Proceedings of the ESSLLI & WeSSLLI Student Session 2020

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(Editor)

Preface

These proceedings contain the papers presented at the Student Session of the Web Summer School in Logic, Language, and Information (WeSSLLI), taking place online and organized by the Brandeis University from July 11^{th} to 17^{th}, 2020. The Student Session is a part of the ESSLLI tradition. Due to the circumstances around the coronavirus (COVID-19) pandemic, the 32nd edition of the European Summer School in Logic, Language and Information, that should have taken place in Utrecht, has been postponed to 2-13 August 2021. However, since the ESSLLI Student Session Program Committee had already received several submissions when this decision was made, it was suggested to merge the ESSLLI Student Session with the WeSSLLI 2020 Virtual Student Session (except for the reviewing process). We would like to thank the ESSLLI Organizing Committee for helping us merge the events and especially the WeSSLLI Organizing Committee as well as the WeSSLLI Student Session organizers for this opportunity to run the joint Student Session, for organizing the entire summer school and supporting us in numerous ways. Furthermore, we would like to express our gratitude to the technical program chairs, Sophia Malamud and James Pustejovsky.

The ESSLLI & WeSSLLI Student Session is an excellent venue for students to present their work on a diverse range of topics at the interface of logic, language, and information, and to receive valuable feedback from renowned experts in their respective fields. The ESSLLI Student Session accepts submissions for three different tracks: Language and Computation (LaCo), Logic and Computation (LoCo), and Logic and Language (LoLa). Regarding the 2020 edition, these traditional tracks were laced with two new topics from the WeSSLLI Student Session, namely: second language acquisition (SLA) and phonology. The Student Session attracted submissions from 14 different countries this year from all over the world. As in previous years, the submissions were of high quality, and acceptance decisions were hard to make. However, the coronavirus (COVID-19) pandemic crisis had an impact on the number of submissions which decreased significantly compared to the previous years. Nevertheless, this experimental online format turned out a success regardless of some difficulties that we have encountered while preparing the Student Session. We received 39 submissions in total. At the combined Student Session, 5 of these submissions were presented as talks (30 minutes) and 18 submissions were presented in the form of a poster. As a longer version was not in the original requirements of the WeSSLLI Student Session, not all of its presenters decided to submit an extended version of their work, thus, those 6 papers were not included in the online proceedings.

We would like to thank each of the ESSLLI and WeSSLLI co-chairs for all their invaluable help in the reviewing process and organization of the combined Student Session. Without them, the combined Student Session would not have been able to take place. Additionally, we would like to thank the area experts for their help in the reviewing process and their support of the co-chairs. Thanks go

to the chairs of the previous Student Sessions, in particular to Matteo Manighetti and Merijn Beeksma for providing us with the materials from the previous years and for their advice. As in previous years, Springer-Verlag has generously offered prizes for the *Best Paper* and *Best Poster Awards*, and for this we are very grateful. Most importantly, we would like to thank all those who submitted to the combined Student Session, for you are the ones that make it such an exciting event to organize and attend.

July 2020

Alexandra Pavlova
Chair of the ESSLLI 2020 Student Session

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Towards a cross-linguistic description of morphological causatives: issues in syntax-semantics linking

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1 Introduction

Causatives have been in the focus of linguistic attention for decades. It seems that during this time, many papers written in the perspective of formal semantics have been using English lexical causatives as their object (e. g. the classical work Talmy 1976). Causative constructions of other types (morphological, periphrastic) seem to have been studied mostly in languages with a long well established tradition of linguistic research: English (Levin 1993), French (Reed 1991), Japanese (Manning, Sag, and Iida 1999), Korean (Shibatani 1973) and others. However, some well-known volumes offer quite a range of studies dedicated to syntactic and semantic properties of causative constructions in individual languages (Kholodovich 1969; Shibatani 1976; Comrie and Polinsky 1993; Dixon and Aikhenvald 2000).

