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Transitivity pairs in Baltic: between Finnic and Slavic

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In this paper we examine transitivity pairs in the two modern Baltic languages Lithuanian and Latvian and compare them to neighbouring Finnic (Finnish, Estonian) and Slavic (Russian, Polish) languages. In Slavic the main strategy is to derive the intransitive (noncausal) verb from the transitive (causal) verb, while in Finnic we find a high number of derived causatives. Baltic uses both techniques, and in addition, there is a higher number of pairs where either both verbs are marked, or two etymologically related verbs are underived from a synchronic point of view. Differences and similarities across the six languages are investigated, using a list of 20 notions divided into five groups. Special attention is paid to animacy and to the distinction between inchoative and durative noncausal verbs.

Keywords: transitivity, causative, anticausative, Baltic, Finnic, Slavic

1. Introduction

The Baltic languages are located in the northern part of Central Europe, where languages of the Indo-European family have met and mingled with languages of the Uralic family for a long time. These contacts led to mutual influences on vocabulary and language structures in prehistoric times before the consolidation of Latvian and Lithuanian as separate languages, but their traces are still felt in modern standard varieties. Several features show the areal relatedness between Baltic and both genetically unrelated Finnic and genetically related Slavic languages. In this paper we explore similarities and differences among languages of the three genera with respect to the morphological marking of intransitive and transitive verbs that refer to the same event. We use a list of 20 notions which can be expressed by an intransitive or a transitive verb, that is, excluding or including a place for an argument referring to the causer or force bringing about the event. These verbs were collected from the contemporary standard varieties of Finnish, Estonian, Latvian, Lithuanian, Polish, and Russian. We then analyse the morphological make-up

of the verbs and their derivational relations, distinguishing "causative marking" of the transitive verb, "anticausative marking" of the intransitive verb, and other constellations. Based on our initial observations, we hypothesized that the Baltic languages should occupy an intermediate position between Finnic and Slavic with regard to the marking of causatives and anticausatives. In §2 we explain how we constructed the list, which includes verbs from different semantic groups, divided into verbs with an animate and an inanimate undergoer. In §3 we explain the principles underlying our analysis, compare the marking strategies found in the languages under investigation, and discuss the effect of aktionsart and semantic factors.

Transitivity pairs have been the subject of linguistic investigation within a variety of approaches and under different names: transitivity alternation, inchoative/causative alternation, causative-anticausative alternation, causal-noncausal alternation, and others. We will briefly review here only those studies that have been most influential in typologically oriented research and also form the background of our investigation, notably work by Martin Haspelmath and by Johanna Nichols. Both scholars took their inspiration from Nedjalkov (1969), in which four notions (LAUGH, BOIL, BURN, BREAK) were explored for causative or anticausative coding and first generalizations were proposed. The original study included data from 60 languages, while Nedyalkov & Silnitsky (1973: 44-45) considered more than 100 languages. Among other things, Nedjalkov and Silnitsky discovered that cross-linguistically the morphological marking of causatives is more common than that of anticausatives (Nedjalkov 1969: 109; Nedyalkov & Silnitsky 1973). However, there are also languages in which anticausatives are more pronounced than causatives, with Russian being one of these. This study also introduced the classification of the forms which was later adopted by other researchers with some terminological modifications (see below).

Haspelmath (1993) developed a list of 31 notions (including Nedjalkov's four) and used them to compile what he called inchoative/causative verb pairs. This list, or some variant of it, has since become an instrument for the study of transitivity alternation across languages as well as in individual languages (for example, Anyanwu 2012) and was also a starting point for our investigation. Haspelmath introduced slight terminological changes into the classification of the formal coding strategies used in Nedjalkov (1969) and Nedyalkov & Silnitsky (1973): alongside "suppletive", "causative" and "anticausative", he introduced "equipollent" and "labile".

In his 1993 paper, Haspelmath applied the list to 21 languages. As the author readily admits, his sample was not well-balanced, but it allowed him to typologically and quantitatively characterize the languages and to test his main hypothesis: that the causative strategy is typically used when the situation is likely to occur spontaneously (not due to any external force) while anticausative coding is typically expected when the situation occurs due to some external force (these ideas were proposed in Jacobsen 1985; Haspelmath 1987: 19-21; Croft 1990: 60). Haspelmath also noted a significant areal tendency among European languages to use the anticausative strategy more frequently than in the rest of the world.

Haspelmath et al. (2014) explored 20 causal/noncausal verb pairs (a subset of Haspelmath 1993) in seven languages in terms of their frequency. The authors found that

the pairs generally conformed to the form-frequency correspondence principle: less coding material is used for more frequent forms. This means that if the noncausal member is more frequent, the causal member is likely to have formal (causative) marking and, conversely, if the causal member is more frequent, the noncausal member is likely to be marked (as anticausative). In Haspelmath (2016) (in this issue), the idea of a spontaneity scale related to the frequency of occurrence of a given situation as spontaneous vs. externally caused is elaborated further, and a number of implicational universals are formulated.

Noteworthy among the studies that use Haspelmath's (1993) list is the *World Atlas of Transitivity Pairs* (WATP 2014), which currently provides data on 73 languages,[1] mainly from Europe and Asia, with a few from Africa but none from the Americas or Australia. It offers three different views of the data. The Slopegraph demonstrates differences in pairs ranked according to the Anticausative/Causative ratio in Haspelmath (1993), while in the Chart Interface, an individual coding strategy is marked by colours and displayed on the spontaneity scale, which is equated with the rankings of the pairs according to the A/C ratio listed in Haspelmath (1993: 104). The Map Interface allows one to detect areal preferences.

Johanna Nichols followed up another thread from Nedjalkov's (1969) pioneering article. She was more interested in the question of how characteristic causative vs. anticausative marking is for particular languages and how this preference correlates with other lexical and grammatical features of the language. In Nichols (1982) she describes Ingush as a language characterized by the causative strategy, opposed to Russian, where anticausative prevails (as shown in more detail in Nichols 1993). Nichols et al. (2004) study what they call LEXICAL VALENCE ORIENTATION in a sample of 80 languages. Their list differs from the one used by Haspelmath (1993) and contains 18 notions, divided equally into those which invoke an animate (mostly human) undergoer (such as 'be angry' or 'laugh') and those which apply to an inanimate undergoer (such as 'boil', 'burn'). Based on the preferred coding strategy, the authors classified the languages into transitivizing, detransitivizing, neutral, and indeterminate types. They explored the interaction of the preferred coding strategy in a given language with a number of typological parameters, and have found that, for example, neutral and indeterminate types favour ergativity while detransitivizing languages are typically accusative. With regard to classification of the strategies used, Nichols et al. (2004) differs from Haspelmath's taxonomy in a number of respects (some of these are merely terminological). For our study one type is of particular importance, viz. doubly derived pairs, when both members have formal markers of valency increase and decrease, cf. Siberian Yupik *aghagh-nga-* 'hang (itr.)': *aghagh-te-* 'hang (tr.)' (Nichols et al. 2004: 153). This type was introduced in Nedjalkov (1969: 108-109) as Russian "zameščenie" = English "replacement/substitution" and differentiated from "čeredovanie" = "alternation", but both subtypes were merged under "equipollent" in Haspelmath (1993: 91). In Grünthal & Nichols (2016) (in this issue), the same list of 18 verbal pairs (sometimes only the 9 pairs of the animate subset) specified for

[1] The list of languages currently has 82 entries, but 9 of them have double lists (one taken from Haspelmath 1993 and another provided/updated by other researchers).

cognacy and morphological coding (updated in some respects) is used, and it is shown that these data are a good tool for modelling phylogeny. An interesting observation about this work relevant for our own study is that the Baltic languages were found to occupy an intermediate position between Uralic and Slavic languages (Grünthal & Nichols 2016, in this issue, Figure 1). However, in the clustering of Indo-European languages, Latvian interestingly is positioned between Slavic and Germanic languages, while Lithuanian was closer to Armenian and Indo-Iranian languages, where causativization is prominent (Grünthal & Nichols 2016, in this issue, Figure 5).

While typological studies such as those mentioned here provide some background for language comparison and judgments about when an individual language "stands out" from or conforms to a global trend, it must be noted that the methods used to gather data and analyse and classify verbs and verb pairs vary considerably. The results of individual studies are therefore often not directly comparable, and in each case one has to consult the data set and the method used. We will discuss some differences between our analysis and that of the same or similar data by other scholars; we provide data on our sample in an appendix to this paper.

2. Methods

Data for this research were gathered, analysed and compared in three steps. First, we compiled a list of notions and collected verbs that matched these notions; second, we identified morphological markers in the collected verbs; and third, we distinguished transitivity pairs according to the type of marking. The results of the second and third step are presented in the following sections. Here, we will discuss our method of collecting verbs and some problems that occurred during the process.

As in the previous projects discussed in the introduction (Haspelmath 1993; Nichols et al. 2004; WATP 2014, and others), the items on our list denote a core event that may be expressed with and without the inclusion of a causer. Following the terminology of Haspelmath et al. (2004), we call verbs of the first type NONCAUSAL and that of the second type CAUSAL. The aim was to design a set with enough overlap with the sets investigated by other researchers to make possible a comparison of results. The criteria for selection we adopted ruled out some of the verbs used by Haspelmath or Nichols and made the inclusions of others necessary. First, our investigation was restricted to intransitive core events, while Haspelmath's (1993) list included 'learn', and Nichols et al. (2004) contained 'learn', 'eat' and 'see'. Second, as we were especially interested in animacy effects, we included an equal number of events with an animate, typically human, and an inanimate undergoer, each represented by eight pairs, as well as four items where both animate and inanimate undergoers are possible. We were not as systematic with another parameter known to have an effect on causative versus anticausative marking, namely, the spontaneity of the event, or force needed to bring it about. Our list contained verbs with various degrees of spontaneity (the likelihood that an event comes about without human or natural forces causing it), but we often found it difficult to decide where to put an event on such a scale. The problem of measuring spontaneity as

a semantic notion is also noted by Haspelmath et al. (2014), who therefore replaced it with the non-semantic parameter of causative prominence, measurable by frequency of occurrence in corpora.

The list of twenty items we finally decided to use consisted of five groups distinguished by semantic criteria. It started with four events that can only have an animate undergoer. If there were different lexical verbs for humans and animals, only the first were considered.

Table 1.1: Group ANIM (animate undergoer)

No.	Label	Noncausal	Causal
1	BIRTH	'be born'	'give birth'
2	DEATH	'die'	'make die', 'kill', 'let die'
3	AWAKE	'wake up$_{ITR}$'	'wake up$_{TR}$'
4	ASLEEP	'fall asleep'	'make fall asleep', 'put to sleep'

Semantically, these notions form two obvious pairs, but only DEATH and AWAKE had been included in previous studies. The following items 5-8 correspond to the first four notions by denoting the beginning and end of existence and a very general "change of state" but have exclusively inanimate undergoers. All were included in Haspelmath's (1993) list. For BEGIN and END only verbs used with nominal objects were regarded as transitive, and thus not verbs exclusively used with verbal phrases (such as in English *It started raining* or *I finished (stopped) smoking*; cf. Haspelmath et al. 2014).

Table 1.2: Group INANIM (inanimate undergoer)

No.	Label	Noncausal	Causal
5	BEGIN	'begin$_{ITR}$', 'set in'	'begin$_{TR}$', 'start$_{TR}$'
6	END	'end$_{ITR}$', 'finish$_{ITR}$'	'end$_{TR}$', 'finish$_{TR}$'
7	OPEN	'open$_{ITR}$'	'open$_{TR}$'
8	CLOSE	'close$_{ITR}$', 'shut$_{ITR}$'	'close$_{TR}$', 'shut$_{TR}$'

The next two groups contain more specific changes of state. For human undergoers, we chose emotions. The last item in this group, LAUGH, differs from the others in denoting an activity rather than a state. None of the four is in Haspelmath's (1993) list, but three (SCARED, ANGRY, LAUGH) are part of the set studied by Nichols et al. (2004).

Table 1.3: Group EMOTION (animate undergoer, emotion predicates)

No.	Label	Noncausal	Causal
9	SCARED	'get scared', 'take fright'	'scare', 'frighten'
10	ANGRY	'get angry'	'make angry'
11	HAPPY	'get happy', 'rejoice'	'make happy', 'fill with joy'
12	LAUGH	'laugh', 'become amused'	'make laugh', 'amuse'

For events with an inanimate undergoer, we selected the following four pairs, which are actually quite diverse semantically. All were included by Haspelmath (1993), and all but MELT by Nichols et al. (2004).

Table 1.4: Group PHYSICAL (inanimate undergoer, change of physical state)

No.	Label	Noncausal	Causal
13	MELT	'melt$_{ITR}$'	'melt$_{TR}$'
14	AFIRE	'catch fire', 'start burning$_{ITR}$'	'set on fire', 'ignite'
15	BOIL	'come to boil'	'bring to boil'
16	BREAK	'break$_{ITR}$'	'break$_{TR}$'

The final four events were chosen for their potential to allow both animate and inanimate undergoers. The first and the fourth are part of Haspelmath's (1993) set, and the second and the third partly overlap with notions from his set (DISPERSE with 'spread', and VANISH with 'get lost/lose').

Table 1.5: Group ANIM/INANIM (both animate and inanimate undergoer possible)

No.	Label	Noncausal	Causal
17	GATHER	'gather$_{ITR}$', 'come together', 'accumulate$_{ITR}$'	'gather$_{TR}$', 'bring together', 'accumulate$_{TR}$'
18	DISPERSE	'disperse$_{ITR}$', 'split up$_{ITR}$ (of a group)'	'scatter$_{TR}$'
19	VANISH	'vanish$_{ITR}$, disappear', 'get lost'	'make vanish', 'lose'
20	CHANGE	'change$_{ITR}$', 'become different'	'change$_{TR}$', 'make different'

The selection of these four pairs turned out to be more difficult than we had initially expected: it seems that speakers rarely have the same ideas about the states and actions of humans and of inanimate objects. This is reflected in different lexical expressions for similar concepts, for example, in English people *come together*, but dust *accumulates*; in some cases, the same verb may also have different meanings, as in English *My luggage got lost at the airport* vs. *I got lost at the airport* (= 'lost my way'). Different transitive

verbs may reflect typical ways how humans interact with other humans as opposed to inanimate objects. However, animacy is often not the only and not even the main factor determining the choice of verb or marking.

Another problem is the distinction between inchoative and stative (durative) noncausal verbs, that is, those that contain a meaning component 'become' ('enter a state, process', 'begin an action', etc.) and those that do not. We had planned to concentrate on inchoatives, but it was not always possible or even advisable to follow this rule strictly. With some of the core events the opposition tends to get blurred; for example, some languages use the same verb for a state and a change into that state. In our sample, this was the case with the emotions ANGRY and HAPPY. In other instances, the state is more common, and thus more likely to be expressed by a simple verb than the inchoative. Examples include AFIRE and ASLEEP. An inchoative with this meaning may be derived from a stative, for example, 'fall asleep' from 'sleep'. Morphological markers of inchoativity often also signal intransitivity and may be similar or identical to anticausative markers. As we were dealing with languages which are rich in derivational morphology, we decided to collect both inchoative and stative verbs if they were available in a given language.[2] There can be interesting differences between a stative-transitive pair (such as 'be burning' ~ 'set on fire') and an inchoative-transitive pair (such as 'catch fire' ~ 'set on fire'), and it cannot be ruled out that these differences had an effect on the marking we were investigating.

