused change of state subevent, it is required that the causing event precede the caused change of state (Dowty 1979, Rappaport Hovav & Levin 1998, Beavers & Koontz-Garboden 2013). To capture this fact, I assume a lexical constraint which states that the caused change of state s must be the final subevent in the causal chain. Formally, I represent this with the relation $fin'(\alpha, \beta)$ which takes two event arguments α and β and says that α is the final subevent in β (more precisely, no subevent follows α in β). Additionally, α may be equivalent to β in specific instances, as I discuss below for unaccusative verbs. Consider the denotation of the transitive verb *kw-andika* 'to write' in (35), where a writing event results in a state of some item becoming written.[13]

(35) $[\![-andika]\!] := \lambda z \lambda x \lambda s \lambda v \lambda e [ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge fin'(s, e)]$

The meaning of *kw-andika* 'write' in (35) states that there is an event that contains two subevents: the causing event v of writing and caused change of state s of being written. The writing event is linked to the agent participant, while the caused state is linked to the theme. The sentence in (36) provides an example of a typical use of the verb *kw-andika* 'to write'.

(36) *Umw-ana y-a-ndits-e in-kuru.*
1-child 1.SBJ-PST-write-PFV 9-story
'The child wrote a story.'

The verb combines with the noun *inkuru* 'story' and the noun *umwana* 'child', which results in the following denotation (after existential closure over event variables):

(37) $\exists s \exists v \exists e[\underline{ag'(v, child')} \wedge th'(s, story') \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge fin'(s, e)]$

The finality constraint on s derives the fact that v must causally precede s. For a sentence with the verb *kw-andika* 'to write' in (36), this means that the writing event must precede the caused state of something being written. Given the lexical restriction that the caused change of state must be final in e, the only available meaning is one where there is a child who is the agent of a writing event and a story that becomes written as a result, consistent with the Initial Causer Realization Principle.

Recall that this approach assumes that individual arguments can be picked up in any order. This allows in principle the ordering of arguments in (38), where the individual arguments apply in the opposite order to (36).

(38) $\lambda x \lambda z \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge fin'(s, e)]$

However, (38) is ruled out. With the ordering in (38), the theme is the final element to be picked up, which would map the theme to initial causer (following the Initial Causer Realization Principle in (29) which makes the argument in subject position the initial causer). This is not possible due to the condition that the subject must be the participant of the initial causing event, which cannot be a theme because the theme is restricted lexically to be a participant of the final subevent of e. Thus the principle in (29) and the lexical semantics are in contradiction, making (38) an impossible denotation.

Turning to the analysis of *–ish*, I propose that the meaning of *–ish* is an operation that takes a verbal predicate and an individual as inputs and introduces a new argument and causal subevent e'.[14] The argument linked to the e' subevent introduced by *–ish* is assigned a general thematic role that subsumes both agents, causees, and instruments (Schlesinger 1989, Van Valin & Wilkins 1996, Croft 1991, Dowty 1991a, Rissman 2011, Rissman & Rawlins to appear). Following this work, I adopt a generalized thematic role (notationally: *ag*) as the label that subsumes agents, causers, and instruments. As noted in Rissman & Rawlins (to appear), there is no single necessary and sufficient condition for what constitutes an instrument. They argue that event participant categories are represented in terms of a cluster of properties. I assume the vague definition of an $agent$ introduced by *–ish* as capable of transferring the force of the causal chain. With these components in mind, I provide the definition of *–ish* in (39), developed from the definition of *with* in Rissman (2011).

(39) $[\![-ish]\!] := \lambda P \lambda y \lambda x_1 ... \lambda x_n \lambda e_1 ... \lambda e_m [P(x_1 ... x_n, e_1 ... e_m) \wedge \exists e'[e' \subset e_m \wedge ag'(e', y)]]$

The morpheme *–ish* takes an argument y and a predicate *P*, which may have *n* participants and *m* subevents. It introduces a new subevent e' in e existentially, and this subevent is linked to a participant that has the semantic role of agent. The novel subevent is underspecified in its position in the causal chain of the verb to which *–ish* attaches. The different readings follow from the possible positions in the causal chain into which the new link is inserted. Thus instead of narrowly adding a causer or instrument to a particular argument position, *–ish* adds a new participant and the reading(s) that arise derive from general and verb-specific constraints on the order of subevents.[15]

The denotation of *–ish* in (39) composes with the denotation of the verb *kw-andika* 'to write' in (35) via functional application, as shown in (40), to give the denotation in (41), deriving (42) by further functional application. Thus there are two individual arguments and three event arguments.

(40) $\lambda P \lambda y \lambda z \lambda x \lambda s \lambda v \lambda e[P(z, x, s, v, e) \wedge \exists e'[e' \subset e_m \wedge ag'(e', y)]](\lambda z \lambda x \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge fin'(s, e)])$

(41) $\lambda y \lambda z \lambda x \lambda s \lambda v \lambda e[\lambda z \lambda x \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge\ s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge fin'(s, e)](z, x, s, v, e) \wedge \exists e'[e' \subset e_m \wedge ag'(e', y)]]$

(42) $\lambda y \lambda z \lambda x \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge written'(s) \wedge\ fin'(s, e) \wedge [\exists e'[e' \subset e \wedge ag'(e', y)]]]$

The meaning in (42) is the combination of *–ish* with the predicate *kw-andika* 'to write'. Here, there are three subevents: v, e', and s. s is the causally final subevent in e by virtue of constraints imposed by the verb, but crucially v and e' are unordered causally relative to one another. Thus the actual ordering of the two can be resolved in one of two ways: v before e' or e' before v. However, constraints on argument realization — in particular the Initial Causer Realization Principle in (29), plus the possibility of reordering — ultimately determine which order arises in a given context, which I suggest captures the two readings. I discuss the instrumental reading first.

