Modelling the causative-inchoative alternation

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Abstract.

The causative-inchoative alternation has traditionally been modelled in terms of the *causativization* of inchoative verbs. I argue that this analysis conflicts with the way the causative-inchoative alternation is predominantly expressed crosslinguistically, which would sooner suggest that the causative-inchoative alternation involves the *decausativization* of causative-inchoative verbs. After considering two further models for the causative-inchoative alternation (that of Parsons (1990) and Levin and Rappaport Hovav (1995)) and finding them wanting as well, I propose a new model (the *Y-model*) that derives the meaning of a causative-inchoative verb and its inchoative counterpart from the meaning of their shared verb stem. The Y-model does justice both to the morphological facts of the causative-inchoative alternation and to the idea that an inchoative verb is a decausative (or more precisely: a *deagentive*) version of its causative-inchoative counterpart.

1   Introduction

The *causative-inchoative alternation* is traditionally said to be a lexical causative alternation.[1] In what follows, I will speak of 'alternating pairs of verbs', or more simply of 'alternating verbs', for pairs of verbs that participate in this alternation. Such pairs consist of a transitive and an intransitive member that are semantically related in roughly the following way: the intransitive member (a.k.a. an *inchoative verb*) denotes a change of state and the transitive member (a.k.a. a *causative-inchoative verb*) denotes a bringing about of this change of state. This informal characterization can be tested against the following pairs of sentences containing alternating verbs:

(1)   (a)   Rebecca broke the pencil.

         (b)   The pencil broke.

(2)   (a)   Maria opened the door.

         (b)   The door opened.

(3)   (a)   Thomas dried the clothes.

         (b)   The clothes dried.

(4)   (a)   Rebecca killed the bear.

         (b)   The bear died.

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[1] Here I mean the typological tradition, which distinguishes between lexical, morphological, and syntactic causatives (Song 1996, chap. 1.1). Morphological and syntactic causatives are regularly marked by a special causative morpheme or predicate and are generally held to be more productive than lexical causatives.

(5)   (a)   Maria melted the butter.

        (b)   The butter melted.

(6)   (a)   The enemy sank the ship.

        (b)   The ship sank.

(7)   (a)   Thomas turned on the light.

        (b)   The light turned on.

(8)   (a)   Rebecca dissolved the aspirin.

        (b)   The aspirin dissolved.

Consider, for instance, *break* from (1) in light of the characterization just given: $break_{\text{intr}}$ denotes a change of state, namely, one in which the referent of its subject argument becomes broken, and $break_{\text{tr}}$ denotes a bringing about of this change of state, namely, one in which the referent of its subject argument brings it about that the referent of its object argument becomes broken.[2] The remaining pairs of verbs in (2)–(8) can be understood analogously. Notice that since nothing about the characterization provided requires the members of an alternating pair to be morphologically related, the pair *kill*/*die* from (3) can qualify even though the two members bear no morphological resemblance to each other. Nevertheless, even if morphological relatedness is not a necessary condition for alternating verbs to satisfy, insofar as the causative-inchoative alternation exhibits any systematicity at all in a language, it is reasonable to expect that alternating pairs will typically be morphologically related (an expectation that is overwhelmingly borne out).

1.1   The traditional model

The central question that the causative-inchoative alternation raises is how the two members of an alternating pair are related, both morphologically and semantically. Restricting our attention for the moment to English, a long-standing idea is that the causative-inchoative verb is derived from its inchoative counterpart via zero derivation, the semantic effect of which is a 'causative operation' that introduces an agentive subject. I will refer to this idea as the *traditional model* of the causative-inchoative alternation. Lyons (1969, chap. 8.2.8), for example, advocates the traditional model, though he speaks of 'zero modification' instead of zero derivation. According to the traditional model, $break_{\text{tr}}$ is derived from $break_{\text{intr}}$ by zero derivation and concomitantly acquires a causative component that the latter lacks. Lexicalized pairs such as *kill*/*die*, although exceptional morphologically in not being related by zero derivation, nevertheless fit the pattern semantically in that *kill* is semantically derived from *die* via the causative operation. According to the traditional model, then, a causative-inchoative verb is generally more complex than its in-

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[2] I will make use of the following subscripts: `intr` = intransitive | `tr` = transitive | `incho` = inchoative | `caus-incho` = causative-inchoative | `stat` = stative | `adj` = adjective | `past-part` = past participle.

$$\boxed{\text{Adj}_{\texttt{stat}}} \dashrightarrow \boxed{\text{V}_{\texttt{incho}}} \dashrightarrow \boxed{\text{V}_{\texttt{caus-incho}}}$$
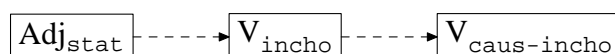
Figure 1: The traditional model

choative counterpart, both morphologically (assuming that zero derivation adds some minimal complexity that the underived form lacks) and semantically (given that the causative-inchoative verb includes a causative component that its inchoative partner lacks).

A natural extension of the traditional model is to take the meaning of the inchoative verb to be semantically based on the meaning of a corresponding stative adjective, given that the inchoative verb denotes a change of state. For example, just as $break_{\texttt{tr}}$ is semantically derived from $break_{\texttt{intr}}$ by means of a causative operation, $break_{\texttt{intr}}$ could in turn be semantically derived from $broken_{\texttt{adj}}$ with the help of a 'change-of-state operation'. This extension of the traditional model accords well with the idea once argued for by Kenny (1963, p. 177) that "[p]erformances are brought to an end by states." If, following Kenny's proposal, breaking the pencil is bringing it about that the pencil is broken, and if, following the traditional model of the causative-inchoative alternation, $break_{\texttt{tr}}$ is derived from $break_{\texttt{intr}}$ by means of a causative operation, then a straightforward way of combining these two ideas is to treat breaking the pencil as bringing it about the pencil breaks and the pencil's breaking in turn as a coming about that the pencil is broken.[3]

In sum, the traditional model can be depicted as in Figure 1, where the dashed arrows indicate the direction of semantic derivation. Beginning with a stative adjective, e.g., $open_{\texttt{adj}}$, a change-of-state operation applies to yield $open_{\texttt{intr}}$, and then a causative operation applies to produce $open_{\texttt{tr}}$.