As only two investigators were collecting the data, we did not need to formulate explicit instructions, such as those given by Johanna Nichols (2016) in a much larger project. In addition to the remarks given above, our informal guidelines included the following:

- Collect lexical verbs (such as English *ignite*), but in their absence make a note of constructions used instead (such as *set on fire*).
- Collect verbs that are reasonably common; there may be more than one verb per cell – if so, sketch the difference. Note if a verb is rare, archaic, etc.
- English example sentences were given as a stimulus, but they did not have to be translated literally.

We collected verbs and examples using several sources for each language, including dictionaries, native speakers (experts), our own knowledge of the languages, monolingual corpora, and Internet resources such as *tatoeba.org* (a platform where sentences and their translations into various languages are provided by volunteers), *linguee.com* and *glosbe.com* (search engines that provide translation equivalents from various multilingual sources, such as EU documents, EP speeches, or film subtitles). In this phase we were not so much focused on finding one or two most suitable lexical items for the tables, but rather in understanding which verbs were used in related meanings, for example, different verbs for 'break' or for 'melt' depending on the material and the circumstances.

[2] As we collected only lexical verbs, we did not include constructions such as *be awake* or *be liquid*.

3. Marking strategies

In this section we present and discuss the morphological structure of the verbs in our sample and the formal relations between verbs of a causal-noncausal pair. In §3.1 we show the derivational means of transitivity change and ask how often they appear in the individual languages. In addition, we discuss other derivational morphology that may be relevant for our study, especially inchoative markers. In §3.2 we return to Haspelmath's (1993) original approach and analyse inchoative-causative pairs in a more restricted sense, disregarding verbs that only have a stative or durative meaning (such as 'burn'). The pairs are assigned types in a way similar to previous studies. However, in contrast to other researchers (among them Grünthal & Nichols 2016, in this issue), verbs with causative or anticausative markers are only considered part of a pair if there is a derivational relation between them, that is, if either one verb is derived from the other, or both are derived from a third source. The exclusion of stative or durative intransitive verbs has a non-trivial effect on the result, which will be discussed in §3.3. In §3.4 we briefly discuss differences between the semantic groups we distinguished and the effects of animacy.

3.1. Causative, anticausative, and inchoative markers in Baltic and Finnic languages

The languages under investigation are rich in derivational morphology, but we restrict our presentation to markers occurring in our sample. Notably in Finnish and Estonian, there are more suffixes with a causative or anticausative function. Fuller accounts of verbal derivational affixes can be found in standard grammars and more specialized studies of the respective language (Finnish: A. Hakulinen et al. 2004: 299-363; L. Hakulinen 2000: 257-302, both on verbal derivation in general; Estonian: Tauli 1973: 145-169; EKG 1995: 424-456; Kasik 1997 (comparison of Estonian and Finnish); Viitso 2003: 69-77; Kasik 2015: 108-182; Kerge 2016: 3247-3251; Latvian: MLLVG 1959: 330-370; Soida 2009; LVG 2013: 278-293, all on verbal derivation in general; Nau 2015 on causatives; Lithuanian: LKG 1971: 186-213, 238-268; DLKG 1994: 385-410; LG 1997: 221-234, on verbal derivation in general; Arkadiev & Pakerys 2015 on causatives).

By CAUSATIVE MARKER we understand derivational morphology (in our languages: suffixes) used regularly to derive causal verbs from intransitive verbs. The derived verbs are causative verbs in a narrow sense. The same suffix may also be used to derive causative verbs (in a broader sense) from non-verbal sources; especially in Finnic it is often difficult to decide about the base of a given derived verb. An ANTICAUSATIVE MARKER in this study is a marker used to derive intransitive verbs from transitive causal verbs. In Finnic, these markers may also appear in verbs derived from non-verbal bases. In Baltic and Slavic languages, there is only one regular and productive anticausative marker, which combines exclusively with verbal bases and is most commonly called the reflexive marker. Note that "anticausative" and "reflexive" are used here to label a certain formal marker which has several functions, not only the one suggested by the label and that the same marker may have different labels according to the purpose of the description. We

are not concerned with questions such as whether given Finnish verbs with *-U-* should be called "reflexive", "middle", or "anticausative".

The following table shows causative and anticausative markers in the investigated languages. Most markers in two languages of one branch are cognate.

Table 2: Causative and anticausative markers found in verbs in the sample

	CAUSATIVE MARKER	ANTICAUSATIVE MARKER
Finnish	*-ttA-*, *-tA-*	*-U-*, *-UtU-*, *-VntU-*
Estonian	*-t-*, *-ta-*, *-sta-*	*-u-*, *-ne-*
Latvian	*-(d)in-ā-*, *-(d)ē-*, *-(d)ī-*	*-s*[3]*/-ies*
Lithuanian	*-(d)in-*, *-(d)y-*	*-si-/-s*
Polish	–	*się*
Russian	–	*-sja/-s'*

Notes: (i) In Finnish A stands for <a> and <ä>, U stands for <u> and <y>, according to vowel harmony; V stands for one of several possible vowels (usually the one in the preceding syllable). (ii) For Latvian and Lithuanian, the forms given in the table include thematic vowels (suffixes) which may be separated; see below for more details.

In Finnish, the main causative suffix is *-ttA-*. It is one of the most frequent verbal suffixes in Finnish and attaches to verbal as well as non-verbal bases (A. Hakulinen et al. 2004: 299, 301; L. Hakulinen 2000: 277, 291–292). In our sample, verbs with this suffix are most often part of a pair with an intransitive verb from which they are derived, for example, *sula-**tta**-a* 'melt$_{TR}$' ← *sula-a* 'melt$_{ITR}$', *synny-**ttä**-ä* 'give birth' ← *synty-ä* 'be born'. The semantic relationship between two verbs formally related by this suffix may be obscure, for example, *mene-**ttä**-ä* 'lose', formally derived from itr. *mennä,* PRS. 1SG *mene-n* 'go'. Some causative verbs with the element *-ttA-* are derived from a non-verbal base or have an unclear source. In our sample such verbs are *muu-**tta**-a* 'change (tr.)' (non-verbal base *muu* 'different'), *pol**tta**-a* 'burn$_{TR}$' (derived from the same root as *pala-a* 'burn$_{ITR}$', but no regular correspondence), *pää**ttä**-ä* 'finish$_{TR}$' (cf. *pää* 'head'), and *lope-**tta**-a* (nonverbal base, cf. adverb *lopen* 'completely', L. Hakulinen 2000: 291). In each case, the sequence *-ttA-* signals that the verb is transitive. When deriving causative verbs (in a broader sense) from nominal stems, the suffix *-ttA-* is sometimes preceded by the suffix *-Oi-*, with which it forms a complex suffix (Hakulinen et al. 2004: 303; 314), for example, in *haj-**oitta**-a* 'disperse$_{TR}$' from a base *haja* 'dispersed' (compare *hankala* 'difficult' → *hankal-oitta-a* 'make difficult').

Another frequent Finnish causative suffix is *-tA-*. Following L. Hakulinen (2000: 266–277), we find it in our sample in *herät-tä-ä* 'wake up$_{TR}$', derived from the consonantal stem *herät-* of the intransitive verb *herä-tä*, and *kadot-ta-a* 'lose', derived from the consonantal stem *kadot-* of the intransitive verb *kado-ta* 'get lost'. Without this spe-

[3] The allomorph *-s* provokes lengthening of the preceding vowel and is usually not segmented in this paper.

cialist knowledge of derivational processes, one would be inclined to identify the suffix *-ttA-* in these verbs – for our purpose, however, the segmentation makes no difference.

In Estonian, the majority of causative formations show the causative marker *-ta-* (cognate to Finnish *-ttA-*), for example, *sula-**ta**-ma* 'melt$_{TR}$' ← *sula-ma* 'melt$_{ITR}$', *uinu-**ta**-ma* 'make fall asleep' ← *uinu-ma* 'fall asleep'. This suffix has a rare variant *-t-* (see, for example, Kasik 2015: 148), which is attested in our sample in *kee-**t**-ma* 'boil$_{TR}$' ← *kee-ma* 'boil$_{ITR}$'. In comparison with Finnish, Estonian morphological causatives are notably less productive and Estonian also does not form causatives from transitive bases (Kasik 1997: 55-56; Kasik 2001: 85-94).

The Estonian suffix *-ta-* is not always a causative suffix. It can also have verbalizing functions when attached to nominal and adjectival bases. The outcome is mostly transitive verbs (Tauli 1973: 152-155; Kerge 2016: 3248); see our discussion of *naerutama* 'make laugh' in §3.2 below. There is also one instance of the suffix *-sta-* in our sample: *puru-sta-ma* 'break$_{TR}$', probably derived from a non-verbal base *puru* 'dust, small pieces of something; torn, broken', but this suffix can be also causative (cf. *asu-sta-ma* 'populate' ← *asu-ma* 'dwell', Tauli 1973: 153). However, in the pair *puru-sta-ma* 'break$_{TR}$' : *puru-ne-ma* 'break$_{ITR}$' the direction cannot be determined (cf. Kasik 2001: 83). As a result, we interpreted *-sta-* in our example as an instance of a potentially causative affix and the pair as double marked. It should be also noted that some formations derived in *-ta-* and *-sta-* can be labile (cf. Tauli 1973: 155 and see our discussion of emotion predicates in §3.2 below).

In the Baltic languages, there are two cognate causative suffixes, whose distribution in Latvian and Lithuanian slightly differs: Latvian, Lithuanian *-(d)in-* and Lithuanian *-(d)y-*, Latvian *-(d)ī-*. Another causative suffix is found only in Latvian: *-(d)ē-*. All of these suffixes may be accompanied by vowel alternation in the stem. None of these suffixes is used exclusively as a causative marker; other functions include denominal and deadjectival derivation and the formation of iteratives.

In Latvian the main causative marker is *-in-* or *-din-*, followed in the infinitive and the past stem by the thematic vowel *-ā-*, for example, *midz-**in-ā**-t* 'make fall asleep' ← *mig-t* 'fall asleep', *mir-**din-ā**-t* 'make/let die' ← *mir-t* 'die'.[4] The choice between *-in-* and *-din-* is not clearly regulated. The form *-din-* is used only with verbal bases, while *-in-* also derives causative verbs from nouns and adjectives (often in combination with a prefix), as in *no-gal-inā-t* 'kill' (← *gal-s* 'end', noun), *uz-jautr-inā-t* 'amuse' (← *jautr-s* 'merry', adjective). The suffix *-(d)in-* is also regularly used in causative verbs in Lithuanian, for example, *bud-in-ti* 'wake up$_{TR}$' ← *bus-ti* 'wake up$_{ITR}$' (root *bud-*), *tirp-in-ti* 'melt$_{TR}$' ← *tirp-ti* 'melt$_{ITR}$',[5] and *-in-* is also used in deadjectival and sometimes in denominal derivation (*stipr-in-ti* 'make stronger' ← *stipr-us* 'strong', *turt-in-ti* 'enrich' ← *turt-as* 'wealth').

[4] Further on we will not segment the derivational suffix *-(d)in-* and the thematic vowel *-ā-* in examples, except where it is necessary for the point under discussion.

[5] *-din-* was attested only in doubly marked pairs in our sample, such as *iš-si-gąs-ti* 'get scared' : *išgąs-din-ti* 'scare', but it also functions as a causative marker in directed pairs, cf. *sprog-ti* 'explode' → *sprog-din-ti* 'explode (tr.)'.

The suffix *-(d)y-* [(d)i:] is also quite frequent in Lithuanian. In our sample, there are seven verbs with *-(d)y-* vs. nine with *-(d)in-*. The suffix *-dy-* appears, for example, in *gim-dy-ti* 'give birth' ← *gim-ti* 'be born', *mig-dy-ti* 'make fall asleep' ← *mig-ti* 'fall asleep'. If the causative marker appears without the dental, it is a marker of inflection class rather than a derivational suffix, for *-y-* alone is a thematic vowel present only in the infinitive stem. Thus, from a synchronic point of view, the suffix should be noted as *-d(y)-*. We illustrate this with some forms in the following table.

Table 3.1: Inflection of selected Lithuanian verbs[6]

	'be born'	'give birth'	'break$_{ITR}$'	'break$_{TR}$' (1)	'break$_{TR}$' (2)
INF	*gim-ti*	*gim-**d**-**y**-ti*	*lūž-ti*	*lauž-**y**-ti*	*laž-ti*
PRS.3	*gimst-a*	*gim-**d**-o*	*lužt-a*	*laž-o*	*laži-a*
PST.3	*gim-ė*	*gim-**d**-ė*	*luž-o*	*laž-ė*	*laž-ė*

As can be seen in these examples, the difference between 'be born' and 'give birth' is expressed by a suffix, while the difference between transitive and intransitive 'break' in the case of *lūžti : laužyti* is expressed by root vowel alternation and assignment to different inflection classes. These processes are also found without the addition of a thematic vowel, as exemplified by the verb *laž-ti* 'break$_{TR}$' in the last column of the table.[7]

The Latvian cognate *-(d)ī-* is only found in a few causative verbs. There is one verb with *-ī-* in our sample: *vār-ī-t* 'bring to boil', formally derived from *vir-t* 'boil$_{ITR}$', with root apophony. The base verb is archaic in the contemporary language,[8] and we treat *vārī-t* here as underived. An example of a causative derived from *-dī-* is *bai-dī-t* 'scare', from the base found in the verb *bī-t-ies* 'fear' (reflexivum tantum).

As in Lithuanian, *-ī-* is a thematic vowel, but in Latvian it also shows up in the past stem, where it is augmented with the glide /j/ if the following suffix begins with a vowel (which is almost always the case). Verbs with this thematic vowel are frequent in Latvian, but most of them are not derived causatives. Among deverbal verbs with *-(d)ī-*, iteratives are more numerous than causatives. Latvian *lauz-ī-t* 'break several times' is such an iterative derived from *lauz-t* 'break$_{TR}$', and not as a causative of *lūz-t* 'break$_{ITR}$' (cf. Soida 2009: 194).

Latvian also has pairs of verbs distinguished by differences in the stems alone. Pairs like *lūz-t* 'break$_{ITR}$' : *lauz-t* 'break$_{TR}$' (= Lithuanian *lūž-ti* : *laž-ti*) are a particular common feature of Baltic languages (Stang 1942: 124-125; Endzelīns 1951: 764-764; Stang 1966, 356).

[6] For the moment, we ignore the additional markers in the present stem of the intransitive verbs: they will be discussed below.

[7] *laž-y-ti* can be also interpreted as iterative to *laž-ti*; as a non-ambigous case, consider *mirk-y-ti* 'soak (tr.)' vs. *mirk-ti* 'soak (itr.)'.

[8] The present tense of *virt* 'boil (itr.)' is found 2 times in LVK2013, one metaphoric use in a text of pompous style, the second token from a poem. The past tense is also found 2 times, both in fiction. To our knowledge, the verb is not used in colloquial registers, except for the present participle *verdošs* 'boiling'.

Table 3.2: Inflection of selected Latvian verbs

	'boil$_{ITR}$'	'bring to boil'	'break$_{ITR}$'	'break$_{TR}$'	'burn$_{ITR}$'	'burn$_{ITR}$'
INF	*vir-t*	*vār-**ī**-t*	*lūz-t*	*lauz-t*	*deg-t*	*deg-t*
3.PRS	*verd*	*vār-a*	*lūst*	*lauž*	*deg*	*dedz*
3.PST	*vir-a*	*vār-**ī**j-a*	*lūz-a*	*lauz-a*	*deg-a*	*dedz-a*

A causative suffix found only in Latvian is *-(d)ē-*, for example, in *kaus-ē-t* 'melt (tr.)' ← *kus-t* 'melt (itr.)', *dzem-dē-t* 'give birth' ← *dzim-t* 'be born', both with vowel alternation.