Consider the instrumental sentence in (43), where the teacher uses a pen to write a story.

(43) *Umw-arimu y-a-ndik-ish-ije in-kuru i-karamu.*
1-teacher 1.SBJ-PST-write-ISH-PFV 9-story 5-pen
'The teacher wrote the story with a pen.'

The derivation of the sentence in (43) proceeds as in (45), with the meanings of the nouns defined in (44). The denotation in (42) first composes with *ikaramu* 'pen', which is the argument licensed by the *–ish* morpheme, shown in (45a). Next, the argument *inkuru* 'story' is composed in (45b), and finally *umwarimu* 'teacher' is the last argument to be picked up in (45c). The result is the denotation in (45e). I assume that the events s, v, and e are existentially bound at a higher node.

(44) a. $[\![ikaramu]\!] := pen'$

b. $[\![inkuru]\!] := story'$

c. $[\![umwarimu]\!] := teacher'$

(45) a. $\lambda y\lambda z\lambda x\lambda s\lambda v\lambda e[ag'(v,x) \wedge th'(s,z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge\ fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',y)]]]$ ($[\![ikaramu]\!]$)

b. $\lambda z\lambda x\lambda s\lambda v\lambda e[ag'(v,x) \wedge th'(s,z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge\ fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',pen')]]]$ ($[\![inkuru]\!]$)

c. $\lambda x\lambda s\lambda v\lambda e[ag'(v,x) \wedge th'(s,story') \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge\ written'(s) \wedge\ fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',pen')]]]$ ($[\![umwarimu]\!]$)

d. $\lambda s\lambda v\lambda e[\underline{ag'(v,teacher')} \wedge th'(s,story') \wedge v \subset e \wedge s \subset e \wedge writing'(v) \wedge written'(s) \wedge\ fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',pen')]]]$

e. $\exists s\exists v\exists e[\underline{ag'(v,teacher')} \wedge th'(s,story') \wedge v \subset e \wedge s \subset e \wedge writing'(v) \wedge written'(s) \wedge\ fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',pen')]]]$

The agent linked to the writing event v is the last argument to be picked up and thus is the subject; therefore, by virtue of the Initial Causer Realization Principle, the event v associated with that argument must be the first in the causal chain of e. This ensures that the subevent e' licensed by the *–ish* morpheme (here, associated with the argument *ikaramu* 'pen') is causally intermediate. The reading, then, is that the teacher acts on the pen to bring about the writing event, i.e. an instrumental reading.

The flexibility of argument order permits an alternative reading, where the participant linked with the event introduced by *–ish* and the entity linked to the agent of the base verb are reordered.

(46) $\lambda z\lambda x\lambda y\lambda s\lambda v\lambda e[ag'(v,x) \wedge th'(s,z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge written'(s) \wedge fin'(s,e) \wedge [\exists e'[e' \subset e \wedge ag'(e',y)]]]$

In this case, the argument linked to e' is picked up last and is thus the initial causer. As a result, e' causally precedes v, and both causally precede s. This gives rise to a classic causative interpretation, as that in (47a), where the teacher is causing the student to write the story.

(47) a. *Umw-arimu y-a-ndik-ish-ije in-kuru umw-ana.*
1-teacher 1.SBJ-PST-write-ISH-PFV 9-story 1-child
'The teacher caused the child to write the story.'

b. $\exists s \exists v \exists e[ag'(v, child') \wedge th'(s, story') \wedge v \subset e \wedge s \subset e \wedge writing'(v) \wedge written'(s) \wedge fin'(s, e) \wedge [\exists e'[e' \subset e \wedge \underline{ag'(e', teacher')}]]]$

In (47b), the teacher is the initial causer, meaning that he or she is the agent of a subevent which precedes the event of the student writing the story. The finality constraint that the caused change of state s is the final subevent is satisfied; there is no event that follows s.

For clarity, let us compare the denotations in (42) and (47b). In (42), the agent of the writing event is the initial causer, meaning that the event added by the *–ish* morpheme is an intermediate event. In (47b), on the other hand, the initial causer is the argument linked to the event licensed by the *–ish* morpheme, and the agent of this event acts on the agent of the verbal causing event. The crucial difference between the two readings is whether the initial causer is the agent of the causing event denoted by the verb or the agent of the event introduced by *–ish*, i.e. whether the writing causally precedes the event introduced by *–ish* or vice versa.

An additional prediction of this analysis is that due to the flexibility in the ordering of participants, object word order should be free. Consider the order of the arguments in (48), which is nearly identical to the denotation in (46), except for the order of the x and z arguments.

(48) $\lambda x \lambda z \lambda y \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge s \subset e \wedge\ writing'(v) \wedge written'(s) \wedge fin'(s, e) \wedge [\exists e'[e' \subset e \wedge ag'(e', y)]]]$

This ordering has the same meaning as the causative sentence in (47a), but predicts that the two objects are picked up in the opposite order, resulting in a reversal in the linear order of the objects:

(49) *Umw-arimu y-a-ndik-ish-ije umw-ana in-kuru.*
1-teacher 1.SBJ-PST-write-ISH-PFV 1-child 9-story
'The teacher caused the child to write the story.'

Thus lambda reordering allows the flexibility of the order of the two objects in sentences with transitive verbs marked with *–ish.* It should be noted that due to the freedom of argument order assumed in the theory, it is technically possible for the sentence in (49) to have a derivation in which *umwana* 'the child' is the participant of the s subevent and *inkuru* 'the story' is linked to the e' subvent. This would mean something akin to 'The teacher wrote the child with a story'. I assume that for pragmatic reasons this is a highly implausible reading, though given the correct context it is technically a possible meaning of the sentence. In fact, in cases like these, speakers have joked at the risibly implausible nature of the alternative readings of sentences like (49).