It is fair to say that variations on the traditional model have by and large dominated analyses of the causative-inchoative alternation in the past. Recall the early generative semantic accounts in which the causative-inchoative verb was derived from a more complex underlying structure (one that included a causative predicate) than its inchoative counterpart. The verb $open_{\texttt{tr}}$, for instance, was derived from an underlying structure containing the amalgamation of predicates (CAUSE (BECOME (NOT CLOSED))), whereas $open_{\texttt{intr}}$ was derived from a simpler structure containing the amalgamation (BECOME (NOT CLOSED)). In such analyses, the predicates BECOME and CAUSE clearly correspond to a change-of-state operation and a causative operation, respectively. Furthermore, the greater morphological complexity of the causative-inchoative verb can be seen as correlating with its greater underlying syntactic complexity (for more on

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[3] Since Kenny does not discuss the causative-inchoative alternation, it is unclear whether he would consider something like the pencil's breaking a performance, although possibly not, because it is not agentive. Even so, he does suggest (pp. 177–178) that a performance may be the bringing about of another performance and that an event such as growing up (presumably not agentive) may be considered a performance.

the generative semantic approach, see Shibatani 1976).

Another instance of the traditional model is Dowty's (1979, chap. 4.3) decompositional analysis, which is similar in spirit to (though at the same time more explicit than) Lyons's. Dowty posits a special 'causative rule' (his S24, T24) that derives transitive verbs from intransitive verbs and whose semantic effect is to add a predicate CAUSE to the representation of the former. Taking *open* again, the causative rule states that given $open_{\text{intr}}$, there is a verb $open_{\text{tr}}$, and the corresponding translation rule states that the representation of $open_{\text{tr}}$ includes a predicate CAUSE. While it might be argued that in Dowty's approach the causative-inchoative verb strictly speaking need not be more complex morphologically than its inchoative counterpart (but see his fn. 6 on p. 206), it is nevertheless clear that the causative-inchoative verb is derived from its inchoative counterpart with the help of a syntactic rule. Dowty also proposes a rule (his S23, T23) that derives inchoative verbs (e.g., $open_{\text{intr}}$) from stative adjectives (e.g., $open_{\text{adj}}$) and whose semantic effect is to add a predicate BECOME to the representation of the former. As Dowty himself admits (p. 207), these two rules have many exceptions (e.g., no *$disappear_{\text{tr}}$ from $disappear_{\text{intr}}$ via the causative rule) and so he later (chap. 6) considers them to have the status of lexical redundancy rules.

1.2 Questioning the traditional model

The traditional model of the causative-inchoative alternation as depicted in Figure 1 is conceptually neat and seems eminently plausible at first. However, there is a robust consideration that speaks against it. Insofar as it is an essential feature of the causative-inchoative alternation that the causative-inchoative verb is semantically derived from its inchoative counterpart, we should expect languages with richer morphologies to generally confirm this direction of derivation (at least for alternating pairs that—unlike *kill*/*die*—are morphologically related). In order to see whether this expectation tends to be fulfilled, I will briefly consider how the sentences in (1)–(8) are rendered into German, Hungarian, and Polish. The conclusion that emerges from this little survey is that the morphology often reveals that a causative-inchoative verb is *not* morphologically derived from its inchoative counterpart, and this suggests that the traditional model is problematic as a model of the causative-inchoative alternation.

It is common for languages to use a reflexive marker (pronoun or affix) to signal the inchoative member of an alternating pair of verbs. In German, for example, the inchoative verb is either marked by the reflexive pronoun *sich* or (as in English) not marked at all.[4]

(9)   (a)   Rebecca zerbrach den Bleistift. $zerbrechen_{\text{tr}}$

          Rebecca broke   the pencil

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[4] The following abbreviations appear in the glosses: REFL = reflexive | SEP-PREF = separable prefix.

(b) Der Bleistift zerbrach.   zerbrechen$_{intr}$
the pencil   broke

(10) (a) Maria öffnete die Tür.   öffnen
Maria opened the door

(b) Die Tür öffnete sich.   sich öffnen
the door open   REFL

(11) (a) Thomas trocknete die Kleider.   trocknen$_{tr}$
Thomas dried   the clothes

(b) Die Kleider trockneten.   trocknen$_{intr}$
the clothes dried

(12) (a) Rebecca tötete den Bären.   töten
Rebecca killed the bear

(b) Der Bär starb.   sterben
the bear died

(13) (a) Maria schmolz die Butter.   schmelzen$_{tr}$
Maria melted   the butter

(b) Die Butter schmolz.   schmelzen$_{intr}$
the butter melted

(14) (a) Der Feind versenkte das Schiff.   versenken
the enemy sank   the ship

(b) Das Schiff sank.   sinken
the ship   sank

(15) (a) Thomas schaltete das Licht ein.   einschalten
Thomas turned   the light SEP-PREF
'Thomas turned the light on.'

(b) Das Licht schaltete sich ein.   sich einschalten
the light turned   REFL SEP-PREF
'The light turned on.'