One of our goals is to fill the gap in bringing together formalized syntactic and semantic analyses of productive morphological causatives in typologically varied languages. Being part of a larger project[1] about valence-increasing devices, this paper suggests a method of formal modeling of constructions with morphological causatives based on transitive verbs in three languages: Nivkh (Isolate, Sakhalin island), Bashkir (Turkic, Ural region), Halkomelem (Salish, Southwestern British Columbia). We focus on constructions based on transitive verbs as we are interested in various ways of introducing an additional argument to the verb structure. We find three-argument constructions particularly challenging in this respect. The selection of languages is not supposed to be representative or typologically salient. These languages were observed to contain interesting phenomena relevant for creating comprehensive models, which was the ultimate criterion for selection.

This paper aims to present an analysis robust enough to apply to different languages, formal enough to be used for computational tasks (such as parsing and sentence generation), easily extendable and in line with modern linguistic theory.

After this ambitious statement, some disclaimers would not go amiss. Firstly, this paper manifests only a phase of a larger project. Therefore, its outcome is more of a proof of concept rather than a finished theory. Secondly, for the sake of brevity and clarity, the implementation part of the presented analysis is only briefly sketched. Thirdly, the principal focus of the paper is the development of the formal approach.

[1] This work is part of the TreeGraSP project funded by the ERC Consolidator Grant awarded to Prof. Laura Kallmeyer.

Typological data and reasoning are used insofar that it is necessary for creating an accurate model.

In Section 2, we report the necessary claims from prior work without any novel data about the languages in question. In Section 3, key concepts are explained, and the most important methods and theories are introduced. Our research's novelty is in conceptualizing the way of analyzing this data, to what Section 4 is dedicated. Conclusions are drawn, and further research paths are indicated in Section 5.

2 Data

This study can be considered pilot insofar that it accounts for a very small number of languages – only three. However, its primary aim is not to suggest a complete account of a specific construction, but to present an approach towards a formal analysis and prove its usefulness.

In this section, we describe[2] the three selected languages: Nivkh, Bashkir, and Halkomelem. The first two languages share many properties: SOV word order, accusative alignment, agglutinative morphology, dependent marking. However, Bashkir has several constructions with morphological causative in contrast to Nivkh. Halkomelem is very different in many respects and is included in this sample to show that our model can capture even these differences.

2.1 Nivkh

Causatives are formed from transitive bases by means of the suffix *-gu-*. The argument realization strategy is described by Nedyalkov, Otaina, and Kholodovich 1969, p. 195. The new subject is placed in front of all the other participants. It receives an unmarked case, which is glossed as NOM in Gruzdeva 1998. The subject of the base sentence becomes an object of the causative sentence and receives the *-aχ-* morpheme if animate (which is most often the case). All other participants are left morphologically and syntactically unchanged. Examples[3] below demonstrate that the same construction can have factual (1) or permissive (2) semantics (or, at least, translations).

(1) *ytyk* *p'-oγla-aχ* *pityγ* *ama-gu-d*
father POSS-child-DAT/ACC book see-CAUS-FIN
'The father showed his son the book.' (Nedyalkov, Otaina, and Kholodovich 1969, p. 192)

(2) *ytik* *n'-aχ* *mos* *amla-gu-d*
grandmother 1SG-DAT/ACC berry.pudding taste-CAUS-FIN
'The grandmother let me eat the berry pudding.'
(Nedyalkov, Otaina, and Kholodovich 1969, p. 192)

[2] Abbreviations: 1 = first person, 2 = second person, 3 = third person, A = actor, ABL = ablative, ACC = accusative, CAUS = causative, DAT = dative, DET = determiner, DIR = direct, FIN = finite, FUT = future, IPFV = imperfective, NMR = non-macrorole participant, NOM = nominative, OBL = oblique, POSS = possessive, SBJ = subject, SG = singular, TR = transitive, UG = undergoer, UNM = unmarked.

[3] For Nivkh, we follow Gruzdeva 1998 in transliteration and most of glossing conventions.

For our paper, we have chosen Nivkh to illustrate the simplest case of a causative construction without additional complications.

