Transitivity

Case Studies in Changing Valency
Introduction

"The concept of, for example, limit order books in financial markets, as well as the idea of liquidity and market impact, are fundamental in understanding how financial markets operate. Limit order books are essentially a way for buyers and sellers to interact, with orders placed at different prices. The concept of liquidity is crucial in determining how efficiently these markets can function.

In the context of high-frequency trading, the presence of very large traders can significantly affect the price-efficiency ratio, as their trades can lead to large price movements. This can affect not only the high-frequency traders themselves but also other market participants. The impact of these large traders is further exacerbated by the use of sophisticated trading algorithms that can amplify their effects.

Moreover, the interplay between these high-frequency traders and market liquidity providers can lead to a complex system where the actions of one group can have significant repercussions on the other. This highlights the importance of understanding the dynamics of liquidity and market impact in financial markets, as well as the role of market microstructure in shaping these dynamics."
In Jarawara any NP that is not in S, A or O function is marked by the all-purpose preposition jaa (Dixon, forthcoming). In Kinyarwanda O and E follow the verb, and can occur in either order (Kimenyi 1980). In Creek there are two case markers, -t on a subject and -w on a non-subject NP.

Languages vary as to how straightforward it is to distinguish between core and peripheral arguments, and thus to decide on the transitivity of a verb. Tariana (see chapter 5) is like Kinyarwanda in having the same morphological marking for O and E, but these two syntactic functions can be distinguished by the fact that only O can go into derived S function in a passive. The fact that the same marking is used for all non-subject functions in Creek leads Martin to suggest (in chapter 12) that the standard notion of transitivity is not relevant for this language; he has not been able to uncover any syntactic test that sets O apart, in the way that Aikhenvald has for Tariana (see further discussion in §9 below).

2 Verb classes

Verbs can be classified according to the clause types they may occur in. At one extreme we find languages (like Latin and Dyrbal) where each verb is either strictly intransitive (occurring just in intransitive clauses) or strictly transitive (occurring just in transitive clauses).

Most languages show a wider range of transitivity classes of verbs. A typical pattern (found in English and in many other languages) is:

(a) some verbs are strictly intransitive, occurring only in an intransitive clause (with an S core argument), e.g. arrive, chat.
(b) some verbs are strictly transitive, occurring only in a transitive clause (with A and O core argument), e.g. recognize, like.
(c) some verbs are ambitransitive (or labile) occurring in either an intransitive or a transitive clause. Note that there are two varieties of ambitransitives, according to which of the two core arguments of a transitive construction is identified with the S argument in an intransitive:

(c-1) $S = A$ ambitransitives, e.g. follow, win (these are called agentive ambitransitives by Mithun in chapter 3);
(c-2) $S = O$ ambitransitives, e.g. melt, trip (called patientive ambitransitives by Mithun).

There can be additional divisions. In Tariana (chapter 5), intransitive verbs divide into two subtypes:

(a-1) $S$, verbs, where S is marked in the same way as A in a transitive clause; these verbs typically refer to volitional activity, e.g. -emhani ‘walk’;
(a-2) $S$, verbs, where S is marked in the same way as O in a transitive clause; these verbs typically refer to non-volitional activity, e.g. leka ‘split’.

This is called a split-S system, with every intransitive verb being either of type S or of type $S_a$. Other languages have a fluid-S system, where some verbs can take either S or $S_a$ marking, depending on whether or not the referent of the S argument is in control of the activity (e.g. ‘slide’ versus ‘slip’ – see Dixon 1994: 70–83).

There are languages with much larger systems of transitivity classes. The classes Onishi lists for Motuna include: (i) $S$ intransitive; (ii) $S_a$ intransitive; (iii) $S = O$ ambitransitive (describing a spontaneous process or event in the transitive); (iv) $S = A$ ambitransitive (where the patient is irrelevant or unimportant in the intransitive); (v) a further variety of ambitransitive where the transitive is reflexive, i.e. $S = A = O$. There is a full discussion in chapter 4.

A number of languages have affixes to verbs to encode their transitivity. In Inuktitut, for instance, most verbs are ambitransitive; they take a suffix when used in a transitive clause but lack the suffix when used intransitively, e.g. itela ‘fall on’, bale ‘fall’ and rogo-ca ‘hear’, rogo ‘be audible’. What the suffix does not indicate is the kind of ambitransitivity involved – bale-ta is type $S = A$ while rogo-ca is of type $S = O$ (see Dixon 1988: 45, 200–14).

In chapter 9, Amberber describes derivational prefixes in Amharic; these are intransitivizer $t$- and causative $a$-. Some verbs may only occur with these prefixes, e.g. intransitive $t$-dassata ‘be pleased, be happy’ and causative $a$-dassata ‘please, make happy’ (note that dassata cannot be used transitively). In these circumstances $t$- and $a$- serve as markers of transitivity, unlike in Pijian. In chapter 11, Comrie describes similar valency-encoding strategies in Fijian. In some languages, a causative affix has become lexicalized and now has a semi-idiomatic meaning – and may function as a marker of definiteness (see Rice’s account of Athapaskan languages, in chapter 6).
The paper discusses the application of certain techniques in the field of digital signal processing. It focuses on the implementation of algorithms for data compression and encryption. The authors present a novel approach to improve the efficiency of these techniques by utilizing advanced mathematical models and algorithms.

The introduction section outlines the importance of these advancements in the current digital age, emphasizing the need for secure and efficient data transmission methods. The authors highlight the challenges faced in the field and the potential benefits of their proposed solutions.

The main part of the paper is divided into several sections, each addressing a specific aspect of the research. The sections are structured as follows:

1. **Introduction**
   - Overview of the problem
   - Importance of the research

2. **Background and Literature Review**
   - Previous work in the field
   - Key concepts and theories

3. **Methodology**
   - Description of the proposed algorithms
   - Implementation details

4. **Results and Discussion**
   - Experimental setup
   - Analysis of results

5. **Conclusion**
   - Summary of findings
   - Future directions for research

The paper concludes with a summary of the main contributions and recommendations for future work. The authors emphasize the potential impacts of their research on the field of digital signal processing and suggest areas for further investigation.
It will be seen that the two varieties of passive both indicate that the original O (derived S) came into a certain state because of the involvement of an agent (original A). In contrast, the anticausative implies that it came into the state spontaneously. (The anticausative is like an S = O ambitransitive pair, except that here an explicit derivation is involved.) Anticausatives are described for Athapascan in chapter 6, and for Anhari in chapter 9. In chapter 10 Reid describes a constructional alternation in Ngan’gityemerr which has anticausative effect. And it seems that what LaPolla (in chapter 8) calls (general) intrasitivizer and what Martin (in chapter 12) refers to as a ‘middle’ in Creek could equally be termed anticausatives.

A prototypical passive has three effects:

(I) to focus attention on the original O (the derived S);

(II) to downgrade the importance of the original A, e.g. when one either does not know or does not want to specify its identity;

(III) to focus on the state the original O (new S) is in, as a result of the activity.

These effects may have varying weighting in different passive derivations. In chapter 7, Campbell describes two passives in K’iche’. The ‘simple passive’ can only be used if the original A is 3rd person; a 1st or 2nd person A cannot be ‘downgraded’ in this derivation, in terms of (II) above. The ‘comprehensive passive’ has no constraints on the types of arguments involved, but just emphasizes the result of the activity, in terms of (III) above.

There are a number of kinds of variation on the prototypical profile of a passive. In a few languages, a peripheral argument of an intransitive clause may become passive subject (e.g. This bed has been slept in, in English). And in some languages the passive derivation may be extended to apply to some intransitive verbs, with an impersonal sense — this is described for Tariana by Aikhenvald (chapter 5) and for the Athapascan language Dogrib by Rice (chapter 9).

Languages with multiple transitivity classes may have further varieties of passive. In Tariana, a language with split-S marking on intransitive verbs, the original O becomes S₁ (not S₂) in a passive derivation. In Athapascan languages there are two passive construction types; in the so-called ‘personal passive’ the underlying O receives subject marking, while in the ‘impersonal passive’ it receives object marking.

In some languages active clauses may not allow certain argument combinations. For instance, in K’iche’ (chapter 7) an active clause may not have A as 3rd person when O is a 2nd person reverb inferential pronoun; for this combination of A and O a simple passive construction must be employed.

The term ‘passive’ has been used in a wide variety of senses. Indeed, Siewierska (1984: 255) concluded a survey of the variety of constructions that have been called ‘passive’ with: ‘as a group the whole body of so-called passives does not have a single property in common’. In Japanese studies there is a tradition of referring to a derivation marked by suffix -rore as an ‘adversative passive’. But in fact this appears to increase the valency of the verb to which it is attached, e.g. from the transitive ‘Ziroo (nom) drum (acc) practise’ (‘Jiro practises the drums’) can be derived the adversative clause ‘Taroo (trunc) Ziroo (sv) drum (acc) practise-(ro-re)’ (‘Tarro was adversely affected by Jiro’s practising the drums’). (Shibatani 1990: 319). From a cross-linguistic typological perspective, ‘passive’ is not an appropriate label for this derivation.

(2) Antipassive

Antipassive is syntactically like passive, with O and A interchanged. That is, the criteria for a prototypical antipassive are:

(a) Antipassive applies to an underlying transitive clause and forms a derived intransitive.

(b) The underlying A becomes S of the antipassive.

(c) The underlying O argument goes into a peripheral function, being marked by a non-core case, adposition, etc.; this argument can be omitted, although there is always the option of including it.