(16) (a) Rebecca löste   das Aspirin auf.   auflösen
Rebecca dissolved the aspirin SEP-PREF

(b) Das Aspirin löste   sich auf.   sich auflösen
the aspirin dissolved REFL SEP-PREF

Of these pairs, the verbs *töten*/*sterben* 'kill/die' in (12) are not morphologically related and *versenken*/*sinken* 'sink$_{tr}$/sink$_{intr}$' are only diachronically related.[5] *Sich* marks the inchoative

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[5] *Versenken* 'sink$_{tr}$' is a prefixed form of *senken* 'sink$_{tr}$', which is in turn a causative form of *sinken* 'sink$_{intr}$'.

verb in three of the remaining six pairs. These data suggest two conclusions. The first is that *sich* does not function purely as a marker of inchoative verbs—its (non)appearance seems to be determined by other factors as well.[6] The second is that *sich* (when it appears) derives an inchoative verb from a causative-inchoative one, and yet this is at odds with the claim made by the traditional model that the order of semantic derivation is precisely the other way around.

Alternating verbs in Hungarian are always distinguished morphologically, but not always in the same way, as the following examples demonstrate:

(17) (a) Rebecca eltörte a   ceruzát. eltör
           Rebecca broke the pencil

      (b) A   ceruza eltört. eltörik[7]
           the pencil broke

(18) (a) Maria kinyitotta az ajtót. kinyit
           Maria opened   the door

      (b) Az ajtó kinyílt. kinyílik
           the door opened

(19) (a) Thomas megszárította a   ruhát. megszárít
           Thomas dried   the clothes

      (b) A   ruha   megszáradt. megszárad
           the clothes dried

(20) (a) Rebecca megölte a   medvét. megöl
           Rebecca killed   the bear

      (b) A   medve meghalt. meghal
           the bear   died

(21) (a) Maria megolvasztotta a   vajat. megolvaszt
           Maria melted   the butter

      (b) A   vaj megolvadt. megolvad
           the butter melted

(22) (a) Az ellenség elsüllyesztette a   hajót. elsüllyeszt
           the enemy   sank   the ship

      (b) A   hajó elsüllyedt. elsüllyed
           the ship sank

However, the *i/e* vowel alternation witnessed here is no longer productive.

[6] Oya (1996) claims that *sich* is the default marker of inchoative verbs in German but that it is incompatible with three types of situations: those that arise by themselves, motion events, and punctual events. In these cases, according to Oya, *sich* is not allowed to appear. Although I cannot discuss Oya's proposal here, I agree with him that the role of *sich* in the causative-inchoative alternation is to signal something more than just inchoativity.

[7] The suffix *-ik* shows up in the present tense: *A ceruza eltörik* 'The pencil breaks'.

(23) (a) Thomas felgyújtotta a   villanyt.   felgyújt
         Thomas turned-on   the light

    (b) A   villany felgyúlt/felgyulladt.   felgyúl, felgyullad[8]
         the light   turned-on

(24) (a) Rebecca feloldotta az aszpirint.   felold
         Rebecca dissolved the aspirin

    (b) Az aszpirin feloldódott.   feloldódik
         the aspirin   dissolved

The pair *megöl*/*meghal* 'kill/die' in (20) is not morphologically related (discounting the shared perfective preverb *meg*). The pairs *eltör*/*eltörik* 'break$_{tr}$/break$_{intr}$' and *felold*/*feloldódik* 'dissolve$_{tr}$/dissolve$_{intr}$' are the only ones in which the inchoative verb is morphologically derived from its causative-inchoative counterpart by means of a suffix. In the remaining five pairs, both the inchoative verb and the causative-inchoative verb seem to be derived from a common verb stem. Consider, for instance, the pair *megszárít*/*megszárad* 'dry$_{tr}$/dry$_{intr}$' from (19): here *szár-* is the morphologically bound verb stem, *-ít* is a transitivizing suffix, *-ad* is an intransitivizing suffix, and *meg* is (as mentioned above) a perfective preverb. Although some of the other pairs (e.g., *felgyújt* 'turn on$_{tr}$' vs. *felgyúl*/*felgyullad* 'turn on$_{intr}$' in (23)) are less transparent due to certain morphophonological effects, the pattern is basically the same: such alternating verbs are both derived from a common verb stem.

It is evident that the Hungarian data also do not square with the traditional model, which leads us to expect that causative-inchoative verbs should be systematically derived from their inchoative counterparts. Notice, incidentally, that the Hungarian data also emphasize the lexical character of the causative-inchoative alternation, because the particular choice of suffix is determined in large part by the lexical item (or stem) that we begin with.

Polish generally uses the reflexive clitic pronoun *się* to distinguish inchoative verbs from their causative-inchoative counterparts, as seen in the next set of examples. Like in Hungarian but unlike in English and German, alternating verbs in Polish are always morphologically distinct.

(25) (a) Rebecca złamała ołówek.   złamać
         Rebecca broke   pencil
         'Rebecca broke the pencil.'

    (b) Ołówek złamał się.   złamać się
         pencil   broke   REFL
         'The pencil broke.'

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[8] In this case there are two equally plausible inchoative verbs.

(26) (a) Maria otworzyła drzwi.   otworzyć
          Maria opened   door
          'Maria opened the door.'

     (b) Drzwi otworzyły się.   otworzyć się
          door   opened   REFL
          'The door opened.'

(27) (a) Thomas wysuszył ubranie.   wysuszyć
          Thomas dried   clothes
          'Thomas dried the clothes.'

     (b) Ubranie wysuszyło się.   wysuszyć się
          clothes   dried   REFL
          'The clothes dried.'

(28) (a) Rebecca zabiła niedźwiedzia.   zabić
          Rebecca killed bear
          'Rebecca killed the bear.'

     (b) Niedźwiedź umarł.   umrzeć
          bear   died
          'The bear died.'

(29) (a) Maria roztopiła masło.   roztopić
          Maria melted   butter
          'Maria melted the butter.'

     (b) Masło roztopiło się.   roztopić się
          butter melted   REFL
          'The butter melted.'

(30) (a) Wróg   zatopił statek.   zatopić
          enemy sank   ship
          'The enemy sank the ship.'

     (b) Statek zatonął.   zatonąć
          ship   sank
          'The ship sank.'

(31) (a) Thomas zapalił   światło.   zapalić
          Thomas turned-on light
          'Thomas turned on the light.'