2.2 Bashkir

Bashkir has two main strategies of case marking in causative constructions. Consider examples from Perekhval'skaya 2017: the default strategy requires ablative CAUSEE marking (3a), in the other strategy dative is used (3b). The difference in case marking does not come from the verb's lexical properties but is determined by the causative construction. This can be proved by the fact that both strategies can be acceptable with the same verb stem, as demonstrated by (3).

(3) a. *Babaj* *ul-ə-nan* *xat-tə* *uqə-t-tər-a*
old.man son-POSS.3-ABL letter-ACC read-CAUS-CAUS-IPFV
'The old man asks his son to read the letter.' (Perekhval'skaya 2017, p. 244)

b. *Babaj* *ul-ə-na* *xat-tə* *uqə-t-tər-a*
old.man son-POSS.3-DAT letter-ACC read-CAUS-CAUS-IPFV
'The old man lets his son to read the letter.' (Perekhval'skaya 2017, p. 244)

The relationship between these two strategies is not easy to describe. In this paper, we would like to model only one difference between the two constructions: the ABL marking is used when the pragmatic focus is on the THEME, while with the DAT marking it is on the CAUSEE. Consider comments by Perekhval'skaya 2017, pp. 244–245: "Similar for the situation in (3a), when the old man discovers the contents of the letter by means of the son (e. g. he comes up with this solution because he has forgotten his glasses). The letter is most probably read aloud in the presence of the old man. In (3b), the son is interested in discovering the contents of the letter. He may read it on his own, in a place or time different from the situation of causation." This observation is supported by data from other languages, namely, Kalmyk (Say 2009, p. 407).

2.3 Halkomelem

Causative constructions with transitive verb bases have been believed non-existent because the causative suffix cannot be stacked on the transitive suffix in Halkomelem (D. B. Gerdts and Hukari 2006b, p. 137, footnote 7). However, some verb roots can take a causative suffix instead of a transitive and form three-argument constructions. Consider the verb root *məḵʷ* in a two-argument construction with a transitive suffix in (4), and the same root with a causative suffix in a three-argument construction in (5).

(4) *məḵʷ-ət* *č* *ceʔ* *tθə* *syaɬ*
pick.up-TR 2.SBJ FUT DET firewood
'You will gather firewood.' (D. B. Gerdts and Hukari 2006b, p. 137)

(5) *neḿ cən məkʷ-stəxʷ tᶿə sχiʔχqəɬ ʔə tᶿə qəyeḿan, neḿ ʔə kʷaχkʷa cəwmən*
go 1SBJ pick.up-CAUS DET child OBL DET shell OBL DET salt.water seashore
'I'm going to get the boy to pick up shells by the seashore.' (D. B. Gerdts and Hukari 2006b, p. 138)

Currently, we are not going to analyze this class of Halkomelem words deeply. Nevertheless, we are interested in accounting for this construction in our formal model (see Section 4.

Halkomelem data can also illustrate another interesting phenomenon. Sometimes, additional nuances of causative meaning are present in a construction without specific marking on either of the components. Namely, D. B. Gerdts and Hukari 2006b, p. 143 suggest a translation of (6) using the English verb 'show' despite the lack of an overt verb 'show' or 'see' in the original sentence.

(6) *neḿ ʔaɬ-stəxʷ tᶿə swiẃləs ʔə tᶿə təx̌ʷaʔc !*
go stretch-CAUS DET young.man OBL DET bow !
'Go show the young man how to pull the bow!' (D. B. Gerdts and Hukari 2006b, p. 143)

Note: in causative constructions like (5) and (6), the CAUSER is always the subject, the CAUSEE is the direct object marked with DET only and the THEME is the oblique object and thus preceded by OBL.

Even though English translations are not sufficient proof that an additional meaning is proper to the construction in question, they can at least slightly indicate this possibility. In other words, there is no sufficiently persuasive evidence that (6) necessarily includes the meaning 'show'. We would like to have the possibility of including additional semantics in a causative construction in our model once it is proven. So, we follow D. B. Gerdts and Hukari 2006b, p. 143 and their translation.