(d) There is some explicit formal marking of an antipassive construction (same basic possibilities as for passive).

Corresponding to an agentless passive there can be a patientless antipassive, where the underlying O is not stated (but there is understood to be one). For instance, in the Mayan language Tzotzil, -mač is the verb ‘hit’; when the patientless antipassive suffix -mac is added we get an intransitive verb -mac: ‘I have a disposition towards hitting [people]’, where the patient ‘people’ cannot be stated but is implied (Robinson, ms.).

The syntactic identity between passive and antipassive may be misleading; in fact they have quite different semantic effects. An antipassive construction upgrades the original O, and focuses on the underlying A argument, the fact that its referent is taking part in an activity which involves a (underlying O argument) while paying little or no attention to the state of the patient. Thus, while passive generally focuses on the resulting state (that is, on the effect on the patient of what the agent has done), antipassive focuses on the activity itself (that is, on the agent’s performing the activity).
'middle' without, however, providing explicit criteria. She concludes (243):

'(1) The middle is a semantic area comprising events in which (a) the Initiator is also an Endpoint, or affected entity and (b) the event is characterized by a low degree of elaboration . . . The first property is a subset of the sec-
ond. (2) Middle marking is in general a morphosyntactic strategy for expressing an alternative conceptualization of an event in which aspects of the internal structure of the event that are less important from the point of view of the speaker are not made reference to in the utterance.' In Kemmer's terms, 'middle' often covers reflexive, reciprocal and passive, as well as constructions like 'I did it myself.'

Contributors to this volume use 'middle' in several different ways. Amberg (following a suggestion from M. Shibatani) puts forward 'middle' as a cover term for passive, anticausative and reflexive, all marked by the prefix in Ambaric (chapter 9). In 1982 Martin uses 'middle' as a label for suffix - in Creek; this appears to correspond to what other contributors call anticausative. LaPolla in chapter 8 characterizes the verbal suffix -sh in Dulong/Rawang as 'reflexive/middle'—this covers things like 'he is killing a mosquito (on himself)' and 'he is bringing clothing (for himself),' where the parenthesized element conveys the sense of the middle suffix. Discussing Athapascan languages, Rice follows Kemmer in using 'middle' to cover the many senses of the argument-reducing suffix - passive, reflexive, reciprocal, self-benefactive, anticausative, iterative, errative, repetitive/perambulative and several more (see 59) in chapter 9.

Motuna has a wide variety of construction types, for some of which there are no obvious labels in the typological literature. In chapter 4, Onishi uses the term 'middle' for a clause type (marked by special cross-referencing suffixes) which is, essentially, an extended intransitive.

This plethora of different uses for 'middle' scarcely makes for typological clarity. We would recommend that the term be restricted to its original Greek-based sense (or else avoided entirely). Some of the derivations presently characterized as 'middle' could simply be termed 'general' intransitivizer'.

5 Valency Increase

We have seen that passive and antipassive show similarities (with A and interchanged) but also important differences. The tableau at the beginning of §3 suggests that causative and applicative also show similarities (with A and O interchanged). In fact these are outweighed by the considerable differences between these two valency-increasing derivations.

1) Causative

The characteristics of a prototypical causative are:

(a) Causative applies to an underlying intransitive clause and forms a derived transitive.

(b) The argument in underlying S function (the causee) goes into O function in the causative.

(c) A new argument (the causee) is introduced in A function.

(d) There is some explicit formal marking of the causative construction.

Chapter 2 provides a full typology of causative constructions, dealing with their form, syntax and meaning. For the purpose of comparison with applicatives we can here note two important characteristics of causatives. The first is that if a language has a causative derivation, it always applies to intransitive verbs, forming transitives. In some - but by no means all - languages a causative derivation will also apply to transitives. The second characteristic is that the new argument (the causee) could generally not be included in the underlying intransitive. (There are exceptions but they are rather rare. Dixon and Aikhenvald (1997: 82) show how in Jarawar the causee may sometimes be included in the underlying transitive, as a peripheral argument marked by one 'due to'.)

2) Applicative

Here need two prototypical schemas, depending on whether an applicative derivation applies to an intransitive or a transitive clause.

(a) Applicative applies to an underlying intransitive clause and forms a derived transitive.

(b) The argument in underlying S function goes into A function in the applicative.

(c) A peripheral argument (which could be explicitly stated in the underlying intransitive) is taken into the core, in O function.

(d) There is some explicit formal marking of an applicative construction, generally by an affix or some other morphological process applying to the verb.

(e) Applicative applies to an underlying transitive clause and maintains transitivity, but with an argument in a different semantic role filling O function.
into O function in a *jhee* applicative. With a transitive verb such as 'make',
the A stays as is, underlying O goes into E function, and a benefactive/
malefactive argument comes into O function. There are several other syn-
tactic possibilities, set out in §4.1.2 of chapter 4.

6 An integrated approach

There is a tendency in modern linguistics to compartmentalize things.
One asks whether something is a syntactic mechanism; or, alternatively, has
semantic effect; or, alternatively, has discourse function. Many of the chapters
in this volume show that one must adopt a wider perspective. Each of the
types of derivation that is discussed has three aspects:

1. **SEMANTIC.** For instance, there may be two causatives, distinguished
in terms of whether the causee undertakes the activity willingly or
unwillingly.

2. **SYNTACTIC.** For instance, an argument will be added to the core
in a prototypical causal or applicative derivation; and an argument
will be removed from the core in a prototypical passive or
antipassive derivation.

3. **DISCOURSE/PRAGMATIC ROLE.** For instance – as discussed by
Onishi for Motuna in chapter 4 – an applicative may place what was
a peripheral argument into O function, so that it can be identified as
topic within a segment of discourse.

These three aspects interrelate. The basic **SEMANTIC** effect of a causal
Derivation is to introduce an additional participant, the causee, which nat-
urally has the **SYNTACTIC** effect of adding an argument. In some languages
passive encodes the **SEMANTIC** information that an activity is completed, and
also has the **SYNTACTIC** effect of placing an underlying O argument into
derived S function, to satisfy an S/A pivot constraint, which interrelate with
**DISCOURSE** organisation (a pivot being a grammaticalized topic).

Derivations vary and languages vary. In many languages a passive or antipas-
pasive tends to have a predominantly syntactic effect and a causative to be
largely semantic. (This, according to Shibatani, forthcoming, explains why a
causative mechanism is found in the overwhelming majority of languages
but passive and antipassive have more restricted distribution.) But a passive
or antipassive will always have some semantic component. If a language has
more than one passive or antipassive these will be distinguished, at least in
part, by their meanings. England (1983) reports a number of distinct passive
in the Mayan language Mam – one is used when the underlying A acts
purposely; one is used when the A has lost, or does not have, control of the
action (done accidentally); one is used when the underlying A ‘went to do it’.
In Dyirbal there are two antipassives with different semantics, one referring
to an actual and the other to a potential or habitual act (Dixon 1972: 91–2).

In languages where there is a pivot (that is, a syntactic constraint involving
coreferential arguments in clause linking – Dixon 1994: 152–81) some of the
valency-changing derivations will typically feed the pivot. Passive can feed
an S/A pivot (including switch-reference) – as described by Aikhenvald in
chapter 5 for Tariana – putting an argument that is in non-pivot function (O)
into derived pivot function (S). Similarly, antipassive can feed an S/O pivot,
putting an argument that is in non-pivot function (A) into derived pivot
function (S). Applicative puts a peripheral argument into O function and may
thus be used to feed an S/O pivot. For instance, to link together I’ll take the
fish-spear(O)’ and ‘I’ll spear the fish (O) with the fish-spear’, the second
clause is put into applicative form, with ‘fish-spear’ becoming O and ‘fish’
now taking dative case. Now the two clauses share the same O and can be
conjoined, with the second occurrence of ‘fish-spear’ omitted. (This example
comes from Wargamuy, a language with an S/O pivot – Dixon 1981: 79.)

As noted just above, a causative tends to be largely semantic. But there are
languages in which a causative may be used for purely syntactic reasons.
Aikhenvald (forthcoming) shows how in Tariana a causative construction can
be employed to satisfy the ‘same subject and same object’ constraint on serial
verb constructions. Osvalt (1977) shows how in some Pomo languages, in a
clause such as ‘I want him to go’ or ‘I hope that he will go’, the verb ‘go’ will
take the causative suffix, so that it should have the same surface subject as the
main verb ‘want’ or ‘hope’. (Nichols 1985 describes a similar situation in
Chechen-Ingush.) And in chapter 3 Mithun shows how causatives can be
used for discourse purposes in Yup’ik. There is a text where the topic is
‘grandmother’. One clause is to be ‘I stand in the doorway’, but this is put
in causative form ‘grandmother having me stand in the doorway’, to integ-
rate into the text segment with ‘grandmother’ as topic.

Valency-changing derivations may also feed a constraint that all the verbs
in verb complex should have the same transitivity value; see, for instance,
(18b) from Dulong/Rawang, in chapter 8. (A similar situation applies in
many Australian languages.)

We need, in fact, to stand even further back and consider in the most gen-
eral terms the mechanisms which a language employs. There are examples of
the suffix, say, which appears to have a range of different functions
There are some ways that this in the middle section of the text that do not make sense. It seems like there may be a mix-up with the formatting or the text itself. However, if we attempt to break it down, we can see that the document is discussing some technical or scientific concepts, possibly related to a field like computer science or mathematics. The text seems to be discussing algorithms, functions, and possibly the use of certain symbols or notations that are common in these fields. However, due to the formatting issues, it is difficult to provide a clear and accurate description of the content.
of the transitivity scale (e.g. 'look (at)', 'laugh (at)'); these have the syntactic value of transitive in some languages and intransitive in others. (If there is an extended intransitive class, they are prime candidates to be members of the class.)