There are two reorderings of participants that are always ruled out by the theory. The lexical specification fin' of the verb requires that the caused change of state s must be the final event in e, and thus it must be causally preceded by both v

and e' (though the causal order of v and e' can vary). This rules out two possible orders: namely, those in which thematic argument z is the innermost participant qua the subject, i.e the denotations in (50).

(50) a. $\lambda y \lambda x \lambda z \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge\ s \subset e \wedge$
$writing'(v) \wedge\ written'(s) \wedge fin'(s, e) \wedge [\exists e'[e' \subset e \wedge ag'(e', y)]]]$

b. $\lambda x \lambda y \lambda z \lambda s \lambda v \lambda e[ag'(v, x) \wedge th'(s, z) \wedge v \subset e \wedge\ s \subset e \wedge$
$writing'(v) \wedge\ written'(s) \wedge fin'(s, e) \wedge [\exists e'[e' \subset e \wedge ag'(e', y)]]]$

The final argument to be saturated is mapped to subject and initial causer, which means that this argument cannot be the participant linked to the caused change of state s, which cannot be the initial causing event, as specified by the meaning of the verb. Any other ordering of arguments is in principle generated by the framework.

To summarize the different available orders with causative verbs, instances in which the agent participant of e' is the final argument to be picked up have e' as the initial causing event, meaning that e' causes v which in turn causes s, which must be final. This order corresponds to a causative reading. The alternative ordering is that v is the initial causer and e' is intermediary. In this ordering, the agent of e' is an instrument acted upon by the argument linked to v to bring about the caused change of state s.

4.3 *Intransitive verbs and* –ish

I now turn to *–ish* with intransitive verbs. Recall from §2 that unergative verbs allow both the causative and instrumental readings, while unaccusative verbs do not permit the instrumental reading. I show that this follows from the causal structure of the two types of intransitive verbs. Because intransitives only have a single subevent in their non-applied form, I assume that in the absence of other subevents (i.e. when there is no valency-adding morpheme to add additional subevents to the predicate), the pragmatic default is that the single subevent of the intransitive is equivalent to the entire event e. This relation is notated formally with the symbol $\subseteq$ (e.g. $s \subseteq e$ means that s is a subevent or equivalent to the event e). In the presence of an additional subevent (i.e. when introduced with valency-changing morphology such as *–ish*), the subevent is not equal to e.

I assume that unaccusative verbs have a single change of state event s and unergative verbs have a single action event v. Furthermore, I argue that with unaccusative verbs there is a constraint that in the presence of other (derived) subevents, the change of state event s must be final in the series of causal events as with causative verbs. With unergatives, on the other hand, there is no such restriction. These constraints I suggest conspire with the analysis of *–ish* above to produce the relevant readings. I discuss each verb class in turn, first discussing unergative verbs and then turning to unaccusatives.

Take, for example, the unergative verb *gu-kora* 'to work' in (51) in which the only subevent in its denotation in (52) is v, which, by default, is equivalent to the main event e in the absence of another subevent.

(51) *Umu-gabo a-ri gu-kora.*
1-man 1.SBJ-BE INF-work
'The man is working.'

(52) $[\![-kora]\!] := \lambda x \lambda v \lambda e[working'(v) \wedge ag'(v, x) \wedge v \subseteq e]$

The meaning conveyed in (52) is that there is an event of working, which has an agent participant. There is no restriction on the ordering of any subevents that are present in addition to v. Given that there is no restriction on the order of a causing event v in relation to other subevents, it is predicted that there should be both causative and instrumental readings with unergative verbs.

Consider the combination of *gu-kora* 'to work' with *–ish* in (53).

(53) $\lambda y \lambda x \lambda v \lambda e[working'(v) \wedge ag'(v, x) \wedge v \subseteq e \wedge \exists e'[e' \subset e \wedge ag'(e', y)]]$

With this ordering or arguments (the default), the participant of the causing event v is the final argument to be picked up, which means that this subevent is interpreted as the initial causing event. This results in an instrumental reading, with v causing e'. This is the reading of the sentence in (54), associated with the denotation in (55).

(54) *Umu-gabo y-a-kor-esh-eje i-suka.*
1-man 1.SBJ-PST-work-ISH-PFV 5-hoe
'The man is working with the hoe.' (Overdulve 1975:(209))

(55) $\exists v \exists e[working'(v) \wedge \underline{ag'(v, man')} \wedge v \subseteq e \wedge \exists e'[e' \subset e \wedge ag'(e', hoe')]]$

The instrumental reading arises because the agent of the working event v causally precedes the agent of the event licensed by e'. In this situation, the two subevents temporally overlap as they move forward, though the event v is what crucially causes e'. By implicature, the agent of the event licensed by e' is assumed to be involved in the action of the event v (here, working). The reading for (54), then, is that the man acts on the hoe, and the hoe is used to do the work. Note that temporally, v and e' may overlap or even be (effectively) simultaneous, though the causality is still initiated by the agent of v.

Consider now the alternative argument ordering in (56), where the y participant linked to e' is the final argument to be picked up.

(56) $\lambda x \lambda y \lambda v \lambda e[working'(v) \wedge ag'(v, x) \wedge v \subseteq e \wedge \exists e'[e' \subset e \wedge ag'(e', y)]]$

This order corresponds to a causative reading, since the participant of e' is the final argument to be picked up. Thus the argument introduced by *–ish* is the causer subject. This is the interpretation that is found with a sentence like that in (57).

(57) *Umw-arimu y-a-kor-esh-eje umw-ana.*
1-teacher 1.SBJ-PST-work-ISH-PFV 1-child
'The teacher made the child work.'

(58) $\exists v \exists e[working'(v) \wedge ag'(v, child') \wedge v \subseteq e \wedge \exists e'[e' \subset e \wedge \underline{ag'(e', teacher')}]]$

In (58), the subevent e' introduced by *–ish* causally precedes the subevent v of the verb *–kora*, resulting in a causative reading in (57).