To a smaller extent, this phenomenon is also proper to Nivkh: the permissive semantics of (2) is not only reflected in translation but explicitly stated as a distinguishing property (Nedyalkov, Otaina, and Kholodovich 1969, p. 192).

3 Key concepts and methods

To approach this topic, we would need to suggest models of syntactic and semantic representations as well as provide a mechanism for linking them. We take this architecture (Van Valin 2005, Fig. 5.4 on p. 134) and some other general principles from Role and Reference Grammar. This theory has been developed with linguistic diversity in mind and thus suits our goals well.

Syntactic representations in RRG are realized as trees, where each layer corresponds to a syntactic entity. Our study will be dealing with CORE structures – syntactic entities comprising the predicate with all its arguments, but nothing more. The predicate is placed in the NUCLEUS, being the essential part of the CORE. A CLAUSE, which is a well-known unit in any linguistic paradigm, is built upon a CORE and also includes PERIPHERY (non-arguments).

We also use the concept of macroroles from the classical RRG (Van Valin 2005, pp. 60–68) and presume that any structure would have one Actor one Undergoer and

one Non-macrorole participant. Using macroroles is helpful when working with various verbs that take different thematic roles, especially in several languages.

For the semantic representations, we use frames in the form of attribute-value matrices as they allow for keeping track of typed features. We follow the approach suggested by Osswald and Kallmeyer 2018 (more discussion and comparison with other solutions can be found in Kallmeyer and Osswald 2013).

In classical RRG, linking the two representations is due procedurally by a consecutive application of a number of rules (Van Valin 2005, pp. 149–150). This approach has been criticized (see Kailuweit 2013; Kallmeyer, Lichte, et al. 2016 *inter alia*). With frames, linking is possible due to typed features assigned to semantic or syntactic structures. There are also interface features, which are used for indexing components in both representations. See Kallmeyer, Lichte, et al. 2016 for more detail about argument linking.

The formalization of both representations, together with features, can be best realized as a metagrammar, which is afterward fed to a parser. We use the extensible metagrammar (XMG) formalism suggested by Crabbé et al. 2013. Due to the lack of space, we do not include a detailed presentation of how the metagrammar describing the constructions in question could look like, and focus on the first steps of modeling the linking.

By general design and purpose, the data structures that result from the metagrammar, correspond to constructional schemata as defined in Van Valin 2005, p. 132: they contain syntactic, morphological, semantic and pragmatic information about the construction and capture language-specific information, referring it to the general principles. However, we claim that any structure can be described in such a way, even the most general one.

So, what we present in Section 4 is the complex data structure comprising a syntactic tree, a semantic frame, typed features describing different properties of either of these representations and labels for constituents. We claim that some traits common for all causative constructions can be defined universally, while some others are language-specific. By designing the universal concept and then tailoring it according to each construction in individual languages, we capture the variety and, at the same time, make reasoning about generalizations legitimate. The transition between universal and language-specific models is granted by the XMG inheritance mechanism and makes the addition of other languages simple.

4 Suggested model

4.1 The universal concept

This section shows the basic architecture of linked syntactic and semantic representations together with relevant features (consider Fig. 1). The following subsections present this general concept's applicability to the chosen languages and deal with interesting phenomena listed for each of them in Section 2. The subsections are ordered from simplest to most complicated issues.

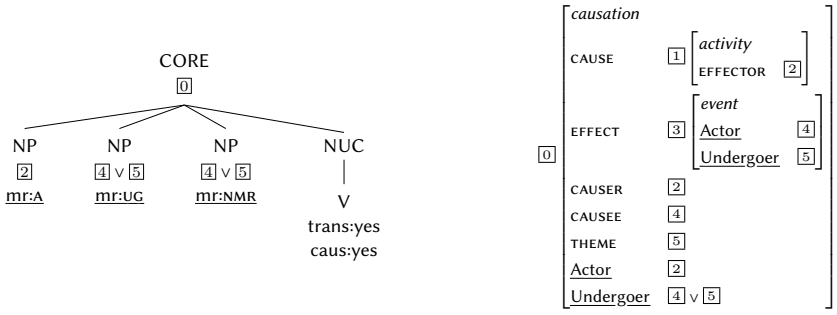

Fig. 1. Basic structure for describing constructions in question

In Fig. 1, the part on the left shows the tree-shaped syntactic representation. Features that are present in any language are already introduced into it and assigned necessary values. Namely, to describe causative constructions based on transitive verbs, one must ensure that the features 'causative' and 'transitive' are declared for a predicate and that both take positive values. Some other features (e.g., case marking) differ from one language to another and thus are not part of the general constructional schema[4].