There are no transparent causative suffixes in Polish or Russian. Historically, some causative formations can be found in the inflection class in *-i-* (cognate with the Baltic *-ī-* mentioned above), cf. Russian *bud-i-t'*, Polish *budz-i-ć* 'awaken', Russian *sad-i-t'*, Polish *sadz-i-ć* 'seat, plant', etc. (see, for example, Nichols 1993: 69-70).

As mentioned above, Baltic shows slightly more variation in causative marking than Finnic. The opposite is true for anticausative markers: in the Baltic (and the Slavic) languages, there is only one, while in the Finnic languages we find several anticausative suffixes, even in our small sample. The Baltic and the Slavic anticausative marker is the one most commonly called the reflexive marker, as one of its functions is to mark (pure) reflexivity. In Lithuanian the marker has the form *-si-* in prefixed verbs, placed after the first prefix, and the form *-s* in forms of non-prefixed verbs, placed at the end of the wordform. In standard Latvian, we may synchronically distinguish the forms *-s* (with lengthening of a preceding vowel) and *-ies*,[9] always placed at the end of a wordform. In Russian the marker is also placed at the very end of the wordform; it has the allomorphs *-sja* and *-s'*. In Polish it has an invariant form, the clitic *się*.

The most frequent Finnish anticausative suffixes contain the vowel *U* (*u*/*y*). It may appear alone or as part of a longer suffix. If the stem ends in a short vowel, this vowel is regularly dropped before the suffix *-U-*, but retained before the suffix *-UtU-* and lengthened with the suffix *-VntU-*. Examples: *särke-ä* 'break$_{TR}$' → *särk-**y**-ä* 'break$_{ITR}$'; *sulke-a* 'close$_{TR}$' → *sulke-**utu**-a* 'close$_{ITR}$'; *koo-ta* (stem *koko-*) 'gather$_{TR}$' → *koko-**ontu**-a* 'gather$_{ITR}$'. Anticausative suffixes without *U*, but with the nasal *-n-*, exist in Finnish, but do not appear in our sample. In Estonian the anticausative suffix *-ne-* appears two times in our sample, in *ava-**ne**-ma* 'open$_{ITR}$' ← *ava-ma* 'open$_{TR}$' and *kogu-**ne**-ma* 'gather$_{ITR}$' ← *kogu-ma* 'gather$_{TR}$, collect'). More frequent is the suffix *-u-* (as in Finnish with a dropped stem-final short vowel), for example, *sulg-**u**-ma* 'close$_{ITR}$ ← *sulge-ma* 'close$_{TR}$' or *murd-**u**-ma* 'break$_{ITR}$' ← *murd-ma* 'break$_{ITR}$'. The cognate of Finnish *-VntU-*, Estonian *-ndu-*, does not appear in our sample.

The following table shows the number of cells in which we found at least one verb with one of the markers presented above. The column CAUSATIVE also includes instances

[9] For this interpretation and the full rules, see Nau (1998: 40). In another interpretation, the reflexive marker has always the form *-s* and the preceding diphthong *ie* is counted as part of the preceding morpheme.

of verbs with the respective marker without a (clear) verbal noncausative base (such as Estonian *puru-**sta**-ma* 'break$_{TR}$', Latvian *pulc-**inā**-t* 'gather$_{TR}$').

Table 4: Occurrence of causative and anticausative markers in our sample (number of cells, out of 20)

	CAUSATIVE	ANTICAUSATIVE
Finnish	16	7
Estonian	14	7
Latvian	13	12
Lithuanian	12	15
Polish	0	17
Russian	0	18

This count shows that Baltic is similar to Finnic in its use of causative markers, but closer to Slavic in its use of anticausative markers.

Apart from the markers discussed thus far, which are the basis for our classification of verbs and verb pairs in the next section, there are two other types of affixes that appear in our sample and deserve some comment. The first are markers of inchoativity in intransitive verbs. In Finnish, suffixes with clear inchoative meaning are *-stU-* and *-AhtU-*, *-AhtA-*. The suffix *-stU-* occurs in our sample in the verb *pelä-**sty**-ä* 'get scared, get frightened', derived from *pelä-tä* 'fear, be afraid'. The causal verb *pelä-sty-**ttä**-ä* 'frighten, scare' is regularly derived from the inchoative by adding the causative suffix after the inchoative suffix. An analogical case with the other inchoative suffix is *il-**ahtu**-a* 'become happy, pleased' and its causative *il-ahdu-**tta**-a* 'delight, cheer up'. In other pairs, however, both the inchoative and the causative are derived from a third, simple intransitive verb. For example, *nuk-ahta-a* 'fall asleep' and *nuku-tta-a* 'make fall asleep' are both derived from *nukku-a* 'sleep'. Estonian is quite different from Finnish in this respect, as it does not have deverbal inchoative markers. Finnish *-AhtA-* corresponds to Estonian *-a(h)ta-*, which is semelfactive or momentary (Tauli 1973: 145; Kasik 1997: 52-53; Viitso 2003: 77; Kerge 2016: 3249), for example, in the labile verb *ehm-ata-ma* 'scare/be scared' (Tauli 1973: 145). The difference between 'sleep' and 'fall asleep' is expressed lexically (*maga-ma* 'sleep', *uinu-ma* 'fall asleep; slumber'). In other instances (emotional predicates), the same verb can express both a state and the beginning of a state. We will return to this question below.

In the Baltic languages, inchoativity is most often marked by a prefix. For example, in Lithuanian 'boil$_{ITR}$, be boiling' is *vir-ti*, and 'come to boil, start boiling$_{ITR}$' is ***už**-vir-ti*. A prefix marking an inchoative may co-occur with the anticausative marker, for example, Lithuanian ***iš-si**-gąs-ti* 'get scared'.

The other kind of marker we want to mention are elements that often occur in intransitive verbs and can be associated with intransitivity, but are not clearly derivational affixes. In the Baltic languages, these are stem-forming elements that appear only in present tense stems: the suffix *-st-* in both languages and the infix *-n-* in Lithuanian. An

example of the former is the verb 'be born': Lithuanian *gim-ti*, PRS.3 *gim-**st**-a* (see Table 3.1 above), Latvian *dzim-t*, PRS.3 *dzim-**st***. The Lithuanian *n*-infix is found, for example, in *kis-ti*, PRS.3 *ki-**n**-t-a* 'change$_{ITR}$' (root *kit-*). Though not productive, these markers are not infrequent, and they contribute to the general tendency in Baltic languages for (in)transitivity to be formally marked. It may be noted that these markers in the Baltic languages are different in their status from the Germanic and Slavic anticausative *-n-*, which was generalized throughout the paradigm and resulted in verbs in *-nan* and *-nọti* respectively (see Villanueva Svensson 2011 [2012] on the history of Baltic, Slavic, and Germanic anticausatives with further references).

In Finnic we have a similar situation: the stem of Finnish and Estonian intransitive verbs very often ends in *-U-*, and its status is not always easy to determine. Sometimes it is (or could be) part of the nominal stem, cf. Estonian *hirmu-ma* 'fear' ← (noun) *hirm, hirmu* 'fear', while sometimes it can be treated as a marker of middle voice (cf. Vihman 2002). We will only consider such a marker in a noncausal verb if it comes in a pair with a causal verb, as in Estonian *murd-**u**-ma* 'break$_{ITR}$' ← *murd-ma* 'break$_{TR}$' or Finnish *särk-**y**-ä* 'break$_{ITR}$' ← *särke-ä* 'break$_{TR}$', but we want to draw attention to the fact that more intransitive verbs from our sample have such a stem-final vowel.

3.2. Inchoative-causative pairs

In this section, we will present the pairs of causal-noncausal verbs in our sample and classify them in a way similar to that used in Haspelmath (1993), Nichols et al. (2004), and others. As in each study a slightly different system was used, we will first lay out our categories and principles used for categorization.

The markers we considered in each language were explained in §3.1. With respect to these markers, we distinguished the following types of relationships between the two verbs in a causal-noncausal pair. As mentioned in the introduction to this section, we only considered (i) pairs where the intransitive verb is inchoative (if this applied), (ii) for C and A marking: pairs of verbs related by derivation (either direct, or both derived from the same source).

C Causative marking: the causal member contains a causative marker, by which it differs from the noncausal member.
Finnish *sula-a* 'melt$_{ITR}$' → *sula-**tta**-a* 'melt$_{TR}$'

A Anticausative marking: the noncausal member contains an anticausative marker, by which it differs from the causal member.
Estonian *sulge-ma* 'close$_{TR}$' → *sulg-**u**-ma* 'close$_{ITR}$'

D Double marking: the causal member has a causative marker, and the noncausal member has an anticausative marker; no direction in derivation is assumed.
Latvian *mos-t-**ies*** 'wake up$_{ITR}$' : *mod-**inā**-t* 'wake up$_{TR}$'

E Equipollent marking: the causal and noncausal members are only differentiated by derivationally non-specialized and non-productive means, such as root apophony and inflection class change. The following example shows both means, the given forms are infinitive, 3rd person present, and 3rd person past tense.
Lithuanian *kis-ti*, *kint-a*, *kit-o* 'change$_{ITR}$' : *keis-ti*, *keiči-a, keit-ė* 'change$_{TR}$'

Both double marking and equipollent marking are found in Baltic languages, and we wanted to keep these two types apart, in contrast to Haspelmath (1993), where double marking is subsumed under equipollent marking. On the other hand, we did not find it necessary to distinguish between conjugation class change and ablaut (especially as these processes are usually joined in Baltic), as done by Nichols et al. (2004) and Nichols & Grünthal (2016) (in this issue).

For Finnish, Comrie (2005) classified pairs such as *muutt-**u**-a : muutt-**a**-a* 'change (itr. : tr.)' as belonging to the equipollent type, because both verbs have a vowel characteristic for their transitivity status. While we acknowledge the soundness of this analysis, we follow the traditional (and etymological) point of view, and regard the *-a-* as part of the stem that through a regular morphonological change is deleted before the derivational suffix *-u-*. Thus, the transitive verb is unmarked.

L Labile or ambitransitive verbs: one verb is used without additional marking in both functions.

Estonian *ehmata-ma* 'scare/be scared'

M More than one verb pair, with different marking strategies. We specify by adding the types of the individual pairs in brackets, for example, M (C/A) for the following verbs for MELT in Lithuanian:

Lithuanian *tirp-ti* 'melt$_{ITR}$' → *tirp-**dy**-ti* 'melt$_{TR}$' = C

Lithuanian *lydy-ti-**s*** 'melt$_{ITR}$' ← *lydy-ti* 'melt$_{TR}$' = A

– None of the above, that is, no formally related lexical pair, is found for the given item. The pairing of two verbs relies solely on semantics. For the reasons given below, we avoid the term "suppletion".

Polish *umrzeć/umierać* 'die' ~ *zabić/zabijać* 'kill'

This type could also cover instances where the only causal partner is a syntactic causative, but we limited our study to morphological causatives.

In the first three definitions, the second clause is necessary to cover instances where a causative or an anticausative marker appears in both verbs of a pair. In these cases, we take into account only additional markers that distinguish the two verbs. These markers are highlighted in the following examples.

Table 5.1: Inherited markers in pairs

	Intransitive	Transitive	Type
Latvian 'gather'	*pulc-inā-t-**ies*** ROOT-CAUS-INF-**ACAUS**	*pulc-inā-t* ROOT-CAUS-INF	A
Finnish 'disperse'	*haja-antu-a* ROOT-ACAUS-INF	*haja-annu-**tta**-a* ROOT-ACAUS-**CAUS**-INF	C

In the above examples, the verb with the additional marker is derived from the other verb and inherits the causative or anticausative marker from its base, but what counts is the last step in the derivational chain. However, the relationship between the two verbs is not always one of direct derivation; examples are given in the table below. Both verbs

may be derived from a third source, verbal or nominal (as in Latvian 'rejoice'). One or both may also contain additional derivational morphology, such as the inchoative markers discussed in the previous section (as in Finnish 'fall asleep').

Table 5.2: Noncausal and causal verb derived from a third source

	Intransitive	Transitive	Type
Latvian 'rejoice'	*priec-ā-t-**ies*** joy-SUF-INF-**ACAUS**	*ie-priec-**in**-ā-t* PFX-joy-**CAUS**-SUF-INF	D
Finnish 'fall asleep/put to sleep'	*nuk-ahta-a* sleep-INCH-INF	*nuku-**tta**-a* sleep-**CAUS**-INF	C

More difficult are instances where the root appears in different forms (cf. examples in the next table). If this difference could be explained by regular alternations, we treated the two verbs as formally related. An example is the Estonian pair 'vanish', where *kadu-* and *kao-* are allomorphs related by regular vowel and consonant alternation (Tauli 1973: 37-38). On the other hand, when the forms differed but there was no direct derivational relationship between the verbs (though ultimately they contained reflexes of the same root), we assigned the type "-". Thus, in Estonian *naeru-ta-ma* 'make laugh' we regarded the first element as the stem of the noun *naer* (*naeru-*) 'laughter' and interpreted the suffix *-ta-* not as the causative, but as the verbalizing suffix (see on both functions Tauli 1973: 152-153; Kerge 2016: 3248, 3249). A similar case is found in one of the pairs for END in Finnish: the tr. *lope-tta-a* 'end$_{TR}$' is derived from the adverb *lopen* 'completely' (L. Hakulinen 2000: 291), but itr. *loppu-a* must have another source, maybe the noun *loppu* 'end' (which, in turn, is deverbal, L. Hakulinen 2000: 222). In Finnish BEGIN, the transitive *aloitta-a* seems to be derived from the complex suffix *-oitta-* from a non-verbal base and not by any regular process from the intransitive verb *alka-a*.

Table 5.3: Less transparently or not directly related lexemes

	Intransitive	Transitive	Type
Estonian 'vanish'	*kadu-ma* vanish-INF	*kao-ta-ma* vanish-CAUS-INF	C
Estonian 'laugh'	*naer-ma* laugh-INF	*naeru-ta-ma* laughter-VERB-INF	–
Finnish 'end'	*loppu-a* end-INF	*lope-tta-a* completely-CAUS-INF	–
Finnish 'begin'	*alka-a* begin-INF	*al-oitta-a* begin-SUF-INF	–

The last three examples in the above table are in something like a grey zone between instances of transparent derivation and instances of verbs that are not formally related, as they make use of the same root. Our decision to treat these verbs as unrelated was

somewhat arbitrary; they may also be interpreted as causative marking (especially when the same suffix is used to derive transitive denominal/deadjectival formations and deverbal causatives, cf. Finnish *-tta-*, which is a causative marker in the broad sense, not just a verbalizing suffix).

This grey zone has some similarities with "weak suppletion", or more generally, the zone between lexicon and grammar (see Veselinova 2006: 11-13 and 15; 2017). For several reasons, we do not use the term suppletion in our study. For one, we adopted the view argued by Veselinova (2006: 11-13; 2017) and others that suppletion presupposes a regular pattern and the expression of obligatory distinctions. We cannot presuppose that transitivity distinctions by derivational means are obligatory in our languages of investigation. More importantly, the label "suppletive" is commonly given to individual forms, not pairs of forms, and it presupposes a direction. Thus, we may say that in the pair English *one – first*, the form *first* is suppletive (it substitutes an expected regular form **oneth*), but we would not say that *one* is suppletive. We cannot transfer this reasoning to the classic example of 'die' ~ 'kill', for we cannot decide which of the two semantically, but not formally related verbs is the suppletive one: do we expect 'die' > 'make die' or 'kill' > 'get killed'? It is exactly this direction that we wanted to determine in our study! Therefore, we call the last type in our system "no (formal) pair" and not "suppletion", as it has been called by others (Haspelmath 1993; Nichols et al. 2004).

