

## 80. Valency-changing word-formation

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### Abstract

*This article deals with valency-changing in general. The verb denotes a state of affairs with a varying number of participants; when its valency is shifted, different participants are put into the foreground (realized as direct object or subject). Transitivity alternations represent the systematic shift between transitive and intransitive verbs. It is claimed that at each state of a verb there is a certain argument hierarchy that determines the grammatical realization of the arguments. A valency-changing operation either decreases or increases the number of arguments of a verb. Valency-decreasing includes several specialized operations such as passive, antipassive, reflexive, reciprocal and noun incorporation, as well as the more general middle or medio-passive. Valency-increasing includes causative and applicative. Valency-changing operations can be realized morphologically (where they contribute to word-formation) or periphrastically (e.g., by means of auxiliaries), or they are hidden and only visible by the actual number of complements. In terms of morphology, (i) affixes may be general or specialized intransitivizers/ transitivity-changers, (ii) several cycles of valency-changing are possible, (iii) the order of affixation mirrors the semantic order of application, (iv) valency-changing precedes all modal, aspectual, temporal or personal specifications – it is therefore derivational. In addition, there are argument alternating operations that do not change valency.*

## 1. Introduction

The notion of valency is used for categories that take a varying number of complements, such as verbs and verbal nouns. Semantically, valency refers to the number of arguments that make a proposition out of the verbal head, while in syntax valency refers to the number of complements that are necessary to form a full clause with this verb. Thus, a valency-changing operation is the same as an operation on argument structure (see Wunderlich in press).

Arguments are distinct from adjuncts: if an argument is omitted, the utterance is felt to be incomplete, while an adjunct can more easily be omitted. Under certain contextual conditions, however, even arguments might be omitted without any interpretational effect, so that the valency doesn't change. Sometimes it is useful to make a distinction between core arguments, realized by structural case (accusative, ergative, dative or nominative), and periphrastic arguments, realized obliquely.

There is no substantial difference between NP/DP and sentential complements concerning valency; both satisfy just one argument position. Infinitival complements, however, are different. Consider raising to object in (1), where the subject of the dependent proposition receives accusative from the matrix verb. Obviously, *thought* has three complements in (1b), while it has only two in (1a). Nevertheless, raising to object is not considered to be a valency-changing phenomenon; semantics is the determining factor.

### (1) Raising to object

- a. I thought [(that) he was at home].
- b. I thought [him] [(to be) at home].

'Valency-changing' presupposes that there is some valency to begin with. Not all linguists share this assumption. According to the radical Neo-Davidsonian approach (Parsons 1991, Schein 1993), syntax begins with a categorial constellation into which lexical roots are inserted. These roots, such as *run*, *eat* or *give*, have no arguments by themselves, except that when a root is inserted into V, it achieves an eventive argument role. By means of higher

functional categories further argument roles can be introduced. Thus, *give* would become a three-place verbal entity by successive steps of valency-increasing, see (2a).

(2) Radical Neo-Davidsonian approach

- a.  $\lambda e \text{ GIVE}(x,y,z)(e) \Leftrightarrow \lambda e [\text{GIVE}(e) \ \& \ \text{THEME}(e,z) \ \& \ \text{RECIPIENT}(e,y) \ \& \ \text{AGENT}(e,x)]$
- b.  $\lambda e \text{ HAIL}(e)$

This approach intuitively captures the possibility of zero-place verbs quite well. An impersonal weather verb such as German *hageln* ‘to hail’ incorporates a root that is also used as a noun (historically it is related to a noun meaning ‘pebble’), with no further argument roles (2b). Now, surprisingly, even a zero-place verb can be used with further arguments, as shown in (3). (Note that *hageln* has an expletive subject *es*, so the syntactic valency is 1.)

(3) Weather verbs

- a. Es hagelte faustgroße Körner.  
‘It hailed pebbles as big as your fist.’  
No passive: \*Faustgroße Körner wurden gehagelt.
- b. Es verhagelte den Weizen.  
lit. ‘It *ver*-hailed the wheat’ ”The hailstorm ruined the wheat.”  
Passive is possible: Der Weizen wurde (vom Sturm) verhagelt.  
“The wheat was ruined by the hailstorm.”
- c. Es hagelte uns faustgroße Körner aufs Dach.  
it hailed us fist-big pebbles on.the roof  
‘It hailed pebbles as big as your fist on our roof.’
- d.  $\lambda z \lambda y \lambda x \lambda e [\text{HAIL}(e) \ \& \ \text{PEBBLES}(e,x) \ \& \ \text{BECOME LOC}(x, \text{ON}(z)) \ \& \ \text{POSS}(y,z)]$
- e. Wir kriegten faustdicke Körner aufs Dach gehagelt.  
‘We got fist-thick pebbles on.the roof hailed’  
‘We got pebbles as big as your fist hailed on the roof.’
- f. Der Sturm/es behagelte unser Dach mit faustdicken Körnern.  
‘the storm/it *be*-hailed our roof with fist.thick pebbles’
- g. (passive of f:) Unser Dach wurde mit faustdicken Körnern behagelt.

(3a) shows an instance with a cognate object in the accusative, and (3b) an instance with the applicative prefix *ver-* (adding the result that something gets ruined). Interestingly, the applicative verb becomes truly transitive and can be passivized, differently from the verb with a cognate object. Since hailing is a weather-conditioned movement of little icy hailstones, the verb *hail* licenses a directional PP as in (3c); in turn, the presence of a directional object licenses so-called possessor-raising in German, so that the dative possessor *uns* ‘us’ (a complement of the verb) is regularly interpreted as the possessor of the roof in (3c) – thus, one arrives at the interpretation roughly given in (3d). The so-called *kriegen*-passive, then, can shift the dative possessor to a nominative subject, as shown in (3e). It is also possible to add the applicative prefix *be-*, shifting the goal to a direct object (which is known as locative alternation), as shown in (3f) – which in turn licenses passive, see (3g).

The examples in (3) illustrate in a nutshell that even a simple zero-place verb such as *hageln* ‘hail’ can be the source of several valency-increasing and -decreasing operations. One also can see that some of these operations are morphologically marked, and others are not. Three of the valency-increasing operations observed in (3) are not marked morphologically in German: (i) the introduction of a cognate object, (ii) the introduction of a directional PP, and (iii) the introduction of a possessor-dative. In other words, these operations do not contribute to word-formation. Nevertheless, they allow the syntactic frame of a lexical item to be enriched. Most interestingly, the possessor-dative shown in (3c) (leading to the passive in

(3e)) clearly increases the valency of the verb, which, however, is licensed only when the directional PP is added – this shows that syntax and lexicon can interact without any morphological mediation.

Four other operations observed in (3) are marked morphologically: two applicatives (different prefixes) and two passives (the same participle formation, but different auxiliaries): (i) the introduction of the result state ‘something becomes damaged’ by means of the prefix *ver-* (one of several alternatives of *ver-*, see Stiebels 1996: 302), (ii) the introduction of the goal ‘become located somewhere’ by means of the prefix *be-*, (iii) the *kriegen*-passive, and (iv) the *werden*-passive.

This article clearly focusses on operations that are visible morphologically. If there were no languages that mark these operations, they would not come into consideration so easily; possibly one would just assume some flexibility (or ambiguity) at work. Interestingly, often only the existence of an operation is marked, leaving a certain amount of ambiguity for its outcome (see section 5.).

In the examples (3) above each applicative can be followed by the passive, so that the applied object becomes the subject of the clause. This indicates the functional advantage of having these operations sequentially applied: if a participant belongs to the type of events described by the verb but is usually not an argument of that verb, it can be made into an argument by means of the applicative operation, and ultimately can become the subject (or major topic) by means of passivization.

As shown in (3), valency-increasing operations can even be based on zero-place verbal roots, which, however, are rare cross-linguistically. Much more often one finds verbal roots with one or two arguments required lexically. Every language seems to distinguish between at least two sorts of intransitive verbs (active and inactive ones, often also called ‘unergatives’ vs. ‘unaccusatives’) on the one side, and transitive verbs, having both a more active and a more inactive participant (logical subject vs. logical object), on the other side. Many languages also have basic ditransitive verbs of the *give* or the *put* kind (‘give him the book’, ‘put the book on the desk’). No language has any basic verbs with a valency more than 3, but many languages allow, by valency-increasing operations, up to 4 or even 5 arguments.

Most valency change observed cross-linguistically concerns transitions between transitive and intransitive verbs in both directions (the so-called transitivity alternations); in other words, 2→1 and 1→2 changes are the most common ones. The same types of operations, however, can apply to verbs with one or even two arguments more, thus, 3→2 and 2→3 changes are possible as well. Totally unattested are 3→1 and 1→3 operations in a single step, which indicates that valency change is always a minimal change. Bigger changes must come about by iterated operations.

The major valency-increasing operations are causative and applicative: causative adds a new subject, while applicative adds an object. Valency-decreasing operations include passive and antipassive: passive demotes the subject, while antipassive demotes the object (or one of the objects). These four operations are also included in the World Atlas of Language Structures (WALS 2011, chapter 107-111); the respective frequencies (computed on different but representative sets of languages) are shown in (4). As one can see, both applicative and passive occur in every second language, while antipassive is much rarer, and the presence of causative is a nearly universal feature of language.

(4) Frequency of visible valency changing operations in the languages of the world, according to WALS 2011

- a. Passive is present in 43% of languages (162 out of 373; Siewierska 2011)
- b. Antipassive is present in 25% of languages (48 out of 194; Polinsky 2011a)
- c. Nonperiphrastic causative is present in 92% of languages (287 out of 310; Song 2011)
- d. Applicative is present in 45% of languages (83 out of 183; Polinsky 2011b)

Indo-European (IE) originally realized both mediopassive and causative by suffixes (while antipassive and applicative were unmarked), whereas most of the modern IE languages developed periphrastic passives (auxiliary + participle) and causatives (a light verb ‘make, let’ + infinitive). Some IE languages also developed applicative markers (prefixes, particles) from prepositions.

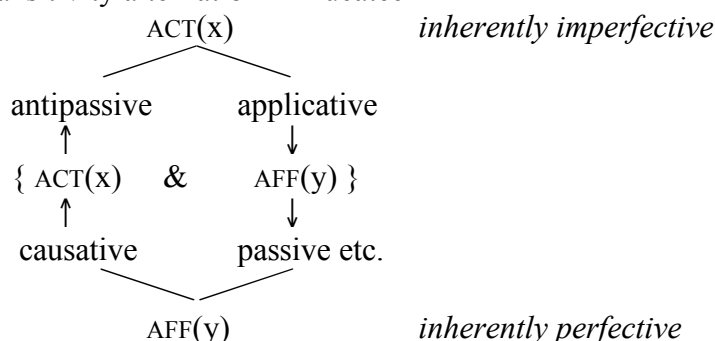
A final remark concerns the theoretical model used in this article. Since one finds basic transitives in every language (and often also basic ditransitive verbs), the radical Neo-Davidsonian approach (illustrated in (2)) would not work. Whether a basic verb requires one, two or three arguments is always a lexical property. Moreover, Neo-Davidsonian representations have a flat structure; they do not show any ordering of arguments, including the order in which the arguments are added. Therefore, this approach is often accompanied with some sort of functional syntax, which has a more hierarchical structure, however, neither the syntax nor the semantics can explain why passive voice is a marked operation and active voice is not. I will use a moderate form of lexical decomposition, which makes the hierarchy of arguments argument hierarchy and the operations that rely on it more transparent.

## 2. Transitivity alternations

Let us for the time being assume that (prototypical) transitive verbs are asymmetric and could be described as  $\{\text{ACT}(x) \ \& \ \text{AFF}(y)\}(e)$  ‘there is an event  $e$  in which  $x$  is active in some way &  $y$  is thereby affected in some way’. Then, all  $2 \rightarrow 1$  and  $1 \rightarrow 2$  changes have at least two alternatives. In case of valency-decreasing, either the active argument or the affected argument is demoted; the corresponding operations are called ‘passive’, ‘reflexive’, ‘anticausative’ or ‘middle’ if the active argument is demoted, and ‘antipassive’ or ‘noun incorporation’ if the affected object is demoted. In case of valency-increasing, either an active argument or an affected argument is added; these operations are called ‘causative’ vs. ‘applicative’. Thus, valency-changing can form a fully symmetric structure built on the asymmetric conception of argument roles.