     (b) Światło zapaliło   się.   zapalić się
          light   turned-on REFL
          'The light turned on.'

(32)   (a)   Rebecca rozpuściła aspirynę.   rozpuścić

Rebecca dissolved aspirin

'Rebecca dissolved the aspirin.'

(b)   Aspiryna rozpuściła się.   rozpuścić się

aspirin   dissolved REFL

'The aspirin dissolved.'

The pairs *zabić/umrzeć* 'kill/die' in (28) and *zatopić/zatonąć* 'sink$_{tr}$/sink$_{intr}$' in (30) are not morphologically related (discounting the shared perfective prefix *za-* in the latter), but in the remaining examples the inchoative verb is derived from its causative-inchoative counterpart by the addition of *się*.

In sum, the problem with the traditional model is that it seems much more appropriate as a model of *causativization* than it is of *decausativization*. And yet—as the data from German, Hungarian, and Polish lead us to think—the causative-inchoative alternation seems to be more about (or at least no less about) decausativization than it is about causativization, and so the traditional model does not really offer what we are looking for.

Nevertheless, a typologist might judge this conclusion as premature. Haspelmath (1993) presents the results of a survey of 31 alternating pairs of verbs in 21 languages. He finds that although the predominant tendency is indeed for inchoative verbs to be derived from their causative-inchoative counterparts, certain languages (e.g., Hindi/Urdu, Khalkha Mongolian, and Turkish) strongly favor a causativization strategy. In Khalkha Mongolian, for example, the causative-inchoative verb *xajl-uul-ax* 'melt$_{tr}$' is derived from its inchoative counterpart *xajl-ax* 'melt$_{intr}$' by the addition of the (causative?) affix *-uul*. The existence of such languages might equally well lead us to conclude that the traditional model is quite appropriate for Khalkha Mongolian, even if it is not so for German, Hungarian, or Polish.

More precisely, Haspelmath classifies alternating pairs as belonging to one of five types on the basis of their surface morphology. In the *causative* alternation, the inchoative verb is basic and its causative-inchoative counterpart is derived. Haspelmath finds this to be the second most frequent pattern crosslinguistically and—as just mentioned—to be characteristic of Indonesian, Khalkha Mongolian, and Turkish. In the *anticausative* alternation, in contrast, the causative-inchoative verb is basic and the inchoative verb is derived. As stated above, this is the predominant pattern in Haspelmath's survey and is characteristic of German and Polish. In *equipollent* alternations, both the causative-inchoative verb and its inchoative counterpart are derived from a common stem. This is the third most frequent pattern in Haspelmath's survey and is characteristic of Hungarian (and Georgian and Japanese). In *suppletive* alternations, different verbs are used, e.g., *kill/die* in English. Most languages have a few suppletive alternations, but they are not characteristic of any language in Haspelmath's survey. Finally, in *labile* alternations,

the same verb form is used for both the causative-inchoative verb and the inchoative verb, as is characteristic of English. Haspelmath finds this to be the fourth most frequent pattern (largely due to English).

Confronted with this diversity in how the causative-inchoative alternation is expressed, the mere fact that certain languages prefer a causativization strategy is not a persuasive enough reason for us to adopt the traditional model. After all, it is not the predominant strategy crosslinguistically, and so it would be preferable to adopt a model that allows for more flexibility in how the causative-inchoative alternation is expressed and that does not conflict with every language that does not fit the causativization mold. In particular, a viable model of the causative-inchoative alternation should allow us to make sense of anticausative and equipollent alternations as well (to use Haspelmath's terminology). Such a model is what we are looking for, and with this background in mind I now turn to a critical review of two alternatives to the traditional model.

2 Two leading analyses

In this section I will present a critique of two leading analyses of the causative-inchoative alternation. These two analyses are due to Parsons (1990, chap. 6) and Levin and Rappaport Hovav (1995, chap. 3), respectively. This critique will pave the way for my own analysis in section 3.

2.1 Parsons's model

For present purposes it is unfortunate that Parsons really only analyzes sentences and not verbs. While this is a shortcoming of his account, I will not attempt to extend his treatment to cover verbs. This having been said, let's consider how he analyzes simple sentences containing alternating verbs.

Parsons's analyses are cast in an event semantic framework with thematic relations that presupposes an ontological distinction between events (which include processes) and states. The two schemas for sentences with inchoative and causative-inchoative verbs are as follows, where *Adj* is a stative predicate constant:[9]

(33)   (a)   Schema for sentences with an inchoative verb:

$$\exists e[\textit{Theme}(e,x) \wedge \exists s[\textit{Being-}\underline{\textit{Adj}}(s) \wedge \textit{Theme}(s,x) \wedge \textit{Become}(e,s)]]$$

      (b)   Schema for sentences with a causative-inchoative verb:

$$\exists e[\textit{Agent}(e,x) \wedge \exists e'[\textit{Theme}(e',y) \wedge \textit{Cause}(e,e')\exists s[\textit{Being-}\underline{\textit{Adj}}(s) \wedge$$
$$\textit{Theme}(s,y) \wedge \textit{Become}(e,s)]]]$$

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[9] In (33) I suppress Parsons's aspectual predicates '*Cul*' and '*Hold*' because they are not relevant to the present discussion.