We will now present the types assigned to the pairs in our sample and proceed by the groups distinguished in §2. If a single value is put in brackets, it means that the use of either the intransitive or the transitive verb is somehow restricted, which will be explained in the text. When counting the number of types for a language or a group, these brackets will be ignored.

The first group (Table 6.1) shows a marked difference between Slavic, on the one hand, and Finnic and Baltic, on the other. For the latter, it contains the highest number of causative marking throughout the list. For Slavic, it is remarkable in that relatively few cells are of type A.

Table 6.1: Pairs of Group ANIM

	Finnish	Estonian	Latvian	Lithuanian	Polish	Russian
1 BIRTH	C	C	C	C	A	A
2 DEATH	(C)	(C)	(C)	C	–	–
3 AWAKE	C	C	D	M (C/A)	A	–
4 ASLEEP	C	C	C	M (C/A)	(L)	–

Only in the first line, for BIRTH, do we have a clear opposition between C marking in Finnic and Baltic and A marking in Slavic. The causatives for 'give birth' can be used in both literal ('give birth to a baby') and in figurative meanings. The opposite notion of DEATH is cross-linguistically less often expressed by formally related verbal pairs (cf.

Haspelmath 1993: 104, Table 4; WATP[10]), with Polish and Russian complying with this tendency. The other four languages have causatives in this cell, but only in Lithuanian is this causative a common means for expressing the meaning 'kill': *žu-dy-ti* 'kill' ← *žū-ti* 'die (of unnatural causes)'. In the other languages, these predicates occupy a rather marginal position with regard to frequency and generality, and are notably not used for a situation where a human being directly causes the death of another human being. The Finnish *kuole-tta-a* (← *kuolla*, stem *kuole-* 'die') is most often found (at least on the Internet) in the meanings 'amortize (an investment)' and 'extinguish (a liability)'. In addition, it may mean 'deaden (a feeling etc.)' and 'kill off (a possibility etc.)'. In the following example from a forum post of 2005, we find morphological causatives for both 'kill' and 'give birth' with respect to viruses – thus, not typical animate beings.

(1) Finnish

viruksia	*voidaan*	***kuole-tta-a***	*lääkkeillä*
virus.PART.PL	can.PRS.IMPERS	die-CAUS-INF	medicine.PL.ADE
ja	***synny-ttä-ä***	*manipuloimalla*	*luontoa*
and	be.born-CAUS-INF	manipulate.INF3.ADE	nature.PART

'one can **kill off** viruses with medicine and **create** them by manipulating nature' (http://www.tiede.fi/keskustelu/79/ketju/elollisen_ja_elottoman_rajapinta?page=3)

Similarly, Estonian *sure-ta-ma* (← *sure-ma* 'die') is listed in dictionaries with the meaning 'deaden; devitalize; mortify' (EN-EE dict.) Interestingly, in Finnish a transitive verb with a cognate root (*surma-ta*, probably denominal from *surma* 'death') is a common word for 'kill', while the intransitive *surra* means 'mourn' in standard Finnish (but it meant 'die' in older Finnish, Hakulinen 2000: 197). The Latvian causative *(no-)mēr-dē-t* (← *(no-)mir-t* 'die', with root apophony) is used in the meanings 'starve to death (tr.)' and 'deaden (a pain, a feeling)'. It has five occurrences in the corpus LVK2013, four of which are with the prefix. The other causative derived from the same intransitive verb, *(no-)mir-din-ā-t*, is used in the more general meaning 'make die, let die (usually slowly)', but is still less frequent. In LVK2013 there is only one example in the form of the verbal noun *nomirdināšana*. A marginal causative for 'make die' is found in Lithuanian as well: *mar-in-ti* 'make die; deaden' (← *mir-ti* 'die', with root apophony). These causatives may have had a more widespread use and the more general meaning of 'kill' at an earlier stage, but a historical study is needed to check this. It should be also noted that there is a common Slavic causative formation **mor-i-ti* 'kill' (← **mer-ti* 'die'; Vaillant 1966: 415; Boryś 2005: 336), and its continuation in Russian *(u-)mor-i-t'* 'kill by poisoning, starving, etc.' and Polish *morz-y-ć* (archaic) 'cause a slow death' may still have a link to (Russian) *(u-)mer-e-t'*, (Polish) *(u-)mrze-ć* 'die'. Thus, historically, there may have been a common tendency in the Slavic, Baltic, and Finnic area to mark the relation between 'die' and 'kill' with a causative strategy – but then another common tendency must have led the causative to be replaced with other verbs for 'kill'.

[10] Of the languages in the database of WATP, 58.3% use different lexemes for 'die' and 'kill' and are thus assigned the type "suppletion" (this group includes Finnish). However, the causative strategy is used by 26% of the languages, and thus is not rare (WATP, map generated on March 15, 2017).

Predicates for AWAKE show a gradation from causative (Finnic) through double or mixed marking (Baltic) to anticausative (Polish). Both Baltic languages are thus "in between" Finnic and Slavic: Latvian by double marking and Lithuanian by having two verb pairs with opposite strategies. Lithuanian anticausative *bud-in-ti-s* 'wake up$_{TR}$' is, however, only marginally used alongside the more common unmarked verb *bus-ti* 'idem', for example, in DLKT, PRS.3 *bunda* has 143 tokens, while *budinasi* has only 2.

The expression ASLEEP is somewhat similar: the Slavic languages have no formal pairs, while the Finnic and the Baltic languages do. In Estonian, the use of causative *uinu-ta-ma* 'put to sleep' (← *uinu-ma* 'sleep') is less common than the periphrastic construction *magama panema* 'put to sleep'.[11] Similarly to the case of AWAKE, Lithuanian has a marginal anticausative *migdy-ti-s* (← *migdy-ti*), which is used alongside non-suffixed *mig-ti* 'fall asleep'.[12] In the Slavic languages, there are no formally related pairs.[13] In Polish the imperfective verb *usypiać* is used both for 'fall asleep' and for 'make fall asleep', so it may be classed as labile. However, perfective verbs for this meaning are clearly different: *usnąć* 'fall asleep' and *uspić* 'put to sleep'.

The second group, where only inanimate undergoers are possible in non-metaphorical use, differs almost completely from the first group. Here we find the highest number of cells with A-marking and the lowest number of C-marking throughout the list. The strategies used are straightforward: there are no instances of double or mixed marking.

Table 6.2: Verbs of Group INAN-EXIST

	Finnish	Estonian	Latvian	Lithuanian	Polish	Russian
5 BEGIN	–	C	A	A	A	A
6 END	A	C	A	A	A	A
7 OPEN	A	A	A	A	A	A
8 CLOSE	A	A	A	A	A	A

The difference between Finnish and Estonian found in the first two lines of this table results from our approach where only verbs related by derivation, either directly or via a third source, were counted as pairs. In Finnish BEGIN and END, causative markers

[11] It should be also noted that Estonian uses the periphrastic inchoative construction *magama jääma* 'fall asleep' and that *uinu-ma* can be used not only as a stative ('sleep; slumber'), but also as an inchoative 'fall asleep'. Cf. also causative *maga-ta-ma* (← *maga-ma* 'sleep') which most frequently is used in the sense 'have sex', but 'put/let (to) sleep' is also attested, see, EE-LV dict., EE-RU dict., etc. (Geda Paulsen, p. c.)

[12] In DLKT, PRS.3 of *migti* (*minga*) has 11 tokens vs. 3 tokens of *migdytis* (*migdosi*). Lithuanian *migti, minga* (prefixed variants also have present stem *-miega*) 'fall asleep' can be also interpreted as derived from stative *miegoti, miega* 'sleep' by assignment to a specific inflection class (that is, no derivational suffix is added).

[13] The relation between inchoative Russian *u-/za-snut',* Polish *u-/za-snąć* and stative Russian *spat'*, Polish *spać* 'sleep' is inactive due to phonetic developments, but historically the inchoative was derived from the stative by the addition of the suffix *-nq-/nu-* (Boryś 2005: 671); Slavic causative *usъp-i-ti* is explained as derived from inchoative *usъ(p)-nǫ-ti* (Vaillant 1966: 404; Boryś 2005: 673).

are found as well, but the verbs with these markers (*aloitta-a* 'begin$_{TR}$' and *lopetta-a* 'end$_{TR}$') are not regularly related to the respective intransitive verbs *alka-a* and *loppu-a*. With a less rigid approach, the cell for BEGIN in Finnish may be assigned to the C type and the cell for END to the M(A/C) type. If we adopted Comrie's (2005) approach, the pair that we assigned to the A type (*päätt-y-ä* ← *päättä-ä* 'end') would count as E equipollent marking (*päätt-y-ä : päätt-ä-ä*).

In the group denoting changes in emotional states, Finnish consistently uses the causative strategy, while Russian and Polish uniformly employ anticausatives. The rest are a mixed bag, and we will discuss these in more detail.

Table 6.3: Verbs of Group EMOTION

	Finnish	Estonian	Latvian	Lithuanian	Polish	Russian
9 SCARED	C	M (C/L)	D	D	A	A
10 ANGRY	C	M (A/L)	A	C	A	A
11 HAPPY	C	M (A/L)	D	D	A	A
12 LAUGH	C	–	M (D/C)	D	–	–

Estonian differs sharply from Finnish in using the causative strategy only one time, in the pair *hirmu-ma* 'be scared' → *hirmu-ta-ma* 'scare'. Note that the causal verb is not necessarily derived from the noncausal verb; it could also be interpreted as denominal, derived from *hirm*, *hirmu* 'fear'. As the base cannot be determined, we gave it the benefit of the doubt (and marked it as C), while in the case of LAUGH we had formal evidence for the lack of a derivational relation between *naer-ma* 'laugh' and *naeru-ta-ma* 'make laugh' (← noun *naer*, *naeru* 'laughter'). Estonian furthermore differs from all other investigated languages in using labile verbs for emotional states. For SCARED it has *ehm-ata-ma* with the momentary suffix *-ata-*, and in the next two lines we find labile verbs which are derived from nominal stems with the suffix *-sta-*: *viha-sta-ma* 'get angry; anger' (← *viha*, *viha* 'anger (NOUN)'), and *rõõmu-sta-ma* 'be/make happy' (← *rõõm*, *rõõmu* 'joy'). This seems to be a pattern in Estonian; another verb of this type that was not included in our survey is *kurva-sta-ma* 'be/make sad' (← *kurb*, *kurva* 'sad'); see Kehayov & Vihman (2014) on the synchrony and diachrony of labile verbs in Estonian. The labile verbs for ANGRY and HAPPY in Estonian additionally have anticausative formations in *-u-*: *vihast-u-ma* 'be/get angry' and *rõõmust-u-ma* 'be/get happy', but these are certainly less frequent.[14] Especially *rõõmust-u-ma* 'be/get happy' seems to be stylistically marked (archaic); it is found, for example, in a Bible translation. The following examples illustrate the use of the labile (ex. 2, 3) and the noncausal (ex. 4) verb for HAPPY; similar examples were found for ANGRY.

[14] A quick GOOGLE count of the first-person past tense forms gave the following results: labile *vihast**a**sin* = 17 800, marked intransitive *vihast**u**sin* = 3 350; labile *rõõmust**a**sin* = 17 200, marked intransitive *rõõmust**u**sin* = 95.

Estonian

(2) *jõulukink, mis mind enim rõõmusta-s*
Christmas.present(NOM.SG) which 1SG.PART most delight-PST(3SG)
'the Christmas present that made me most happy' (http://m.postimees.ee/section/3223/3446545)

(3) *Rõõmusta-si-n, oi kus ma rõõmusta-si-n.*
delight-PST-1SG oh how.much 1SG.NOM delight-PST-1SG
'I was delighted, oh how much I was delighted.' (http://alkeemia.delfi.ee/tervis/tervisemured/karm-kogemus-jaana-poorane-teekond-labi-kooma-alkoholismi-narkomaania-ravimisoltuvuse-arkamise-ja-tervenemiseni?id=74192429)

(4) *nõnda et ma rõõmust-u-si-n veel enam*
so that 1SG.NOM delight-ACAUS-PST-1SG still more
'so that I rejoiced still more' (2 Corinthians 7, from http://studybible.info/Estonian/2%20Corinthians%207)

The causative strategy is rare in Baltic, as well. Only Lithuanian has a clear example in the cell for ANGRY: *pyk-dy-ti* or *pyk-in-ti* 'make angry'[15] ← *pyk-ti* 'be angry'. For the other three pairs of this group, we noted double marking in both Baltic languages: 'get scared', 'get happy', and 'laugh' have an anticausative marker, while their transitive counterparts have causative markers. However, it must be noted that what in our analysis is counted as an anticausative marker did not result from a derivation of intransitive verbs from transitive verbs in these instances. Rather, the reflexive marker in verbs such as Latvian *sa-bī-t-ies* 'get scared' (inchoative of *bī-t-ies* 'be afraid') or Lithuanian *ap-si-džiaug-ti* 'get happy' (inchoative of *džiaug-ti-s* 'be happy') can be explained as a marker of the middle, which signals a "low degree of elaboration of events" and is frequently found in emotion predicates (Kemmer 1993: 18, 210–221). These verbs are either reflexiva tantum (deponent) or they appear with and without the reflexive marker without a difference in meaning or transitivity (cf. Kemmer 1993: 21). An example of the latter is Latvian 'laugh', where *smie-t-ies* = *smie-t*; the verb without the reflexive marker is less frequent, but well attested. Latvian also has a causal verb that from a synchronic point of view may be seen as underived: *baidī-t* 'scare' (historically derived by the causative suffix *-dī-* and by root apophony from the verbal root *bī-* 'fear'); it forms a pair of type A with the durative verb *baidī-t-ies* 'fear'. Latvian *dusmot* 'make angry' is also used as the stative verb 'be angry' and is thus labile. These observations illustrate that the choice between stative and inchoative for the intransitive (noncausal) part of a pair has consequences for the typology, a point we will discuss in more detail in the next section. For LAUGH the inchoative/stative distinction does not apply, as it is an action and not a state. Verbs for 'laugh' may be marked for the beginning of the action, but these verbs often rather denote a momentary action (for example, Latvian *ie-smie-t-ies* is defined in LLVV (1975) as 'start laughing and stop at once'). We nevertheless included these marked verbs in the sample, as they are the closest equivalents to inchoative verbs.

[15] It should be noted that of the two, *pykinti* is more frequently used as 'nauseate' (< 'cause bad feeling') rather than 'make angry'.

In the Slavic languages, the verbs for LAUGH mark an exception from the general preference for type A in these languages. However, this comes as no surprise, as anticausative marking with unergative verbs is extremely rare (cf. Haspelmath 2016, in this issue). In modern Russian and Polish the two verbs are formally unrelated: the root is the same, but the transitives are denominal (Russian *smejat'-sja* 'laugh' : *raz-smešit'* 'make laugh'; Polish *śmiać się* 'laugh', *roze-śmiać się* 'burst into laughing': *(roz-)śmiesz-yć/-ać* 'make laugh'). Here Estonian patterns with Slavic.