Yucatec Maya is a language that demonstrates this idea most clearly because no verb can actually have more than two arguments (Krämer and Wunderlich 1999). Consider the following diagram (5).

(5) Transitivity alternation in Yucatec



There are mainly two classes of intransitive verbs in Yucatec; those that are inherently imperfective and are marked only for the perfect, and those that are inherently perfective and are marked only for the imperfect. In the imperfect, the argument is encoded by an ergative clitic attached to a preceding auxiliary, while in the perfect, the argument is encoded by a nominative (=absolutive) suffix; note that there is no 3rd person suffix. These two classes of intransitive verbs roughly correspond to active vs. nonactive verbs, although some verbs seem arbitrarily be classified. The transitivity alternations are illustrated in (6) and (7).

Intransitivization is mostly done by stem alternation, while transitivization is done by suffixation. (INC = incompletive or habitual aspect.)

- (6) Intransitivization in Yucatec (Bricker and Yah 1981: xi)
- a. k=in hek<sup>?</sup>-ik. *transitive*  
INC=1sg break-IMPF  
'I am breaking it.'
  - b. k=u héek<sup>?</sup>-ik. *middle* (inherently perfective)  
INC=3 break.MID-IMPF  
'It is breaking.'
  - c. hé<sup>?</sup>ek<sup>?</sup>. *passive* (inherently perfective)  
break.PASS  
'It has been broken.'
  - d. k=in hèek<sup>?</sup>. *antipassive* (inherently imperfective)  
INC=1sg break.ANTIPASS  
'I am breaking (something).'
- (7) Transitivization in Yucatec (Straight 1976: 193)
- a. k=a luk<sup>?</sup>-ul. *intransitive* (inherently perfective)  
INC=2 leave-IMPF  
'You are leaving.'
  - b. k=a luk<sup>?</sup>-s-ik. *causative* (transitive)  
INC=2 leave-CAUS-IMPF  
'You are removing it.'
  - c. k=a k<sup>?</sup>óoy. *intransitive* (inherently imperfective)  
INC=2 dig  
'You are digging.'
  - d. k=a k<sup>?</sup>óoy-t-ik. *applicative* (transitive)  
INC=2 dig-APPL-IMPF  
'You are digging it (up).'

Causative and applicative can only apply on actually intransitive verbs. In order to express three-place concepts such as 'teach' or 'send', it is necessary first to intransitivize the root verb. In (8a), the transitive root is passivized before the causative is applied (and the result again passivized); in (8b), an object is incorporated before the applicative. Again, note the symmetry in this system: the active argument is demoted before a new active argument is introduced, and the affected argument is demoted before a new affected argument is introduced.

- (8) Three-place concepts in Yucatec
- a. k=u ká<sup>?</sup>an-s- á<sup>?</sup>al. *transitive* (Bricker 1978: 22)  
INC=3 learn.PASS-CAUS-PASS-IMPF  
'It is being taught.'
  - b. k=u kon-lol-t-ik-etʃ. *transitive* (Krämer and Wunderlich 1999: 467)  
INC=3 sell-flower-APPL-IMPF-2  
'He is selling you flowers.'

These examples clearly show that multiple operations on argument structure are possible, and thus overcome the restriction to maximally 2 arguments. There is no reason for assuming that Yucatec is somehow handicapped in expressivity.

### 3. Argument hierarchy

In the beginning of the preceding section I said that the asymmetric nature of transitive verbs might be captured by  $\{\text{ACT}(x) \ \& \ \text{AFF}(y)\}(e)$ . The two components of the event cannot be independent of each other because then, they wouldn't form a single event, neither can  $\text{AFF}(y)$  temporally precede  $\text{ACT}(x)$  because then, there would be an external source for  $y$ 's affectedness. In the minimal event combining the two components it is the activity of  $x$  that accounts for  $y$  being affected. Hence, the conjunction '&' must be understood as asymmetric:  $\text{AFF}(y)$  is determined in some way (e.g., caused) by  $\text{ACT}(x)$ . However, the actual relationship does not need to be expressed explicitly (see Wunderlich 2012).

I take it for granted that for each individual verb (be it basic or derived) the arguments form a hierarchy. In the example considered here, the actor (agent or logical subject) ranks higher than the affected object, which in turn determines which argument is realized by ergative or accusative: the higher argument is realized by ergative (if available), and the lower argument is realized by accusative (if available). The grammatical realization of the arguments of a verb thus depends on argument hierarchy. Even if one does not have clear semantic arguments to determine which argument ranks higher (as in experiencer verbs such as *see*, *like*, *fear*, dimensional verbs such as *limit*, *surround*, *surpass* etc.) – nevertheless, the verbs are clearly asymmetric, and no dispute arises as to which argument could possibly be ergative or accusative. Usually one simply writes  $\text{SEE}(x,y)$ ,  $\text{LIKE}(x,y)$ ,  $\text{SURROUND}(x,y)$  etc., indicating the argument hierarchy by the linear ordering  $(x,y)$ , with  $x > y$ .

The argument hierarchy in (9b) corresponds to the structure in (9a): the more an argument is structurally embedded the lower it is ranked. From the open proposition in (9a), the corresponding predicate is formed by stepwise  $\lambda$ -abstraction, first concerning the highest argument, and so on recursively (9c). If the complex predicate is applied to a specific argument expression, the lowest argument (corresponding to the leftmost  $\lambda$ -abstractor) is captured first, and so on recursively (9d,e). That is to say,  $\lambda$ -abstraction takes stepwise a negative copy, which is then unwound in the reverse order to saturate the open proposition.

- (9) The computation of a transitive verb: semantic composition
- a.  $\{\text{ACT}(x) \ (\& \ \text{AFF}(y))\}(e)$
  - b. Argument hierarchy:  $e > x > y$
  - c. Lambda abstraction:  $\lambda y \ \lambda x \ \lambda e \ \{\text{ACT}(x) \ \& \ \text{AFF}(y)\}(e)$
  - d. Lambda application, first step:  
 $\lambda y \ \lambda x \ \lambda e \ \{\text{ACT}(x) \ \& \ \text{AFF}(y)\}(e)(\textit{the\_apple}) = \lambda x \ \lambda e \ \{\text{ACT}(x) \ \& \ \text{AFF}(\textit{the\_apple})\}(e)$
  - e. Lambda application, second step:  
 $\lambda x \ \lambda e \ \{\text{ACT}(x) \ \& \ \text{AFF}(\textit{the\_apple})\}(e)(\textit{peter}) = \lambda e \ \{\text{ACT}(\textit{peter}) \ \& \ \text{AFF}(\textit{the\_apple})\}(e)$
  - f. Aspect and tense specify, and mood binds the event variable  $e$ .

Following a proposal by Kiparsky (1992), argument hierarchy and the structural cases should be encoded by the same system of relational features. Lexical Decompositional Grammar (Wunderlich 1997, 2000, 2006) uses the features  $+hr$  = 'there is a higher argument role' (= 'not the highest role'), and  $+lr$  = 'there is a lower argument role' (= 'not the lowest role'); for reasons of markedness, these features differ slightly from those proposed by Kiparsky. Consequently, the highest argument is  $-hr$ , and the lowest argument is  $-lr$ , while any medial argument would be  $+hr,+lr$ . The structural cases are specified as follows: dative =  $[+hr,+lr]$  is compatible with the medial argument, accusative =  $[+hr]$  with a non-highest, ergative =  $[+lr]$  with a non-lowest, and nominative =  $[ ]$  (the unspecified case) with any argument. For the transitive verb shown in (10a) four different case patterns are possible, while all other combinations are ruled out (10c). Which of these patterns is selected depends on further

conditions. Note that in a split language like Hindi all four patterns are possible, depending on aspect, animacy and definiteness (Wunderlich 2006: 101).

- (10) The computation of a transitive verb: association with structural case
- a.  $\lambda y \quad \lambda x \quad \lambda e \{ACT(x) \ \& \ AFF(y)\}(e)$   
 $-lr \quad +lr$   
 $+hr \quad -hr$
  - b. DAT = [+hr,+lr]  
 ACC = [+hr]  
 ERG = [+lr]  
 NOM = [ ]
  - c. Possible case patterns for  $\{x, y\}$ : {ERG, ACC}, {ERG, NOM}, {NOM, ACC},  
 {NOM, NOM}.  
 Selection according to the constraint ranking of the particular language

Similarly, a ditransitive verb such as *zeigen* ‘to show’ has three arguments (*Ich zeigte ihm den Orion* ‘I showed him the Orion’); here the ranking  $x > y > z$  is best realized by the case pattern {NOM, DAT, ACC} in German.

Lexical marking is an option that overrides the default features in (10). For instance, a dative-subject verb such as German *gefallen* or Icelandic *líkar* (both ‘to like’) assigns [+hr] to the highest argument.

Valency-changing operations operate on a verb stem; their effects can easily be described in terms of argument hierarchy. Passive binds the highest argument (–hr) existentially, while antipassive binds the lowest argument (–lr) existentially, and the reflexive identifies a lower argument with the highest one. Causative introduces a new highest argument (–hr), so that the former subject automatically becomes [+hr], while applicatives introduce a non-highest argument (+hr).

## 4. Valency-decreasing operations

### 4.1. Passive and antipassive

Valency-decreasing operations apply directly on the sequence of  $\lambda$ -abstractors. (11) shows the passive, which binds the highest argument existentially, so that it remains unexpressed. (The event argument is irrelevant here and therefore ignored.)

- (11)  $PASS [\dots \lambda x \text{ VERB}(x, \dots)] = \dots \exists x \text{ VERB}(x, \dots)$   
 –hr

Some languages only allow passivization of transitive verbs, while other languages also include some subclasses of intransitive verbs. The class of verbs that can be passivized is often restricted to agentive verbs, but certain nonagentive verbs can be included as well (e.g., *The garden is surrounded by a fence*). Existential binding causes the passivized n-place verb to be realized with at most n-1 morphosyntactic complements; thus, a transitive verb is detransitized, and an intransitive verb becomes impersonal. As a consequence, another argument is realized by nominative (the default case) and thus becomes morphosyntactic subject. (12) and (13) show that in the passive of ditransitive verbs there are different options regarding the choice of object that becomes nominative. In the two languages illustrated here (the Uto-Aztecan language Yaqui, and Georgian), both objects are marked by accusative in the active. If the recipient shifts to nominative in the passive (as in Yaqui) it is said to be the primary object, while if the theme shifts to nominative (as in Georgian) it is said to be the direct object (Dryer 1986).

## (12) Double accusative and passive in Yaqui (Van Valin 2007)

- a. Joan Peo-ta           ʔuka       vaci-ta   miika-k.  
Juan Pedro-ACC   DET.ACC corn-ACC give-PERF  
'Juan gave Pedro the corn.'
- b. Peo ʔuka       vaci-ta   miik-wa-k.  
Pedro DET.ACC corn-ACC give-PASS-PERF  
'Pedro was given the corn.'
- c. \*Uʔu       vaci Peo-ta       miik-wa-k.  
DET.NOM corn Pedro-ACC give-PASS-PERF  
'The corn was given to Pedro.'

## (13) Double accusative and passive in the present series of Georgian (Joppen-Hellwig 2001: 50, 130)

- a. Ketino Eka-s       xalitša-s       s-čukni-s.  
Ketino Eka-ACC carpet-ACC 3D-present-PRES.3N  
'Ketino presents Eka with a carpet.'
- b. xalitša e-čuk-eb-a                                       Eka-s.  
carpet PASS-present-TH-PRES.3N Eka-ACC  
'The carpet is presented to Eka.'
- c. \* Eka e-čuk-eb-a                                       xalitša-s.  
Eka PASS-present-TH-PRES.3N carpet-ACC  
'Eka is presented with a carpet.'