With unaccusative verbs, on the other hand, I assume that in the presence of other subevents (i.e. those added by morphology such as *–ish*), the change of state event s must be the final event in the causal chain, which is formalized with the same finality condition used with caused change of state verbs above (i.e. $fin'(s, e)$). In the absence of any other subevents, s is the only subevent, and the finality constraint is satisfied by default. The intuition behind this constraint comes from restrictions on lexical verbs; it does appear to be the case that lexical verbs encode a chain of causal events where a change of state causes another event. I adopt this from Rappaport Hovav & Levin (1998), who do not include changes of state causing actions in their inventory of possible event templates. In fact, it is difficult to imagine what kind of meaning a verb which describes such an ordering of events would be.

The constraint on the order of subevents predicts that the only available reading with verbs which denote a single change of state should be the causative reading. The instrumental reading is ruled out because the event e' licensed by *–ish* cannot be causally preceded by s, since s must be the final subevent in the causal chain. Consider, for example, the meaning of the verb *ku-rumbura* 'to blossom' in (59), which is change of state of becoming bloomed. Here, as with *gu-kora* 'to work', s is a subevent of e unless there are no other subevents, in which case it is interpreted as equivalent to e.

(59) $[\![-rumbura]\!] := \lambda x \lambda s \lambda e[bloomed'(s) \wedge th'(s, x) \wedge s \subseteq e \wedge fin'(s, e)]$

The composition of the denotation of *ku-rumbura* 'to bloom' (59) with the *–ish* morpheme gives the denotation in (60).

(60) $\lambda y \lambda x \lambda s \lambda e[bloomed'(s) \wedge th'(s, x) \wedge s \subseteq e \wedge fin'(s, e) \wedge \exists e'[e' \subset e \wedge ag'(e', y)]]$

The denotation in (60) corresponds to the instrumental reading, where the participant of the subevent s is the initial causer. However, this results in a violation of the finality constraint which states that s cannot causally precede any other subevent, which rules out the instrumental reading in (61).

(61) *#In-dabyo zi-ra-rumbur-ish-ije ibi-babi bya-zo.*
10-flowers 10S-pst-bloom-ISH-PFV 8-petals 8-theirs
Intended: 'The flowers used their petals to bloom.'

(62) $\exists s \exists e[bloom'(s) \wedge \underline{th'(s, flowers')} \wedge s \subseteq e \wedge fin'(s, e) \wedge \exists e'[e' \subset e \wedge ag'(e', petals')]]$

The alternative ordering is that in (63), where y is instead the final argument to be saturated.

(63) $\lambda x \lambda y \lambda s \lambda e[bloomed'(s) \wedge th'(s, x) \wedge s \subseteq e \wedge fin'(s, e) \wedge \exists e'[e' \subset e \wedge ag'(e', y)]]$

The denotation in (63) corresponds to the causative reading; because y is the final argument picked up, it is the initial causer and thus e' precedes s. This satisfies the finality constraint on s since s is the final subevent in the causal chain. It follows from the analysis that unaccusatives allow causative readings with *–ish*, as shown in (64), where an initial causer acts to cause the flowers to bloom.

(64) *I-mana y-a-rumbur-ish-ije ibi-babi.*
9-god 9S-PST-bloom-ISH-PFV 8-petals
'God made the flowers bloom.'

(65) $\exists s \exists e[bloomed'(s) \wedge th'(s, flowers') \wedge s \subseteq e \wedge fin'(s, e) \wedge \exists e'[e' \subset e \wedge \underline{ag'(e', god')}]]$

On the analysis presented here, changes of state are final in the causal chain, which predicts that when unaccusative verbs combine with the *–ish* morpheme the e' subevent must causally precede the event described on the verb. This is borne out, capturing the data in (61) and (64) where the instrumental reading is ruled out with unaccusative verbs.

4.4 *Implicit Arguments*

So far, the cases of *–ish* have involved wholesale addition of a new participant into a verb's argument structure both syntactically and semantically, where the interaction with verb meaning has served to rule in or out certain readings. However, recall from Section 2.1 that with verbs that entail the use of an instrument the only reading available is one in which the argument introduced by *–ish* is an instrument. In this section, I implement the framework of the analysis of Jerro (2016) for the locative applicative with verbs of motion in order to capture the restriction of instrument verbs with *–ish*.

Verbs of directed motion in Kinyarwanda vary with respect to the semantic role (either source, route, or goal) that is assigned to the applied object of the locative applicative (Jerro 2016, forthcoming). For example, the verbs *kw-iruka* 'to run', *kw-injira* 'to enter', and *kw-ambuka* 'to enter' in (66) – (68) are representative of different classes of translational motion verbs where the locative applied object is either a goal, route, or source, respectively.

(66) a. *Yohani a-ri kw-iruk-a.*
John 1.SBJ-BE INF-run-IPFV

'John is running.'

b. *Yohani a-ri kw-iruk-ir-a kw' i-soko.*
John 1.SBJ-BE INF-run-APPL-IPFV 17 5-market
'John is running to the market.'

(67) a. *N-di kw-injir-a mu n-zu.*
I.SG-BE INF-enter-IPFV 18 9-house
'I am entering the house.'

b. *N-di kw-injir-ir-a mu n-zu mu mu-ryango.*
I.SG-BE INF-enter-APPL-IPFV 18 9-house 18 3-door
'I am entering the house through the door.'

(68) a. *Karemera y-∅-ambuts-e in-yanja.*
Karemera 1.SBJ-PST-cross-PFV 9-ocean
'Karemera crossed the ocean.'

b. *Karemera y-∅-ambuk-iy-e i Mombasa (mu) n-yanja.*
Karemera 1.SBJ-PST-cross-APPL-PFV 23 Mombasa 18 9-ocean
'Karemera crossed the ocean from Mombasa.'