As seen in (33a), the meaning of a simple sentence containing an inchoative verb (schematically, $x\,V_{\texttt{incho}}$) asserts that x is the theme of an event e that 'becomes' (i.e., leads to or results in) a 'target state' s of type *Being-<u>Adj</u>* whose theme is also x. And, as shown in (33b), the meaning of its causative-inchoative counterpart (schematically, $x\,V_{\texttt{caus-incho}}\,y$) asserts that x is the agent of an event e that causes an event e' of which y is the theme and which 'becomes' a 'target state' of type *Being-<u>Adj</u>* whose theme is y. As an illustration, the schemas in (33) yield the following analyses of *break*$_{\texttt{incho}}$ and *break*$_{\texttt{caus-incho}}$ in terms of *broken*$_{\texttt{adj}}$:

(34)　(a)　x break$_{\texttt{incho}}$:
$$\exists e[\textit{Theme}(e,x) \wedge \exists s[\textit{Being-Broken}(s) \wedge \textit{Theme}(s,x) \wedge \textit{Become}(e,s)]]$$

　　　(b)　x break$_{\texttt{caus-incho}}$ y:
$$\exists e[\textit{Agent}(e,x) \wedge \exists e'[\textit{Theme}(e',y) \wedge \textit{Cause}(e,e') \wedge \exists s[\textit{Being-Broken}(s) \wedge$$
$$\textit{Theme}(s,y) \wedge \textit{Become}(e,s)]]]$$

At first glance, Parsons's analysis of the causative-inchoative alternation seems to be an event semantic implementation of the traditional model. Although Parsons is not explicit about derivations, it is easy to understand him as claiming that an inchoative verb is derived from its corresponding adjective (by the addition of *Become*) and that a causative-inchoative verb is derived in turn from its related inchoative verb (by the addition of *Cause*). Indeed, it is clear that his analysis validates the entailment from the meaning of a causative-inchoative verb to the meaning of its inchoative counterpart, just as the traditional analysis does:

(35)　Given $V_{\texttt{caus-incho}}$ and $V_{\texttt{incho}}$, it follows that if $x\,V_{\texttt{caus-incho}}\,y$, then $y\,V_{\texttt{incho}}$.

However, there is reason to think that Parsons does not really intend to implement the traditional model. One problem that he mentions in passing (chap. 6.8) is that there are a number of cases in which a causative-inchoative verb and its related adjective exist but the corresponding inchoative verb is missing.[10] The examples that he lists (chap. 13.3.10) are the following (where the '*' signals that the respective verb is missing):

(36)　(a)　alert$_{\texttt{tr}}$/alert$_{\texttt{adj}}$, *alert$_{\texttt{intr}}$　(alert$_{\texttt{tr}}$ the burglar)

　　　(b)　dirty$_{\texttt{tr}}$/dirty$_{\texttt{adj}}$, *dirty$_{\texttt{intr}}$　(dirty$_{\texttt{tr}}$ the rug)

　　　(c)　fatten$_{\texttt{tr}}$/fat$_{\texttt{adj}}$, *fatten$_{\texttt{intr}}$　(fatten$_{\texttt{tr}}$ the cattle)

　　　(d)　flatten$_{\texttt{tr}}$/flat$_{\texttt{adj}}$, *flatten$_{\texttt{intr}}$　(flatten$_{\texttt{tr}}$ the pillow)

　　　(e)　load$_{\texttt{tr}}$/loaded$_{\texttt{adj}}$, *load$_{\texttt{intr}}$　(load$_{\texttt{tr}}$ the wagon)

　　　(f)　load$_{\texttt{tr}}$/loaded$_{\texttt{adj}}$, *load$_{\texttt{intr}}$　(load$_{\texttt{tr}}$ the hay)

　　　(g)　randomize$_{\texttt{tr}}$/random$_{\texttt{adj}}$, *randomize$_{\texttt{intr}}$　(randomize$_{\texttt{tr}}$ the digits)

　　　(h)　wet$_{\texttt{tr}}$/wet$_{\texttt{adj}}$, *wet$_{\texttt{intr}}$　(wet$_{\texttt{tr}}$ the towel)

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[10] Parsons (1990, p. 120): "Causative-Inchoatives are transitive verbs that are derived from a related adjective with the 'cause to become ADJ' meaning. There may or may not be an inchoative intransitive verb 'between' the adjective and the transitive verb."
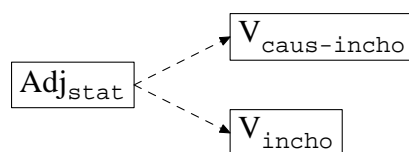
Figure 2: Parsons's model

If causative-inchoatives are derived from their inchoative counterparts (as the traditional model claims), then it is puzzling why some causative-inchoative verbs lack a corresponding inchoative verb. Parsons's strategy is to derive both causative-inchoative verbs and inchoative verbs directly from the related adjectives. I will refer to this strategy as *Parsons's model* and depict it as in Figure 2, where the dashed arrows again stand for the direction of semantic derivation.

While the missing inchoative verbs in (36) are indeed problematic for the traditional model, they do not receive an explanation in Parsons's approach either. Parsons's model does have the advantage of not requiring the causative-inchoative verb to be derived from its inchoative counterpart, but at the same time it says nothing about why the inchoative verbs in (36) are missing. In other words, Parsons's model needs to be amended by an account of why the gaps in (36) arise with the inchoative verbs and not with the causative-inchoative verbs.

Parsons is in fact uncritical about the status of the missing inchoative verbs in (36). However, it seems to me that they are not all equally odd and that a kind of blocking effect may be at work with some of the examples. Consider, for instance, the verb $dirty_{intr}$ in (36b). First of all, *Merriam Webster's Collegiate Dictionary* actually lists an intransitive verb $dirty_{intr}$ with the meaning 'to become soiled', which suggests that it is at least a possible verb for certain speakers. Second, although a sentence such as (37a) does sound somewhat odd at first, it is nevertheless quite intelligible and at least part of its oddness seems to stem from the fact that it is preferable to use the combination of *get* and $dirty_{adj}$ instead, as seen in (37b).[11]

(37)   (a) ?The rug dirtied.

       (b) The rug got dirty.