The shape of the tree is determined by our motivation to study constructions with three core arguments. The three-argument syntactic template is not supposed to be stored in the inventory of a language nor built from scratch. We approach morphological causatives as verbal derivations and thus would like to capture the relationship between the base transitive non-causative construction and its causative counterpart. Therefore we suggest that the causative syntactic tree inherits the properties of the non-causative one but differs from it in the value of the feature 'causative' on the verb and the number of NP nodes. Inheritance is provided by the *import* method in XMG. We currently leave the detailed description of this mechanism outside of this paper.

The semantic representation is shown on the right in Fig. 1. It is a frame corresponding to the whole CORE structure (consider label 0). The frame of the *causation* comprises two subframes. The CAUSE is always a general activity performed by an EFFECTOR. In all languages, this participant is also the one to bear the semantic role of the CAUSER and the Actor macrorole in the CORE construction (consider features and labels beneath the second subframe).

The EFFECT subframe corresponds to the event described by the transitive base verb. Whatever it is, it will involve two participants, one of which would bear the Actor macrorole and the other – the Undergoer. Moreover, the Actor of the EFFECT will always be the CAUSEE in the causative construction, while the Undergoer of this event will be the THEME. However, languages differ regarding which of these participants

[4] The constituent order is an individual property of each language and thus must not be accounted for in the universal structure. The present order of the constituents has been chosen for facilitating the reading of the graph.

would bear the Undergoer macrorole in the CORE construction; therefore, the value to this feature is not assigned in the general constructional schema.

Participants are assigned thematic roles as well (which in our architecture is a semantic feature). As they depend on each particular predicate, they are not part of the universal structure shown in Fig. 1.

4.2 Nivkh: the instantiation of the basic structure

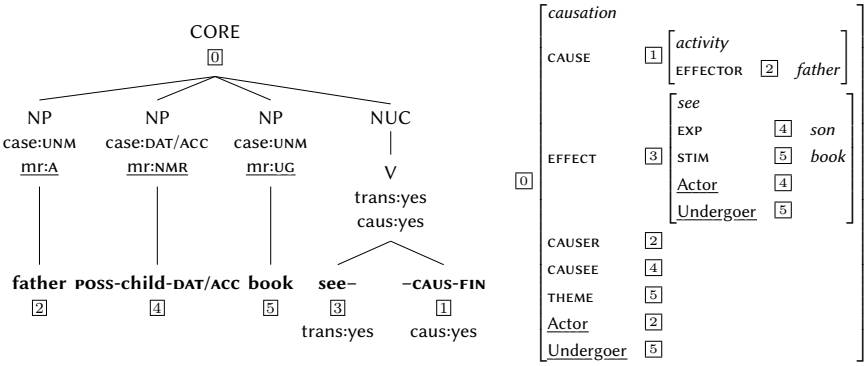

Fig. 2. A full analysis of Nivkh (1)

As already stated, example (1) from Nivkh does not have any additional syntactic or semantic peculiarities. We use it to illustrate how the general concept described in Section 4.1 is applied to a given language – consider Fig. 2.

The frame representation repeats the structure suggested in Fig. 1, but the general values of some features are substituted with specific ones. Thus, participants of the base predicate 'see' are assigned thematic roles EXPERIENCER and STIMULUS. According to the Actor-Undergoer hierarchy (Van Valin 2005, p. 54, modified by Kallmeyer, Lichte, et al. 2016), EXPERIENCER would always take the Actor macrorole when the STIMULUS is present. This is reflected in the macrorole assignment within the EFFECT subframe. Studies in Nivkh (Nedyalkov, Otaina, and Kholodovich 1969) show that the Undergoer of the embedded frame becomes the Undergoer of the whole causative construction, the CAUSEE being the Non-macrorole participant. The final macrorole assignment is presented in the last lines of the whole frame.