Thus, passivization not only is a test for subjecthood (Which argument is demoted in the passive?) but also for objecthood, differentiating between two types of double objects: primary vs. secondary object on the one hand, and direct vs. indirect object on the other (Dryer 1986, Wunderlich 2006: 136). Languages with symmetric objects (Bresnan and Moshi 1990) allow both alternatives: either the recipient or the theme becomes the syntactic subject in the passive. These differences clearly indicate that the promotion to nominative is not part of the passive operation, but a subsequent effect dependent on typological factors.

Passive is an operation even found in languages where it is not overtly marked (such as Basque). It reflects a ubiquitous salience shift. If an argument other than the subject is the actual topic, definite/specific, or a speech act participant, it might be more salient than the subject; in that case, passive can shift it to a higher argument position, thus making its high salience visible. (Aissen 1999 discusses subject choice in the framework of Optimality Theory.)

Passive can be marked by a verbal affix, a stem alternation, a particle, or a periphrastic construction with an auxiliary and a participial form; it can also be made visible only by a shift in the complement pattern. Some languages allow the so-called personal passive, in which the highest argument of a passivized verb is expressed by an oblique instrument, source, or agent phrase; such a phrase is best seen as an adjunct whose free argument is coindexed with the existentially bound argument. Assume that the sentence *John was kissed by Ann* is represented as  $\exists e \{ \exists x \text{ KISS}(x, \text{John})(e) \ \& \ \text{AGENT}(e, \text{Ann})$ , then  $x = \text{Ann}$  is a contextual default for the value of  $x$ .

Various theories of the passive have been proposed, among them the voice hypothesis (Kratzer 1996), claiming that verbs have a basic form without agent, and only if they are integrated into a voice phrase, is an agent either added (in the active voice) or not (in the passive voice). This hypothesis suggests that active voice is the more marked variant of a transitive verb, which, however, is only rarely observed cross-linguistically (e.g., in languages



of the Austronesian family). Moreover, it does not describe the semantic effect of passive as existential binding but rather as the absence of an argument.

In view of examples such as those in (14), Keenan (1980) and Dowty (1982) have argued that English passive must operate on transitive verb phrases rather than verbs, e.g., on the VP *think cancer to be unlikely to be caused by hot dogs* in (14a). However, already Bresnan (1982) showed that a lexical rule of passive is able to handle these more complex instances, too.

- (14) Passive of raising and control predicates (Bresnan 1982: 65)
- a. Cancer is now thought to be unlikely to be caused by hot dogs.
  - b. Intruders are now forced to be prepared to be attacked by dogs.

Let us assume that (15a) represents the passive of *think* and (15b) the embedded complex (itself being passivized), then (15c) results through functional composition as the approximate representation of (14a). This clearly shows that the most internal argument is shifted to the subject of the whole complex by means of two passive operations. (Note that in a polysynthetic language such as Greenlandic all the higher predicates are affixes, thus the operations are necessarily word-internal rather than affecting VPs.)

- (15) Analysis of raising + passive
- a.  $\lambda p \exists x \text{ THINK}(x,p)$
  - b.  $\lambda z \exists y \text{ UNLIKELY}(\text{CAUSE}(y,z))$  *raising*
  - c.  $\lambda z \exists x \text{ THINK}(x, \exists y \text{ UNLIKELY}(\text{CAUSE}(y,z)))$

Similarly, with the three pieces in (16a) one gets (16b) in the first step, and (16c) in the second step, representing (14b). Here, the most internal argument is stepwise identified with the subject of *be prepared* and the object of *force*; again, two passives are involved.

- (16) Analysis of control + passive
- a.  $\lambda z \exists u \text{ ATTACK}(u,z)$   
 $\lambda P \lambda y \text{ PREPARED}(y,P(y))$  *subject control*  
 $\lambda Q \lambda x \exists v \text{ FORCE}(v, x, Q(x))$  *object control*
  - b.  $\lambda y \text{ PREPARED}(y, \exists u \text{ ATTACK}(u,y))$
  - c.  $\lambda x \exists v \text{ FORCE}(v, x, \text{PREPARED}(x, \exists u \text{ ATTACK}(u,x)))$

Antipassive is the mirror-image of the passive; it binds the lowest (rather than the highest) argument existentially, as shown in (17).

- (17)  $\text{ANTIPASS}[\lambda z \dots \text{VERB}(\dots, z)] = \exists z \dots \text{VERB}(\dots, z)$   
 -lr

While the passive is triggered by a particularly high salience status of the lower argument, the antipassive is triggered by a particularly low status of that argument. It is therefore expected to be a less universal operation than passive. Whereas a canonical NOM-ACC verb turns into  $\emptyset$ -NOM by passivization, a canonical ERG-NOM verb turns into NOM- $\emptyset$  by antipassivization. However, similarly to an agent phrase in the passive, the object can be expressed obliquely. Note the aspectual and definiteness shift in the Inuit antipassive.

- (18) Antipassive in South Baffin Inuit (Spreng 2006)
- a. Anguti-up      nanuq                      quqir-jaa.  
    man-ERG      polar.bear.NOM    shoot-PART.3sg>3sg  
    ‘The man shot the polar bear.’

- b. Anguti quqir-si-juq nanu-mik.  
 man.NOM shoot-ANTIP-PART.3sg polar.bear-OBL  
 ‘The man is shooting/shot a polar bear.’

Antipassive also makes an argument accessible to relevant grammatical processes. In the ergative language Chukchi, spoken in Northeast Siberia, relativization is only possible with nominative arguments. If a transitive subject is involved, the verb must be antipassivized in order to make that argument accessible to relativization, consider (19d, b), whereas (19c), based on the active verb, is ungrammatical.

(19) Antipassive and relativization in Chukchi (Polinsky 1994, 2011a)

- a. tumg-e ηinqey rəyegtetew-nin  
 friend-ERG boy.NOM save-AOR.3sg.3sg  
 ‘The friend saved the boy.’
- b. tumgətum ηinqey-ək ine-nyegtele-gʔi *antipassive*  
 friend.NOM boy-LOC ANTIP-save-AOR.3sg  
 ‘The friend saved the boy.’
- c. \* [ηinqey rəyagtala-lʔ-ən] tumgətum  
 boy.NOM save-PTCP-NOM friend  
 (‘the friend that saved the boy’)
- d. [ηinqey-ək ine-nyegtelewə-lʔ-ən] tumgətum *antipassive*  
 boy-LOC ANTIP-save-PTCP-NOM friend  
 ‘the friend that saved the boy’

Although antipassive is found particularly often in ergative languages, it is not restricted to this type of language, just in the same way as passive is not restricted to accusative languages. A language can show both passive and antipassive by means of marked morphemes; an example is given in (20) (from Zoque, spoken in Chiapas, Eastern Central Mexico). One often finds a combination of causative with antipassive, as in (20c), which is the mirror-image of the combination of applicative and passive, seen in (3b,g) in the introduction.

(20) Passive, antipassive, and causative+antipassive in Zoque (Johnson 2000)

- a. huʔc-ʔəm-wə bi wakaš.  
 stab-PASS-COMPL DEF cow  
 ‘(They) killed the cow.’
- b. behča cəm-ʔoy-pa.  
 horse carry-ANTIP-INCOMPL  
 ‘The horses will carry (it).’
- c. miš-yak-keš-ʔoy-wə-ʔam dey.  
 2>1-CAUS-eat-ANTIP-COMPL-NOW now  
 ‘Now you have already fed me.’

## 4.2. Recent developments in the passive of North Germanic languages

In this section, three interesting and still-ongoing innovations regarding passive are briefly discussed: (i) the so-called ‘new passive’ of Icelandic, in which the demotion of the subject is not accompanied by any change of case, (ii) the reinvention of a pure morphological passive in mainland Scandinavian, particularly in Swedish, and (iii) the complex passive in Norwegian and Danish, in which passive simultaneously affects a matrix control verb and its

dependent verb. These three developments have nothing in common, but together, they nicely illustrate the possible variation within passive constructions.

#### 4.2.1. Emergence of a new passive in Icelandic

Icelandic exhibits a canonical passive as well as several sorts of impersonal passive. In the canonical passive, the object of the verb becomes the subject. Accusative objects are shifted to nominative, and the passive participle agrees with the subject (21a). Objects that are lexically marked for dative or genitive retain their case; here, the participle takes the neuter singular form (21b). The same distribution of case and agreement is found if the passive clause begins with an expletive *það* as in (21c); in this case, however, a definiteness effect takes place, that is, the non-initial subject must be indefinite.

##### (21) Canonical passive

- a. maður-inn                      var barinn                      af þjófí-num.  
 man.NOM.msg-DEF    was beaten.NOM.msg    by thief-DEF  
 ‘The man was beaten by the thief.’
- b. Honum var    hrint.  
 he.DAT was    pushed.NEUT  
 ‘He was pushed.’
- c. Það var    strákur              barinn.                      / barinn strákur.  
 it was    boy.NOM.msg beaten.NOM.msg / beaten boy  
 ‘There was a boy beaten.’

The impersonal passive always needs an expletive *það*; it is possible with intransitive verbs (22a), with inherent reflexives (22b), and with various kinds of non-inherent reflexives. This construction did not emerge before the mid-19th century (Árnadóttir, Eythórsson and Sigurðsson 2011).

##### (22) Impersonal passive

- a. Það var dansað alla nóttina.                      intransitive verb  
 it was danced all night  
 ‘There was dancing all night.’
- b. Það var drifið sig á ball.                      itr. reflexive verb  
 it was hurried REFL.ACC to dance  
 ‘There was hurrying off to the dance.’
- c. Það var farið heim til sín.                      itr. verb + reflexive adverbial  
 it was gone home to REFL.GEN  
 ‘There was going home to oneself.’

The latest innovation is the new passive, beginning in the mid-20th century. It always uses the expletive *það*, but differs from the canonical or the impersonal passive in at least three properties: (i) Not only the lexically marked dative and genitive objects, but also the regular accusative objects retain their case; (ii) It is not possible to add an agentive by-phrase; (iii) There is no definiteness effect, that is, definite and indefinite objects are likewise possible.

##### (23) New passive

- a. Það var barið                      strákr/              strákr-inn.  
 it was beaten.NEUT.sg    boy.ACC /boy.ACC-DEF  
 ‘A boy/ the boy was beaten.’
- b. Það var skammað mig.  
 it was scolded me.ACC  
 ‘There was scolding me.’

- c. Það var fengið sér öllara  
 it was got REFL.DAT beer.ACC  
 ‘There was having oneself a beer’

Note that because of case syncretism ambiguities between the canonical and the new passive can arise. In minimally contrasting examples like the following ones it is the definite dative phrase that shows that (24b) is an instance of the new passive.

- (24) Minimal contrast
- a. Það var hrint stelpu. *canonical passive*  
 it was pushed girl.DAT  
 ‘A girl was pushed.’
- b. Það var hrint stelpu-nni. *new passive*  
 it was pushed girl.DAT-DEF  
 ‘The girl was pushed.’

Several proposals have been made about the nature of the new passive and the constructions that served as a model for the change. Maling and Sigurjónsdóttir (2002) assume that the new construction, although it uses passive morphology, is nevertheless an active impersonal with a null thematic subject (*pro*), which developed by extending reflexive impersonal passives to transitive verbs. On the other hand, Eythórsson (2008) and Gísladóttir (2007) argue that the new construction is a ‘true passive’, modeled after those passives that retain lexical case. In any case, it should be clear that some sort of *það*-passive has been extended.

Cross-linguistically, both options are attested. The deponens verbs of Latin show that verbs with passive morphology can become active (*loqu-or* [1sg.PASS] ‘I speak’). On the other hand, Ukrainian impersonal passive is an example where accusative case on the object is preserved (Sobin 1985, Lavine 2005). (Note that Ukrainian *-no/-to*, which differs from the neuter singular *-ne/-te*, is really non-agreeing.)