Finally, the third point is that other languages often do have an intransitive verb corresponding to $dirty_{intr}$. Hungarian, for example, has an inchoative verb *bepiszkolódik* '$dirty_{intr}$' that is derived from its causative-inchoative counterpart *bepiszkol* '$dirty_{tr}$':

(38)   (a) Rebecca bepiszkolta a   szönyeget.   bepiszkol
          Rebecca dirtied   the rug

       (b) A   szönyeg bepiszkolódott.   bepiszkolódik
          The rug   dirtied

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[11] Compare this with ?*The pencil got broken*, which is itself a bit odd and at any rate certainly not a substitute for *The pencil broke*.

Thus, it is questionable whether an analysis of the causative-inchoative alternation really should rule out an inchoative verb *dirty*$_{\text{intr}}$. And if it should not, then this particular example provides only rather weak support for Parsons's model. Other verbs from (36) that are listed by *Merriam Webster* as having an inchoative use are *fatten*$_{\text{intr}}$ (see (36c)), *flatten*$_{\text{intr}}$ (see (36d)), and *wet*$_{\text{intr}}$ (see (36h)).

Whatever the exact status of such examples, several of the inchoative verbs in (36) do seem problematic, namely, *alert*$_{\text{intr}}$ in (36a), the two verbs *load*$_{\text{intr}}$ in (36e) and (36f), and *randomize*$_{\text{intr}}$ ((36g)). Since *alert*$_{\text{tr}}$ and the two verbs *load*$_{\text{tr}}$ are arguably three-place relations, they are not canonical causative-inchoative verbs and may therefore require special treatment. This leaves *randomize*$_{\text{intr}}$:

(39)   (a)   Thomas randomized the numbers.

          (b) *The numbers randomized.

My aim here has not so much been to explain away the examples in (36) as to sort them. In fact, there are a number of clear cases in which a causative-inchoative verb lacks an inchoative counterpart, and such contrasts serve as the main motivation behind Levin and Rappaport Hovav's analysis, as we will see:

(40)   (a)   Rebecca broke her promise.

          (b) *Her promise broke.

(41)   (a)   Maria cracked the secret code.

          (b) *The secret code cracked.

(42)   (a)   The baby dirtied his diapers.

          (b) *His diapers dirtied.

In view of the entailment pattern in (35), Parsons's model remains oddly incomplete: if the meaning of a causative-inchoative verb always entails the meaning of its inchoative counterpart, then it is quite unclear why the inchoative verb should sometimes be missing (in (39)–(42), for example). After all, it should have a perfectly sensible meaning—it should have as its meaning part of what the causative-inchoative verb means. Indeed, given the entailment pattern in (35), not deriving the causative-inchoative verb directly from its inchoative counterpart is in fact less economical, because both the rule deriving causative-inchoative verbs and the one deriving inchoative verbs have to introduce the change-of-state predicate *Become*. In deriving both the causative-inchoative verb and the inchoative verb from the related adjective, Parsons does not resolve but really only *postpones* the question of why the inchoative verb is not always available.

Even if my conclusion is that Parsons's analysis is both incomplete and contains an awkward redundancy, the branching postulated by his model constitutes an interesting twist on the traditional model and is an idea that I will adopt—albeit in a rather different form—in my analysis in section 3. It is hard to doubt on morphological grounds that the causative-inchoative verbs

*fatten*_{tr}, *flatten*_{tr}, and *randomize*_{tr} in (36) are derived from the adjectives *fat*, *flat*, and *random*, respectively (e.g., see Marchand 1969, pp. 271, 320 on *-ize* and *-en*), and so this speaks against the traditional model and in favor of Parsons's model.[12] Parsons's model also has the potential advantage of offering a more straightforward account of the apparent derivation of an inchoative verb from its causative-inchoative counterpart (or of what Haspelmath calls anticausative alternations) in that the inchoative verb would actually be derived from the related adjective. For example, Parsons could say that one function of the reflexive clitic *się* in Polish is to derive inchoative verbs from adjectives. At the same time, though, it must be emphasized that this would also be a rather unnatural thing to say about a reflexive clitic, for *się* would have to both be morphologically category-changing (adjective to verb) and semantically contribute a change-of-state predicate (*Become*)—an altogether improbable scenario for a reflexive clitic. Faced with this situation, the challenge is to correct Parsons's model so that we can construct a more plausible analysis of how inchoative verbs are derived.

2.2 Levin and Rappaport Hovav's model

Levin and Rappaport Hovav (1995, chap. 3) present an analysis of the causative-inchoative alternation in which a causative-inchoative verb and its inchoative counterpart have the same lexical semantic representation, one that is both causative and dyadic, as schematized in (43), where *State* is a stative predicate constant.[13]

(43)   Representation of alternating verbs:

  [[*x Do-something*] *Cause* [*y Become State*]]   (See p. 94)

For example, this schema yields the following analysis for *break*:

(44)   x break_{caus-incho} y | y break_{incho}:

  [[*x Do-something*] *Cause* [*y Become Broken*]]   (See pp. 83, 94)

According to Levin and Rappaport Hovav, an inchoative verb is derived from its causative-inchoative counterpart by means of a rule of detransitivization. I will refer to this idea as *Levin and Rappaport Hovav's model* and depict it as in Figure 3. Notice that, compared to the traditional model, the order of derivation between causative-inchoative and inchoative verbs is reversed.

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[12] Marchand (1969, p. 320) observes that there are very few intransitive verbs with *-ize* that are derived from adjectives. His examples are *americanize*, *classicize*, *generalize*, *medievalize*, *moralize*, and *tranquillize*. I doubt that any of these verbs are bona fide inchoative verbs when used intransitively (*moralize* cannot even denote a change of state). For example, *americanize*_{intr} as in *Europe is americanizing* appears to mean 'Europe is acquiring American traits' or 'Europe is becoming more American' rather than 'Europe is becoming American'. This accords with Marchand's statement that such verbs can be paraphrased by 'do as, act in a way characterized by *X*', where *X* is the underived form.