Against the background of the other languages, the strong preference in Finnish for the causative strategy with pairs of the third group calls for some explanation. One factor may be that emotions are often expressed in this language with a construction containing a causative verb (so called *tunnekausatiivi* 'causatives of emotion'; cf. Hakulinen et al. 2004: 313-314; 459–460): alongside a nominative construction 'I am glad/angry/afraid', Finnish frequently uses a construction where the experiencer is an object and the stimulus does not have to be expressed, literally '[it] gladdens/angers/frightens me'. The use of emotion predicates with causative markers is well-known in Finnic, but Estonian stands out as one of the few languages of the branch where the stimulus is obligatory (Lindström 2013: 144). In addition, Estonian contrasts with Finnish due to its tendency to use labile predicates in our set (see Kehayov & Vihman 2014: 1078-1079; they also note that all of their labile emotion predicates have the suffix *-(s)ta-*).

In the fourth group, we again find a considerable amount of mixed strategies, some double marking, and equipollent marking. Only Russian consistently employs the anticausative strategy.

Table 6.4: Verbs of Group PHYSICAL

	Finnish	Estonian	Latvian	Lithuanian	Polish	Russian
13 MELT	C	C	C	M (C/A)	M (A/E)	A
14 AFIRE	C	–	D	A	A	A
15 BOIL	C	C	A	C	A	A
16 BREAK	A	M (A/D)	E	E	A	A

For MELT we find causative marking in Finnic and Baltic, but Lithuanian also has an anticausative pair: *lydyti-s* 'melt$_{ITR}$' ← *lydy-ti* 'melt$_{TR}$'. These verbs typically refer to the melting of metal, while the pair with the causative strategy (*tirp-ti* → *tirp-in-ti*) is mostly used to speak about the melting of other substances. We thus have here a nice example for a correlation between spontaneity (internal vs. external causation) and marking strategy. Russian and Polish have anticausatives, but Polish is interesting in that it also has an equipollent pair *top-nie-ć* 'melt$_{ITR}$' : *top-i-ć* 'melt$_{TR}$' where the suffix *-nie-* functions as a marker of intransitivity contrasting with the inflectional class *i* as a marker of transitivity.

With AFIRE and BOIL, the distinction between stative ('be on fire', 'be boiling') and inchoative ('catch fire', 'come to boil') is again important for determining the type in

the Baltic languages. We will consider here only the inchoative verbs and discuss the different behaviour of stative verbs below in 3.3. Both items feature the causative strategy in Finnic and the anticausative strategy in Slavic, while the Baltic languages show a certain mixture.

As to AFIRE, Finnish has a clear causative (*sytty-ä* → *syty-ttä-ä*), while the cognate Estonian causative (*süti-ta-ma* ← *sütti-ma*) is archaic in the literal meaning of 'set on fire'. In the modern language, it is used in the figurative meanings of 'enkindle, incite'. The default predicate for 'ignite' is *süüta-ma.* The root is the same, but the morphological relation of *süüta-ma* (tr.) to its possible base *sütti-ma* (itr.) is synchronically irregular.[16] As a result, Estonian AFIRE is marked as "no pair". Latvian and Lithuanian both have anticausative markers in intransitive verbs, but only in Lithuanian can we assume a derivation *už-si-deg-ti* 'catch fire' ← *uždeg-ti* 'set on fire'. The Latvian inchoative verb *aiz-deg-t-ies* (PRS.3 *aiz-de**g**-a-s*) 'catch fire' is derived from the intransitive verb *deg-t* (PRS.3 *de**g***) 'burn', and not from the transitive *aiz-deg-t* (PRS.3 *aiz-de**dz***) 'set on fire', which is proved by the different inflectional stems (otherwise it would be PRS.3 *aiz-de**dz**-a-s*).[17] We thus do not count Latvian *aizdegties* and *aizdegt* as a pair of type A. Latvian also has a marked causative *aiz-dedz-inā-t* 'set on fire', which is more frequent than the unmarked causal verb (corpus count LVK2013 for 3rd person present and past tense: *(aiz-)deg-t* = 14, *(aiz-)dedz-inā-t* = 66). The pair *aizdegt-**ies*** ~ *aizdedz-**inā**-t* fulfills our criteria for double marking.

For BOIL the situation in the Baltic languages is slightly different. Lithuanian has an unmarked labile verb *vir-ti* 'boil', which is used without an anticausative marker in the inchoative *už-vir-ti* 'come to boil'. In addition it has a marked causative *(už-)vir-in-ti* 'bring to boil', but no derived noncausal verb. The Latvian cognate of Lithuanian *vir-ti* (Latvian *vir-t*) is used only as an intransitive verb, and even this use is not frequent nowadays (see our remarks above in §3.1). Instead, the most common verb for 'bring to boil' is *(uz-)vār-ī-t*, which historically can be argued to be formally derived from *vir-t* (root apophony and assignment to inflection class in *-ī-*), but the rarity of the use of the base makes the relation obscure. As a contrast, the anticausative *uzvārīt-ies* 'come to boil' is transparent and regular. In Polish, besides the regular A-type pair *zagotować* 'bring to boil' → *zagotować się* 'come to boil', there is an unmarked verb *zawrzeć* 'come to boil' and a corresponding durative *wrzeć* 'boil$_{ITR}$'. These verbs (*zawrzeć* and *wrzeć*) are most often used figuratively, but the literal use is still well attested in the corpus NKJP. The transitive verb *warzyć*, on the other hand, is archaic in the primary meaning 'boil', and while they go back to the same root, the relation between *wrzeć* and *warzyć* is not clear from a synchronic point of view (historically, the transitive verb is a derived causative, see Boryś 2005: 680).

[16] Despite the irregularity, *süüta-ma* is sometimes presented as still derivable (with the suffix *-ta-*), see Tauli 1973: 161 (under "other exceptions") and EKS (http://www.eki.ee/dict/sp/index.cgi?Q=sütitama&F=M).

[17] The forms *aizdedzas* (PRS.3), *aizdedzās* (PST.3) in the meaning of 'catch fire, start burning' are occasionally found in texts on the Internet, but there are no hits in the corpora, not even in Tīmeklis (97 million word-forms, compiled from Internet sources).

With BREAK, the Baltic languages are remarkable in their consequent and stable use of the equipollent strategy. We included verbs from two roots for each language. One (Lithuanian itr. *lūž-ti* ~ tr. *lauž-ti*; Latvian itr. *lūz-t* ~ tr. *lauz-t*) corresponds to the sense selected as "first choice" in Nichols' questionnaire (2016) ("stick-like object snaps in two"). The second pair (Lithuanian itr. *duž-ti* ~ tr. *dauž-ti*; Latvian itr. *plīs-t* ~ tr. *plēs-t*) is used for the breaking (shattering, crushing) of glass, and thus corresponds to Nichols' second choice; the Latvian verbs also mean 'tear'. With all these verbs, the opposition between causal and noncausal verb is marked by root apophony and different conjugation classes. In Estonian, on the other hand, we find different strategies with different 'break'-verbs. The first sense is rendered by the pair *murd-ma* (tr.) → *murd-u-ma* (itr.). This instance of anticausative marking corresponds to the cross-linguistic trend discussed in Haspelmath (2016) (in this issue), Haspelmath et al. (2014), etc.[18] The second Estonian pair included in our sample shows double marking: *puru-ne-ma* (itr.) ~ *puru-sta-ma* (tr.). These verbs are used for shattering and crushing glass etc. In Finnish there are several 'break'-verbs whose semantic differentiation would need a special investigation. The two most general of these verbs show the anticausative strategy: *rikko-a* → *rikko-utu-a* (itr.) 'break', *särke-ä* (tr.) → *särk-y-ä* (itr.) 'break, smash, shatter'. A third pair – the one selected in Haspelmath (1993) and classed by him as of the anticausative type – is more tricky: although *murtu-a* 'break$_{ITR}$, fall to pieces' looks like an anticausative derived from *murta-a* 'break$_{TR}$; break in; etc.' (this verb is often used in figurative meanings), Finnish linguistic sources suggest that both verbs are denominal formations from the stem *mur-* (cf. *muru* 'crumb, morsel'): *mur-* → *mur-tu-a* 'fall to pieces' and *mur-* → *mur-ta-a* 'make pieces, break to pieces' (after L. Hakulinen 2000: 301). This pair might be classed as a case of double marking (or equipollent marking in Comrie's (2005) approach), but as we were not sure of its interpretation and the range of meaning seems to deviate from the more typical 'break' verbs (of which we already had two straightforward pairs), we decided to not include the verbs with the root *mur-* in our typology. This root appears in further intransitive and transitive verbs which we did not include in our sample because they are further away from the prototype of 'break': *mure-ta* (stem *muren-*) and *mure-ntu-a* 'crumble, fall apart', *muren-ta-a* 'make crumble, erode', and others.

We now turn to our last group, with notions that may have both animate and inanimate undergoers. While the Slavic languages show their usual preference for the anticausative strategy, in Finnic and Baltic causative and anticausative are almost equally distributed.

[18] Note, however, that in WATP anticausative marking is noted for 32.9% and causative marking for 27.6% of the languages, and thus, the difference is not that large in their sample. WATP also shows some interesting areal patterns for BREAK (map generated on March 16, 2017).

Table 6.5: Verbs of Group ANIM/INANIM

	Finnish	Estonian	Latvian	Lithuanian	Polish	Russian
17 GATHER	A	A	A	A	A	A
18 DISPERSE	C	C	C	A	A	A
19 VANISH	C	C	C	M (C/A)	–	A
20 CHANGE	A	A	A	M (E/A)	A	A

As mentioned in §2, it is not easy to identify verbs that combine with animate and inanimate undergoers in the same way. In our selection, only verbs for CHANGE met this criterion in all languages. Interestingly, for other items, the animate/inanimate distinction is not reflected in different marking strategies in this group, but rather is seen in the choice of different lexical verbs. For example, for GATHER, Latvian distinguishes between *pulc-ē-t-ies/pulc-inā-t-ies* (itr.) ← *pulc-ē-t, pulc-inā-t* (tr.) for human undergoers, *salasī-t-ies* (itr.) ← *salas-ī-t* (tr.) for animate and inanimate undergoers, all four meaning 'gather', and *uzkrā-t-ies* (itr.) ← *uzkrā-t* (tr.) 'accumulate' for inanimate undergoers (such as dust, goods). With another formal pair, *vāk-t* (tr.) → *vāk-t-ies* (itr.), the causal verb is used in the meaning 'gather, collect' with inanimate objects, but the noncausal verb is used with animate undergoers and its first meaning is 'go away (having gathered one's belonging)'; the meaning 'gather, come together' is rare, and we did not include the intransitive verb in our list. Similar lexical differentiation is found in other languages, but the strategy for GATHER with all these verbs in our sample is A.

For DISPERSE, Finnish has several verbs with the root *haja-* (cf. the nominal *haja* 'dispersed, scattered'), of which only two form a clear pair: *haja-antu-a* 'disperse$_{ITR}$' → *haja-annu-tta-a* 'make disperse'. Although the noncausal verb contains an anticausative marker, the strategy is causative, as the intransitive verb is the base of derivation for the causative verb. Another causal verb with this root is *hajotta-a* (*hajot-ta-a*)'break up, scatter, disperse (tr.)', which may be derived from itr. *hajo-ta* 'break up, fall apart'. Because of its distinct semantics, we did not include the intransitive verb here, but its inclusion would not change the type. It may be noted that *hajottaa* is used with different kinds of objects (disperse a crowd, dissolve, disintegrate a substance, etc.) and is much more frequent than *hajaannuttaa*. Another less frequent causal verb with this root is *haj-oitta-a* 'break up, tear up, scatter', which is derived from the nominal *haja*. The same root is also found in Estonian, which likewise employs the causative strategy (*haju-ma* (itr.) → *haju-ta-ma* (tr.) 'disperse'). The two Baltic languages differ in this line of the table: Latvian uses the causative strategy and one pair of verbs for both animate and inanimate undergoers (*izklīs-t* → *izklīd-inā-t* 'disperse (itr. → tr.)'), while Lithuanian shows the anticausative strategy (cf. *išsklaidyti* → *iš-si-sklaidyti* 'disperse (tr. → itr.)' and some differences in the choice of verbs with respect to animacy.

Latvian (constructed examples)

(5) *Mākoņi* *iz-klīda.*
cloud.NOM.PL PFX-disperse.PST.3
'The clouds dispersed.'

(6) *Vējš* *iz-klīd-**in**-āja* *mākoņus*
wind.NOM.SG PFX-disperse-CAUS-PST.3 cloud.ACC.PL
'The wind dispersed the clouds.'

Lithuanian (constructed examples)

(7) *Debesys* *iš-**si**-sklaid-*ė.
cloud.NOM.PL PFX-ACAUS-disperse-PST.3
'The clouds dispersed.'

(8) *Vėjas* *iš-sklaid-*ė *debesis.*
wind.NOM.SG PFX-disperse-PST.3 cloud.ACC.PL
'The wind dispersed the clouds.'

In the case of VANISH, Latvian again patterns with Finnic (causative coding), while Lithuanian has both causative (*prading-ti* 'get lost' → *pradang-in-ti* 'make disappear') and anticausative pairs (*pamesti* 'lose' → *pa-si-mesti* 'get lost'), and is thus in between Finnic and Slavic. However, it should be noted that *pradanginti* is significantly less frequent than *pamesti* (for example, in DLKT, PRS.3 *pradangina* has only 12 tokens while *pameta* is attested 185 times). This difference in frequency belongs to a general pattern we observed in Baltic and Finnic languages and can probably be found in many more languages: the most common verb for intransitive (noncausal) VANISH has the meaning 'disappear', while the most common verb for causal VANISH means 'lose' and not 'make disappear'. There is also a correlation with animacy: objects of 'lose' and 'make disappear' are usually inanimate. If you want to make an animal or human disappear, you would more likely 'drive them away' than 'lose them'. For this reason, a verb meaning 'lose (an object)' may change its meaning when used with reference to humans. In Finnish *hävittää*, the causative of *hävitä* 'disappear', has the meaning 'lose, misplace' with reference to objects, but the meaning 'annihilate, destroy' with reference to animate beings. In Latvian there are two morphological causatives of the itr. *(pa-)zus-t* 'disappear': *(pa-)zaud-ē-t* 'lose' and *pazud-inā-t* 'ruin, destroy' (with reference to humans). The latter can also be used to express the rare meaning 'make disappear (by magic)' with reference to both animate and inanimate objects.

Mixed marking is found in Lithuanian also with the last item, CHANGE. The transitive (causal) verb *keis-ti* 'change$_{TR}$' is the base for anticausative *keis-ti-s* 'change$_{ITR}$', but it is also part of the equipollent pair *kis-ti, ki-n-ta, kit-o* 'change$_{ITR}$' : *keis-ti*, *keiči-a*, *keit-ė* 'change$_{TR}$', marked by root apophony and different inflection classes. The other languages uniformly have anticausative marking.

The findings of this section are summarized in the following tables, where we counted how often a given language used each of the marking strategies. Following Haspelmath's (1993) practice, a strategy used parallel with another in the same cell (our M type) scores 0.5. For the languages with morphological causatives we also added the ratio of anticausative vs. causative marking (when C > 0).