- (25) Ukrainian impersonal passive of transitive verbs (Lavine 2010)
- a. Kulju roziervano (cvjaxom).  
 balloon.ACC pierced<sub>[-AGR]</sub> (nail.INSTR)  
 ‘The balloon was pierced (by a nail).’
- b. Vazu bulo rozbyto vitrom.  
 vase.ACC was broken<sub>[-AGR]</sub> wind.INSTR  
 ‘The vase was broken by the wind.’

Under what conditions impersonal passives of transitive verbs in languages such as Ukrainian and contemporary Icelandic are preferred to personal passives has still to be explored.

#### 4.2.2. Emergence of a dominant morphological passive in Swedish

The mainland Scandinavian languages (Norwegian, Danish, Swedish) have two productive ways of forming the passive, a morphological way using the suffix *-s*, and a periphrastic way using the auxiliary *bli* ‘become’ together with a passive (perfect) participle. (The ordering verb-PAST-PASS in Swedish is unexpected because passive, a valency operation, usually precedes inflection; on the other hand, since *-s* is an innovation resulting from a former reflexive pronoun, it is expected to be word-final.)

Morphological and periphrastic passives in Norwegian, Danish and Swedish (Engdahl 1999)

- (26) a. Dør-en **åpne-s** utover. *(Norwegian)*  
 door-DEF open-PASS outward

- lit. ‘The door is opened outward.’
- b. \*Dør-en **blir åpne-t** utover.
- (27) a. Der **tale-s** ikke mere dansk i Skåne. (Danish)  
 there speak-PASS no longer Danish in Scania  
 ‘Danish is no longer spoken in Scania.’
- b. Der **bliver** (ofte) **tal-t** dansk i Skåne  
 there is (often) speak-PART Danish in Scania  
 ‘Danish is (often) spoken in Scania.’
- (28) På den tiden **tala-de-s** franska vid hov-ed. (Swedish)  
 at that time speak-PAST-PASS French at court-DEF  
 ‘At that time French was spoken at the court.’

In Norwegian and Danish, the *s*-passive is restricted to the uninflected verb form (infinitive or present), while Swedish has extended the use of *s*-passive to all contexts during the last century. The overall frequency of the *s*-passive is about 50% in Norwegian and Danish, but more than 90% in Swedish. Engdahl (2006) argues that the periphrastic passive in Swedish is now the marked form, which requires that the subject has some control over a change of state.

#### 4.2.3. The complex passive in Norwegian and Danish

In the double or complex passive shown in (a), an object of the lower verb is raised to the subject of the higher verb. The matrix verb is a control verb requiring an infinitive complement; so if it is passivized, the dependent subject is targeted, too. The double passive seems to preserve the control relation between the two verbs. The construction is recursive, as shown in (29b,c).

- (29) Complex passive in Norwegian (Hellan 2001)
- a. Jon ble **forsøk-t skut-t**  
 Jon was attempt-P.PART shoot-P.PART  
 ‘It was made an attempt to shoot Jon.’
- b. Jon ble **love-t forsøk-t skut-t**  
 Jon was promised attempted shot  
 ‘It was promised that there would be an attempt to shoot Jon.’
- c. Jon ble **påståt-t love-t forsøk-t skut-t**  
 Jon was claimed promised attempted shot  
 ‘It was claimed that it was promised that there would be an attempt to shoot Jon.’

The initial verb can be in the *bli* passive or *s*-passive, all later verbs, however, must have the participial form with *-t*. Interestingly, the final verb also can be an active participle, undistinguishable from the passive participle (a). Moreover, the final active participle also can go together with an auxiliary, as in (30b).

- (30) Complex passive based on active participles (Hellan 2001)
- a. Jon **påstå-s frykte-t omkomme-t**  
 Jon claim-PASS fear-P.PART perish-A.PART  
 ‘It is claimed that it is feared that Jon has perished.’
- b. Jon **påstå-s frykte-t å ha lest bok-en**  
 Jon claim-PASS feared to have read book-DEF  
 ‘It is claimed that it is feared that Jon has read the book.’

In every case, the complex passive construction has a common argument that raises successively from the lowest (the last) verb into the matrix clause. Notice that the raised argument expression can also end as the object (rather than subject) of the matrix verb participle (31).

Moreover, the participle phrase can be used as an attribute of a noun, where the raised argument is coreferenced with the head noun.

- (31) Complex passive in a subject-to object raising context  
 Jeg har ofte sett ham **forsøk-t introduser-t** for direktøren.  
 I have often seen him attempt-P.PART introduce-P.PART for the director  
 ‘I have often seen attempts at introducing him for the director.’
- (32) Complex passive in an attribute phrase  
 en ofte **forsøk-t skut-t** bjørn  
 an often attempted shot bear

Danish has the complex passive construction, too (with slightly different restrictions that cannot be discussed here).

- (33) Complex passive in Danish (Ørsnes 2006)
- a. Bil-en **forsøge-s reparere-t**.  
 car-DEF try-PASS repair-P.PART
  - b. Bil-en blev **forsøg-t reparere-t**.  
 car-DEF was tried repaired
  - c. Bil-en blev **love-t forsøg-t reparere-t**.  
 the.car was promised tried repaired  
 ‘A promise was made to try to repair the car.’

The following example shows that the complex passive is also possible with subject-to-object raising verbs.

- (34) Double participles with subject-to-object raising verbs in Danish (Ørsnes 2006)
- a. Man forventer forslag-et vedtage-t  
 you expect proposal-DEF adopt-P.PART  
 ‘You expect the proposal to be adopted.’
  - b. Forslag-et forvente-s vedtage-t.  
 proposal-DEF expect-PASS adopt-P.PART  
 lit. ‘The proposal is expected to be adopted.’

The complex passive construction can be compared with the remote passive found with German control verbs, as in (35).

- (35) Remote passive in German (Müller 2003)  
 weil der Wagen oft zu reparieren versuch-t wurde  
 because the.NOM car often to repair try-P.PART was  
 ‘because many attempts were made to repair the car’

Here, the matrix verb is passivized, and simultaneously, the object of the embedded verb is advanced to subject, as if this verb were passivized. Müller (2003) argues that this effect is the consequence of complex predicate formation, consider (36), a reformulation of Müller’s HPSG-analysis. Assume that (36a) represents the lexical entry for a subject-control verb, and (36) represents the complex verb formed with REPAIR, whereby the embedded object becomes the object of the complex verb. The passive morphology only attaches to the matrix verb, and the object shifts to the subject of the whole complex. Note that coindexation of controller and controllee in the lexical entry guarantees that both subjects simultaneously are bound existentially.

- (36) (Remote) passive of a complex verb in German
- a.  $\lambda V \lambda x \text{ TRY}(x, V(x))$  *subject-control*
  - b.  $\lambda y \lambda x \text{ TRY}(x, \text{ REPAIR}(x,y))$  *complex verb formation*
  - c.  $\text{PASS} [\lambda y \lambda x \text{ TRY}(x, \text{ REPAIR}(x,y))] =$  *passive*  
 $\lambda y \exists x \text{ TRY}(x, \text{ REPAIR}(x,y))$

This account is not possible for the complex passive in the Scandinavian languages because it gives no motivation for the distribution of the passive morphology to both verbs. Let us instead assume that the control condition is separately stated, which blocks the formation of a complex verb by a simple application, see (37a). In the next step, the control verb is applied to REPAIR, still with an additional identity condition for the two subjects (37b). Then, if the passive is applied, it must be distributive; otherwise, the identity condition might be violated. (Intuitively,  $z=x$  requires that everything that happens to  $x$  should also happen to  $z$ .) In a medial step, the embedded object is allowed to raise into the matrix. The final result, shown in (37c), is identical with what one gets in the German case.

- (37) Distributed passive for a subject-control verb in Norwegian and Danish
- a.  $\lambda V \lambda x \text{ TRY}(x, \lambda z V(z)) \ \& \ z=x$  *subject control*
  - b.  $\{\lambda x \text{ TRY}(x, \lambda y \lambda z \text{ REPAIR}(z,y)) \ \& \ z=x\}$  *composition*
  - c.  $\text{PASS} \{\lambda x \text{ TRY}(x, \lambda y \lambda z \text{ REPAIR}(z,y)) \ \& \ z=x\} =$  *passive*  
 $\text{PASS} \{\lambda x \text{ TRY}(x, \text{PASS} \lambda y \lambda z \text{ REPAIR}(z,y)) \ \& \ z=x\}$  *distribution of passive*  
 $\{\exists x \text{ TRY}(x, \lambda y \exists z \text{ REPAIR}(z,y)) \ \& \ z=x\} =$  *application of passive*  
 $\{\lambda y \exists x \text{ TRY}(x, \exists z \text{ REPAIR}(z,y)) \ \& \ z=x\} =$  *raising*  
 $\lambda y \exists x \text{ TRY}(x, \text{ REPAIR}(x,y))$

The complex passive is also possible with object-control verbs such as ‘ask for’, ‘order’, ‘forbid’.

- (38) Complex passive with an object-control verb in Danish (Ørsnes 2006: (32))  
 Den gule stjer-ne blev af nazister-ne **påbud-t bære-t** af alle jøder.  
 the yellow star-DEF was by nazis-DEF order-P.PART bear-P.PART by all jews  
 lit. ‘The yellow star was ordered by the nazis to be born by all jews.’

If one represents these verbs as in (39a) and distributes the passive on both verbs, one finally gets the result shown in (39b).

- (39) Distributed passive for an object-control verb
- a.  $\lambda V \lambda x \text{ ORDER}(x, y, \lambda z V(z)) \ \& \ z=y$
  - b.  $\text{PASS} \{\lambda x \text{ ORDER}(x, y, \lambda u \lambda z \text{ BEAR}(z,u)) \ \& \ z=y\} =$   
 $\text{PASS} \{\lambda x \text{ ORDER}(x, y, \text{PASS} \{\lambda u \lambda z \text{ BEAR}(z,u)\}) \ \& \ z=y\} =$   
 $\lambda u \exists x \text{ ORDER}(x, y, \exists z \text{ BEAR}(z,u)) \ \& \ z=y\}$

In this case the two subjects are independent of each other, as also evidenced by the two agent phrases in (38). There is therefore less reason for distributing the passive morphology to both verbs. Perhaps one might argue that the complex passive is the only way to realize the embedded object as the topic of the construction. Note that German does not allow the remote passive with an object-control verb.

- (40) Passive of an object-control verb in German
- a. \* Der gelbe Stern wurde zu tragen befohlen.  
the.NOM yellow star was zu bear ordered
  - b. Den gelben Stern zu tragen wurde befohlen.  
the.ACC yellow star to bear was ordered

### 4.3. Reflexive, reciprocal, and noun incorporation

Another valency-decreasing operation is the lexical reflexive, using an affix. It establishes an anaphoric relationship by identifying a lower argument with the highest one. Such an operation is distinct from using a reflexive anaphora (such as *themselves*) in the syntax (see Reinhart and Siloni 2005).

- (41)  $\text{REFL} [\lambda z \dots \lambda x \text{VERB}(x, \dots, z)] = \lambda x \text{VERB}(x, \dots, x)$   
+lr      -lr                                      -lr

The lexical operation also allows to opt for a possessor reflexive. (42a) shows the canonical case, in which a transitive verb is detransitivized. In (42b) however, the verb remains transitive; in this case a possessor is added to the core arguments (which makes the verb ditransitive) and is then identified with the highest argument. In general, reciprocal functions similarly, but has a more complex semantics: the antecedent  $X$  must be plural and must receive a distributed interpretation, and any  $x \in X$  is paired with some (or every)  $y \in X$ , where  $y \neq x$ . Interestingly, (42c) illustrates a case in which the reciprocal morpheme must be combined with the reflexive in order to unfold its full semantics.