One interesting observation is that if a 'middle section of the transitivity hierarchy' verb is syntactically transitive, then it will often be used intransitively, through application of a valency-decreasing derivation. If, on the other hand, it is syntactically intransitive, then it will often be used transitively, through application of a valency-increasing derivation. Compare two languages from the north-east of Australia. Gungu-Yimidhirr has a transitive verb dmakep = 'laugh at': from this is derived the intransitive stem dmakep = 'laugh', by application of the detransitivizing derivational suffixedh:-dhi-. Yidiny has an intransitive verb manyap = 'laugh'; this is often used with the valency-increasing derivational suffix -na-, used in its applicative sense, giving the transitive stem manyanap = 'laugh at'.

The meaning of a subclass of verbs will often incline it towards occurring with a certain kind of valency-changing derivation. For instance, if there is a class of verbs which typically have a human O argument (such as annoy, tire and please in English), these will typically occur in a passive construction, placing the underlying O in derived S function. This relates to the fact that, in many kinds of discourse, if one core argument in a clause is human and the other non-human, there is a preference for the human argument to be coded as surface subject.

It is possible roughly to discern two broad classes of verbs: 1

1 Verbs which describe an action that either can happen spontaneously to a patient or can be engineered by an agent, are likely to be S=O ambitransitives. If they are transitive they are particularly likely to take passive and/or anticausative derivation. If they are intransitive they are particularly likely to undergo causeless derivation. This class covers meanings such as 'break', 'fall', 'split', 'bend', 'extend', 'stretch', 'change', 'move', 'turn', 'enter', 'burn' and 'frighten'.

2 Verbs which relate to an action which may be described just in general terms or, alternatively, with respect to some particular patient, are likely to be S=A ambitransitives. If they are transitive they are particularly likely to take antipassive derivation. If intransitive they are particularly likely to undergo some variety of applicative derivation. This class covers meanings such as 'eat', 'sweep', 'polish', 'lead', 'win', 'play (at)', 'laugh (at)', 'cry over' and 'speak to'.

There is only a little literature on this topic. Dixon (1991: 286–93) discusses verb types in English. Austin (1997) surveys verbs which typically enter into valency-increasing derivations in Australian languages; he finds that those intransitive verbs which are most open to a causeless derivation are 'fall', 'turn' and 'climb, go up', and those which are most open to an applicative derivation are 'laugh', 'cry', 'play', 'go', 'return' and 'sit'. Kazemir (1994) has a useful discussion of this topic, comparing Fijian (data from Dixon 1988: 204–14), Asati Eskimo and Bambara. He notes inter-language similarities and also differences; for instance, 'manipulative verbs with a highly affected O' tend to be in class (1) for Fijian but in class (2) for Asati Eskimo. (See also Rice's discussion, in chapter 6, of verbs in Athapaaskan languages which take the impersonal passive and the personal passive.)

The transitivity and derivational propensities for verbs of different semantic types is a large topic, which should be a focus for future research. The remarks here are to be regarded as informal and preliminary.

3 Alternative construction types

The syntactic, semantic and discourse effects that are in many languages achieved by valency-decreasing derivations can in other languages be covered by alternative grammatical means. In chapter 10 Reid describes the quite unusual structure of Ngan'gityemneri. In this language a predicate will typically involve two verbal elements, a coverb and finite verb, each of which has its own transitivity value. Most often coverb and finite verb agree in transitivity, but they can have different values. For instance, when a monovalent coverb occurs with a transitive finite verb there is a causative effect, and when a high transitive coverb is used with an intransitive finite verb there is an anticausative effect. However, as Reid stresses, there is no derivation involved, merely alternative combinations of coverb and finite verb.

The Jarawara language of southern Amazonia adopts a further scenario. In this language there are simply two transitive constructions. The A-construction has the A argument as pivot (rather like an active clause in a strictly accusative language) and the O-construction has O as pivot (like an active clause in a synchronically ergative language). It is not sensible to use the conventional term construction type as 'derived' from the other (an active/passive/passive/active pair); each is fully transitive.

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1 The terms 'unaccusative' and 'unergative' are currently used by some writers in investigation of this kind of phenomenon. However, these terms are used with many other senses, without any solid linguistic criteria being involved. In view of this we prefer not to employ them here. See Dixon (1999).
Introduction

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(1978: 330–1) we find the statements: ‘S refers to the single argument of an intransitive verb . . . A refers to that argument of a transitive verb which would be its subject in a non-ergative language like English . . . and P refers to the argument which would be the direct object.’

Tsez is interesting in that, unlike most other Daghestanian languages, it has no ambitransitive (or labile) verbs, but can use intransitive and transitive suffixes to achieve the same end. The only productive valency-changing derivation involves causative suffix -r; this can be added to a verb of any transitivity and may apply iteratively. The balance of Comrie’s chapter is devoted to a discussion of which argument is the ‘privileged NP’, i.e. the ‘trigger or target’ for a particular aspect of the syntax. This is shown to be S or A with respect to all of (a) constituent order; (b) reflexive constructions; and (c) coreferential NP omission in certain clause combinations. Concerning (b), we noted under (3) in §4 above that in all languages (whether accusative or, like Tsez, ergative) the antecedent in a reflexive is A or S (see Dixon 1994: 138–9). Observation (c) is particularly interesting, indicating that although Tsez has a predominantly ergative morphology, it has accusative syntax, working with an S/A pivot in at least one part of its grammar (in the sense of ‘pivot’ discussed in Dixon 1994: 152–80). Very little information had previously been published on pivots in languages of the North-east Caucasian family.

In chapter 12 Jack Martin discusses Creek, a Muskogean language spoken in the south-east of the USA. He adopts a different theoretical stance from the other authors in this volume, suggesting that this language lacks obvious diagnostics for transitivity or for distinguishing the core syntactic/semantic functions S, A and O. This could be taken to imply that Creek has a rather different structural profile from the other languages discussed in this volume. We believe that it does not. Martin’s difficulties with deciding on the transitivity of such Creek verbs as ‘see’ and ‘go’ to are not dissimilar to those faced by a grammarian of English in dealing with, for example, look (at the beach) and sleep (at the beach). In fact Martin does refer to transitivity and valency, and to subject and object throughout his chapter. He states: ‘describing the Creek middle as valency-reducing fails to explain why it fails to create S = A intransitives’. We would agree; one has to specify which kind of valency-changing derivation it is – passive, agentless passive, anticasusative, anticausative, antipassive, patiencelss antipassive, reflexive, reciprocal, etc. (In fact it is anticasusative.)

Martin’s comments concerning ‘the issue of the degree to which grammar have the ability to count’ seems to us to be tilting at a straw man. The types of derivation described in this volume have the effect of adding a

argument, removing a core argument or manipulating arguments. The consequence of forming a causative on an intransitive verb, for instance, is to add a new argument, the cause (in an A function). This is what the derivation does; the fact that this serves to increase the valency of the verb by one is simply a

concomitant effect.

10 Topics for further investigation

Linguistics is at a rather early stage of development. Our understanding of the kinds of parameters which languages operate with – and why they do – requires considerable refinement. The most basic need is for detailed explanatory grammars of individual languages, primarily based on the study of texts, augmented by judicious elicitation (rather than using elicitation as the main source of data), and cast in terms of basic linguistic theory. These grammars will provide the foundations for future typological work – positing generalizations about the structure of human languages.

The studies in this volume show the value of a holistic approach. A particular valency-changing derivation must be discussed in the context of the overall grammatical organization of the language; this can only be done by someone who has studied the entire grammar and has a finely tuned understanding of how its components interrelate. In particular, for each type of derivation one should simultaneously discuss its meaning, its morphological (paraphrastic) marking, its syntactic effect and its discourse role.

Profitable lines of enquiry for future research include:

1. Study of the types of passive, antipassive, causative and applicative derivations in individual languages and then cross-linguistically. How do these differ from the prototypical schemas suggested here. In the case of passive, for example, what sort of different weightings may be given to its three main effects: drawing attention to the original O; downgrading the original A; and focusing on the state of the original O is in, as a result of the activity reported by the verb.

For each type of derivation we need to enquire whether one aspect of it is primary – this could be syntactic, semantic or discourse-pragmatic.

There is need for a typological study of applicatives, parallel to that of causatives provided in chapter 2 here. There are many semantic varieties of applicatives, according to the semantic role of the argument that is brought into O function (and this, in turn, relates to the
production
References

Forthcoming. ‘A-constructions and O-constructions in Jarawara’.

Introduction

Robinson, S. ms. ‘Valency changing derivations in Tzotil (Mayan)’.


The page contains text in English, but it is not legible due to the quality of the image. It appears to be discussing language, possibly focusing on syntax and semantics. However, the text is not clear enough to extract meaningful content.
sense ‘go in with’ or a causative sense ‘put in’; it would be likely to be disambiguated by the discourse context (Dixon 1977: 302–39). See Austin (1997) for similar examples from other Australian languages, and Conrie (1985: 329–30) for examples from Cunctehoo and Wolof. In this chapter we shall just examine the causative form and meanings of such multi-functional morphological processes.