[13] Levin and Rappaport Hovav 1994 contains a preliminary version of their analysis. Here I rely on their later (1995) treatment.

$$\boxed{\text{Adj}_{\text{stat}}} \dashrightarrow \boxed{\text{V}_{\text{caus-incho}}} \dashrightarrow \boxed{\text{V}_{\text{incho}}}$$
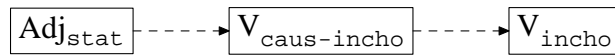
Figure 3: Levin and Rappaport Hovav's model

At first glance, Levin and Rappaport Hovav's analysis is quite extraordinary, for it appears to claim that alternating pairs of verbs, although syntactically different (given that the one is transitive and the other intransitive), are nonetheless synonymous. Indeed, it is difficult to see how two verbs with the same lexical semantic representation could not be synonymous, assuming that a difference in meaning should imply a difference in semantic representation. However, on closer inspection it is not at all obvious that alternating verbs really *do* have the same lexical semantic representation, even within Levin and Rappaport Hovav's framework of assumptions. Levin and Rappaport Hovav state that the rule of detransitivization that derives an inchoative verb consists in the 'lexical binding' of the causer argument of the causative-inchoative verb, with the consequence that the causer argument does not appear in the argument structure of the inchoative verb. In other words, although a caustive-inchoative verb and its inchoative counterpart are both causative and dyadic in their shared lexical semantic representation, they differ in valence at argument structure: whereas the causative-inchoative verb is dyadic, the inchoative verb is monadic due to the lexical binding of its causer argument.

Although Levin and Rappaport Hovav are not explicit about what the semantic correlate of lexical binding is, at a couple of places (pp. 108, 130) they suggest that it consists in the existential binding of the causer argument. However, if we take this suggestion seriously, then a causative-inchoative verb and its inchoative counterpart are not really synonymous after all, for the meaning of the causative-inchoative verb entails the meaning of the inchoative verb but not vice versa. More precisely, if an inchoative verb is defined in terms of its causative-inchoative counterpart as in (45) (which makes explicit that the effect of lexical binding is to existentially bind the causer argument), then the (one-way) entailment pattern shown in (46) is valid, just as it is in Parsons's account (see (35)).

(45) $y\ V_{\text{incho}} \stackrel{\text{def}}{=}$ there is an x such that $x\ V_{\text{caus-incho}}\ y$

(46)   Given $V_{\text{caus-incho}}$ and V_{incho}, it follows that if $x\ V_{\text{caus-incho}}\ y$, then $y\ V_{\text{incho}}$.

In the face of (45), it seems extraordinary to claim, as Levin and Rappaport Hovav do, that alternating verbs have the same lexical semantic representation, because there is a clear sense in which such pairs differ in meaning. Indeed, if the semantic correlate of lexical binding is the existential binding of the causer argument, then an inchoative verb in Levin and Rappaport Hovav's analysis is for all intents and purposes semantically monadic, because it will not be possible to syntactically realize or modify its (existentially quantified) causer argument.

The strongest piece of evidence that Levin and Rappaport Hovav offer in favor of the claim that inchoative verbs are semantically dyadic comes from the possibility of modifying an inchoative verb with *by itself* (in the sense of 'without outside help'), as in (47). They suggest (p. 89) that *by itself* functions as a kind of anaphor that identifies the causer (*x* in (43)) with the theme (*y* in (43)) of inchoative verbs.

(47)   (a)   The pencil broke by itself.

      (b)   The door opened by itself.

      (c)   The clothes dried by themselves.

However, such sentences actually lack the predicted causative interpretation: (47a), for example, does not mean that the pencil broke itself (with the literal paraphrase 'The pencil did something that caused it to break'), although it should mean this if *by itself* identified the causer with the theme, as Levin and Rappaport Hovav suggest. Moreover, since there are non-inchoative intransitive verbs that can combine with *by itself* in the appropriate context, we cannot even maintain that *by itself* picks out inchoative verbs exclusively:

(48)   (a)   The baby girl stood by herself for the first time today.

      (b)   Peter walked by himself for the first time yesterday since his accident.

From these considerations I conclude that *by itself* does not show that inchoative verbs are semantically dyadic. In the absence of more convincing evidence to the contrary, I assume in fact that inchoative verbs are semantically monadic, hence they have a different semantic representation from causative-inchoative verbs, contrary to what Levin and Rappaport Hovav claim.

In principle, even if inchoative verbs are monadic, they could still be causative, with an existentially bound causer argument, following the definition in (45). Härtl (2000) addresses in detail the question of whether inchoative verbs are causative and concludes that they are not. Accepting Härtl's conclusion, Levin and Rappaport Hovav's account is doubly problematic, because it is even less clear how their mechanism of lexical binding could ever *decausativize* a causative-inchoative verb.

But setting such difficulties aside, Levin and Rappaport Hovav's prime motivation for deriving inchoative verbs from causative-inchoative verbs is the observation that the inchoative counterpart of a causative-inchoative verb is sometimes missing, as we saw in (39)–(42). They propose (p. 107) the following condition on the detransitivization of a causative-inchoative verb: "an externally caused verb can leave its cause argument unexpressed only if the nature of the causing event is left completely unspecified." For example, the idea is that $crack_{\mathrm{tr}}$ in (41) cannot be detransitivized because there is something specified about the causing event. There is perhaps something right about this, but the status of the condition is unclear, given that it is not built into their analysis. Moreover, the predicate Do-something that figures in their representa-

$$\text{Adj}_{\texttt{stat}} \dashrightarrow \text{V}_{\texttt{stem}} \begin{cases} \text{V}_{\texttt{caus-incho}} \\ \text{V}_{\texttt{incho}} \end{cases}$$
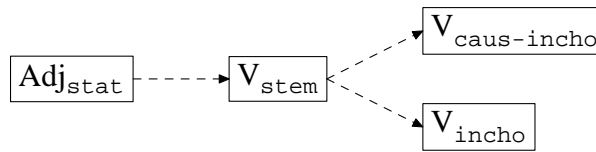
Figure 4: The Y-model

tions (see (43) and (44)) does not appear to specify much one way or the other about the causing events in question.