- (42) Reflexive and Reciprocal in Bolivian Quechua (van de Kerke 1996: 160, 146)
- a. Pedru maylla-ku-n  
P wash-REFL-3sg  
'Pedro washes himself.'  
 $\text{REFL}[\lambda y \lambda x \text{WASH}(x,y)] = \lambda x \text{WASH}(x,x)$
  - b. Pedru uya-n-ta maylla-ku-n  
P face-3sg-ACC wash-REFL-3sg  
'Pedro washes his (own) face.'  
 $\text{REFL}[\lambda z \lambda y \lambda x \{ \text{WASH}(x,z) \ \& \ \text{POSS}(y,z) \}] = \lambda z \lambda x \{ \text{WASH}(x,z) \ \& \ \text{POSS}(x,z) \}$
  - c. maylla-na-ku-yku  
wash-REC-REFL-1pl  
'We wash each other.'

Incorporation is quite a different type of valency-reducing; in this case, an argument is realized by a morphologically integrated nominal predicate. For instance, a noun can be prefixed to the verb stem (as in *klavierspielen* 'piano-playing'), so that this noun predicates of the lowest argument of the verb. Van Geenhoven (1998) analysed incorporated nouns as predicative indefinites. Formally, one can assume an operation that takes two elements in the input, a noun and a verb, and produces a coherent verb reading by argument identification, see (43).

- (43)  $\text{INCORP} \langle \lambda v \text{NOUN}(v), \lambda z \dots \text{VERB}(\dots, z) \rangle = \exists z \dots \{ \text{VERB}(\dots, z) \ \& \ \text{NOUN}(z) \}$   
-lr

This analysis suggests that noun incorporation always leads to a general or unspecific reading; however, some languages also allow a specific reading of the incorporated noun, as in (44a),



where a demonstrative is ‘stranded’. Its referent has to be identified with the entity that the N-V complex is predicating of, see (44b).

- (44) Noun incorporation with definite reading in Southern Tiwa (Baker 1988: 93)
- a. Yede a-seuan-mu-ban.  
that 2sg-man-see-PAST  
‘You saw that man.’
  - b.  $R(\text{‘that’}) = \iota z \{SEE(you, z) \& MAN(z)\}$ .

Only the lowest argument can be incorporated – probably because canonical  $\lambda$ -application takes place, affecting the lowest  $\theta$ -role first. Thus, a ditransitive verb incorporates the theme, not the recipient.

- (45) ‘give’ in Southern Tiwa (Baker 1988: 110)
- Ka-‘u’u-wia-ban.  
1sg>2sg-baby-give-PAST  
‘I gave you the baby.’  
 $\lambda y \lambda x \lambda e \exists z \{ \{ACT(x) \&_{CAUS} BEC POSS(y, z)\} \& BABY(z)\}(e)$

Noun incorporation cannot be iterated directly, but it is possible to have more than one cycle of operations, such as incorporation + causative in (46). This generates the complex meaning given in (46b).

- (46) Cyclic incorporation in Halkomelem (Salish, Gerds 2004: 215)
- a. ni? ?ə č sq-əəlcəp-st=ənəq-stəx<sup>w</sup>  
AUX Q 2SUBJ cut-wood-CAUS-person-CAUS  
‘Did you have him have people cut firewood?’
  - b.  $\lambda u \lambda v \lambda e \{ACT(u) \& \exists x \{ACT(v) \& \exists y \{CUT(x, y) \& WOOD(y)\} \& PERSON(x)\}\}(e)$

Noun incorporation creates a configuration where other arguments can function as the object or subject: an instrument (47a), a possessor (47b,c), or a goal (47d). A transitive verb is detransitivized in (47a,b), and then undergoes instrumental or possessor applicative (see next section), becoming again transitive. Even an intransitive verb can incorporate (47c,d), and becomes again intransitive when it undergoes possessor or goal applicative. (The bracketings in the semantic representations show the ordering of operations. It is open to discussion, whether the possessor is introduced by an applicative or inherited from the incorporated possessed noun.)

- (47) Noun incorporation, followed by an invisible applicative (Baker 1988: 128,96,107)
- a. Kua ta fakatino he tama e malala. *Niue (Polynesian)*  
PERF-draw-picture ERG-child NOM-charcoal  
‘The child has been drawing pictures with a charcoal.’  
 $\lambda z \lambda x \lambda e \{ \exists y \{DRAW(x, y) \& PICTURE(y)\} \& INST(z)\}(e)$
  - b. Wa-hi-nuhs-ahni:nu: John. *Oneida (Iroquoian)*  
PAST-1sg>3m-house-buy John  
‘I bought John’s house.’  
 $\lambda z \lambda x \lambda e \{ \exists y \{BUY(x, y) \& (HOUSE(y)) \& POSS(z, y)\}\}(e)$
  - c. Hrao-nuhs-rakv ne sawatis. *Mohawk (Iroquoian)*  
3m-house-white DET John  
‘John’s house is white.’  
 $\lambda y \lambda e \{ \exists x \{WHITE(x) \& (HOUSE(x)) \& POSS(y, x)\}\}(e)$

- d. Am-seuan-wan-ban liora-n. *Southern Tiwa (Kiowa-Tanoan)*  
 3pl-man-come-PAST lady-pl  
 ‘The man came to the ladies.’  
 $\lambda y \lambda e \{ \exists x \{ \text{COME}(x) \ \& \ \text{MAN}(x) \} \ \& \ \text{GOAL}(y) \}(e)$

Note that noun incorporation is also productive in Swedish, where it allows to introduce another participant as the direct object: *Läkaren hjärt-opererade patienten* ‘The doctor heart-operated the patient’ (Mellenius 1996).

## 5. Valency-increasing operations

### 5.1. Causative and similar operations

Valency-decreasing always binds an existing argument, so the semantic core remains unaffected. By contrast, valency-increasing adds an argument as well as a licensing predicate, so the semantic core itself is enlarged. Either a higher predicate together with a higher argument is added, or a lower predicate together with a lower argument. A prototypical instance of the former type of operations is the causative, whereas various sorts of applicative are characteristic for the latter type of operations.

The causative adds a causer, who instigates the event expressed by the basic verb, either by direct coercion, or more indirectly by giving an order or admitting a certain course of affairs. Some version of causative is found in nearly every language, and many languages have more than one type of causative (differing morphosyntactically and often also in their finer semantic aspects).

It is disputed in the literature whether the causative has to be represented explicitly by the predicate CAUSE (and whether this CAUSE is a relation between two events or between an entity and an event), or whether the causal relationship can be inferred from the lexical combination of an action predicate with another, simpler predicate (see, e.g., the different views advocated by Bierwisch 2002 vs. Wunderlich 2000, 2012). For the purposes of this article, I use the notion  $\&_{\text{CAUSE}}$ , taken as a contextually-induced reading of the connector AND. (Notice that  $\&_{\text{CAUSE}}$  is asymmetric, just like  $\&$  itself, when used in a lexical decomposition from which argument hierarchy is derived.) Moreover, the causative usually gets a factive reading, which is expressed by existential binding of the verb’s original event variable.

$$(48) \quad \text{CAUS} [\lambda e' \text{ VERB}(\dots)(e')] = \dots \lambda x \lambda e \{ \text{ACT}(x) \ \&_{\text{CAUSE}} \ \exists e' \text{ VERB}(\dots)(e') \}(e)$$

In a typical causative formed from a transitive verb the causee becomes the medial argument; it is marked dative in an accusative language such as Japanese (see below (54a)), as well as in an ergative language such as Basque (49).

- (49) Causative in Basque (Joppen and Wunderlich 1995: 145)  
 Ama-k          haurr-a-ri          zopa          jan-eraz-i          dio.  
 mother-ERG    child-DET-DAT    soup.NOM    eat-CAUS-PERF    have.3N.3sgD.3sgE  
 ‘Mother let the child eat the soup’  
 $\lambda z \lambda y \lambda x \lambda e \{ \text{ACT}(x) \ \&_{\text{CAUSE}} \ \exists e' \text{ EAT}(y,z)(e') \}(e)$

In a double object construction the causee is realized as the primary object (which can become the subject under passive, can be co-indexed with an object affix, etc.). Besides this unmarked option, illustrated in (50a), there is also a marked option, in which the causee is obliquely realized and does not function as a structural object (50b). Such a marked option is found in various languages, even in those that otherwise have a dative; in Hungarian, for instance, it can be captured by the assumption that the causative morpheme lexically assigns instrumental case (51b).

- (50) Causative variation in Bantu: Chimwiini (a) vs. Chichewa-A (b) (Baker 1988: 183,163)
- a. Mwa:limu Ø-wa-andik-ish-ize wa:na xati.  
 teacher SU-OB-write-CAUS-ASP children letter  
 ‘The teacher made the children write a letter.’
- b. Anyani a-na-wa-meny-ets-a ana kwa buluzi.  
 baboons SU-PAST-OB-hit-CAUS-ASP children to lizard  
 ‘The baboons made the lizard hit the children.’
- (51) Medial arguments in Hungarian (Wunderlich 2002)
- a. Anna Péter-nek adott egy könyv-et.  
 A. P.-DAT gave a book-ACC  
 ‘Anna gave a book to Peter.’
- b. Anna könyv-et olvas-tat Péter-rel.  
 A. book-ACC read-CAUS P.-INST  
 ‘Anna has Peter read a book.’

The periphrastic causative is a construction formed with an object control verb, such as *force*, *make*, or *let* (*force him to go*, *make him go*, *let him go*). Such a verb adds two arguments, whereby it identifies the object with the subject of a dependent (infinitive) clause (52a). It would, therefore, be unexpected that a single morphological operation produces an object control configuration, as proposed by Alsina 1992 (see also Matsumoto 1998).

- (52) Periphrastic vs. morphological causative
- a.  $\lambda P \lambda y \lambda x \text{FORCE}(x,y,P(y))$
- b.  $\lambda p \lambda x \{ \text{ACT}(x) \ \&_{\text{CAUSE}} \ p \}$

A few languages have operations that add a highest argument in a function distinct from causer. One such operation is the assistive in Quechua. (53) shows that causative and assistive are structurally alike in Quechua: either a causer or a helper is added as the highest argument. Note that a helper does not necessarily contribute an additional event because she is involved in the same type of action as the helpee. (Quechua lacks a dative, therefore all objects are realized as accusative; object agreement on the verb refers to the highest object, which is the causee or helpee in these cases.)

- (53) Causative and Assistive in Bolivian Quechua (van de Kerke 1996: 153, 157)
- a. mama-y Maria-ta maylla-chi-wa-rqa  
 mother-1sg Mary-ACC wash-CAUS-1A-PAST  
 ‘My mother made me wash Maria.’  
 $\lambda z \lambda y \lambda x \lambda e \{ \text{ACT}(x) \ \&_{\text{CAUSE}} \ \text{WASH}(y,z) \} (e)$
- b. mama-y Maria-ta maylla-ysi-wa-rqa  
 mother-1sg Mary-ACC wash-ASS-1A-PAST  
 ‘My mother helped me to wash Maria.’  
 $\lambda z \lambda y \lambda x \lambda e \{ \text{HELPER}(x) \ \& \ \text{WASH}(y,z) \} (e)$

Another operation that adds a highest argument is the affective in Japanese. That causative and affective are structurally alike is shown in (54a,b). Although the affective is formed with the same suffix (*-are*) as the passive and is therefore traditionally called ‘indirect passive’, its argument structure is clearly distinct from that of a passive (54c). (Note that *-ni* functions both as dative and as adverbial postposition.)

- (54) Causative, affective and passive in Japanese (Washio 1995: 6)
- a. John-ga Mary-ni tokei-o nusum-ase-ta.  
 John-NOM Mary-DAT watch-ACC steal-CAUS-PAST  
 ‘John let Mary steal a watch.’  
 $\lambda y \lambda x \lambda u \lambda e \{ACT(u) \&_{CAUSE} STEAL(x,y)\}(e)$
- b. John-ga Mary-ni tokei-o nusum-are-ta.  
 John-NOM Mary-DAT watch-ACC steal-AFF-PAST  
 ‘John had a watch stolen by Mary.’  
 = ‘John was affected by Mary stealing (his) watch.’  
 $\lambda y \lambda x \lambda u \lambda e \{AFF(u) \& STEAL(x,y)\}(e)$
- c. Tokei-ga Mary-ni nusum-are-ta.  
 watch-NOM Mary-BY steal-PASS-PAST  
 ‘The watch was stolen by Mary.’  
 $\lambda y \lambda e \exists x STEAL(x,y) (e)$

In Korean, the morphological causative and passive use the same suffix *-i* (or *-hi*, *-li*, *-ki*, depending on the phonological context), so (55) is ambiguous; here, the passive reading is only possible with an inalienable possession. (Note that Korean also has a light-verb passive and a periphrastic passive.)