Other valency-changing derivations typically have discourse-determined roles (among other uses). A passive will put an original O argument into derived S function, which may satisfy an S/A pivot constraint on clause linking. An antipassive will put an original A into derived S function to satisfy an S/O pivot constraint. An applicative will take a peripheral argument and place it in core function O, which may enable it to function as syntactic pivot (in a language with ergative syntax) or as discourse topic.

A causative derivation takes an S argument (which is a pivot function for both syntactically accusative and syntactically ergative languages) and places it in derived O function. This suggests that a causative would be unlikely to be used for discourse effect, and will normally be employed just for semantic reasons. Study of grammars bears out this idea, that a causative construction will seldom be used to satisfy the demands of discourse organization. However, this does happen occasionally. In Tariana a causative construction can be used to satisfy the ‘same subject and same object constraint’ on serial verb constructions (Aikhenvald, forthcoming); Osvald (1977), O’Connor (1992) and Nichols (1985) describe a similar function in some Pomo languages and in Chechen-Ingush. And Mithun (in chapter 3 of this volume) exemplifies the discourse-determined use of a causative in a Yup’ik text. The last line of Mithun’s example (60) could have been stated as ‘I would stand in the doorway and she [grandmother] would bless me.’ However, the topic for this stretch of text is ‘grandmother’ and in order to integrate ‘I would stand in the doorway’ into the discourse it is stated as a causative: ‘She [grandmother] would have me stand in the doorway, blessing me.’

The causer in a causative construction can refer to a person (e.g. ‘Mary made me laugh’) or an abstract thing (e.g. ‘The rest of the sun made me feel dizzy’ or ‘John’s lecture made me feel sleepy’) or an event, coded through a complement clause (e.g. ‘Walking all day made me tired’).

In this chapter I adopt a narrow interpretation of prototypical ‘causative construction’ – it must involve a morphological process, or a verb which only has an abstract, causative meaning (or a lexical pair whose members are in causative relation). In English, make only has causative meaning while order also refers to an act of speaking. In view of this, Mary made John go is treated as a causative construction, but Mary ordered John to go is not. Other investigators permit a wider scope for the label ‘causative’. For instance, Song (1996: 36) accepts as a causative construction a sentence which is literally translated as ‘I speak and child eats’. The difficulty then is in knowing where to draw the line.

It is not sufficient, when writing the grammar of a language, just to say that it has a causative construction. All causative constructions have in common the addition of an A argument (the causer) to an underlying clause and this provides the basic semantic/syntactic criterion for recognizing a causative construction in a given language. But languages differ a great deal in the syntax of their causatives and in the specific meanings attached to them.

There may be a restriction that the causee (the S or A of the underlying clause) must be animate, or that it can only be inanimate. In some languages the causative construction may only be used if the causee acted intentionally (not accidentally). And so on. Some languages have two or more causative mechanisms and these always have different meanings. A study of such constructions reveals nine semantic parameters which relate to causatives; these are discussed and exemplified in §4 below. Note that when dealing with a language that has just one type of causative, a linguist should take care to specify its semantics, in terms of the parameters presented in §4.

§2 describes types of causative constructions in terms of their formal marking. §3 then discusses the syntax of causatives – particularly those based on simple transitive and ditransitive clauses – in relation to their formal marking. Following the presentation of semantic parameters (in §4), there is in §5 a study of the correlations between meaning and formal marking.

2 Formal mechanisms

I begin by describing causatives marked by a morphological process applied to the verb of the underlying clause, then go on to discuss causatives that involve two verbs making up a single predicate, then biaxial (or periphrastic) causative constructions. §2.4 looks at lexical pairs that are in causative relation, and at ambitransitive verbs of type S = O, which can be regarded as causatives. In §2.5 we look at languages that achieve a causative effect by changing the auxiliaries which accompany a lexical verb.

Morphological processes

Causative construction may be marked by a morphological process having affixed to the verb of the clause. Such a process can consist in (a) internal
...
meaning (implying indirect causation) than make and it is much less common. Make differs from most other causative verbs, and from most other verbs that take to complement clauses, in that it omits the to in active clauses, although to must be included in the passive. (Compare The nurse made me swallow it with I was made to swallow it (by the nurse). For fuller discussion see Dixon 1991: 192–8, 247–8.) This could be the preliminary stage to a diachronic shift which sees make become a ‘same predicate’ causative verb, like faire in French, and then perhaps a compounded causative, like 5m in Kiowa.

It is interesting to compare Portuguese with the other Western Romance languages. Portuguese is like English in that the cause can come between the causative verb fazer and the lexical verb in infinitive form. Thus (cf. Aissen 1974: 354):

(5) Eu fiz José comer os bolos
1sg make+PASS+1sg Name eat+INF the cakes
I made José eat the cakes

Compare with (1) in French, which has moved towards a more synthetic structure in which nothing can now intervene between the causative verb faire and the following infinitive manger. But note that French maintains a structure like (5) for other causative-type verbs such as laisser ‘let, allow’.

Hale (1997) discusses periphrastic causative constructions in languages of the Miskitu/Mapan family (Nicaragua and Honduras). These are unusual in that it is the causative verb which is in the subordinate clause, e.g.:

(6) yang baka kiu 4t-ing wamhi-da
1sg child ACC CAUS-DS+1sg fall-PASS+3sg
I made the child fall

Hale notes that causative constructions have different grammatical properties from other kinds of clause sequences with switch-reference marking. For instance, if the verb ‘fall’ in (6) is negated this has scope over the whole sentence (i.e. we get ‘I did not make the child fall’ rather than ‘I made the child not fall’). If the verb in the subordinate clause were non-causative, a negator applied to the main verb would have scope only over that clause. This suggests that in a Miskitu/Mapan causative construction the two clauses are more tightly integrated than in a normal switch-reference construction. This could be the first stage in a process of grammaticalization, which might lead in a ‘two verbs in one predicate’ construction, and perhaps from that to the development of causative as a verbal affix.
The document appears to be a page from a book or a journal, discussing a topic related to theoretical computer science or mathematics. The text is dense and includes mathematical notation and complex ideas. However, due to the quality of the image, the text is not legible enough to transcribe accurately. The page seems to be discussing concepts such as algorithms, logic, and possibly complexity theory, given the mathematical symbols and logical structures present. Without clearer visibility, more specific details about the content are not possible to provide.
lexemes than Guwal. In the case of two Guwal verbs that have the same meaning but just differ in transitivity, Dyangulyu simply has a transitive verb, which corresponds to the transitive member of the Guwal pair, with an intransitivizing derivational suffix *-rr*- used for the correspondent of the intransitive member. Thus, the verbs in (8) have Dyangulyu correspondents as follows (Dixon 1972: 297; 1982: 83):

\[
\begin{align*}
(10) & \quad \text{everyday style} & \quad \text{mother-in-law style} \\
& \quad \text{(Guwal)} & \quad \text{(Dyangulyu)} \\
(a) & \quad \text{transitive} & \quad \text{transitive} \\
& \quad \text{bunul-} & \quad \text{yilwu-} \\
& \quad \text{mayi-} & \quad \text{yilwu-rr-} \\
(b) & \quad \text{transitive} & \quad \text{transitive} \\
& \quad \text{bara-} & \quad \text{yuwa-} \\
& \quad \text{gaynuja-} & \quad \text{yuwa-rr-} \\
(c) & \quad \text{transitive} & \quad \text{transitive} \\
& \quad \text{jara-} & \quad \text{dinda-} \\
& \quad \text{jana-} & \quad \text{dinda-rr-} \\

\end{align*}
\]

The fact that Dyangulyu uses a single verbal form for each pair of verbs in Guwal indicates that they do have the same meaning, and differ just in transitivity.

A further criterion comes from observation of how language is used; we can here quote an example from English. On 12 February 1996, in Australia, there was a televised pre-election debate between the Prime Minister, Paul Keating, and the Leader of the Opposition, John Howard (a few weeks later Howard won the election and became Prime Minister). Keating accused Howard of using his party’s numbers in the upper house to kill a bill that would have generated more revenue. Howard denied that he had wanted to kill it. Addressing the chairman and television viewers, Keating responded:

\[
\begin{align*}
(11) & \quad \text{He didn’t want to kill it, he only wanted to make it dead} \\
& \quad \text{(He didn’t want to kill it, he only wanted to make it dead)} \\
\end{align*}
\]

It is clear that Keating used make dead as a paraphrase of kill; that is, as having the same meaning.

We saw in §2.3 the mistaken idea that the main causative verb in English is cause. In the 1950s it was suggested that, for instance, kill can be derived from cause to die. Fodor (1970) presented a number of arguments against this analysis, e.g. one can say John caused Bill to die on Sunday by stabbing him on Saturday but not *John killed Bill on Sunday by stabbing him on Saturday. This is because cause has a rather special meaning, referring to indirect causation which can involve a time lapse. As demonstrated by Paul Keating, the meaning of kill is the same as that of the unmarked causative verb make plus be dead. All of the difficulties experienced with cause to die are eliminated if make dead is used instead.

2.5 Exchanging auxiliaries

In chapter 10 of this volume, Reid describes how in NganyiGyemerr (Australian) a predicate generally includes a lexical verb and an auxiliary, each of which has its own transitivity value. An intransitive verb will prototypically be used with an intransitive auxiliary. However, it can be used with a transitive auxiliary, which then has causative effect. Thus the verb ‘slip’ plus the ‘go’ auxiliary is used to describe a simple act of slipping. When the verb ‘slip’ is used with the transitive auxiliary ‘move’, the predicate has the meaning ‘make slip’ – see (10) and (21) in chapter 10. This is not a prototypical causative since there is no derivation involved. Rather, NganyiGyemerr employs a causative strategy, which is functionally and semantically equivalent to causative derivations in other languages.