In our analysis, the macrorole feature is present in both syntactic and semantic representations and ensures correct linking between those. In Fig. 2, the syntactic representation has all values of the feature 'mr' determined.

Since we are dealing with a language with some morphology, features are assigned not only to complete words but also to morphemes. It is the causative suffix that makes the verb causative. So, the binary feature 'causative' receives its positive value within the suffix node. It percolates upwards to make the value of the feature 'causative' positive on higher levels and ensure the correct tree structure.

There is a new feature in the syntactic representation, which was not shown in the basic structure. The feature 'case' is language-specific and takes as its value one of the morphological cases available in a paradigm of a given language[5]. This feature is crucial for the very first step of sentence parsing (as it helps identify NPs) and the very last step of sentence generation (as it makes the sentence grammatical). The selection of cases from the language paradigm is closely related to macrorole assignment and is made on the metagrammatical level through the intersection of two XMG classes.

4.3 Halkomelem: nuances of causative semantics

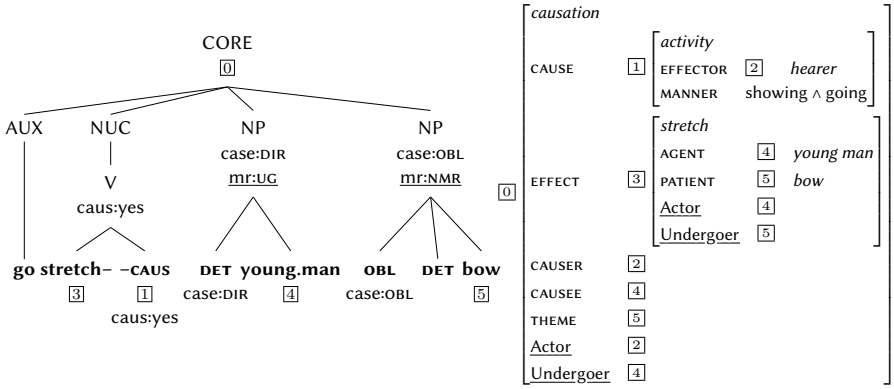

Fig. 3. A full analysis of (6) with the feature MANNER in the CAUSE subframe

Nuances of causative semantics described and discussed in Section 2.3, illustrate non-compositionality: the resulting meaning of the causative verb form does not equal to the sum of its components. Indeed, there are no overt morphemes that could bring these semantics into sentences.

To account for additional meanings, we follow the approach used by Seyffarth 2019 in a study about English lexical causatives. Designing the frame for the sentence *Sylvia laughed Mary off the stage*, Seyffarth 2019, pp. 21–22 suggests the same CAUSE frame, as in Fig. 1, enriched with a semantic feature MANNER, which takes the value *laughing*. This architecture shows the decomposition of the semantics that the verb *laugh sb.* expresses without overt marking.

We find this approach useful for describing sentences like (6) – consider Fig. 3. As it is an imperative sentence, there are only two overt NPs, although the structure requires three arguments. Thus, the participant labeled 2 in the frame structure is not shown in the tree structure. The two NPs are case marked: the absence of OBL

[5] We have selected for our sample only languages that have case marking to make the demonstration of how this feature works easier. Other types of marking (verb agreement, word order, etc.) can be modeled similarly.

marker marks the direct case while its presence marks the oblique case. The macrorole assignment in Halkomelem is different from Nivkh and it is the CAUSEE (not the THEME) that becomes the Undergoer of the clause (according to various syntactic tests demonstrated by D. Gerdts 2010). The last note about Fig. 3 is the absence of the feature 'transitive', it will be discussed in Section 4.5.