Crucially, in each case the base verb describes motion and thus there is a path — and with it also a source, goal, and route of the agent along that path — and the applicative serves to give overt syntactic realization to one of these implicit participants. However, it is idiosyncratic to each verb which participant is the one realized by the applicative, and not entirely predictable solely from the meaning of the verb. In order to capture the idiosyncratic lexical variation in which semantic role is selected by different verbs, Jerro (2016) argues that the participant brought out by the applicative is already present in the meaning of non-applied verb as a semantic argument of the verb. However, a single verb can only license one locative participant (a feature of Niger-Congo languages; Creissels 2006) and so this additional locative is bound off in the non-applied variant in order to resolve the mismatch between the number of semantic participants and the number of syntactic positions.

More specifically, consider as an example the denotation of the verb *kw-ambuka* 'to cross' in (69a). For clarity, the number of syntactic arguments is listed in what I will refer to as a "predicate argument structure' (PAS), which enumerates the number of syntactic positions available; this is listed in (69b). This notation does not conform to any specific formalism, but is easily translated into notions such as the θ-grid of a standard Principles-and-Parameters type approach, the ARG-ST of HPSG, or the a-structure of LFG; the central point of the PAS is to track of the number of overt syntactic arguments. In this notation, the underlining indicates the subject of the clause, and the order of non-subjects corresponds to their order in the clause. The subscripted thematic role labels are included for clarity and do not serve a theoretical function.

(69) a. $[\![kwambuka]\!] := \lambda z \lambda y \lambda x \lambda e \exists p[crossing'(e) \wedge ag'(e,x) \wedge route'(e,y) \wedge source'(e,z) \wedge path'(e,p)]$

b. $\langle$ $\underline{\text{DP}}_{ag}$ DP_{loc} $\rangle$

While there are three unsaturated semantic arguments in (69a), there are only two syntactic argument slots in the predicate argument structure of the verb, as notated in (69b).

For non-applied verbs in which there is such a mismatch, a lexical rule existentially binds off the supernumerary semantic argument prior to insertion into the syntax (and, crucially, prior to lambda reordering). This rule is formalized in (70a), where the input has a series of individual participants and a series of subevents as semantic arguments, and the output existentially binds off the first semantic argument. In (70b), it is indicated that there is no change in the number of syntactic arguments in the corresponding predicate argument structure.

(70) a. $\lambda x_1 \lambda x_2 ... \lambda x_n \lambda e_1 ... \lambda e_m [P(x_1 ... x_n, e_1 ... e_m)] \Rightarrow$
$\lambda x_2 ... \lambda x_n \lambda e_1 ... \lambda e_m \exists x_1 [P(x_1 ... x_n, e_1 ... e_m)]$

b. $\langle$ $\underline{\text{DP}}_{\alpha}$ DP_{β} ... $\text{DP}_{\alpha-1}\rangle \Rightarrow \langle$ $\underline{\text{DP}}_{\alpha}$ DP_{β} ... $\text{DP}_{\alpha-1}\rangle$

With the verb *kw-ambuka* 'to cross', the source is bound off in the denotation via the rule in (70), which gives rise to two semantic and syntactic arguments.

(71) a. $\lambda y \lambda x \lambda e \exists z \exists p[crossing'(e) \wedge ag'(e,x) \wedge route'(e,y) \wedge source'(e,z) \wedge path'(e,p)]$

b. PAS: $\langle$ $\underline{\text{DP}}_{ag}$ DP_{loc} $\rangle$

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': the agent and the route, as in (72).

(72) *Karemera y-∅-ambuts-e* *in-yanja.*
Karemera 1.SBJ-PST-cross-PFV 9-ocean
'Karemera crossed the ocean.'

In the case of applied motion verbs, Jerro (2016) proposes a specific denotation for the locative applicative in which the applicative adds a syntactic argument and assigns it a locative role. This use of the applicative is couched in a larger typology of applicative morphology in which a particular applicative adds a syntactic argument and/or semantic participant depending on the class of verb two with the applicative attaches.

(73) a. $[\![-ir_{loc}]\!] := \lambda P \lambda x_1 ... \lambda x_n \lambda e[P(x_1 ... x_n, e) \wedge loc'(e, x_1)]$

b. $\langle$ $\underline{\text{DP}_{ag}}$ ... $\rangle \Rightarrow \langle \underline{\text{DP}_{ag}}$ DP_{loc} ... $\rangle$

The denotation in (73) states that the first argument of the predicate (i.e. x_1) is associated with the loc thematic role, which has a corresponding argument in the PAS. This argument, however, will also be associated to a participant that is linked to a source, route, or goal — depending on the verb. Since the verb already assigns a more specific type of locative role, the assigning of the locative does not alter the semantics. This has the effect of giving syntactic license to an unrealized semantic argument.

The meaning of the applicative in (73) combines with the meaning of the verb *kw-ambuka* 'to cross' to give the denotation in (74a) for the applied variant of *kw-ambuka* 'to cross', with the PAS in (74b).

(74) a. $\lambda z \lambda y \lambda x \lambda e \exists p[crossing'(e) \wedge ag'(e, x) \wedge route'(e, y) \wedge source'(e, z) \wedge loc'(e, z) \wedge path'(e, p)]$

b. PAS: $\langle$ $\underline{\text{DP}}_{ag}$ DP_{loc} DP_{loc} $\rangle$

The denotation in (74a) has three arguments: an agent, a route, and a source (as well as a redundant semantic participant loc that is linked to the same argument as the $source$ participant). Correspondingly, there are three syntactic arguments in the PAS in (74b), which has an additional locative argument than in the base predicate in (71a). Thus the applied variant of the verb *kw-ambuka* 'to cross' brings out the source that could not be licensed with the non-applied variant.