Table 7.1: Summary of types per language (absolute numbers)

	Strategy							
Language	C	A	D	E	L	–	Sum	A/C
Finnish	13.0	6.0	0	0	0	1.0	20	0.46
Estonian	11.5	5.5	0.5	0	1.5	1.0	20	0.48
Latvian	6.5	8.0	4.5	1.0	0	0	20	1.23
Lithuanian	6.0	9.5	3.0	1.5	0	0	20	1.58
Polish	0	16.5	0	0.5	1.0	2.0	20	–
Russian	0	16.0	0	0	0	4.0	20	–

Table 7.2: Summary of types per language (%)

	Strategy					
Language	C	A	D	E	L	–
Finnish	65.0	30.0	0	0	0	5.0
Estonian	57.5	27.5	2.5	0	7.5	5.0
Latvian	32.5	40.0	22.5	5.0	0	0
Lithuanian	30.0	47.5	15.0	7.5	0	0
Polish	0	82.5	0	2.5	5	10.0
Russian	0	80.0	0	0	0	20.0

The main results regarding language preferences were the following:

- The Slavic languages decidedly prefer the anticausative strategy (no clear examples of causative marking were found).
- The Finnic languages prefer the causative strategy, but also make use of the anti-causative strategy. Causative is used about twice as often as anticausative.
- The Baltic languages use both causative and anticausative, with a weak preference for the latter.
- The causative strategy is used in Finnic languages about twice as often as in the Baltic languages and slightly more often in Finnish than in Estonian.
- The anticausative strategy is used in Slavic about or almost twice as often as in Baltic.
- Finnish and Russian use none of the other strategies.
- The Baltic languages make more use of double and equipollent marking than the other languages.

- Estonian is the only language with several labile verbs in this sample (the score 1 for L in Polish is only due to the imperfective 'fall asleep', while the perfective verbs are different).

3.3. The effect of inchoative vs. stative (durative) on marking strategies and the rise of double marking

In their cross-linguistic study of transitivity marking, Nichols et al. (2004) observed that

> […] verb pairs, and languages, vary as to whether it is stative or inchoative plain verbs that are most often formally paired with induced verbs: induced 'teach' can be related to stative 'know' or to inchoative 'find out, realize', induced 'straighten' to 'be straight' or 'become straight', and so on. (Nichols et al. 2004: 156-157)

However, they found that this distinction was not important for their study and included pairs of both types (while asking data collectors to specify the relations between causal and both inchoative and stative intransitive verb, where these were distinct, Nichols 2016). Haspelmath (1993) explicitly talked about inchoative verbs, but his sample includes at least one non-inchoative intransitive verb: 'burn'. In our study, we assumed that the distinction between inchoative and non-inchoative (durative) verbs may have an effect on the marking strategies and tried to consistently stick to inchoative verbs. Here we will discuss whether and where the difference was indeed important.

Most of the notions in our sample denote a change of state and do not have a durative counterpart in the form of a simple verb. For example, there are (in our standard varieties of the languages) no simple verbs for 'be dead', 'be open', 'be melted/liquid', etc. We therefore only considered notions where such verbs were available. The first item to which this applied is ASLEEP. All languages in our study have different verbs for 'be asleep (= sleep)' and 'fall asleep'. In Finnish, the causal verb is derived from the durative (*nuku-tta-a* 'make asleep' ← *nukku-a* 'sleep'), but we noted C as the marking strategy anyhow, disregarding, according to our guidelines, the inchoative marker in *nuk-**ahta**-a* 'fall asleep'. In Estonian there also exists a causative of the verb for 'sleep', *maga-**ta**-ma* ← *maga-ma*, although in the contemporary language it has acquired the meaning 'have sex' and is rarely used as 'put to sleep'. There are no deverbal inchoative markers in Estonian, and the meaning 'fall asleep' is expressed by a different verb, *uinu-ma* 'fall asleep' (also 'slumber, lie sleeping'), with a regular causative *uinu-ta-ma*. Latvian also has different verbs (*gulē-t* 'sleep' and *ie-mig-t*, *aiz-mig-t* 'fall asleep'), but the durative does not have a causative partner. In Lithuanian, *(už-)mig-ti* can be interpreted as inchoative to *mieg-o-ti*, *mieg-a* 'sleep' (the difference is in inflectional class; the prefix is not necessary to mark inchoativity), while in Polish and Russian, the verbs for 'sleep' and 'fall asleep' share the root, but they are not related by productive, regular derivational processes.

For the opposite AWAKE, none of the contemporary languages has a simple verb for the durative, but in Lithuanian we find its trace: *bud-ė-ti*, *bud-i* 'be on duty' originally meant 'be awake'. The inchoative *bus-ti, bu-n-d-a* 'wake up$_{ITR}$' and the causative *bud-in-ti*

'wake up$_{TR}$' were derived from this verb. In the current use, *bud-ė-ti* lost the meaning 'be awake', and there is no synchronic derivational link between this verb and *bud-in-ti*, and only *bus-ti* (inchoative) → *bud-in-ti* (causative) is synchronically valid (see on the original derivational relation Smoczyński 2007: 78; see also Vaillant 1966: 236 on cognate verbs in Slavic).

More relevant for our question are verbs of the third and the fourth group: the emotional predicates SCARE, ANGRY, HAPPY, and changes in physical state in the fifth group (AFIRE, BOIL). We will regard only Finnic and the Baltic languages here. The following table compares marking strategies in inchoative-causative pairs (as discussed above in §3.2) and durative-causative pairs. The last line counts differences between a and b lines (inchoative : causative vs. durative : causative) of one item; if a language has one pair that has both inchoative and durative readings (as in Finnish 'get/be angry' : 'make angry'), it is marked twice.

Table 8: Inchoative vs. durative noncausal verbs in Finnic and Baltic

	Finnish	Estonian	Latvian	Lithuanian
9a 'get scared' ~ 'scare'	C	M (C/L)	D	D
9b 'be afraid' ~ 'make afraid'	–	–	A	M (C/A)
10a 'get angry' ~ 'make angry'	C	M (A/L)	A	C
10b 'be angry' ~ 'make angry'	C	M (A/L)	M (A/L)	C
11a 'get happy' ~ 'make happy'	C	M (A/L)	D	D
11b 'be happy' ~ 'make happy'	C	M (A/L)	D	D
14a 'catch fire' ~ 'set on fire'	C	–	D	A
14b 'be burning' ~ 'make burn'	–	C	M (C/E)	M (C/L)
15a 'come to boil' ~ 'bring to boil'	C	C	A	C
15b 'be boiling' ~ 'bring to boil'	C	C	A	M (C/L)
Differences	2	2	3	3

The difference is not trivial, especially in the Baltic languages. In Finnic, it is related to different stems or roots chosen for inchoative and durative verbs. All Finnish verbs for SCARE contain the root *pel-* 'fear', but only the inchoative and causal form a regular causative pair (*pelästy-ä* 'get/be scared'→ *pelästy-ttä-ä* 'scare'), while durative-causal pairs do not, as the causal verb is denominal (*pelä-tä* 'fear' ~ *pelotta-a* 'scare, frighten' ← *pelko*, *pelon* 'fear (NOUN)'). With AFIRE, the Finnish pair *pala-a* 'burn$_{ITR}$' ~ *poltta-a* 'burn$_{TR}$' shows irregular sound correspondences, while in the pair *sytty-ä* 'catch fire'→ *syty-ttä-ä* 'set on fire, ignite' we have a regular causative. In Estonian it is the other way around: as discussed above, the inchoative-causal pair is problematic, and we therefore did not count it, but the durative-causal pair is clearly of type C (*põle-ma* 'burn, be burning' → *põle-ta-ma* 'burn, make burning'). Estonian uses different roots in the

verbs for ‘scare’ and ‘fear’, and the latter exist only as intransitive verbs without a causal correspondence (*pelga-ma* ‘be afraid’; *kart-ma* ‘fear, be frightened’). For the other emotional predicates, there is no difference between inchoative and durative in Finnish or Estonian, and BOIL differs only in Finnish in the additional inchoative suffix in *kieh-ahta-a* ‘come to boil’, which does not count in our typology.

In Baltic, only for the notion of happiness are the marking strategies consistently the same for pairs with inchoative and durative noncausal verbs. For ANGER, we find a difference that affects our types in Latvian: while the inchoative always has the anticausative marker (*sadusmo-t-ies*, *saskais-t-ies* ‘get angry’), the durative verb has both a marked and an unmarked form (*dusmo-t/dusmo-t-ies* ‘be angry’). The unmarked form is also used as a transitive verb, and, thus, it is labile.

Latvian

(9) *Jo mani tas viss kaut kā ļoti* ***dusmo***.
for 1SG.ACC DEM.NOM.SG.M all.NOM.SG.M PTC how very make_angry.PRS.3
‘For all this makes me somehow very angry.’ (LVK2013)

(10) *tu laikam* ***dusmo***
2SG.NOM probably be_angry.PRS.2SG
par tiem neatbildeetajiem zvaniem
about DEM.DAT.PL.M unanswered.DAT.PL.M.DEF call.DAT.PL
‘You are probably angry about the unanswered calls’ (tīmeklis-1.0, nonstandard orthography)

(11) *Kāpēc tu tagad* ***dusmojies*** *uz mani ?*
why 2SG.NOM now be_angry.PRS.2SG.ACAUS to 1SG.ACC
‘Why are you angry with me now?’ (LVK2013)

In the Latvian pair ‘be afraid’ ~ ‘make afraid’, we noted a historical development where an originally derived causal verb has become the base of a derived noncausal verb: *bai-dī-t* ‘scare’ (derived from the verbal root *bī-* ‘fear’) → *baidī-t-ies* ‘fear’. The same development took place in the case of BOIL: Latvian *vir-t* ‘boil (itr. or labile)’ → *vār-ī-t* ‘boil$_{TR}$’ → *vārī-t-ies* ‘boil$_{ITR}$’. In both cases, the original intransitive base verb has a marginal position in the modern language: it is archaic and infrequent. This is different in Lithuanian, where the cognate *vir-ti* ‘boil’ is still used as a labile verb. Durative verbs for SCARED in Lithuanian are unmarked *bij-o-ti*, *bij-o* ‘fear’, which is the base for the causative *bai-dy-ti* ‘scare’, and the much rarer anticausative *baidyti-s.*[19] We could thus count two pairs with a durative noncausal verb (*bij-oti* → *bai-dy-ti* and *baidy-ti-s* ← *baidy-ti*), but the anticausative would be marginal, while it is the most common in Latvian.

Verbs for AFIRE all have the root *deg-* in Baltic. A simple verb with this root can be durative and transitive. In Lithuanian it is one labile predicate (*deg-ti* ‘burn (itr., tr.)’), while in Latvian the two uses are differentiated in the present and past stem (*deg-t*, *de**g***, *de**g**a* ‘burn$_{ITR}$’ : *deg-t, de**dz**, de**dz**a* ‘burn$_{TR}$’). In both languages we also have derived causatives (Lithuanian *deg-in-ti*, Latvian *dedz-inā-t* ‘burn$_{TR}$, set fire to’).

[19] 4623 tokens of PRS.3 *bijo* vs. 78 tokens of *baidosi* in the Corpus of Modern Lithuanian.

We concluded that the difference between inchoative and durative does have an effect on the marking strategy, especially in the Baltic languages. Another question is whether certain marking strategies correlate with either inchoative or durative noncausal verbs, especially the strategies L, E, and D. In Baltic, we indeed get more labile verbs if we regard durative-causal pairs instead of inchoative-causal pairs. In Estonian, the language with the most labile verbs in our sample, this is not the case, and the only labile verb in Polish (imperfective *usypiać* 'fall asleep') is exclusively inchoative. Thus, if there is a correlation, it seems to be language-specific.

With respect to double marking (D-type), which is characteristic to the Baltic languages, we hypothesized that the relation could be inchoative-causal rather than durative-causal, but this hypothesis was not confirmed. In Latvian there are two items where the choice of a durative instead of an inchoative noncausal verb changes the marking strategy from D to another type. The two cases differ: For SCARE we have a secondary anticausative as a durative verb (*baidīt-ies* 'be afraid' ← *baidī-t* 'scare, frighten', see above), while the inchoative inherits the reflexive marker from a base verb (*iz-bī-t-ies*, *no-bī-t-ies*, *sa-bī-t-ies* 'get scared' ← *bī-t-ies* 'be afraid'). In AFIRE it was the formation of inchoative *aiz-deg-t-ies* 'catch fire' (based on *deg-t*, *deg* 'burn$_{ITR}$') which entered into a secondary relation with *aiz-dedz-inā-t* 'set on fire' (based on tr. *deg-t, dedz* 'burn'), and thus led to a doubly marked pair in our interpretation. In Lithuanian the inchoative and the durative for SCARED use different roots. The durative *bijoti* 'fear, be afraid' does not contain a reflexive marker and combines with its derived causative to a pair of type C (see above for details on the verb pairs).

This brings us to the question of what causes double marking. Our study has shown that there are various, unrelated reasons why this marking type arises.

The reason why D-type is so frequent in the group EMOTION is most probably that the reflexive affix functions here as a marker of middle and all predicates belong to the group of media tantum. It is well-known that emotion predicates tend to be middle-marked (cf. Kemmer 1993: 18) and were they not media tantum, the relation would be simply of C-type. It should be recalled that our treating the affixes in question as "anticausative" markers for the purpose of assigning types is based on purely formal considerations and does not imply that the reflexive verbs are derived as anticausatives (intransitives) from a non-reflexive transitive verb – in the case of media tantum, they are clearly not derived. An alternative solution would be not to count these instances as occurrences of anticausative marking. Other developments are also possible, for example, Lithuanian *džiug-in-ti* 'rejoice$_{TR}$' could have initially been formed as a causative *nu-/pra-džiug-in-ti* 'rejoice (tr., perfective)' to inchoative *nu-/pra-džiug-ti* 'rejoice (itr., inchoative)', but was later deprefixed (to have an imperfective version of the predicate), and thus only then the relation between *džiaugti-s* and *džiug-in-ti* arose.

There is only one instance of D-type marking in Estonian: *puru-ne-ma* 'break$_{ITR}$' ~ *puru-sta-ma* 'break$_{TR}$'. Both verbs are formed from a non verbal base in Estonian (*puru* 'dust, small pieces of something; torn, broken'). There are more pairs of this type in Estonian beyond our sample (see Kasik 2001: 83), and the pattern is also found in Finnish: the pair *mur-tu-a* 'break$_{ITR}$' ~ *mur-ta-a* 'break$_{TR}$', which we mentioned above but did not include in our count, may be a case in point.

Thus, the rise of D-type pairs seems to be independent of inchoative marking and can rather be explained by the following factors: (1) the middle marking of emotion predicates which are media tantum, (2) the formation of anticausatives and the establishment of their relation to predicates with causative markers, (3) the formation of causatives and the establishment of their relation to media tantum, (4) denominal formations sharing the same base and receiving different verbalizers (one of them transitive, the other one intransitive).

3.4. Semantic factors influencing marking strategies

As explained in §2, we purposefully selected verbs from different semantic fields for our study and paid special attention to animacy. The five semantic groups we distinguished are repeated here for convenience:

ANIM (animate undergoer, general): BIRTH, DEATH, AWAKE, ASLEEP

INANIM (inanimate undergoer, general): BEGIN, END, OPEN, CLOSE

EMOTION (animate undergoer, emotion): SCARED, ANGRY, HAPPY, LAUGH

PHYSICAL (inanimate undergoer, change of physical state): MELT, AFIRE, BOIL, BREAK

ANIM/INANIM (animate or inanimate undergoer): GATHER, DISPERSE, VANISH, CHANGE

The following table shows that preferences for marking types did indeed differ across our groups. As Polish and Russian do not have the full choice of marking strategies (notably they lack the causative strategy), the table includes only the results for the Finnic and the Baltic languages.