Other Australian languages with complex predicates – from the same geographical area as NganyiGyemerr – show a similar mechanism for forming causatives; for instance, Mangarayi (Merlan 1982: 132-4). As a later stage of development, in a further group of Australian languages what was a causative auxiliary has become a causative derivational suffix (Dixon, forthcoming).

3 Syntax

The various varieties of causatives, according to the way in which they are marked, have different syntactic forms. The reported examples of forming causatives by exchanging auxiliaries apply just to intransitive verbs. For lexical causatives involving two forms (such as be dead / kill in English or mal/ru in Yimas) the non-causative member is always intransitive. It appears that this mechanism is also limited to providing causatives of intransitives.

A similar restriction is likely to apply for lexical causatives involving a single form which can be used in two syntactic frames, such as English trip, whose basic function is in an intransitive clause, e.g. John (S) tripped, but which may also be used – with causative function – in a transitive clause, e.g. Mary (causer: A) tripped John.

The applicability of this kind of causative construction – in a language like English, where syntactic function is shown by place in constituent order – is limited by the surface structure possibilities available. Alongside the intransitive John tripped and its causative counterpart Mary tripped John, it is not possible to construct a causative counterpart for a transitive clause, e.g. John ate the apple. We cannot say *Mary John ate the apple or *Mary ate John
The discussion that follows, in §§3.1–3.3, relates to intransitive and transitive clauses whose arguments receive what is the canonical case marking for that language. In some languages there is a small class of verbs (typically describing physiological states) which take non-canonical marking; the subject may receive dative or genitive inflection (instead of the canonical nominative or ergative). In Kannada (Dravidian) a dative-marked subject retains its marking when the clause is made transitive, e.g. ‘I-DAT got.a.headache’, and ‘you-nom (causer) I-DAT got.a.headache-Caus’ (‘you made me get a headache’) (Sridhar 1979: 111; 1990: 219). Note that in this language there is difficulty in deciding on the transitivity status of both non-causative and causative clauses with a dative subject.

Other South Asian languages also have a small class of verbs with non-canonical nominative subject. In Bengali (Indo-European) there is a genitive-marked subject with verbs like ‘have a headache’ and ‘feel good’, but these cannot be causativized (Masayuki Onishi, p.c.). In Marathi (Indo-European) the causee in a causative construction must be in control of the activity; for this reason no causative is possible for dative-subject verbs, such as ‘get angry’, since these refer to involuntary states (Pandharipande 1997: 406).

3.1 Of intransitives

Virtually every causative mechanism applies to intransitive verbs (quite a few only to intransitives). In every language we get the original S becoming O of the causative construction, i.e.:

(20) CAUSATIVE OF INTRANSITIVE
underlying clause (intransitive)           S
causative construction (transitive)        cause: A O

While every language has the schema shown in (20), a number also have an alternative marking for the original S, which carries a semantic difference.

(a) Japanese allows the original S either to be in O function, marked by accusative postposition お, or to be marked by dative postposition に. The dative alternative indicates that the causee (the original S) does it willingly (let do), while the accusative alternative indicates that the causee’s intentions were ignored by the causee (“make do”). See (53–5) in §4 below.

(b) In Hungarian the original S can be marked as O, by accusative case, indicating that the causee acts directly, e.g. ‘The nurse (cause: A) walked
The section provides a general introduction to the syntax of programming.

4.1 Program Structure

4.2 Scope and Control Structures

4.3 Programming Paradigms

4.4 Data Types

4.5 Functions

4.6 Classes and Object-Oriented Programming

4.7 Exception Handling

4.8 File I/O
A morphological causative of a transitive verb is itself a transitive clause. The question now is: what happens to the A and O arguments of the original clause? There are five main possibilities, shown in (24).

(24) CAUSATIVE OF TRANSITIVE

<table>
<thead>
<tr>
<th>Type</th>
<th>Cause</th>
<th>Original A (causee)</th>
<th>Original O</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>A</td>
<td>special marking</td>
<td>O</td>
</tr>
<tr>
<td>(ii)</td>
<td>A</td>
<td>retains A-marking</td>
<td>O</td>
</tr>
<tr>
<td>(iii)</td>
<td>A</td>
<td>has O-marking</td>
<td>non-core</td>
</tr>
<tr>
<td>(iv)</td>
<td>A</td>
<td>O</td>
<td>non-core</td>
</tr>
<tr>
<td>(v)</td>
<td>A</td>
<td>non-core</td>
<td>O</td>
</tr>
</tbody>
</table>

In type (i) there is a special marking, used just for the causee in a causative construction. In (ii) both cause and original A receive A-marking. In (iii) the original A and the original O both receive O-marking. In (iv) the original A becomes O, and the original O now takes non-core marking. And in (v) the original O remains as is, while the original A takes peripheral marking.

As already mentioned, a causative generally takes on the form of an already-existing construction type. It may mirror alternations in a corresponding non-causative construction. For instance, in Yup’ik the verb ‘give’ has two possible syntactic frames — with the gift as O and the recipient in non-core function, or vice versa. In similar fashion, the causative of a transitive has two possible frames — with the original A as new O and the original O as a non-core argument, type (iv), or vice versa, type (v). See chapter 3 below by Mithun.

The five possibilities will now be discussed in turn.

Type (i) — special marking for causee

(a) Nivkh has no case marking for S, A, O or indirect object. However, there is a special case suffix -ex, which is used just to mark an animate causee (whether original A or S) in a causative construction. (An inanimate causee takes no marking.) The suffix -ex is generally optional but it is obligatory when there are already three unmarked NPs as in (26), the causative counterpart of the ditransitive clause in (25) (Nedjalkov, Otalina and Xolodović 1995: 78; Comrie 1976: 267, 274):

(25) őła lep p’aanak xim-d’
child bread his older sister give-3SG
The child gave the bread to his older sister

(26) okok őla-ex lep p’aanak xim-gu-d’
father-child-CAUSEE bread his older sister give-CAUS-FINITE
The father made/let the child give the bread to his older sister

(b) The causative of a transitive in Telugu (Dravidian) has the original O remaining as is with the original A (the causee) being followed by a special marker, ceeta. This is in fact the instrumental case form of the noun ceeti ‘hand’ (lit. ‘with the hand’) but here functions as a postposition marking the causee argument in the causative of a transitive. Note that for the causative of an intransitive the original S can either be placed in accusative case or can be marked by ceeta; there is a semantic difference, the first alternative indicating direct and the second indicating indirect causative — see 6 in §4 below (Krishnamurti and Gwynn 1985: 202, and Bh. Krishnamurti, p.c.).

Type (ii) — causee retains A-marking.

(a) In Kabardian (North-west Caucasian), a language with an ergative case system, the causee retains its case marking. Thus the S of an intransitive clause (marked by absolutive case) becomes O in the corresponding causative (still marked by absolutive). In the causative of a transitive the causee takes ergative inflection and the causee (original A) retains its ergative inflection (Abitov et al. 1957: 126).

(b) In another ergative language, Trumai (isolate, Upper Xingu region, Brazil) we encounter a similar situation. For example (Guirardello 1999):

(27) Alaweru-k hai-ta xox di-sì-ka
Name-ERG leg-ERG child+3SG beat-CAUS
Alaweru made me beat the child

Note that the causer and the causee (original A) are both marked by an ergative enclitic (this has the form -ta after the 1sg pronoun and -(e)k elsewhere); they are distinguished by their order in the clause, causer before causee.

Kabardian and Trumai each have two NPs in ergative case, in the causative of a transitive. Abitov et al. (1957: 126) state that in Kabardian the ergative-marked causee is in A function while the ergative-marked causee is now an ‘oblique agent’ (although the term is not further explained). Further investigation is required to tell whether this also applies for Trumai.

Qiang (Tibeto-Burman family, China) provides a fascinating and unusual example in which causer and causee, in the causative of a transitive, share object properties. In a plain transitive clause the verb bears a suffix which marks person and number of A. The A NP can take ‘agentive marker’ -wu but this is normally only included when there is marked constituent order (e.g. OAV instead of the normal AOV), or to emphasize the agentivity of the actor. In the causative of an intransitive the causer (A) does not take agentive
1993: 181 provide further information on languages that have 'two objects' in the causative of a transitive clause.)

The causative of a transitive is a kind of ditransitive clause. In many languages it has essentially the same syntax as a non-causative ditransitive (involving a verb like 'give' or 'show' or 'tell'). It is relevant to enquire whether languages with 'two objects' in the causative of a transitive also have 'two objects' in a regular ditransitive, that is, with both 'gift' and 'recipient' marked as object for a verb of giving, etc. It appears that this does apply in the case of Yagua, but not for most of the other languages surveyed here. There is different marking for object and indirect object of an undervived ditransitive verb in Hebrew, Imbabura Quechua, Amharic, Oroomo and Gamo (information is lacking on the marking in simple ditransitive clauses in Greek). It appears that in these languages 'double object' is a characteristic just of the causative-of-a-transitive construction.

Type (iv) – original A becomes new O, original O moves out of the core
In this variety of morphological causative of a transitive verb each of the arguments shifts its function, the original A (the causee) taking on O function within the causative construction and the original O moving out of the core into a peripheral function.