(75) a. *Karemera y-∅-ambuk-iy-e i Mombasa (mu) n-yanja.*
Karemera 1.SBJ-PST-cross-APPL-PFV 23 Mombasa 18 9-ocean
'Karemera crossed the ocean from Mombasa.'

b. $\exists e \exists p[crossing'(e) \wedge ag'(e, karemera') \wedge route'(e, ocean') \wedge source'(e, mombasa') \wedge loc'(e, mombasa') \wedge path'(e, p)]$

Having laid out the details of this approach, I turn now to showing how the same analysis can be extended to the case of instrument verbs and *–ish*.

As briefly noted in Section 2.1, there is a specific class of verbs which entails the use of an instrument, such as the English verbs *cut, amputate, dissect, guillotine, cleave*, and *sever* (Koenig et al. 2008). Consider the meaning of the verb *cut* in English, where a successful cutting event is entailed to be mediated by the use of some kind of instrument, such as a knife or scissors. These verbs are distinct from verbs like *break* or *eat*, where use of an instrument is possible but not required. With obligatory instrument verbs, the instrument is entailed to exist even if that participant is not realized as a syntactic dependent. For example, it is felicitous to say either sentence in (76), though the use of an instrument is assumed even when it is not overtly present in the clause, as in (76b).

(76) a. Joel cut the bread with a knife.

b. Joel cut the bread.

For cases where *–ish* appears with an obligatory-instrument verb like *cut*, I propose that the participant of the intermediary subevent and the subevent introduced by *–ish* is the same, which has the effect of *–ish* licensing an implicit instrumental argument that is not licensed by the base verb. Take, for example, the denotation of the verb *gu-kata* 'to cut' in (77a), with the PAS in (77b). I assume that there is an additional subevent r which is linked to the instrumental participant. As with other caused change of state verbs (such as *kw-andika* 'to write' above), the caused change of state s must be final in the causal chain. Additionally, the verb *gu-kata* 'to cut' idiosyncratically requires that the causing event v must precede the (instrumental) subevent r, which in turn — given the finality constraint on caused changes of state — must precede s. The intuition is that since these verbs are inherently instrumental, they must encode a more elaborated causal structure than verbs that take instruments and causees only due to *–ish* marking. This captures the fact that this verb implicates a causer acting on an instrument to bring about some change of state of the theme. I formally represent the causal precedence of v before r with the relation $init'$, which parallels the relation fin' above; namely, $init'(\alpha, \beta)$ takes two event arguments α and β and says that α is the initial subevent in β (more specifically, α is preceded by no other subevent in β).[16]

(77) a. $[\![-kata]\!] := \lambda z \lambda y \lambda x \lambda s \lambda r \lambda v \lambda e[ag'(v, x) \wedge ag'(r, z) \wedge th'(s, y) \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge cutting'(v) \wedge cut'(s) \wedge init'(v, e) \wedge fin'(s, e)]$

b. $\langle\ \underline{\text{DP}}_{ag}\ \text{DP}_{th}\ \rangle$

As with the motion verbs above, note that there are only two syntactic arguments in the PAS of the verb, indicating a mismatch between the number of syntactic argument positions and the number of semantic arguments. Following the analysis presented for locative applicatives, I propose that the outermost argument is existentially bound prior to insertion in the syntax in cases where there are more semantic arguments than syntactic arguments positions.

Consider a sentence with the non-applied variant of the verb *gu-kata* 'to cut', such as that in (78), where the participant z in (77a) is existentially bound in the non-applied variant.

(78) *Umu-gabo y-a-kas-e igi-ti.*
1-man 1.SBJ-PST-cut-PFV 7-tree
'The man cut the tree.

(79) $\exists s \exists r \exists v \exists e \exists z[ag'(v, man') \wedge ag'(r, z) \wedge th'(s, tree') \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge cutting'(v) \wedge cut'(s) \wedge init'(v, e) \wedge fin'(s, e)]$

In (79a), the intermediary participant is existentially bound in order to resolve the mismatch between the argument structure and the number of participants in the semantics. The variable r is existentially bound in a higher node in the derivation, as I have assumed for all event variables.

I furthermore propose a related meaning of *–ish* for this particular class of verbs where there is no new participant added by the use of *–ish* equivalent to the non-semantic argument adding use of the locative applicative with motion verbs. Instead, the argument linked to e' is the outermost participant of the base verb (formally represented as x_1).

(80) a. $[\![-ish]\!] := \lambda P \lambda x_1 ... \lambda x_n \lambda e_1 ... \lambda e_m [P(x_1 ... x_n, e_1 ... e_m) \wedge \exists e' [e' \subset e_m \wedge ag'(e', x_1)]]$

b. $\langle \underline{\text{DP}_{ag}} \text{ ... } \rangle \Rightarrow \langle \underline{\text{DP}_{ag}} \text{ DP}_{ag} \text{ ... } \rangle$

In (80), a new subevent e' is introduced into the causal chain of the verb, but the participant linked to e' is the first argument of the verb to which *–ish* attaches instead of a new participant licensed by *–ish*. Crucially, I assume that the more general analysis of *–ish* in (39) is blocked by the lexicalized use of *–ish* with *hit*-type verbs. Thus, this is a subtype of the broader *–ish* morpheme and here presented in a compositional manner in order to clearly delineate the argument realization of the verb *gu-kata* 'to cut' when it appears with *–ish*.

When the meaning in (77a) composes with the meaning of *–ish* in (80), the result is the denotation in (81a), with the PAS in (81b), where there are three syntactic arguments that are mapped to four subevents: the causing event, the caused change of state, and the event e' introduced by *–ish*. The intermediary argument z is linked to the subevent r as well as e'.