- (55) Ambiguity between Korean causative and passive (Kim and Pires 2003).
- John-i/nun Mary-eykey meli-ul kkakk-i-ess-ta.  
 J.-NOM/TOP M.-DAT hair-ACC cut-CAUS/PASS-PAST-DECL
- (i) ‘John had Mary cut the hair.’ (John’s or someone else’s hair) *Causative*  
 (ii) ‘John was cut his hair by Mary.’ *Passive*

## 5.2. Applicative

For operations that add a non-highest argument, the term ‘applicative’ is used as a collective name; the added argument can be a recipient, possessor or beneficiary, a location or source, an instrument, a companion or some other participant of an event. In some languages, a single morpheme encodes all these semantic roles, while other languages have several distinct morphemes. The general scheme of applicatives when applied to a transitive verb is given in (56). (Whether BECOME is present or not depends on further circumstances, especially on the dynamics of the verb.)

- (56)  $APPL [VERB(x,y)] = VERB(x,y) \& POSS(z,y)$  ‘z is (or becomes) a possessor of y’  
 $\& LOC(y \text{ AT } z)$  ‘y is (or becomes) located at z’  
 $\& INST(z,y)$  ‘z operates as an instrument on y’

In principle, the operation is possible with ditransitive verbs, too. Some applicatives also apply to intransitive verbs; they then characterize a relation with the intransitive subject, or just a further participant of the event. Applied objects can also stand in a manner, comitative or sociative relation. In any case, the subject remains the same.

The most prototypical instance of applicative is the benefactive alternation, shown in (57); here, the transitive verb ‘buy’ becomes ditransitive by means of the applicative suffix *-kan* in (57b). Following Baker (1988), one might say that the preposition ‘for’ is incorporated into the verb, so that the prepositional object becomes a direct argument of the verb. However, since *untuk* ‘for’ and the applicative *kan* are quite distinct morphemes, ‘incorporation’ would have to be understood in a rather abstract sense. Conceptually it is more convenient to consider the applicative as a way of expressing further participants, independently of whether

corresponding prepositional means exist. Thus, the relationship between (57a) and (57b) is purely semantical, not generative; the applicative applies to the verb, not to a syntactic construction. The predicate variable ‘P’ in (57a) serves as a placeholder for the prepositional phrase, which could also be ‘with’, ‘in’, etc. Even if one concedes that the applicative could have a comitative rather than a benefactive meaning, the verb in (57b) is more specific than that in (57a) because it has a third structural argument.

(57) Benefactive alternation in Bahasa Indonesia (Chung 1976)

- a. Ali memi televisi untuk ibu-nja.  
 Ali TR.buy television for mother-his  
 ‘Ali bought a television for his mother.’  
 $\lambda P \lambda z \lambda x \lambda e \{BUY(x,z) \& P(z)\}(e)$  (57)
- b. Ali mem-beli-kan ibu-nja televisi.  
 Ali TR-buy-APPL mother-his television  
 ‘Ali bought his mother a television.’  
 $\lambda z \lambda y \lambda x \lambda e \{BUY(x,z) \& BECOME POSS(y,z)\}(e)$

Note that some German prepositions have developed to prefixes, which seems to support Baker’s incorporation hypothesis (*er fuhr um den Park – er umfuhr den Park* ‘he drove around the park’), see also (3b,f) above. Prefixes and particles are widely used as applicative markers in the Germanic and Slavic languages (see Stiebels 1996, Olsen 1997, Rojina 2004), however, the benefactive expressed by a dative or primary object is not marked on the Indo-European verb.

To illustrate how widely applicative constructions vary cross-linguistically, I will briefly discuss examples from three non-related languages: Maasai (Maa) (an Eastern Nilotic language spoken in southern Kenya and northern Tanzania), Halkomelem (a Salish language spoken in southwestern British-Columbia), and the Bantu-language Kinyarwanda (spoken in Rwanda). (The Maasai people had contact with Bantus for centuries, but taken their military strength in the past as well as their general mental attitude, it is unlikely that they have borrowed from Bantu.)

Maasai has two general applicative morphemes: (i) the dative applicative *-aki(n)* (together with some allomorphs in the perfective), which adds a benefactive or goal argument, and (ii) the instrumental applicative *-ié(k)*, which adds an instrument, associative, locative or agent role. Both can be attached to intransitive, transitive and ditransitive verbs, and appear also in the combination DAT-INSTR. The additional argument is always a core argument, due to the following tests: It can pronominally be indicated by one of the verb prefixes that encode a transitive relation; as an NP it appears with the accusative tonal pattern; in the passive/middle it appears as subject (marked by a pronominal prefix or with nominative tonal pattern). Obligatory for the Maasai verb is only the pronominal prefix marking the subject; with a 1sg or 2sg object a so-called inverse prefix marks both subject and object: *áá-* for 1sg>2sg, *áa-* for 3>1sg, and *kí-* for 2>1sg or 3>2sg. All objects can be realized by an accusative NP, regardless of whether they belong to the root or are added by an applicative; in principle, either one of them can become nominative in the passive/middle. It is possible to have four explicit NP arguments. Oblique arguments are introduced with the preposition *tɛ*.

(58) Applicatives in Maasai (Lamoureaux 2004: 64, 40, 41, 54)

- a. e-ton-íék-ì.  
 3sg-sit-INST-MED  
 ‘It will be used to sit.’
- b. áa-iger-óki m-pálái  
 3>1sg-write-DAT fsg-letter.ACC

- ‘He will write a letter to/for me.’
- c. áá-ishɔ-ɔkí            kanisa  
1sg>2sg-give-DAT    church.ACC  
‘I will give it to the church for you.’
- d. ε-súj-íé                εν-κεράί            εν-κίτηη            e-ηúdi            εν-tím  
3-follow-DAT-INST    fsg-child.NOM    fsg-cow.ACC    fsg-stick.ACC    fsg-forest.ACC  
‘The child will use the stick to follow the cow into the bush.’

All three objects of a DAT-INST combination can potentially be middle subjects (59b-d); thus Maasai is a language with symmetric objects (see Bresnan and Moshi 1990).

- (59) Symmetric middle in Maasai (adapted from Lamoureaux 2004: 95)
- a. e-duη-ókín-yìè            in-kírí            ɔl-álεm            en-kitók  
3-cut-DAT-INST            fpl-meat.ACC    msg-knife.ACC    fsg-woman.ACC  
‘He will cut meat with the knife for the woman.’
- b. e-duη-ókín-óré            in-kírí            ɔl-álεm            en-kítok  
3-cut-DAT-INST.MID        fpl-meat.ACC    msg-knife.ACC    fsg-woman.NOM  
‘The woman will cut meat for herself with the knife.’
- c. e-duη-ókín-óré            in-kírí            ɔl-alεm            en-kitók  
3-cut-DAT-INST.MID        fpl-meat.ACC    msg-knife.NOM    fsg-woman.ACC  
‘The knife is used to cut meat for the woman.’
- d. e-duη-ókín-óré            in-kírí            ɔl-álεm            en-kitók  
3-cut-DAT-INST.MID        fpl-meat.NOM    msg-knife.ACC    fsg-woman.ACC  
‘The meat is cut with the knife for the woman.’

Interestingly, the instrumental applicative also serves as causative; in this function it introduces a dependent agent role rather than the causing agent. This can easily be seen from the examples below: a machete is a good instrument for felling a tree (60a), while children achieve the instrumental role when they are told to do the action (60b). Thus, the Maasai causative does not introduce the causer but the causee. This is even true where other languages have a lexical causative; compare ‘look.at’ and ‘show’ in (60c,d). (60e) shows nicely the kind of ambiguity that can arise.

- (60) Instrumental vs. causative use of the applicative (Lamoureaux 2004: 80, 74; the ventive expresses a motion towards the point of reference)
- a. e-ur-íé                    ɔl-pánkà            ɔl-catá  
3-make.fall-INST    msg.machete.ACC    msg-tree.ACC  
‘He will use the machete to fell the tree.’
- b. e-ur-íé                    iη-κερά            il-paék  
3sg-make.fall-INST    fpl-children.ACC    mpl-corn.ACC  
‘He will make the children bend the corn.’
- c. á-íηɔr-ìè                ɔl-ηátúny            ɔl-tɔrɔbíní  
1sg-look.at-INST    msg-lion.acc    msg-binoculars.acc  
‘I will look at the lions with the binoculars.’
- d. á-íηɔr-ìè                ɔl-ηátúny            ɔl-payían  
1sg-look.at-INST    msg-lion.acc    msg-man.acc  
‘I will show the man the lions.’
- e. á-ínɣàη-un-íé            εν-κίτηη  
1sg-buy-VENT-INST    fsg-cow.ACC  
(i) ‘I will use something (e.g. money) to buy a cow.’

(ii) ‘I will make him/her buy a cow.’

Quite different from Maasai is Salish, a family of 23 languages spoken in British Columbia and northwest USA. Only up to two core arguments are possible, all others are marked as oblique. All Salish languages distinguish at least two (classes of) applicative morphemes: APPL1 (called *relational*), adding an object to an intransitive verb, and APPL2 (called *redirectional*), adding an object to a transitive verb, whereby the former object becomes oblique (Kiyosowa 2006, Kiyosowa and Gerdts 2010). For instance, psych predicates are usually intransitive, and become transitive either by APPL1 (with the applied object as stimulus) or by the causative, as shown in (61). (The suffix *-t* is here a transitivity marker (TR), not a valency-changing morpheme.)

(61) Intransitive psych verbs in Halkomelem (Geerdts and Kiyosawa 2005: 334,339)

- a. cəq-me-t                      č                      ceʔ                      k<sup>w</sup>θə                      nəcəwməx<sup>w</sup>.  
surprise-APPL1-TR    2sgSUBJ    FUT    DET    visitor  
‘You will be surprised at the visitors.’
- b. niʔ    cən                      siʔsiʔ-meʔ-t                      k<sup>w</sup>θə                      sq<sup>w</sup>əmey  
AUX    1sgSUBJ    frighten-APPL1-TR    DET    dog  
‘I was frightened at the dog.’
- c. niʔ    cən                      siʔsiʔ-stəx<sup>w</sup>                      k<sup>w</sup>θə                      sməyəθ  
AUX    1sgSUBJ    frighten-CAUS    DET    deer  
‘I frightened the deer.’

‘Give’ is basically a 2-place verb, the recipient is only added by means of APPL2, thus, the theme argument is demoted.

(62) Applicative with transitive verbs in Halkomelem (Gerdts 1988: 101,233)

- a. ni    ʔám- əs-t-əs                      k<sup>w</sup>θə John    ʔə k<sup>w</sup>θə púk<sup>w</sup>.  
AUX    give-APPL2-TR-3SUB    DET John    OBL DET book  
‘He gave John the book.’
- b. ni    ʔám- əs-t-əm                      k<sup>w</sup>θə John ʔəλ Mary    ʔə k<sup>w</sup>θə púk<sup>w</sup>.  
AUX    give-APPL2-TR-PASS    DET John    OBL Mary    OBL DET book  
‘John was given the book by Mary.’

The applicative can also follow the causative, cf. (72), where ‘eat’ is basically intransitive. In any case, the number of core arguments cannot exceed two, at any stage of derivation.

(63) Causative + applicative in Comox (Watanabe 2003: 250, cited in Kiyosawa 2006: 196)

- ʔiltən-st-aʔam-θi                      t<sup>θ</sup>əm                      ʔə    tə                      čuy.  
eat-CAUS-APPL2-TR.2sgOBJ    1sgSUBJ.FUT    OBL    DET    child  
‘I will feed the child for you.’