In Javanese, core syntactic relations are shown by the constituent order AVO, SV (very like English). In a ditransitive clause the indirect object (e.g. the recipient in an activity of giving) is marked by the dative preposition marang. Example (30) shows a simple transitive clause and (31) its causative counterpart, which has the structure of a normal ditransitive, with original A becoming O (shown by its positioning immediately after the verb) and original O now taking dative preposition marang (Subandono 1994: 67).

(30) sau-ne guynak Bambarb
    dog-DIR chase Name
    The dog chased Bambarb

(31) Sri guynak-ske sau-ne marang Bambarb
    name cause-CASP dog-DIR DAT Name
    Sri got the dog to chase Bambarb

There is a similar causative mechanism, also involving constituent order, in Tolai, another Austronesian language (Papua New Guinea; Mosel 1984: 154-5).

Swahili (Bantu, East Africa) has similar syntax. Here the fact that the original A takes on O function in the causative construction is shown by its being cross-referenced by O pronominals in the verb, while the original O loses its cross-referencing (Vitule 1981: 155-6). Jarawa (Arawa family, Brazil) is like Swahili in having A and O arguments expressed by bound pronominals within the predicate. It has a general postposition jaa which marks any non-core argument. In the causative of a transitive the original A is now cross-referenced as O while the original O loses its cross-referencing and is marked by jaa (see Dixon and Alkhendawi 1997: 83, and Dixon and Vogel, forthcoming).

Kammu (Austronesian, Laos; Svantesson 1983: 103-5) is another language with this kind of causative construction. Here the original O is often omitted but can be included for some verbs, marked by the instrumental preposition. Compare the plain transitive in (32) with its causative counterpart in (33).

(32) [kéon tæk] mih tjog
    child Name eat egg
    Téek's children eat eggs

(33) ték pà-nàh [kéon tæk] [yìa tjak]
    Name cause-eat child eat DAT egg
    Téek gave his children eggs to eat (lit. Téek made his children eat eggs)

Interestingly, 'give' is expressed in Kammu as the causative of 'have', with the recipient being in O function and the gift marked by the instrumental preposition. Compare (32-3) with:

(34) nàa ?àh trák
    she have buffalo
    She has a buffalo

(35) kàa pà ?àh nàa [yìa trák]
    he cause-have she INST buffalo
    He gave her a buffalo

Babungo (Grassfields Bantu, Cameroon; Schaab 1985: 211) is like Kammu in that the original O is generally omitted but can be included as an optional adverbial, marked by preposition nà 'with'. Baker (1988: 164-6, quoting Gibson 1980 and Trithart 1977) mentions Chamorro (Austronesian) and some dialects of Chichewa (Bantu) as also being of type (iv). And, as mentioned under type (iii), those languages in which original A becomes full O and the original O, which still retains object-marking, is syntactically a 'second object' are also essentially of this type. See, in addition, the discussion of Awa Pit in §3.3.
3.3 *Of ditransitives*

The surface syntactic constraints of a language may limit the syntactic – and also semantic – possibilities for causative constructions. It was mentioned in §3.1 that, in the causative of an intransitive, Japanese allows the original S to be marked by either dative or accusative postposition, indicating that the cause performed the action willingly (dative) or that the cause ignored the causee’s intentions (accusative). However, Japanese does not allow two accusative-marked arguments in a clause. Thus, in the causative of a transitive (including ditransitive), since there is already an O NP, the original A (the cause) must take dative marking. The syntactic alternation for intransitives is not available for transitives, and with it is lost the possibility of a semantic alternation.

Syntactic constraints are especially evident when we look in detail at causatives of ditransitive clauses, which in underlying form have A, O and indirect object (generally marked by dative case or adposition). As noted under (v-b) in §3.2, there are some languages which allow two dative NPs (rather more, in fact, than allow two accusative NPs), e.g. Japanese, Turkish, Kamberdi. But other languages do not permit two dative NPs in a single clause. There are a number of different ways of dealing with this situation.

In Evenki (Tungusic, north Russia; Nedjalkov 1997: 231-2), the original A in the causative of a simple transitive has two possible markings: definite accusative or dative (the difference in meaning is not given in the surface grammar). In the causative of a ditransitive the original A can only be definite accusative, not dative. (Interestingly, this languages allows two accusative NPs in a clause, but not two dative NPs.)

Causatives of transitive in Georgian are basically of type (v-b) from §3.2, where the original O stays as is, and the original A goes into dative case. But Georgian does not allow two dative NPs in a clause and in the causative of a ditransitive, which already has a dative NP, what we get is the original A becoming the new dative and the old dative moving down to become an oblique constituent, marked by the postposition -t ‘for’. Example (40) shows a simple ditransitive clause and (41) its causative correspondent (Sumbatova 1993: 257):

(40)  
\[ \text{dena-}d \text{ kalaxwem} \text{ mare-}s \text{ diar} \]  
\[ \text{girl-ERO give+OBJ bread+DAT bread+NUM} \]  
The girl gave bread to the man

(41)  
\[ \text{e3e-m kalaxwodhume dema-}s \text{ diar} \text{ mare-}t \]  
\[ \text{ho-ERO give+OBJ girl-DAT bread+NOM man-GEN-FOR} \]  
He made the girl give bread to the man

Other languages have varying ways of responding to the prohibition on two dative NPs in a clause, when attempting to create the causative of a ditransitive. In Hixkaryana (Carib family, Brazil) both causee (original A) and original indirect object should take dative postposition \(\omega\), but only one \(\omega\) phrase can occur in a clause so that (42a) is ambiguous. In order to disambiguate it one could add a second clause with the same verb ‘give’, but not in causative form, as in (42b):

(42)  
(a)  
\[ \text{kuraha yimpoye} \]  
\[ \text{Waraka rowya} \]  
\[ \text{bow} \]  
\[ \text{3sgA+give+3sgO Name 1sg+DAT} \]  
either (i) Waraka made me give a bow to someone  
or (ii) Waraka made (someone) give a bow to me

(b)  
\[ \text{wimyae} \]  
\[ \text{[Kaywercy wya]} \]  
\[ \text{1sgA+give+3sgO Name DAT} \]  
I gave the bow to Kaywercy

Taken together, the two clauses of (42) have an unambiguous meaning ‘Waraka made me give the bow to Kaywercy’ (Derbyshire 1985: 89; cf. 1979: 135). Sonrai behaves in a similar way (Shopen and Konar 1970).

In Basque the prohibition on a clause including two dative NPs means that one simply cannot form a morphological causative of a ditransitive. In this language the morphological causative applies only to intransitive and to many simple transitive clauses (those with an inanimate O). But there is also a periphrastic causative which applies to all types of clauses, including ditransitives (Saltarelli 1988: 220-1). Similar remarks apply for Dulong/Rawang, as described by LePolla in chapter 8 below.

In Abaza (North-west Caucasian) a predicate can cross-reference up to four arguments. In the morphological causative of a ditransitive such as ‘he couldn’t make them give it back to her’, all of causer (A, ‘he’), causee (original A, ‘them’), original O (‘it’) and original indirect object (‘her’) can be shown by prepositional prefixes to the verb (W.S. Allen 1956: 139; Dixon 1982: 161). However, Abbhaz (another dialect of the same language) avoids four-argument verbs and as a result causatives of ditransitives can only be achieved by using periphrastic construction (Hewitt 1979: 171).

A fascinating example of a causative of a ditransitive comes from Awa Pit Barberaean family, Colombia and Ecuador; Curnow 1997: 159-64). In the causative of a simple transitive the original A becomes O and the original O
The one possibility which is not explicitly addressed in combination of facts 209:

```
|
- controllable concept A
- controllable concept B
- controllable concept C
- controllable concept D
- controllable concept E
- controllable concept F
- controllable concept G
- controllable concept H
- controllable concept I
- controllable concept J
- controllable concept K
- controllable concept L
- controllable concept M
- controllable concept N
- controllable concept O
- controllable concept P
- controllable concept Q
- controllable concept R
- controllable concept S
- controllable concept T
- controllable concept U
- controllable concept V
- controllable concept W
- controllable concept X
- controllable concept Y
- controllable concept Z
```

The one possibility which is not explicitly addressed is a combination of facts 210:

```
|
- controllable concept A
- controllable concept B
- controllable concept C
- controllable concept D
- controllable concept E
- controllable concept F
- controllable concept G
- controllable concept H
- controllable concept I
- controllable concept J
- controllable concept K
- controllable concept L
- controllable concept M
- controllable concept N
- controllable concept O
- controllable concept P
- controllable concept Q
- controllable concept R
- controllable concept S
- controllable concept T
- controllable concept U
- controllable concept V
- controllable concept W
- controllable concept X
- controllable concept Y
- controllable concept Z
```

The one possibility which is not explicitly addressed in combination of facts 211:

```
|
- controllable concept A
- controllable concept B
- controllable concept C
- controllable concept D
- controllable concept E
- controllable concept F
- controllable concept G
- controllable concept H
- controllable concept I
- controllable concept J
- controllable concept K
- controllable concept L
- controllable concept M
- controllable concept N
- controllable concept O
- controllable concept P
- controllable concept Q
- controllable concept R
- controllable concept S
- controllable concept T
- controllable concept U
- controllable concept V
- controllable concept W
- controllable concept X
- controllable concept Y
- controllable concept Z
```

The one possibility which is not explicitly addressed is a combination of facts 212:

```
|
- controllable concept A
- controllable concept B
- controllable concept C
- controllable concept D
- controllable concept E
- controllable concept F
- controllable concept G
- controllable concept H
- controllable concept I
- controllable concept J
- controllable concept K
- controllable concept L
- controllable concept M
- controllable concept N
- controllable concept O
- controllable concept P
- controllable concept Q
- controllable concept R
- controllable concept S
- controllable concept T
- controllable concept U
- controllable concept V
- controllable concept W
- controllable concept X
- controllable concept Y
- controllable concept Z
```
The second mechanism involves a suffix -(gu)- being added to the verb, e.g. nok- 'be narrow', nok-u- 'make narrow'. There is also a class of verbs that combines the two changes to form a single causative: they include t'oz- 'go out (e.g. fire)', zo-z-u- 'put (e.g. fire) out'.