(81) a. $\lambda z \lambda y \lambda x \lambda s \lambda r \lambda v \lambda e [ag'(v, x) \wedge ag'(r, z) \wedge th'(s, y) \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge cutting'(v) \wedge cut'(s) \wedge init'(v, e) \wedge fin'(s, e) \wedge \exists e' [e' \subset e \wedge ag'(e', z)]]$

b. $\langle \underline{\text{DP}_{ag}} \text{ DP}_{ag} \text{ DP}_{th} \rangle$

In (81), the outermost argument z is both the agent of the intermediary event r as well as the participant linked to the subevent e'. I take the linking of the same participant to two separate subevents to indicate that the two subevents are treated as the same subevent in the causal chain. This has the effect of e' always being interpreted as the intermediary subevent r with instrument verbs. Thus, it is predicted that with these verbs, *–ish* has an obligatorily instrumental reading, which is borne out in (82) with the verb *gu-kata* 'to cut'.

(82) *Umu-silikari y-a-kat-ish-ije umu-horo igi-ti.*
1-soldier 1.SBJ-PST-cut-ISH-PFV 3-machete 7-tree
'The solider cut the tree with a machete.'

(83) $\exists s \exists r \exists v \exists e [\underline{ag'(v, soldier')} \wedge ag'(r, machete') \wedge th'(s, tree') \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge cutting'(v) \wedge cut'(s) \wedge init'(v, e) \wedge fin'(s, e) \wedge \exists e' [e' \subset e \wedge ag'(e', machete')]]$

In (82), the initial causer is the soldier, which is the last participant to be picked up. The restriction on v to precede r is satisfied, as the participant *umuhoro* 'machete'

(linked to both r and e') is not the initial causer, but rather it is intermediary in the causal chain.

Consider an alternative ordering of the arguments, where z is the last argument to be picked up and thus interpreted as the initial causer.

(84) $\lambda x \lambda y \lambda z \lambda s \lambda r \lambda v \lambda e[ag'(v, x) \wedge ag'(r, z) \wedge th'(s, y) \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge \mathit{cutting}'(v) \wedge \mathit{cut}'(s) \wedge \mathit{init}'(v, e) \wedge \mathit{fin}'(s, e) \wedge \exists e'[e' \subset e \wedge ag'(e', z)]]$

Such a denotation, however, is ruled out: given the constraint that v causally precedes r, it is not permissible for z to be the initial causer; z cannot simultaneously be the initial causer as well as the participant linked to an intermediary causal event. This predicts that the causative reading of *–ish* with the verb *gu-kata* 'to cut' should be ruled out, which is borne out in (85).

(85) *#Umu-silikari y-a-kat-ish-ije umw-ana igi-ti.*
1-soldier 1.SBJ-PST-cut-ISH-PFV 1-child 7-tree
Intended: 'The soldier made the child cut the tree.'

(86) $\exists s \exists r \exists v \exists e[ag'(v, \mathit{child}') \wedge \underline{ag'(r, \mathit{soldier}')} \wedge th'(s, \mathit{tree}') \wedge v \subset e \wedge s \subset e \wedge r \subset e \wedge \overline{\mathit{cutting}'(v) \wedge \mathit{cut}'(s)} \wedge \mathit{init}'(v, e) \wedge \mathit{fin}'(s, e) \wedge \exists e'[e' \subset e \wedge \underline{ag'(e', \mathit{solider})}]]$

Given the restriction on the order of events specified by the verb *gu-kata* 'cut', the causative reading is ruled out for these verbs.

In this section I have argued for an analysis of instrument verbs as case in which a particular sense of *–ish* is used to bring out the implicit instrument entailed by the verb. This extends an analysis of the locative applicative in Kinyarwanda with verbs of translational motion in which a locative participant is brought out via the applicative. More broadly I have made a case for how the lexical entailments of particular verbs determines the available readings of *–ish*.

5. CONCLUSION

In this paper I have provided an account of the syncretic morpheme *–ish* in Kinyarwanda, which marks both the morphological causative and instrumental applicative. This poses an issue for traditional analyses of causatives and applicatives; while causatives traditionally add a new subject causer, instrumental applicatives traditionally add a new instrumental object. The goal of this paper has been to explain how a single morpheme can capture both of these putatively distinct uses. One potential solution to this is to assume that the two putatively distinct uses are mapped to homophonous forms of *–ish*. However, I argue against such an analysis by showing that there is no clear syntactic and semantic delineation that can be made between the two uses. Furthermore, I provide

historical and comparative evidence that the morphological causative of Proto-Bantu extended to cover the instrumental applicative in Kinyarwanda.

I propose instead an account in which the two uses of the morpheme in fact derive from a single operation of underspecification. The morpheme *–ish* adds a new causal subevent and argument to the argument structure of a verb, but the exact position of the subevent licensed by *–ish* is variable, though constrained by general and verb-specific constraints on possible verb meanings as well as general constraints on argument realization. Furthermore, I show that with verbs in which there is an implicit instrument, the only available reading of *–ish* is the instrumental reading. In order to capture this formally, I adopt an analysis from Jerro (2016) where applicative morphology is used to give syntactic license to an unrealized semantic argument.

Broadly speaking, I have shown how causative and applicative morphology in particular languages is more similar than superficial characterizations such as "subject-adding" and "object-adding," respectively, might suggest. While certain languages may employ strictly subject-adding and object-adding valency-changing morphology (cf. Chichewa), the case of *–ish* provides at least one example of a language in which the function of the two uses overlap. This has interesting ramifications for future work on syncretic morphology in other languages; in the broadest sense, the central goal of the present paper is that syncretic morphemes merit investigation in their own right — distinct from the various uses that the morpheme may have.