The applicatives in the Bantu languages, particularly those in Kinyarwanda, are since Kimenyi (1980) the topic of various theoretical discussion (Baker 1988, Marantz 1984, 1993, Bresnan and Moshi 1990, Pylkkänen 2008, McGinnis and Gerdts 2003, Mc Ginnis 2005, 2008 etc.). Some applicative variants of Kinyarwanda are illustrated in (64a-c); here, benefactive, possessor-raising, and instrumental applicative are marked by different suffixes. As can be seen, *-iish* is ambiguous; similarly to Maasai it either marks instrumental applicative or causative (64c, d). The reading depends on the sortal properties of the complements: usually a

child but not a piece of soap is washed, while soap but not a child can be an instrument of washing.

(64) Applicatives in Kinyarwanda (Polinsky and Kozinsky 1992)

- a. umugóre y-a-som-e-ye umwáana igitabo.  
 woman 3sg-PAST-read-APPL-PERF child book  
 ‘The woman read the book to the child.’ (benefactive appl)
- b. umugabo a-ra-kikir-ir-a umugóre umwáana.  
 man 3sg-PRES-hold-APPL-IMPF woman child  
 ‘The man is holding the woman’s child.’ (possessor-raising appl)
- c. umugóre y-Ø-uhag-iish-ije umwáana isábune.  
 woman 3sg-PAST-wash-APPL-PERF child soap  
 ‘The woman washed the child with soap.’ (instrumental appl)
- d. umugóre y-Ø-uhag-iish-ije umukoóbwa umwáana.  
 woman 3sg-PAST-wash-CAUS-PERF girl child  
 ‘The woman made the girl wash the child.’ (causative)

The different sorts of applicative behave differently in Kinyarwanda: benefactives are symmetric, while locatives are asymmetric. More precisely, in the benefactive applicative either object can become subject under passive or be realized with an object marker on the verb, while in the locative applicative only the applied object (the respective location) can become subject under passive or be realized with an object marker (65, 66). The object markers are similar to the class markers CL for the subject. Note that also the morpheme ordering in the locative differs from that in the benefactive in that the locative marker *-ho* follows the aspect marker; however, I don’t think that this is relevant for the different grammatical potential. (The data are reported by Kimenyi 1980, McGinnis 2001, Jeong 2006, and many others.)

(65) Passive of Kinyarwanda applicatives

Benefactives

- a. Umukoóbwa a-ra-andik-ir-w-a íbárúwa n’úmuhuúngu.  
 girl 3sg-PRES-write-APPL-PASS-ASP letter by boy  
 ‘The girl is written the letter for by the boy.’
- b. Íbárúwa i-ra-andik-ir-w-a umukoóbwa n’úmuhuúngu.  
 letter CL-PRES-write-APPL-PASS-ASP girl by boy  
 ‘The letter is written for the girl by the boy.’

Locatives

- c. Ishuûri ry-oohere-j-w-é-ho igitabo n’úmwáalímu.  
 school CL-send-ASP-PASS-ASP-LOC book by teacher  
 ‘The school was sent the book by the teacher.’
- d. \*Igitabo cy-oohere-j-w-é-ho ishuûri n’úmwáalímu.  
 book CL-send-ASP-PASS-ASP-LOC school by teacher  
 ‘The book was sent to school by the teacher.’

(66) Object markers in Kinyarwanda applicatives

Benefactives

- a. Umugóre a-rá-mu-he-er-a ímbwa ibíryo.  
 woman 3sg-PRES-OBJ-give-APPL-ASP dog food  
 ‘The woman is giving food to the dog for him.’



- b. Umugóre a-rá-bi-he-er-a umugabo ímbwa.  
 woman 3sg-PRES-OBJ-give-APPL-ASP man dog  
 ‘The woman is giving it to the dog for the man.’
- Locatives
- c. Úmwáalímu y-a-ry-oohere-jé-ho igitabo.  
 teacher 3sg-PAST-OBJ-send-ASP-LOC book  
 ‘The teacher sent the book to it.’
- d. \*Úmwáalímu y-a-cy-oohere-jé-ho ishuûri.  
 teacher 3sg-PAST-OBJ-send-ASP-LOC school  
 ‘The teacher sent it to school.’

A possible explanation for this different behavior might go as follows. Let us assume that a locative semantically always adds LOC(y,z) to the event, where z is the location and y another argument of the verb; thus, the added argument is always the lowest one. By contrast, what the benefactive adds might be cognized in two different ways: (i) it simply adds a benefactive to the event, i.e., BEN(z), where the added argument is again the lowest one, or (ii) it adds a possessor-relation to another argument of the event, i.e. POSS(z,y); here, the added argument is not the lowest one. Let us further assume that only the lowest argument can become subject under passive or indicated with an object prefix; then, the distribution in (65) and (66) automatically follows. In other words, in the symmetric benefactives two different analyses are possible.

Pylkkänen (2002/2008) distinguishes between high and low applicatives: low applicatives establish a semantic (possessor) relation between two individual arguments, such as a recipient and a theme, while high applicatives establish a semantic relation between an individual and an event; syntactically, the low applicative is contained within the verbal phase (VP), whereas the high applicative operates above of it. In the above-used notation, ‘& POSS(z,y)’ characterizes a low applicative, and ‘& BEN(e,z)’ a high applicative semantically. Consequently, when an applicative is low, it can only operate on transitive verbs, whereas when it is high it can also operate on intransitive verbs.

In this respect, all the Maasai applicatives have to be classified as high. In the Salish languages, APPL1 must be high, whereas APPL2 might be classified as low. Indeed, all the documented semantic roles of APPL2 (see Kiyosawa 2006), such as recipients, sources, possessors, raised possessors and even delegatives (‘instead of’), are based on a two-place relation between individuals. What is described as benefactive vs. malefactive could be differentiated by pragmatic inference. The delegative reading, however, is problematic for a syntactic account because it relates the applied object to the subject, which is VP-external.

- (67) Delegatives in Interior Salish (Kiyosowa 2006: 183)
- a. Coeur d’Alene (Doak 1997: 157)  
 níč-ši -t-s-es x<sup>We</sup> pilí.  
 cut-APPL2-TR-1sgOBJ-3SUBJ DET Felix  
 (i) ‘Felix cut (wood) instead of me.’ or (ii) ‘Felix cut (wood) for me.’
- b. Okanagan (Mattina 1993: 272)  
 k<sup>Wu</sup> q<sup>Wəlq<sup>W</sup>íl-x-t-s</sup>.  
 1sgOBJ talk -APPL2-TR-3SUBJ  
 ‘He talked for me (in my stead).’

McGinnis and Geerds (2003) study the position of objects as well as quantifier binding between them in several applicatives for determining their relative ordering. They also compare various multiple applicatives in Kinyarwanda, looking for the objects that can

become subject under passive. They come to the conclusion that there is the ranking BEN > LOC > [VP transitive THEME > INST]. Since all these applicatives are possible with intransitives, they should be high, which constitutes a puzzle. One of the inherent problems of their account is that high/low is associated with several other contrasts: intransitive vs. transitive base, symmetric vs. asymmetric objects, phasal vs. non-phasal interpretation, interpreted as (z,y) vs. (e,z) relation. McGinnis (2005) admits that there might be some mismatching between the structure in which an applicative merges syntactically and the structure in which it is interpreted; for her, instrumentals merge low, but are high semantically. However, note that both instrumentals and benefactives are marked nearer to the verbal root than locatives, thus, in a sense, they both are ‘lower’ than locatives morphologically.

### 5.3. Multifunctional affixes

In the preceding sections, several instances of affix ambiguity have been observed. Both the Maasai and the Kinyarwanda instrumental applicative can also be used as a causative (60b, 64d), the Korean causative can also be used as a passive (55), and the Japanese passive can also be used for introducing an affected argument in the highest position (54). From the viewpoint of their semantic effect, these affixes are clearly ambiguous: either a higher or a lower argument is added, and a highest argument either is introduced or existentially bound. Such an ambiguity can mostly be resolved, taking the specific lexical information of verb and complements into account. Still the question arises as to why this can happen. There seems to be some economy principle at work: it might be more costly to have a separate affix for each specific operation than having a single affix that is contextually specified.

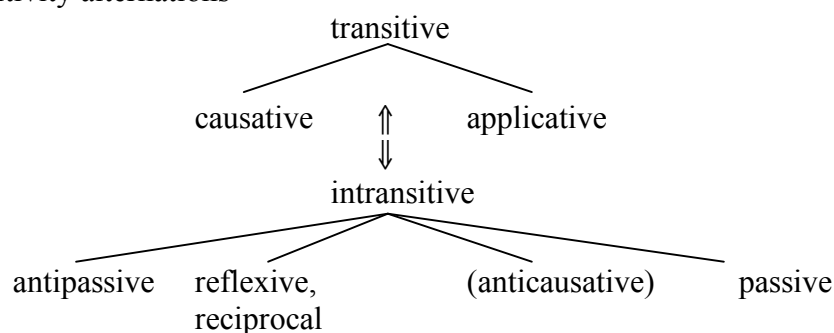
The Pama-Nyungan languages of Australia often have a single affix as a general transitivizer. The Kalkatunga suffix *-nti* adds a causer if it is combined with an inchoative or stative verb (68a), but it adds a beneficiary, instrument, or location if it is combined with an agentive verb (68b).

- (68) Transitivization in Kalkatunga (Austin 1997)
- |    |              |                                  |
|----|--------------|----------------------------------|
| a. | iti ‘return’ | iti-nti ‘send/bring back’        |
|    | nguyi ‘fall’ | nguyi-nti ‘push over’            |
| b. | nuu ‘lie’    | nu-nti ‘lie on (something)’      |
|    | wani ‘play’  | wani-nti ‘play with (something)’ |

Most transitive verbs of Salish have a transitivity marker which indicates transitivity, regardless of whether another transitivizing affix is present, recall (61,62). Since the verbal roots of Salish are usually intransitive (Davis and Matthewson 2009), the presence of the transitivity marker is informative in general.

In the reverse direction, there can be a general detransitivizer, usually called middle. According to the diagram (69), general transitivizers and general detransitivizers might be distinguished from more specific operations.

- (69) Transitivity alternations



Chukchi, a paleosiberian language, has the general detransitivizer *-tku/-tko*, comprising antipassive, reflexive, reciprocal, and anticausative. (This suffix has further functions not considered here.)

(70) Detransitivization in Chukchi (Nedjalkov 2006: 222)

- |    |                                   |  |                      |
|----|-----------------------------------|--|----------------------|
| a. | ʔəttʔ-e juu-nin ‘the dog bit him’ | ʔəttʔ-ən nə-jγu- <i>tku</i> -qin ‘the dog bites’     |                      |
|    |                                   |  | <i>antipassive</i>   |
| b. | tewla-nen ‘he shook it off’       | tewla- <i>tko</i> -γʔe ‘he shook himself’            | <i>reflexive</i>     |
| c. | ommačajpə-nen ‘he hugged him’     | ommačajpə- <i>tko</i> -γʔat ‘they hugged each other’ | <i>reciprocal</i>    |
| d. | ejpə-nin ‘he closed it’           | ejpə- <i>tku</i> -γʔi ‘it closed’                    | <i>anticausative</i> |

A middle voice, often fused with tense or person, is found in many unrelated languages (e.g., Classical Greek, Fula, Munda). In some modern Indo-European languages (Spanish, Icelandic, Russian), the middle is derived by means of a reflexive marker. (Note that the German reflexive allows the same readings as Spanish except the passive one, see Steinbach 2002.)