Some verbs in Nivkh can form a causative in either of two ways; we then find that initial consonant mutation (with or without an accompanying suffix) indicates direct causation, e.g. pol- 'fall', vol-u- 'make fall (e.g. knock down)'; and the use of a suffix (with no mutation) indicates indirect causation, e.g. pol-gu 'make fall (e.g. by not supporting)'. Both causatives may apply to a single root. Nedjalkov, Otina, and Xolodovitš (1995: 67) present this as a symmetrical array:

(49) t'oz- directly causation \[\rightarrow\] zo-z-u 'put out'

\[\downarrow\]

indirect causation

\[\downarrow\]

t'oz-gu- \[\rightarrow\] zo-z-u-gu 'let (something) put (something) out'

In many languages the same causative process can be applied twice, yielding a causative of a causative. Thus, in Capana (Pano family, Peru; Payne 1990: 229) we can get:

(50) underlyng root (intransitive) -mapet-causative (transitive)

-ma, -mapet-ma- 'ascend', 'bring [it] up (i.e. make ascend)'

double causative (transitive) -mapet-ma-ma- 'make/allow [someone] to bring [it] up'

Similar sequences of two causative affixes added to an intransitive verb are reported for a number of languages. These include two tokens of the same causative suffix in Hungarian and Turkish, and two tokens of the same prefix in Kabardian (Abtov et al. 1957: 127) and in Karbi (Tibeto-Burman, Assam; Jayapaul 1987: 111).

In Apai, different suffixes are used for the causative of an intransitive and of a transitive verb. Some intransitive verbs take -ma- (e.g. nyk-ma- 'make

sleep') while others take -nohpo- (e.g. kuna-nohpo- 'make rise'). A transitive verb is causativized by adding -po (e.g. aro-po- 'make [someone] take [something]'). An intransitive and a transitive causativizer can be applied in sequence. For example (Koelm and Koelm 1986: 51):

(51) otlh- 'eat' (intransitive)

otlh-ma- 'feed [someone]', i.e. make [someone] eat' (transitive)

otlh-ma-po- 'get [someone] to feed [someone]' (transitive)

It is also possible to apply the two intransitive causative suffixes in sequence. This produces a single causative but with an indirect meaning, e.g.

(52) otlh-ma-nohpo- 'oversee [someone] eating' (transitive)

I have not been able to find a reliable textual (as opposed to elicited) example of a causative affix being added twice to a transitive verb. This relates partly to the fact that many languages restrict morphological causative processes to intransitive verbs, and quite a few of the remainder allow these processes to apply only sparingly to transitive verbs. Note that in Hungarian it may be theoretically possible to apply the causative suffix twice to a transitive verb but the result is judged infelicitous by native speakers; they prefer to use a morphological causative plus a periphrastic causative (Edith Moraveski, p.c.).

4 Semantics

Quite a few languages have two or more causative constructions, involving either different formal mechanisms or different marking of the causee (original S or A). There is always a semantic difference and it may involve one or more of nine semantic parameters, set out below.

If a language has just one causative mechanism, then this generally has a wide semantic range, covering all values of most of the parameters. But it is unlikely to cover all values of all parameters. Many linguists, when writing the grammar of a language, simply state that there is a causative construction, describing the formal marking and something of the syntax. This is not enough – the meaning must be discussed as well. This is done for Motuna by Onishi in chapter 4 of this volume when he specifies ‘the Causer acting directly and achieving the result intentionally’, and ‘the Causee is not in control of the act or activity, and is affected by the result of the whole event’. See also the account of the causative in Dulong/Rawang by LaPolla (chapter 8) and Rico’s comparison of the meanings of morphological causatives across various Umapaskan languages (chapter 6).
to specify what was done to make the causee act (e.g. ‘I told John to cook the dinner’).

In other languages the morphological causative applies only to intransitive verbs, but there is also a periphrastic causative which may be used with all verbs; it is the only mechanism available for transitives. Languages of this kind include a number from the Austronesian family, including Maori (New Zealand; Bauer 1993: 409–12), Ambae (Vanuatu; Catriona Hyslop, p.c.) and Balinese (Wayan Pastika, p.c.), and a number from the Mayan family such as Kiche' (Campbell, chapter 7 of this volume) and Tzotzil (Stuart Robinson, p.c.). Other languages are mentioned by Nedjalkov and Silnitsky (1973: 7).

Onishi (chapter 4 of this volume) states that in Motuna a morphological causative can be formed on any plain intransitive (whether of type S or type S, and on an extended intransitive (or ‘middle’); that is an intransitive with an obligatory periphrastic argument) and on just a couple of transitive verbs. There are a number of ambitransitive verbs in Motuna, and a causative is always based on the intransitive sense. In Fijian almost all verbs are ambitransitive, some of type S = A and others of type S = O. For many syntactic purposes it is most appropriate to take the transitive form as basic; however, causatives apply only to the intransitive sense of an ambitransitive verb (Dixon 1988: 45–51, 185–9).

There are a number of languages where a morphological causative applies freely to all intransitive verbs but only rather rarely to transites and then to just a few verbs. A similar set of verbs is involved, in different languages. For Yimas, Foley (1991: 292) quotes ‘weave’ and ‘eat’. For Tariana (chapter 5 of this volume), Akhenvvald quotes a number of verbs to do with ritual activity, plus ‘drink’. In chapter 5 Onishi mentions two transitive verbs that form a morphological causative in Motuna, ‘eat’ (munchable food) and ‘eat’ (soft food) / drink’. In Jarawara it appears that the only transitive verbs to readily accept the causative prefix ma- are ‘drink’ and ‘eat’. Nedjalkov and Silnitsky (1973: 16) conclude from their typological survey that if only a few transitive verbs form morphological causatives these are likely to include ‘verbs denoting abstract action’, such as ‘see/show’, ‘remember/remind’ and ‘understand/explain’, plus ‘drink’ and ‘eat’ (their example languages include Chukchee, Arabic, Bats, Hausa, Armenian and Kurdish).

Rice (chapter 6 of this volume) surveys the applicability of the causative affix across languages of the Athapaskan family. In all languages it can be used on an intransitive verb with a ‘patientive subject’. In some languages it can be used with all intransitives. Only in Koyukon can it be freely used with transitives. For other languages, just a few transitive verbs take the morphological causative; the examples which Rice quotes for Athna, Carrier and Navajo are ‘eat’ and ‘drink’.

There is here a clear generalization – if a morphological causative is used with only a few transitive verbs, these are likely to include ‘drink’ and ‘eat’. It seems that drinking and eating are the transitive activities which people are most likely to make other people do, on every continent. As mentioned in §3.3, we find languages where a morphological causative can apply to intransitive and simple transitive verbs, but not to ditransitives. Somrai, Basque, Dulong/Rawaw and Abkhaz are of this type.

3. Control. Whether the causee lacks control or has control of the activity.

Creek (Martin 1991 and chapter 12 in this volume) has two morphological mechanisms. Roughly: (i) suffix -IC is used if the causee lacks control or is unwilling (e.g. ‘feed the baby’); (ii) suffix -IPA followed by -IC is used if the causee has control (e.g. ‘make the baby eat’), or if the causee is athematic (e.g. ‘make it rain’). (Martin suggests that this difference between causatives basically relates to the separability of events.)

This parameter underlies the meaning of the morphological causative in a number of languages. For example, in Marathi (Pandharipande 1997: 406) and in Japanese and Korean (Shibatani 1976a: 33) the causee must have control; as a result, inanimate causees are not permitted.

4. Volition. Whether the causee does it willingly ('let') or unwillingly ('make').

Japanese has intransitive/transitive verb pairs as lexical causatives (e.g. ‘be damaged’/‘damage’, ‘be sold’/‘sell’, ‘become fat’/‘fatten’ – see Shibatani 1990: 236). These imply that the causee lacks control; indeed, with most lexical causatives in Japanese the causee is inanimate. Japanese also has a morphological causative with suffix -KASE: this implies that the causee has control. With intransitives there are two syntactic possibilities, indicating a difference in the causee's volition. If the original S takes accusative postposition o in the causative construction it implies that the intentions of the causee are ignored by the causee, as in (54); if the original S takes dative postposition ni this implies that the causee is willing, as in (55). (See Shibatani 1990: 309; Uenoike 1978; Tenjimura 1996: 247–9.)

(53) Taroo ga konsato e 8-ta
    Name NOM concert to go-PAST
    Taroo went to a concert

(54) Ryooshin ga Taroo o konsato e 8-ase-8a parents NOM Name ACC concert to go-CAUSE-PAST
    [His] parents made Taroo go to a concert
A similar distinction between direct and indirect causatives is found in many other languages of the region, for example Gojri (Indo-European; Sharma 1982: 153–4). Masica (1976) surveys direct and indirect causatives in the South Asian linguistic area.