Table 9: Marking types across semantic groups (Finnish, Estonian, Latvian, Lithuanian)

	C	A	D	E	L	–	Sum
ANIM	14.0	1.0	1.0				16
INANIM	2.0	13.0				1.0	16
EMOTION	6.0	2.0	5.5		1.5	1.0	16
PHYSICAL	7.5	4.0	1.5	2.0		1.0	16
ANIM/INANIM	6.5	9.0		0.5			16

The first two groups show a clear preference for one type, occurring in each group in over 75% of pairs, while the other groups are more balanced. The group EMOTION stands out with only half of the pairs using one of the main strategies (C or A).

The most pronounced difference is seen between ANIM, which overwhelmingly shows the causative strategy and only one instance of anticausative marking, and INANIM, which has the lowest number of causatives and the highest number of anticausative marking. It is likely that animacy plays at least some role here, which put our findings in line with a tendency found by Nichols et al. (2004): languages where causative mark-

ing is available disfavour anticausative marking with animate verbs, but not necessarily with inanimate verbs. This is based on a tendency to encode notions that predicate about humans as primary (Nichols et al. 2004: 172). However, differences between other groups or individual verbs cannot be explained by animacy effects. The last group is especially interesting in this respect. If animacy clearly correlated with C vs. A marking, we might expect different marking strategies (maybe with different lexical roots) if speaking about animate beings or inanimate objects that gather, disperse, vanish, or change. However, this is not the case. While sometimes different verbs are used or preferred, notably with the notions GATHER and DISPERSE, the marking strategies are almost always the same.

Another semantic factor discussed in the literature on transitivity pairs is spontaneity, or the lack of external causation. We did not come up with a definition or method that would allow us to rank our notions according to such a parameter. In our sample, spontaneity seems to have an effect on the choice of marking strategy in a few instances where there is more than one pair for an item in our list. The most convincing example is the Lithuanian pair for MELT. Here Lithuanian uses the causative strategy for the more spontaneous process (such as melting of snow and wax) and the anticausative strategy for the less spontaneous process (melting of metal). A similar situation may be seen with the two Lithuanian pairs for VANISH: *ding-ti* 'disappear' → *pra-dang-in-ti* 'make disappear' with causative marking, and *pa-mes-ti* 'lose' → *pa-si-mes-ti* 'get lost' with anticausative marking. However, we are not able to say whether MELT in general is "more spontaneous" than BREAK or OPEN, or if VANISH is "more spontaneous" than CHANGE, and we doubt that tendencies in marking strategies can be explained by one or two semantic factors alone. More fine-grained analyses of particular semantic groups may lead to more interesting results.

4. Conclusions

At the outset of our study we hypothesized that Baltic languages (Latvian and Lithuanian) might occupy an intermediate position between Finnic (Finnish and Estonian) and Slavic (Russian and Polish) with regard to their tendencies to use causativizing vs. anticausativizing morphology. A sample of 20 pairs of notions has shown that this is indeed the case. Both the count of markers in the individual verbs in §3.1 and the count of marking types of formally related pairs in §3.2 confirmed that Finnic languages prefer causative marking and Slavic languages anticausative marking, while Baltic languages are in between. More specifically, the probability of finding causative marking steadily decreases moving from Finnish to Estonian, then to Latvian and Lithuanian, while modern Polish and Russian do not use causative marking at all. The likelihood of finding anticausative marking follows the opposite direction: Baltic languages are slightly less intransitivizing than Slavic ones, while Finnic languages employ anticausative marking only approximately half as much as the Baltic ones. On the other side of the Baltic Sea, we find about the same distance between Finnish and Swedish with regard to anticausative marking (61.3% in Swedish and 32.3% in Finnish, WATP 2014). Causative marking, however, is not typical for Swedish (only 12.9% vs. 43.5% in Finnish, WATP 2014;

cf. also Comrie 2005: 82). With their relatively high number of causatives, the Baltic languages clearly stand out among the Indo-European languages of the area, which suggests that this feature may be attributed to Finnic influence. In addition, the Baltic languages are characterized by the presence of doubly marked pairs, equipollent marking, or the mixed type, where different expressions for a notion represent different marking types. A tendency to use labile predicates, on the other hand, was found only in Estonian in the group of emotion predicates.

Comparing our results with previous studies (Haspelmath 1993; Nichols et al. 2004; WATP), we find that they agree with global trends. This is most evident where Finnic, against its preference for causatives, uses the anticausative strategy, or where Slavic does not use the anticausative strategy that is the default in this branch. Thus, the four notions where all the languages in our sample use the anticausative strategy (OPEN, CLOSE, GATHER, CHANGE) very often show this strategy in other languages as well, and the three items where Polish and Russian do not show anticausative marking – DEATH, ASLEEP, and LAUGH – rarely have anticausatives.

When collecting causal and noncausal verbs in the six languages under investigation, we tried to consistently choose inchoative verbs. That is, whenever there was a choice between an inchoative and a durative noncausal verb (for example, 'fall asleep' vs. 'sleep', 'get scared' vs. 'be afraid', 'catch fire' vs. 'burn'), we chose the inchoative. In §3.3 we showed what effect this choice had on our results. Most notably, the Baltic languages showed more double marking with inchoatives and more labile and equipollent marking with duratives. In that section we also explored the reasons for double marking, which in our sample was found more often with animates than with inanimates (in contrast to the results of Nichols et al. 2004). In our sample, double marking in Baltic most often was connected to the marking of intransitive verbs as media tantum, using the same reflexive marker that is used for deriving intransitive verbs from transitive verbs.

In §3.4 we briefly discussed how semantic factors may influence the choice of marking strategy in Finnic and Baltic languages. We stated a clear difference in marking between the first two semantic groups that we distinguished: causative marking in 14 of 16 cells for verbs with animate undergoers ('be born/give birth', 'die/kill', 'fall asleep/put to sleep', 'wake up') versus anticausative in 13 of 16 cells for verbs with an inanimate undergoer ('begin', 'end', 'open', 'close'). The other three groups, however, did not show such an animacy effect. Nor did we find evidence for the idea (expressed most boldly in Haspelmath 1993 but revised in later work) that notions can be ranked according to a semantic parameter of spontaneity or likelihood of external causation. Rather, our findings suggest that more narrowly defined semantic groups of verbs may show distinct behaviours. In our study, such a semantic group was emotion predicates, where we found labile verbs in Estonian and double marking in Baltic.

In our study we also tried to contribute to the methodology of investigating transitivity pairs for language comparison. The design of a list of causal and noncausal verb pairs that reflect the coding preferences of a language is not a trivial task. Given differences in the behaviour of semantic groups, such a list should probably be larger than our 20 items. On the other hand, the careful analysis of linguistic data that we found necessary, taking into consideration details of word-formation, inflection, and meaning, requires

expert knowledge of the investigated languages, and thus sets a practical limit on the number of items and the number of languages that can be compared.

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Abbreviations

1, 2, 3 – 1st, 2nd, 3rd person; ACAUS – anticausative; ACC – accusative; ADE – adessive; CAUS – causative; DAT – dative; DEF – definite; DEM – demonstrative; IMPERS – impersonal; INCH – inchoative; INF – infinitive; INF3 – third infinitive (in Finnish); ITR – intransitive; LOC – locative; M – masculine; NOM – nominative; NPST – non-past; PART – partitive; PFX – prefix; PL – plural; PRS – present; PST – past; PTC – particle; SG – singular; SUF – suffix; TR – transitive; VERB – verbalizer.

Appendix

List of verbs considered in this study and types of inchoative-causative pairs.

Notes: (1) The counts at the end of each table refer to markers found in a cell (if a causative or anticausative marker is found in a cell, the cell is counted, without considering the type of relation the respective verb has to a verb in the neighbouring cell). (2) Verbs that were not considered as part of an inchoative-causative pair in §3 are put in square brackets.

Estonian

No., label	Intransitive (default: inchoative)	Transitive (causative)	Type
1 BIRTH	*sündi-ma* ‘be born’	*sünni-**ta**-ma* ‘give birth’	C
2 DEATH	*sure-ma* ‘die’	*sure-**ta**-ma* ‘deaden; devitalize’ [*tap-ma* ‘kill’]	C
3 AWAKE	*ärka-ma* ‘wake up’	*ära-**ta**-ma* ‘wake up’	C
4 ASLEEP	*uinu-ma* ‘fall asleep’, ‘slumber, doze’	*uinu-**ta**-ma* ‘put to sleep’	C
	[durative: *maga-ma* ‘sleep’]	[*maga-**ta**-ma* ‘put/let (to) sleep; have sex’]	
5 BEGIN	*alga-ma* ‘begin’	*alga-**ta**-ma* ‘start, initiate’	C
6 END	*lõppe-ma* ‘end’	*lõpe-**ta**-ma* ‘end’	C
7 OPEN	*ava-**ne**-ma* ‘open’	*ava-ma* ‘open’	A
8 CLOSE	*sulg-**u**-ma* ‘close’	*sulge-ma* ‘close’	A

9 SCARED	*hirmu-ma* 'be scared' *kohku-ma* 'get scared' *ehmata-ma* 'get scared' [*ehmu-ma* 'be startled'] [durative: *pelga-ma* 'be afraid'; *kart-ma* 'fear, be frightened']	*hirmu-**ta**-ma* 'scare' *kohu-**ta**-ma* 'scare' *ehmata-ma* 'frighten, startle'	M(C/L)
10 ANGRY	*vihast-**u**-ma* 'get/be angry' *vihasta-ma* 'be angry'	*vihasta-ma* 'make angry'	M(A/L)
11 HAPPY	*rõõmust-**u**-ma* 'get glad' (rare) *rõõmusta-ma* 'be/get glad'	*rõõmusta-ma* 'make glad'	M(A/L)
12 LAUGH	[*naer-ma* 'laugh']	[*naeruta-ma* 'make laugh']	–
13 MELT	*sula-ma* 'melt, taw, etc.'	*sula-**ta**-ma* 'melt, taw, etc.'	C
14 AFIRE	[*sütti-ma* 'catch fire'] [durative: *põle-ma* 'burn, be burning']	[*süüta-ma* 'ignite, set on fire'] [*süti-**ta**-ma* 'enkindle, incite'] [*põle-**ta**-ma* 'burn']	–
15 BOIL	*kee-ma* 'boil'	*kee-**t**-ma* 'boil'	C
16 BREAK	*murd-**u**-ma* 'break' *puru-**ne**-ma* 'break, shatter, fall apart'	*murd-ma* 'break' *puru-**sta**-ma* 'break, smash, shatter'	M(A/D)
17 GATHER	*kogu-**ne**-ma* 'gather, come together, accumulate'	*kogu-ma* 'gather, collect, accumulate'	A
18 DISPERSE	*haju-ma* 'disperse, scatter'	*haju-**ta**-ma* 'disperse, scatter'	C
19 VANISH	*kadu-ma* 'vanish, get lost' [*mine-ma* 'go']	*kao-**ta**-ma* 'lose' [*mine-**ta**-ma* 'lose']	C
20 CHANGE	*muut-**u**-ma* 'change'	*muut-ma* 'change'	A

Finnish

No., label	Intransitive (inchoative)	Transitive (causative)	Type
1 BIRTH	*synty-ä* 'be born'	*synny-**ttä**-ä* 'give birth'	C
2 DEATH	*kuolla* (stem *kuole-*) 'die'	*kuole-**tta**-a* 'deaden; extinguish' [*tappa-a* 'kill'; *surma-ta* 'kill']	C
3 AWAKE	*herä-tä* 'wake up' (stem *herä(t)-*) [*hav-ahtu-a* 'wake up']	*herät-**tä**-ä* 'wake up'	C
4 ASLEEP	*nuk-ahta-a* 'fall asleep' [*uin-ahta-a* 'fall asleep'] [durative: *nukku-a* 'sleep']	*nuku-**tta**-a* 'put to sleep'	C
5 BEGIN	[*alka-a* 'begin']	[*al**oitta**-a* 'begin']	–
6 END	*päätt-**y**-ä* 'end' [*loppu-a* 'end']	*päättä-ä* 'end' [*lope-**tta**-a* 'end']	A
7 OPEN	*ava-**utu**-a* 'open' [*aue-ta (auke-a, -si)* 'open']	*ava-ta (avaa, avasi)* 'open'	A

8 CLOSE	*sulke-**utu**-a* ‘close’	*sulke-a* ‘close’	A
9 SCARED	*pelästy-ä* ‘be/get scared’ [durative: *pelä-tä* ‘be afraid, fear’]	*pelästy-**ttä**-ä* ‘scare’ [*pelo-**tta**-a* ‘scare, make afraid’]	C
10 ANGRY	*suuttu-a* ‘be/get angry’ *vihastu-a* ‘be/get angry’	*suutu-**tta**-a* ‘make angry’ *vihastu-**tta**-a* ‘make angry’	C
11 HAPPY	*il-ahtu-a* ‘be/get glad, delighted’	*ilahdu-**tta**-a* ‘make glad’ *riemastu-**tta**-a* ‘delight’	C
12 LAUGH	*naura-a* ‘laugh’ *naur-ahta-a* ‘give a laugh’	*naura-**tta**-a* ‘make laugh’	C
13 MELT	*sula-a* ‘melt, taw, etc.’	*sula-**tta**-a* ‘melt, taw, etc.’	C
14 AFIRE	*sytty-ä* ‘catch fire’ [durative: *pala-a* ‘burn’]	*syty-**ttä**-ä* ‘set on fire’ [*pol**tta**a* ‘burn’]	C
15 BOIL	*kieh-ahta-a* ‘come to boil’ [durative: *kiehu-a* ‘boil’]	*kiehu-**tta**-a* ‘bring to boil’	C
16 BREAK	*särk-**y**-ä* ‘break’ *rikko-**utu**-a* ‘break, fall apart’ [*murtu-a* ‘break, fall to pieces’]	*särke-ä* ‘break’ *rikko-a* ‘break, shatter’ [*murta-a* ‘break, crack’]	A
17 GATHER	*koko-**ontu**-a* ‘gather, come together’ *kerä-änty-ä* ‘accumulate’	*koo-ta (koko-aa, -si)* ‘assemble’ *kerä-tä* ‘gather, collect’	A
18 DISPERSE	*haja-antu-a* ‘disperse, scatter’ [*hajo-ta* ‘fall apart, disintegrate’]	*haja-annu-**tta**-a* ‘disperse’ [*hajo-**tta**-a* or *haj-**oitta**-a* ‘scatter, disperse, break up’]	C
19 VANISH	*kado-ta* ‘disappear, get lost’ *hävi-tä* ‘disappear’ [*mennä* (stem *mene-*) ‘go’]	*kadot-**ta**-a* ‘lose’ *hävi-**ttä**-ä* ‘lose, misplace; make vanish’; ‘destroy; annihilate’ [*mene-**ttä**-ä* ‘lose’]	C
20 CHANGE	*muutt-**u**-a*	*muu**tta**-a*	A

Latvian

No., label	Intransitive (inchoative)	Transitive (causative)	Type
1 BIRTH	*dzim-t* ‘be born’	*dzem-**dē**-t* ‘give birth’ *dzem-**dinā**-t* ‘give birth’ (more often metaphorical)	C
2 DEATH	*mir-t* ‘die’	*(no-)mir-**dinā**-t* ‘make/let die’ *(no-)mēr-**dē**-t* ‘deaden; starve’ *(no-)gal-**inā**-t* ‘kill’	C
3 AWAKE	*mos-t-**ies*** ‘wake up’	*mod-**inā**-t* ‘wake up’	D
4 ASLEEP	*aiz-/ie-mig-t* ‘fall asleep’ [durative: *gulē-t* ‘sleep’]	*(aiz-/ie-)midz-**inā**-t* ‘put to sleep’	C
5 BEGIN	*sāk-t-**ies*** ‘begin’	*sāk-t* ‘begin’	A
6 END	*beig-t-**ies*** ‘end’	*beig-t* ‘end’	A
7 OPEN	*atvēr-t-**ies*** ‘open’	*atvēr-t* ‘open’	A