(71) Spanish reflexives (Kaufmann 2004: 191)

- |    |                              |                                   |                      |
|----|------------------------------|-----------------------------------|----------------------|
| a. | Juan se lava.                | ‘Juan washes himself.’            | <i>reflexive</i>     |
| b. | La cuerda se rompe.          | ‘The rope splits.’                | <i>anticausative</i> |
| c. | El libro se publicó en 1952. | ‘The book was published in 1952.’ | <i>passive</i>       |
| d. | Se vive bien aquí.           | ‘People live well here.’          | <i>impersonal</i>    |
| d. | Estas frutas se comen.       | ‘These fruits are edible.’        | <i>modal</i>         |

The anticausative is the odd one out among these specific detransitivizing operations. Unlike passive, it does not allow any reference to the agent of a transitive verb (using a ‘by-phrase’ or ‘willingly’). Some part of the transitive verb’s meaning is really cut off. But that conflicts with the principle of monotonicity, stating that no semantic information is deleted in the course of derivation. Therefore it is hard to imagine that an affix could have emerged with a pure anticausative function; it would have been blocked by the monotonicity principle. What one indeed finds are morphemes with a broader function (such as the middle) including the anticausative reading as a special, contextually determined case.

Japanese has the suffix *-e*, which either transitivizes or detransitivizes. Comrie (2006) lists 57 inchoative/causative pairs where *-e* derives the causative verb (72a), and 36 pairs where it functions in the opposite manner, i.e. derives the inchoative verb from the transitive one (72b). This shows that the anticausative reading is restricted to a minor set of lexical items. Moreover, note that in addition to *-e*, Japanese has other means of deriving the transitive or intransitive variant, see (72c).

(72) Causatives vs. anticausatives in Japanese (Comrie 2006)

- |    |                    |                            |
|----|--------------------|----------------------------|
| a. | ak-u ‘open’        | ak-e-ru ‘open (tr.)’       |
|    | itam-u ‘hurt’      | tam-e-ru ‘injure’          |
|    | tat-u ‘stand’      | tat-e-ru ‘raise’           |
| b. | nuk-u ‘remove’     | nuk-e-ru ‘come off’        |
|    | or-u ‘break (tr.)’ | or-e-ru ‘break’            |
|    | tuka-u ‘use’       | tuka-e-ru (be usable)      |
| c. | kowa-s-u ‘destroy’ | kowa-re-ru ‘be destroyed’. |

There is a lively debate as to whether anticausatives can preserve the reference to a causer (Koontz-Garboden 2009, Schäfer 2009) or not (Haspelmath 1993, Horvath and Siloni 2011), and also an intensive study into the historical development of anticausative constructions (Ottosson 2009, Cennamo, Eythórsson and Barðdal 2011).

Multifunctional affixes are also interesting under the viewpoint of markedness. Usually the presence of a particular semantic feature (such as +plural, +2nd person, etc.) is morphologically marked. One could think of a very general affix that marks the non-default value for each such dimension. In this respect it is interesting to note what Watters et al. (2006) report about a particular harmonic mutation in the verbs in Kusunda, a language isolate of Nepal. This mutation marks the semantically more complex category in various dimensions: it marks causative in the transitivity dimension, irrealis in the modality dimension, negation in the polarity dimension, and dependent in the dependency dimension.

Thus, there is a possible scale of explicitness: affixes that represent a specific operation on argument structure > those that represent a specific outcome of an operation (such as valency) > those that represent the non-canonical variant in a dimension (for instance, a deviation from what a lexical item means under usual circumstances).

## 6. Residual issues

In this section some further issues involved in morphological valency-change are addressed.

### 6.1. Order of affixation

Valency-changing operations can be combined cyclically, so that the output of a first operation serves as the input for a further operation. In particular, valency-increasing and valency-decreasing operations often alternate. Yucatec Maya illustrates a type of language in which no more than two structural arguments are possible; in a certain state of affairs a verb can either be transitivized or detransitivized. More precisely, causative (suffixation with -s) or applicative (suffixation with -t) applies to verbs in an intransitive state, whereas passive, antipassive or noun incorporation applies to verbs in a transitive state. These operations can easily be combined. (73a) shows the ordering V-CAUS-PASS, (73b) V-APPL-PASS, (73c) V-PASS-CAUS-PASS, and finally (73d) V-INCORP-APPL. The last line in each example indicates the semantic representation of the complex verb.

(73) Cyclic transitivization and intransitivization in Yucatec Maya (Krämer and Wunderlich 1999: 463-467)

- a. k<sup>i</sup>in-s-áʔab<sup>ʔ</sup>-en                      tumèen    leti  
 die-CAUS-PASS.PERF-1    PREP            PRON.3.SG  
 ‘I was killed by him.’  
 $\lambda y \lambda e \exists x \{ACT(x) \ \&_{CAUS} \ DIE(y)\}(e)$
- b. k=a                      k<sup>ʔ</sup>óoy-t-áʔal  
 INCOMPL=2    dig -APPL-PASS.IMPF  
 ‘It gets dug (up).’  
 $\lambda y \lambda e \exists x \{DIG(x) \ \& \ AFFECTED(y)\}(e)$
- c. k=u                      káʔan-s-áʔal  
 INCOMPL=3    learn.PASS-CAUS-PASS.IMPF  
 ‘It is being taught’  
 $\lambda z \lambda e \exists x \{ACT(x) \ \&_{CAUS} \ \exists y \ LEARN(y,z)\}(e)$
- d. taan=u                      kon-lol    -t    -ik -et  
 INCOMPL=3    sell-flower-APPL-IMP-2  
 ‘He’s selling you flowers.’ (lit. ‘he’s flower-selling you’)  
 $\lambda y \lambda x \lambda e \{ \exists z (SELL(x,z) \ \& \ FLOWER(z)) \ \& \ AFFECTED(y)\}(e)$

Several other languages supply evidence that valency-changing operations can be combined freely, though they may be subject to some sequential constraints, see Muysken (1986) on Quechua. (74a) is an example from Chichewa (Bantu) with the ordering V-APPL-REC-CAUS. (74b) shows the stepwise semantic interpretation; the symbol  $\oplus$  indicates a reciprocal relationship between the two occurrences of a variable.

(74) Interaction of argument changing operations in Chichewa (Hyman 2003)

- a. M-lenje a-na-mang-ir -an -its -a a-tsikana nkhuṇi.  
 1-hunter 1-PAST-tie-APPL-REC-CAUS-FV 2-girl firewood  
 ‘The hunter caused the girls to tie firewood for each other’
- b. *mang*:  $\lambda y \lambda x \lambda e$  TIE(x,y)(e)  
*mang-ir*:  $\lambda y \lambda z \lambda x \lambda e$  {TIE(x,y) & BEC POSS(z,y)}(e) *benefactive*  
*mang-ir-an*:  $\lambda y \lambda x^{\oplus} \lambda e$  {TIE(x,y) & BEC POSS(x,y)}(e) *reciprocal*  
*mang-ir-an-its*:  $\lambda y \lambda x^{\oplus} \lambda u \lambda e$  {ACT(u) & CAUSE  $\exists e'$  {TIE(x,y) & BEC POSS(x,y)}(e')}(e) *causative*

It is easy to imagine that any other order of affixes would yield a different interpretation:

- REC-CAUS-APPL: ‘The hunter caused the girls to tie each other at the firewood’;
- CAUS-REC-APPL: ‘The hunters caused each other to tie firewood for the girls’.

However, some surface orders of suffixes are forbidden. According to Hyman and Mchombo (1992), the causative suffix *-its* may not appear after the applicative suffix *-ir* or the passive suffix *-idw*. In other words, the affix ordering is fixed, independently of semantic scope.

(75) Surface alignment constraints in Chichewa

- a. \*-ir-its (-APPL-CAUS)  
 b. \*-idw-its (-PASS-CAUS)

The resulting ambiguity, however, can normally be resolved. This is illustrated in (76) for the first constraint. In (76a), the applied instrument ‘sticks’ clearly relates to ‘making cry’ and not to ‘cry’, whereas in (76b) the applied instrument ‘spoon’ relates to the lower verb ‘stir’. (Interestingly, the passive of (76) requires ‘sticks’ as the subject, and the passive of (76b) requires ‘woman’ as the subject, thereby reflecting the different semantic scope.)

(76) Chichewa CAUS-APPL representing both scopes (Hyman 2003)

- a. alenjé a-ku-líl-**its-il**-a waná ndodo.  
 hunters 3pl-PROG-cry-CAUS-APPL-FV child sticks  
 ‘The hunters are making the child cry with sticks.’ (INST (CAUSE (CRY)))
- b. alenjé a-ku-tákás-**its-il**-a mkází mthíko.  
 hunters 3pl-PROG-stir-CAUS-APPL-FV woman spoon  
 ‘The hunters are making the woman stir with a spoon.’ (CAUSE (INST (STIR)))

According to Stiebels (2003), the affix order is transparent in (76a), but opaque in (76b) because of the language-specific constraint that violates the (revised) mirror principle.

(77) Mirror Principle

- a. Morphological derivations must directly reflect syntactic derivations (and vice versa). (Baker 1985: 375)  
 b. Revised: The affix order must mirror semantic composition. (Stiebels 2003: 292)

The revised mirror principle claims a correspondence between morphology and semantics rather than between morphology and syntax.

## 6.2. Other types of argument alternation

From the literature (especially Levin 1993 on English), many types of argument alternations are known, in which two arguments shift their place, such as *wipe*-alternation, locative alternation, or dative shift.

- (78) *wipe*-alternation  
 a. She wiped the crumbs from the table.  
 b. She wiped the table.
- (79) Locative alternation  
 a. Max loaded the luggage into the car.  
 b. Max loaded the car (with luggage).
- (80) Dative shift  
 a. Anna gave the photos to Max.  
 b. Anna gave Max the photos.

In the *wipe*- as well in the locative alternation, the respective a-sentence adds a locative (source or goal) PP to the transitive verb, while the verb in the b-sentences already incorporates that information (e.g., &  $\exists y$  BECOME-LOC(y,ON(table))) in (78). These alternations, thus, nicely illustrate that the locative applicative is possible even if it is not marked; the DP next to the verb realizes the applied object (78b, 79b). The dative shift is a bit different, because the DP next to the verb realizes a recipient (a possessor) (80b). Here, the ditransitive construction might be considered as an instance of the possessor applicative.

It has often been observed that there are finer semantic differences between the respective a- and b-sentences, which, however, follow from the different status of the arguments involved. For instance, (78a) entails that all the crumbs are wiped off, whereas (78b) entails that the whole table is wiped, but not that all the crumbs are wiped off.

If a language allows only two structural arguments, the base object must be realized obliquely when APPL2 is applied (see above). English, however, accepts a double-object construction – why not in the *wipe*- and the locative alternation? The answer is: the applied object in these constructions is not a medial argument, and the base argument is ‘moved’ into a position, where it cannot be expressed as structural argument (see Wunderlich 1997a,b). Moreover, the crumbs must remain unexpressed in (78b) because an appropriate preposition in English doesn’t exist.

## 6.3. The place of valency-changing morphology in the grammar

Valency is a basic property of lexical items, therefore, a morpheme that changes valency is expected to attach directly to the root or stem. A valency shift can affect the aspectual or temporal properties of the stem, and thus determines the expected association with tense-aspect (as seen in the Inuit antipassive, (18)). Furthermore, valency shift is expected to precede person-number inflection, relating to the arguments actually present. Valency-decreasing noun incorporation enables a further cycle of valency-changing operations, as shown in (46). Moreover, nominalization can follow a lexical reflexive like in Hungarian *mos-akod-ás* (wash-REFL-NOML ‘self-washing’; Reinhart and Sioni 2005: 411). In sum, valency-change belongs to the derivational component of morphology, which usually precedes inflection.

Both causative and passive are often periphrastic, while applicative and antipassive are not – why? Auxiliaries as well as light verbs operate as higher verbs, and thus can only affect the

highest argument. By contrast, applicative constructions alternate with oblique objects or low adverbials, which do not make use of a verb.

From the viewpoint of interaction between morphosyntax and semantics, three general types have been identified along this article:

- (i) A valency-changing operation can be invisible on the verb.
- (ii) A valency-changing operation can be realized by a general transitivizer or detransitivizer, so that the actual meaning depends on further context.
- (iii) A valency-changing operation can be realized by a specific morpheme or construction (such as passive or causative).

It is this order in which the operations vary between less and more explicitness.

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