By providing a unified account of a case where one morpheme has both functions, I have also shown that the function of applicativization in particular may be broader than previous analyses have assumed. This adds to a growing body of work which has begun to question what the core functionality of applicatives are across certain Bantu languages (Marten 2003, Jerro 2016). Furthermore, most previous work has assumed that an applicative adds a wholesale new object with a defined thematic role to the argument structure of the verb, largely simply overlain onto the meaning of the base verb in a strictly monotone increasing fashion. This paper has shown, however, that sometimes the lexical semantics of the base verb can rule in or out certain readings of the applicative due to constraints on argument realization and the compositional semantics, showing that idiosyncratic verb meaning does have a role in the realization of valency-changing morphology.

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Author's address: Department of Linguistics, The University of Texas at Austin, College of Liberal Arts Building
Austin, TX 78712-1048, U.S.A.
E-mail: jerrokyle@utexas.edu

FOOTNOTES

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2 The kinds of readings lumped under the role "beneficiary" are more diverse than often assumed in the syntactic literature on applicatives. See Shibatani (1996), Kittilä (2005), and Kittilä & Zúñiga (2010) for typological work on benefactive readings.

3 Traditionally, the term "syncretism" refers to the merging of different inflectional varieties of a morpheme during the development of a language. Here, I use the term synchronically, discussing a morphological form with two distinct through related uses. See Section 3 for discussion of the historical situation that gave rise to there merge between these two uses.

4 The interlinear glosses for the data presented for Kinyarwanda use the Leipzig Glossing Conventions, with the exception that numbers are used to indicate noun class and personal pronouns are indicated with roman numerals. I gloss the morpheme *–ish* as ISH. Cited data follow the convention of the original.

5 The choice of allomorph is conditioned by the phonology of the stem to which the morpheme is attached. Relevant to the current discussion, the forms *–eje* or *–ije* are used after voiceless alveopalatal fricatives (i.e. "sh" [ʃ]). This allomorph is used regardless of the whether the final consonant of the stem is part of the verb root (e.g. as with the verbs *gu-tesha* 'halt/prevent' and *ku-rusha* 'to be greater than, to be more than') or added via morphology (e.g. the morpheme *–ish*).

6 An anonymous reviewer asks about the syntactic structure of *–ish* as either an ECM-type or object-control type construction. I leave this question on the syntax of *–ish* to future work, as the present paper focuses on the semantic role of the added argument, which is orthogonal here to whether *–ish* creates a control or raising construction. It is worth noting that in the analysis I propose in §4, *–ish* overlays a new argument and event into the event structure but add no extra thematic information about the causee, which parallels a raising analysis of causatives.

7 A related point is that there is no marking on the putatively demoted causee of the causative use of *–ish*. In many languages, the demoted causee in causative constructions is marked with some kind of distinct oblique morphology (Comrie 1989). With *–ish*, however, there is no such marking on the demoted causee.

8 In certain cases, the passive morpheme *–w* often appears inside the perfective morpheme *–ije*, resulting in *–ij-w-e*. This phenomenon has been referred to in the Bantuist literature as *imbrication* (de Bois 1975, Bastin 1983, Hyman 1995, Kula 2001).

9 An anonymous reviewer points out that Kimenyi (2006) provides judgments which allow the doubling of *–ish*. The speakers I have consulted consistently reject these kinds of sentences, and in this paper I analyze the judgments from the speakers that I consulted. I leave the discussion of possible variation to future work.

10 Other speakers of Chicheŵa have indicated that sentences like that in (27) are only marginally unacceptable, such as data presented in Bresnan et al. (2016:433,(14)) from judgments given by Sam Mchombo. For both speakers, however, the doubling of causatives is, to some degree, dispreferred.

11 Note that I treat all subevents, even caused changes of state, as events and thus not as states; I do not deal directly with states here.

12 There are in fact (at least) two ways to capture the freedom of argument order in this style of framework. One is to assume a default ordering of arguments associated with a lexical entry, and then to propose a lexical reordering operation that freely rearranges the arguments. 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. There is no empirical reason in the data presented here to favor either analysis, but for clarity of the analysis, I assume the former.

13 An alternative approach to the restriction of the ordering of causal subevents is to assume that the instrument must precede the theme by conventional implicature, as done in Rissman (2011). She argues that by introducing a new argument into the sentence (here, via the morpheme *–ish*), it is presupposed that this new argument is relevant to the description of the event (via the maxim of quantity). In the case of the *–ish* morpheme, it is implicated that the argument licensed by *–ish* is a necessary instrument for the bringing about of the caused change of state. This achieves a similar effect to the finality constraint on the caused change of state s in that both approaches derive the desired ordering of causal subevents.

14 While I do not discuss this in depth here, *–ish* in Kinyarwanda licenses a direct causative reading, and this fact arises naturally from the denotation of *–ish* in (39), where all the subevents (including the event licensed by *–ish*) are part of a single event described by the verb (cf. the treatment of direct/indirect causation in Kratzer 2005). See Jerro (2013) for discussion of direct and indirect causation in Kinyarwanda.

15 An anonymous reviewer asks how the analysis presented here interfaces with the object symmetry facts, with the assumption that object symmetry diagnostics are determined by the syntax or thematic role of a particular applicative (Baker 1988, Alsina & Mchombo 1993, McGinnis & Gerdts 2003)). However, recent work has argued that object symmetry facts are multivariate and do not (and, in fact, cannot) derive from parametric syntactic variation (Jerro 2016, Ackerman et al. 2017). Following this work, I assume that objecthood facts follow from a complex mix of syntax, information structure, noun cast, and the meaning of the verb to which the applicative attaches. I do not pursue an analysis of these facts here.

16 An alternative to this approach would be to state in the denotation that r must precede s and follow v. However, the denotation presented in (77a) more elegantly captures the same generalization since s is independently assumed to always be final in the causal chain. Perhaps ironically, there is no mention of the ordering of the r subevent in (77a), but the desired effect of ensuring that r is intermediary in the causal chain falls out from restrictions on the other subevents.