8 CLOSE	*aizvēr-t-**ies*** ‘close’ *slēg-t-**ies*** ‘shut’	*aizvēr-t* ‘close’ *slēg-t* ‘shut’	A
9 SCARED	*iz-/no-/sa-bī-t-**ies*** ‘be/get scared’ [durative: *bī-t-ies* ‘fear, be afraid’ *baidī-t-ies* ‘fear, be afraid’]	*(iz-/no-)bie-**dē**-t* ‘scare, frighten’ [*baidī-t* ‘scare, frighten’]	D
10 ANGRY	*sa-dusmo-t-**ies*** ‘get angry’ [*sa-skais-t-**ies*** ‘get angry, furious’] [durative: *dusmo-t* ‘be angry’ ; *dusmo-t-ies* ‘be angry’]	*(sa-)dusmo-t* ‘make angry’	A
11 HAPPY	*(no-)priecā-t-**ies*** ‘be/get happy’	*(ie-)priec-**inā**-t, priec-ē-t* ‘make happy, delight’	D
12 LAUGH	*smie-t-**ies*** ‘laugh’ *smie-t* ‘laugh’ [*ie-smie-t-**ies*** ‘burst out laughing’]	*smī-**dinā**-t* ‘make laugh, amuse’	M (D/C)
13 MELT	*(iz-/no-)kus-t* ‘melt, taw’	*(iz-/no-)kaus-ē-t* ‘melt, taw’	C
14 AFIRE	*aiz-deg-t-**ies*** (PRS.3 *aiz-deg-as*) ‘catch fire’ [durative: *deg-t* (PRS.3 *deg*) ‘burn’]	*(aiz-)dedz-**inā**-t* ‘set on fire’ [*aizdeg-t* (PRS.3 *aizdedz*) ‘light (up)’] [*deg-t* (PRS.3 *dedz*) ‘burn’]	D
15 BOIL	*uz-vārī-t-**ies*** ‘come to boil’ [durative: *vārī-t-ies* ‘boil’ *vir-t* ‘boil’ (archaic)]	*(uz-)vārī-t* ‘bring to boil’	A
16 BREAK	*lūz-t* ‘break’ *(sa-)plīs-t* ‘break, burst’	*lauz-t* ‘break’ *(sa-)plēs-t* ‘break, smash’	E
17 GATHER	*pulc-ē-t-**ies***, *sapulc-inā-t-**ies*** ‘gather, come together’ *salasī-t-**ies*** ‘gather, assemble’ *uzkrā-t-**ies*** ‘gather, accumulate’	*(sa-)pulc-**inā**-t*, *(sa-)pulc-ē-t* ‘gather, assemble’ *salasī-t* ‘gather, collect’ *uzkrā-t* ‘gather, accumulate’	A
18 DISPERSE	*izklīs-t* ‘disperse, scatter, spread’	*izklīd-**inā**-t* ‘disperse, scatter’	C
19 VANISH	*(pa-)zus-t* ‘disappear, get/be lost’	*(pa-)zaud-ē-t* ‘lose’ *pazud-**inā**-t* [‘ruin, destroy’; ‘make vanish’ (occasional)]	C
20 CHANGE	*mainī-t-**ies*** ‘change’	*mainī-t* ‘change’	A

Lithuanian

No., label	Intransitive (inchoative)	Transitive (causative)	Type
1 BIRTH	*gim-ti* ‘be born’	*gim-**dy**-ti* ‘give birth’	C
2 DEATH	*žū-ti* ‘die (of unnatural causes)’ [*mir-ti* ‘die’]	*žu-**dy**-ti* ‘kill’ [*mar-**in**-ti* ‘make/let die, deaden’]	C

3 AWAKE	*bus-ti* ‘wake up’ *budin-ti-**s*** ‘wake up’ (rare)	*bud-**in**-ti* ‘wake up’ [žadin-ti ‘wake up’]	M (C/A)
4 ASLEEP	*mig-ti* ‘fall asleep’ *migdy-ti-**s*** ‘fall asleep’ (rare) [durative: *miego-ti* ‘sleep’]	*mig-**dy**-ti* ‘put to sleep’	M (C/A)
5 BEGIN	*pra-**si**-dė-ti* ‘begin’	*pra-dė-ti* ‘begin’	A
6 END	*baig-ti-**s*** ‘end’	*baig-ti* ‘end’	A
7 OPEN	*at-**si**-dary-ti* ‘open’	*ati-dary-ti* ‘open’	A
8 CLOSE	*už-**si**-dary-ti* ‘close’	*už-dary-ti* ‘close’	A
9 SCARED	*iš-**si**-gąs-ti* ‘get scared’ [durative: *bijo-ti* ‘be afraid’; *baidy-ti-s* ‘be afraid’ (rare)]	*iš-gąs-**din**-ti* ‘scare, frighten’	D
10 ANGRY	*su-pyk-ti* ‘get angry’ [durative: *pyk-ti* ‘be angry’]	*pyk-**dy**-ti, pyk-**in**-ti* ‘make angry’	C
11 HAPPY	*ap-**si**-džiaug-ti* ‘get happy’ [durative: *džiaug-ti-s* ‘be glad’]	*džiug-**in**-ti*	D
12 LAUGH	*juok-ti-**s*** ‘laugh’ [*pra-**si**-juok-ti* (rare), *pra-juk-ti* ‘start laughing’]	*juok-**in**-ti* ‘make laugh’	D
13 MELT	*tirp-ti* ‘melt, taw’ *lydy-ti-**s*** ‘melt (of metal etc.)’	*tirp-**in**-ti, tirp-**dy**-ti* ‘melt, taw’ *lydy-ti* ‘melt (metal)’	M (C/A)
14 AFIRE	*už-**si**-deg-ti* ‘catch fire’ [durative: *deg-ti* ‘burn’]	*už-deg-ti* ‘set on fire’ [*deg-**in**-ti* ‘burn’ *deg-ti* ‘burn’]	A
15 BOIL	*už-vir-ti* ‘come to boil’ [durative: *vir-ti* ‘boil’]	*už-vir-**in**-ti* ‘bring to boil’ [*vir-ti*; *vir-in-ti* ‘boil’]	C
16 BREAK	*lūž-ti* ‘break’ *duž-ti* ‘break, shatter’	*lauž-ti* ‘break’; *lauž-y-ti* ‘break’ *dauž-ti*; *dauž-y-ti* ‘break, shatter’	E
17 GATHER	*rink-ti-**s*** ‘gather’ *kaup-ti-**s*** ‘accumulate’	*rink-ti* ‘gather, come together’ *kaup-ti* ‘accumulate’	A
18 DISPERSE	*sklaidy-ti-**s*** ‘disperse’ *skirsty-ti-**s*** ‘go away’	*sklaidy-ti* ‘disperse’ *skirsty-ti* ‘distribute’	A
19 VANISH	*(pra-)ding-ti* ‘disappear’ *pa-**si**-mes-ti* ‘get lost’	*pra-dang-**in**-ti* ‘make disappear’ *pa-mes-ti* ‘lose’	M (C/A)
20 CHANGE	*kis-ti* ‘change’ *keis-ti-**s*** ‘change’	*keis-ti* ‘change’	M (E/A)

Polish (imperfective/perfective)

No., label	Intransitive (inchoative)	Transitive (causative)	Type
1 BIRTH	*urodzić **się*** ‘be born’	*urodzić* ‘give birth’	A

2 DEATH	*umierać/umrzeć* ‘die’	*zabijać/zabić* ‘kill’ [*morzyć* (archaic) ‘make/let die slowly’]	–
3 AWAKE	*budzić/o-*, *z-budzić* ***się*** ‘awake’	*budzić/o-*, *z-budić* ‘wake up’	A
4 ASLEEP	***usypiać****/usnąć* ‘fall asleep’ [durative: *spać* ‘sleep’]	***usypiać****/uśpić* ‘put to sleep’	(L)
5 BEGIN	*zaczynać/zacząć* ***się*** ‘begin’ *rozpoczynać/rozpocząć* ***się*** ‘begin’	*zaczynać/zacząć* ‘begin’ *rozpoczynać/rozpocząć* ‘begin’	A
6 END	*kończyć/skończyć* ***się*** ‘end’	*kończyć/skończyć* ‘end’	A
7 OPEN	*otwierać/otworzyć* ***się*** ‘open’ *odmykać/odemknąć* ***się*** ‘open’	*otwierać/otworzyć* ‘open’ *odmykać/odemknąć* ‘open’	A
8 CLOSE	*zamykać/zamknąć* ***się*** ‘close’	*zamykać/zamknąć* ‘close’	A
9 SCARED	*prze-*, *wy-straszać/straszyć* ***się*** ‘get frightened’ [durative: *bać się* ‘fear, be afraid’]	*(wy-)straszać/straszyć* ‘frighten scare’	A
10 ANGRY	*roz-złościć* ***się*** ‘get angry’ *roz-gniewać* ***się*** ‘get angry’	*roz-złościć* ‘make angry, furious’ *roz-gniewać* ‘make angry’	A
11 HAPPY	*cieszyć/ucieszyć* ***się*** ‘be/get happy’	*cieszyć/ucieszyć* ‘make happy’	A
12 LAUGH	*roze-śmiać* ***się*** ‘start laughing’ *śmiać* ***się*** ‘laugh’	*roz-śmieszać/roz-śmieszyć* ‘make laugh; amuse’	–
13 MELT	*topić/roztopić* ***się*** ‘melt’ *roztapiać/roztopić* ***się*** ‘melt’ ***top-nie-ć*** ‘melt’ [*tajać* ‘melt (of snow)’]	*topić/roztopić* ‘melt’ *roztapiać/roztopić* ‘melt’	M (A/E)
14 AFIRE	*zapalać/zapalić* ***się*** ‘start burning’ [durative: *palić*, *spalać/spalić się* ‘burn’]	*za-, roz-palać/palić* ‘set on fire’ [*palić*, *spalać/spalić* ‘burn’]	A
15 BOIL	*zagotowywać/zagotować* ***się*** ‘come to boil’ [*zawrzeć* ‘come to boil’] [durative: *gotować się* ‘boil’]	*zagotowywać/zagotować* ‘bring to boil’ [*gotować/ugotować* ‘boil’]	A
16 BREAK	*łamać/złamać* ***się*** ‘break’ *tłuc/stłuc* ***się*** ‘break, shatter’	*łamać/złamać* ‘break’ *tłuc/stłuc* ‘break, shatter’	A
17 GATHER	*zbierać/zebrać* ***się*** ‘gather’ *zgromadzać/zgromadzić* ***się*** ‘gather; come together’	*zbierać/zebrać* ‘gather, collect’ *zgromadzać/zgromadzić* ‘gather (in great amount)’	A

18 DISPERSE	*rozproszać/rozproszyć* ***się*** ‘disperse’ [*rozchodzić/rozejść się* ‘disperse’]	*rozproszać/rozproszyć* ‘disperse, scatter’	A
19 VANISH	[*znikać/zniknąć* ‘vanish’ *zanikać/zaniknąć* ‘vanish’ *ginąć/zginąć* ‘disappear; get lost’]	[*tracić/stracić* ‘lose’ *(gubić/)zgubić* ‘lose’]	–
20 CHANGE	*zmieniać/zmienić* ***się*** ‘change’	*zmieniać/zmienić* ‘change’	A

Russian (perfective/imperfective)

No., label	Intransitive (inchoative)	Transitive (causative)	Type
1 BIRTH	*rožd**at’-sja/**rodit’-sja/*** ‘be born’	*rožd**at’/**rodit’*** ‘give birth’	A
2 DEATH	[*umirat’/umeret’* ‘die’]	[*ubivat’/ubit’* ‘kill’] [*(u-)mor-**i**-t’* ‘kill (with poison/by starving etc.’)]	–
3 AWAKE	*prosnut’**sja/**prosypat’**sja*** ‘awake’	*(raz-)budit’* ‘wake up’	–
4 ASLEEP	[*usnut’* ‘fall asleep’ *zasnut’/zasypat’* ‘fall asleep’] [durative: *spat’* ‘sleep’]	[*usypit’/usypljat’* ‘put to sleep’]	–
5 BEGIN	*načinat’-**sja/**načat’-**sja*** ‘begin’	*načinat’/načat’* ‘begin’	A
6 END	*zakančivat’-**sja**/zakončit’-**sja*** ‘end’	*zakančivat’/zakončit’* ‘end’	A
7 OPEN	*otkryvat’-**sja/**otkryt’-**sja*** ‘open’	*otkryvat’/otkryt’* ‘open’	A
8 CLOSE	*zakryvat’-**sja/**zakryt’-**sja*** ‘close’	*zakryvat’/zakryt’* ‘close’	A
9 SCARED	*is-pugat’-**sja*** ‘get scared, startle’ [durative: *bojat’-**sja*** ‘fear, be afraid’; *pugat’-**sja*** ‘shy’]	*(is-)pugat’* ‘scare, startle’	A
10 ANGRY	*razo-zlit’-**sja*** ‘get angry’ [durative: *zlit’-**sja*** ‘be angry’]	*(razo-)zlit’* ‘make angry’	A
11 HAPPY	*radovat’-**sja*** ‘be/get happy’	*radovat’* ‘make happy’	A
12 LAUGH	*smejat’-**sja*** ‘laugh’	*(raz-)smešit’* ‘make laugh’	–
13 MELT	*(ras-)topit’-**sja*** ‘melt’ (of wax, butter) *(ras-)plavit’-**sja*** ‘melt’ (of metal) [(*ras-*)*taja-t’* ‘melt’ (of snow, butter, wax)]	*(vy-/ras-)topit’* ‘melt’ (of wax, butter) *(vy-/ras-)plavit’* ‘melt’ (of metal)	A
14 AFIRE	*zažeč’-**sja/**zažigat’-**sja*** ‘catch fire’ *zagorat’-**sja/**zagoret’-**sja*** ‘start burning’ [durative: *goret’* ‘burn’]	*zažeč’/zažigat’* ‘set on fire’ [*sžigat’/(s-)žeč’* ‘burn’]	A

15 BOIL	*za-/vs-kipat'/vs-/za-kipet' vskipjatit'-**sja***	*vskipjatit'* 'bring to boil'	A
	[durative: *kipet'* 'boil' *varit'-**sja*** 'boil, be boiling']	[*varit'* 'boil, keep boiling' *kipjatit'* 'boil']	
16 BREAK	*(s-)lomat'-**sja*** 'break'	*(s-)lomat'* 'break'	A
17 GATHER	*sobirat'-**sja**/sobrat'-**sja*** 'gather'	*sobirat'/sobrat'* 'gather, collect'	A
18 DISPERSE	*rasseivat'-**sja**/rassejat'-**sja*** 'disperse, scatter'	*rasseivat'/rassejat'* 'disperse, scatter'	A
19 VANISH	*(po-)terjat'-**sja*** 'get lost' [*propadat'/propast'* 'disappear, get lost']	*(po-)terjat'* 'lose'	A
20 CHANGE	*izmenit'-**sja**/(iz-)menjat'-**sja*** 'change'	*izmenit'/(iz-)menjat'* 'change'	A

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