The main modification of the frame is the feature MANNER in the CAUSE subframe. We show that the set of values for this feature is determined by the language, but it can remain open in principle. In this particular case, we show the possibility of combining several additional meanings. Namely, the value 'showing' reflected in the translation by D. B. Gerdts and Hukari 2006b, p. 143 and the value 'going' coming from the lexical semantics of the auxiliary verb. Once again, we use this example to illustrate the performance of our model. An in-depth investigation of different semantic augments in Halkomelem causative constructions lies outside of the present paper's scope.

4.4 Bashkir: accounting for concurring strategies

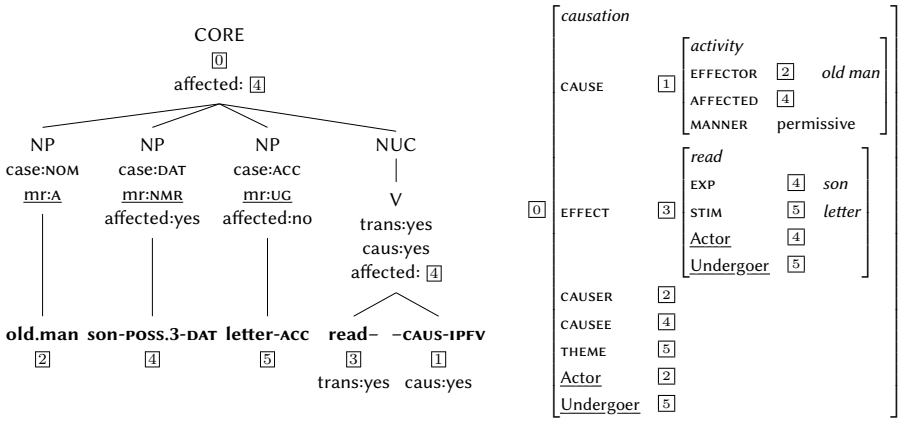

Fig. 4. A full analysis of (3b) with extensions in the CAUSE subframe

We have shown in Section 2.2 that several constructions with morphological causative can co-exist in a single language. In this section, we suggest a solution that helps to select one of the concurring constructions.

We would suggest introducing the feature AFFECTED to reflect the speaker's pragmatic intention. If the speaker intends that the THEME is affected, the ABL marking for the CAUSEE is used. If AFFECTED references the CAUSEE, it is marked with DAT. The latter construction is illustrated in Fig. 4. The CAUSE frame is enriched with the semantic feature MANNER, which has been described in the previous section. We introduced it following the translation of (3b) in Perekhval'skaya 2017, p. 244.

The feature AFFECTED appears within the CAUSE frame as it denoted which participant is pragmatically more affected by the act of causation, not by the base verb. It

takes as value a label of the participant. In the depicted example, the affected participant is the CAUSEE, which is labeled 4.

The value of the feature AFFECTED influences the case marking of the causee. For this reason, it must be accessible by NP nodes in the syntactic representation. This is achieved by percolating up to the CORE level and ascribing the positive value to the binary syntactic feature AFFECTED on the respective NP. In Fig. 4, the syntactic feature AFFECTED is declared for both non-nominative NPs. Since the semantic feature AFFECTED references the CAUSEE, the value of the syntactic feature on this NP becomes positive. In the model for (3a) the semantic feature AFFECTED would reference the THEME and respectively the syntactic feature AFFECTED ascribed to this constituent would become positive.

The advantage of this solution is that the EFFECT frame corresponding to the transitive base verb remains unchanged, and the causative construction can be easily built upon any stem. It also facilitates linking across dimensions involving syntactic, semantic and pragmatic reasoning.

4.5 Halkomelem: more than just 'transitive'

Halkomelem three-argument causative constructions are tricky to analyze in respect of valence. In terms of our model, it is not clear how to ascribe values to the feature 'transitive' for predicates in sentences like (5) and (6).

One way would be doing nothing special and store the value for the feature 'transitive' in the lexicon. If so, three-argument constructions would result from a combination of two arguments available for the transitive base with one additional argument added through causative verb derivation. However, non-causative transitive constructions like (4) would receive values for the feature 'transitive' twice: one coming from the stem and the other coming from the explicit suffix. This solution does not seem elegant to us.