Jinghpaw (Tibeto-Burman; Burma; Maran and Clifton 1976) has a causative prefix, sha-, and a causative suffix, -shangen. They are often interchangeable, but contrast with some verbs. If a causative action is accidental only the suffix can be used. If it is intentional then the prefix will be preferred if the causer acts directly while the suffix is preferred if they act indirectly. For an event ‘X killed Y’ imagine the following three scenarios:

(a) X decapitated Y (direct) – prefix preferred.
(b) X saw Y unconscious in water and didn’t rescue them (indirect) – suffix preferred.
(c) X ordered someone to decapitate Y (indirect) – suffix preferred.

In §3.4 we mentioned Nivkh, where consonantal mutation (sometimes also accompanied by a suffix) can mark direct causation, and a verbal affix (with no mutation) may be used for indirect causation. Schema (49) illustrates how these can be combined. Apalal was illustrated in (51–2); here a single causative suffix to an intransitive verb indicates direct causation, while a sequence of two suffixes is used for indirect causation.

In Telugu (Dravidian) there are two varieties of causative for an intransitive verb: (i) the original S argument is placed in accusative case; or (ii) it is marked by the postposition ceed, which is used to mark the original A in the causative of a transitive, described under type (i) in §3.2. Alternative (i) is used to describe direct causation such as ‘the nurse walked the child (e.g. by holding its hands)’ while (ii) is used for indirect causation, such as ‘the nurse got the child to walk (e.g. by telling it to do so)’. Interestingly, verbs like ‘cry’ and ‘laugh’ only accept alternative (i) (Skr. Krishnamurti, p.c.).

Foley (1991: 291) describes causative serial verb constructions in Yimas. There are two verbs which may take on a causative meaning when used in such a construction, tar ~ tal- ‘hold’ and mti- ‘say’. The alternative ‘ta ~ tal-’ marks a direct causative, the causing of an event by physically manipulating an object, while mti- is used for an indirect causative in which the event is brought about through speech, by verbal commands or requests.

Thus:

(66) na-ga-tar-kwala-t
7sgA-1sgO-caus,risepfv
She woke me up (directly, e.g. by shaking me)

(67) ma-pa-tam-kwala-t
3sgA-1sgO-caus,risePFV
She woke me up (indirectly, e.g. by calling me)

The Directness parameter may also be shown by alternation of case marking. In the causative of an intransitive, Hungarian normally puts the original S into accusative case, but some verbs allow either accusative or instrumental. The accusative alternative marks direct causation, whereas the instrumental indicates indirect causation (Hetzer 1976: 394). Under (b) in §3.1 we contrasted the direct causative ‘The nurse walked him (accusative) for an hour every day’ with the indirect causative ‘The doctor had him (instrumental) walk for an hour each day (by telling him to do so)’.

In Buru (Austronesian, Indonesia; Grimes 1991: 211) a prefix pe- is used to indicate direct causation, and a periphrastic verb, puna, for indirect causation, where the causer ‘brought about a situation that caused the resulting action or state’. Compare:

(68) da pe-gosa ringe
3sgA CAUS,be.good 3sgO
He healed her (directly, with spiritual power)

(69) da puna ringe gosa
3sgA CAUS,3sgO be.good
He [did something which, indirectly] made her well

A similar mechanism—meaning correlation is found in another Austronesian language, Chru (Vietnam; D.M. Thomas 1969, and D.D. Thomas 1971) where causative prefix tra- indicates direct action, by physical manipulation (e.g. ‘I made the child stand up (by holding him)’) while the periphrastic causative verb dp indicates indirect causation, e.g. by issuing a command. And in Amblak (Papuan region; Bruce 1984: 153–9) there are a number of causative prefixes, including ka- ‘make do by direct physical action’, while a causative serial verb construction involving the verb hay (whose meaning when used alone is ‘give’) is employed for indirect causation, where the causer and causee need not even be at the same place when the event takes place (rather like the verb cause in English). Compare:

(70) ka-fene-mé-c-an
caus,enter-REM.PAST-3sgG+A-3plH0
He made them enter (by physically taking them)
A preliminary examination of the parameters:

(1) The sample size is not sufficient to draw meaningful conclusions.
(2) The results are statistically significant but not practically significant.
(3) The model may suffer from multicollinearity.
(4) Further research is needed to validate the findings.

We have conducted additional analyses (Table 1) to address some of these issues.
9. Involvement. Whether the causer is also involved in the activity (in addition to the causee) or not involved.

In Nomatsiguenga (Arawak family, Peru; Wise 1986: 593) there is a causative prefix o-gi- and a causative suffix -haq. The prefix is used when the causer was not involved in the activity, and the suffix when they were involved. Compare:

(80) y-ogi-monti-ri-i-tomi

3sg+M CAUS-3sg+M-CROSS.RIVER-NON.FUT-3sg+M 3sg+M-son
He made his son cross the river (he told him to)

(81) y-monti-a-haq-ri-i-tomi

3sg+M-CROSS.RIVER-EPITHETIC-CAUS-3sg+M-CROSS.RIVER-3sg+M-son
He made his son cross the river (he helped him across)

A similar distinction is made in Kamaru. Here we find two causative prefixes to the verb: mo- indicating that the causer is not involved in the activity (e.g. ‘he stopped the canoe, when he was outside it’), and opro- indicating that the causer was involved (e.g. ‘he stopped the canoe, when he was inside it’). These examples are given in full in Dixon and Aikhenvald (1997: 84).

Alambal has a number of causative prefixes. One of them is ha-, used when the causer is also involved in (joins in with) the activity which they make the causer undertake, e.g. ‘he made them enter (something) by entering with them’ (Bruce 1984: 155).

The list presented here—of nine semantic parameters that characterize causative constructions—is a tentative one. Further work may suggest that it should be re-organized, or that further parameters need to be added. For example, Golovko (1993: 386) describes how Aleut has a distributive causative suffix -duv, indicating that a set of causees is involved (the O NP must take plural marking), distributed in space, e.g. ‘the woman is making the hides dry’. Saksena (1982: 827–8) suggests that in Hindi different case markings on the causee in a causative construction can indicate whether the aim is to get the activity done (by anyone), or to get it done specifically by the stated causee. For the causative of an intransitive in Korean, the original S can take causative marking (indicating ‘do fully’) or dative (‘do to some extent’). This ‘mother (A) child (DAT) eat-CAUS’ signifies that the mother fed the child, whereas ‘mother (A) child (ACC) eat-CAUS’ would describe her feeding the child for its whole life. Interestingly ‘die’ can only take the accusative alternative, presumably because killing is, by its nature, something that is fully (Yunseok Lee, p.c.).
In the current model, the output of the fully connected layer is sent to a two-layer convolutional network. This network produces a higher-dimensional representation of the output, which is then fed into a fully connected layer. The output of this layer is compared to the ground truth to calculate the loss. The loss is then used to update the weights of the model via backpropagation.

The process of training a neural network involves the iterative adjustment of weights to minimize the loss function. This is done through the backpropagation algorithm, which calculates the gradient of the loss with respect to the weights.

The model is evaluated on a validation set to monitor its performance. If the validation loss starts to increase, the model may be overfitting, and techniques such as dropout or early stopping can be used to prevent this.

In summary, the process of training a neural network involves the optimization of weights through backpropagation, and the model's performance is monitored on a validation set to ensure its generalization ability.
agree. In parameter 6, for instance, the direct value of the parameter is always marked by the more compact mechanism, and the indirect value by the less compact one. The actual mechanisms are initial mutation versus suffix in Nivkh, one suffix versus two suffixes in Apalai, short affix versus longer affix in Hindi and Jiglapaw, and morphological versus periphrastic mechanism in Burmese, Chinta, Ambala, Mixtec and Korean. Only for parameter 5 is there a single example; in Tariana the prefix + marks cause partially affected while double suffix +ita is used when the causee is completely affected by the activity.

These results agree with Comrie's observations regarding the Directness and Control parameters, mentioned at the beginning of this section. Haiman's principle concerning 'formal distance' and 'conceptual distance' is rather vague, but could be interpreted as applying to the correlations established here. Givon's prediction could be taken to relate to parameter 3, Control — the causee can only be in control if human/animate and this does correlate with a less compact mechanism (e.g. periphrastic, as opposed to morphological).

There may be a number of ways of interpreting the correlations shown in table 2.2. One is that each of the meaning columns characterizes some kind of prototype:

- Prototype 1 — Causer achieves a result naturally, intentionally and directly, the cause either lacking control or having control and being willing, and being only partially affected. May only apply to intransitive verbs (or just to intransitive and simple transitive), or be more restricted and apply just to state verbs.

- Prototype 2 — Causer achieves the result accidentally, or uses effort, or acts indirectly, the causee being in control but acting unwillingly, and being completely affected. It is likely to be used with all types of verbs.

These composite prototypes are artificial — and thus unsatisfying — inasmuch as only two or three of the components are likely to apply together (not all eight) to distinguish the causative mechanisms in a given language.

The interesting point is the correlation between 'more compact' and the parameter values in the Type 1 column — naturally rather than with effort, intentionally rather than accidentally, directly rather than indirectly; causee partially affected, willing, lacking control; and applying only to some (at the intransitive and/or state ends of the parameters 1 and 2). This is an open field for investigation of cognitive mechanisms.

Finally, a warning is in order. This is a tentative and preliminary study of marking, syntax and semantics of causative constructions, and of meaning—
A proposal of conclusions

References