What we suggest is a more sophisticated yet more robust solution. We suggest accounting for the semantic and the syntactic transitivity separately instead of having a single feature. Moreover, we consider the discussion about the difference between the concepts of transitivity and valence in Van Valin and LaPolla 1997, pp. 147–150 and prefer formulating further claims using terms *syntactic valence* and *semantic valence*. Following Van Valin and LaPolla 1997, p. 150, we define syntactic valence of a predicate as "the number of syntactic arguments a verb takes". The *semantic valence* in turn is defined as "the number of argument positions that a verb has in its logical structure" (*ibid*).

Given that, we posit that suffixes bearing grammatical meaning (namely, transitive and causative) index the syntactic valence, whereas lexical morphemes (verb roots) have a semantic valence. In other words, semantic valence is an invariable property of the root, and syntactic valence can be changed through verbal derivations. This claim is in line with what is commonly known about suffixes in contrast to roots. Moreover, it is in line with observations made by D. B. Gerdts and Hukari 2006a about Halkomelem. After having presented lists of verbs like *məkʷ 'pick up'* D. B. Gerdts and Hukari 2006a, p. 508 conclude "that transitive marking, rather than functioning as

a means of deriving transitive from intransitive forms, should be viewed as inflection on roots that are already semantically transitive".

Now, the way how the causative suffix functions has to be clarified. Undoubtedly, it increases the valence of the predicate by one. But now, as we distinguish between semantic and syntactic valence, we need to add precision: the causative suffix operates on the semantic valence of a verb and makes the syntactic valence equal to a number that is higher by one. In this respect, it is different from the transitive suffix that just equals the syntactic valence to two. This discrepancy in functions can perhaps explain why transitive and causative suffixes do not stack in Halkomelem. We summarize our claims in Tab. 1.

Not only this approach helps to explain and model Halkomelem data, but it can also be useful for studying other languages demonstrating non-agglutinative traits in constructions with morphological causatives.

The more straightforward structure with the single 'transitive' feature can also be converted into the more complex one with two different 'semantic' and 'syntactic valence' features. If investigations of a larger number of languages would show that the behavior attested in Halkomelem is quite frequent, we might wish to perform the conversion for the sake of uniformity of all models.

5 Conclusion

In this paper, we have shown that constructions with morphological causatives based on transitive verbs can be syntactically and semantically decomposed in a similar way independently on the language. Features determining each particular construction can be introduced for any dimension: syntax, semantics, morphology, and pragmatics. Although only two of them seem to be critically relevant for the universal concept of a causative construction, other features are shared across languages as well. This opens a possibility to develop a complex hierarchy of constructions encountered in structurally varied languages where constructions with more modifications would automatically include features from more general constructions.

Our goal in developing a formal method of analyzing constructions with morphological causatives based on transitive verbs seems to be achieved in a sense that the prototype displayed in the present paper shows compatibility with classical RRG theory, its formalization by Osswald and Kallmeyer 2018 and language data reported by

[7] D. B. Gerdts and Hukari 2006a, p. 506, D. B. Gerdts and Hukari 2006b, p. 132
[7] D. B. Gerdts and Hukari 2006a, p. 507, D. B. Gerdts and Hukari 2006b, pp. 137–138

verb	semantic valence	syntactic valence		
		bare	TR	CAUS
e.g. *yays* 'work'[6]	1	1	2	1+1=2
e. g. *məḵʷ* 'pick up'[7]	2	n/a	2	2+1=3

Table 1: Syntactic and semantic valence of Halkomelem verbs

many other scholars. It is easily extendable and, as Section 4.5 promises, not only over other agglutinative languages.

Much was left aside from this paper and has to be done in the nearest future. First of all, the implementation of the suggested formal analysis is a challenging task *per se*. Secondly, testing our approach on a larger sample is necessary to improve both the understanding of causative constructions and the parameters relevant to modeling these linguistic data. A goal for a longer-term would be to create a formal model of not only causative but also other valence-increasing constructions.

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