While Levin and Rappaport Hovav are right to emphasize the derived character of inchoative verbs, their claim that inchoative verbs—like their causative-inchoative counterparts—are dyadic and causative lacks support. And yet they are forced to make this claim precisely because they want to derive inchoative verbs from causative-inchoative verbs. In the next section I will suggest that inchoative verbs are indeed derived, but that they are derived from alternating verb stems and not from causative-inchoative verbs directly.

3 The Y-model

In order to overcome the shortcomings of the three models discussed in the previous two sections, I will propose a new model of the causative-inchoative alternation. The leading idea of the new model is to semantically derive both the causative-inchoative verb and its inchoative counterpart from a common verb stem that is in turn semantically based on the corresponding stative adjective, as depicted in Figure 4. I will refer to this model as the *Y-model*. Observe that, like Parsons's model, it involves branching, but unlike Parsons's model, it directly derives both the causative-inchoative verb and its inchoative counterpart from a common verb stem and not from the corresponding adjective.

Recall from section 1.2 that Hungarian offers overt morphological support for the idea that causative-inchoative and inchoative verbs are derived from a common verb stem. Moreover, as we saw from Haspelmath's survey, this morphological pattern is quite characteristic of the causative-inchoative alternation crosslinguistically. But the idea that a causative-inchoative verb and its inchoative counterpart are both derived from a common verb stem is also consistent with the data from English, German, and Polish. For example, we could consider deriving both $break_{\texttt{caus-incho}}$ and $break_{\texttt{incho}}$ from the verb stem $break_{\texttt{stem}}$ as opposed to linearly deriving the one from the other (as in the traditional model or in Levin and Rappaport Hovav's model). Similarly, German *sich* or Polish *się* could be viewed as deriving an inchoative verb from a shared verb stem and not from the causative-inchoative verb. In sum, although English, German, and Polish—unlike Hungarian—do not provide overt morphological evidence for the Y-model, they are nevertheless consistent with the order of derivation that the Y-model postulates.

I will cast my analysis in an event semantics much in the style of Parsons. The analysis presupposes the following three pairwise disjoint domains of objects together with their designated individual variables: *ordinary objects* (x, y, z, ...); *events* (which include processes) (e, e', e'', ...); and *states* (s, s', s'', ...). Moreover, it also makes use of a *causal relation* between events (denoted by 'Cause'), an *immediate temporal precedence relation* between events or states ('$\ll$'), and a notion of *metaphysical necessity* ('$\Box$'). Finally, it employs a small inventory of thematic relations. These include *performer* ('Performer'), *agent* ('Agent'), *instrument* ('Instrument'), and *theme* ('Theme'). Following Parsons (chap. 5.4.1), 'instrument' should be understood in an extended sense, as covering both traditional instruments (e.g., *the key* in *The key opened the door*) and natural forces (e.g., *the wind* in *The wind opened the door*). Performers are defined as agents or instruments, hence the performer relation is not basic and could be dispensed with, but it is convenient to define for verbs like $open_{\mathtt{tr}}$ that accept either agents or instruments as their subject.

Given these preliminaries, I now turn to how alternating verb stems are represented. Alternating stems are analyzed as ordered pairs of relations, as in (49), where <u>State</u> is a stative predicate constant.

(49) Representation of alternating verb stems:

$\langle \lambda x \lambda e[\mathsf{Theme}(e,x) \wedge \exists s[e \ll s \wedge \underline{\mathsf{State}}(s) \wedge \mathsf{Theme}(s,x)]],$

$\quad \lambda x \lambda e' \lambda e[\mathsf{Performer}(e,x) \wedge \mathsf{Cause}(e,e')]\rangle$

$\overset{\mathrm{def}}{=} \mathsf{ALTERNATING\text{-}STEM}$

The idea is that the meaning of an alternating verb stem consists of two parts, a change-of-state part and a causative part. This idea figures quite literally in the representation in (49), where the first member of the ordered pair is the change-of-state part and the second member is the causative part. Specifically, the change-of-state part is a two-place relation between events *e* and ordinary objects *x* such that *x* is the theme of *e* and *e* is immediately followed by a state *s* of type <u>*State*</u> whose theme is also *x*, and the causative part is a three-place relation between events *e*, events *e'*, and ordinary objects *x* such that *x* is the performer of *e* and *e* causes *e'*. It may seem odd to think of a verb stem as denoting an ordered pair of relations as opposed to merely a relation, but it is precisely such an analysis that can serve as an appropriate input to the derivation of causative-inchoative and inchoative verbs, as we will now see.

For an instance of (49) consider the representation of $break_{\mathtt{stem}}$ in (50), where the stative predicate Broken replaces <u>State</u>.

(50) $break_{\mathtt{stem}} \rightsquigarrow$

$\langle \lambda x \lambda e[\mathsf{Theme}(e,x) \wedge \exists s[e \ll s \wedge \mathsf{Broken}(s) \wedge \mathsf{Theme}(e,s)]],$

$\quad \lambda x \lambda e' \lambda e[\mathsf{Performer}(e,x) \wedge \mathsf{Cause}(e,e')]\rangle$

$\overset{\mathrm{def}}{=} \mathsf{BREAK}$

$\lambda y \lambda x \lambda e [\exists e'[(\text{ALTERNATING-STEM})_2(e, e', x) \wedge$
    $(\text{ALTERNATING-STEM})_1(e', y)]] = \quad$ (by (49))
$\lambda y \lambda x \lambda e [\exists e'[\text{Performer}(e, x) \wedge \text{Cause}(e, e') \wedge \text{Theme}(e', y) \wedge \exists s[e' \ll s \wedge \underline{\text{State}}(s) \wedge$
    $\text{Theme}(s, y)]]]$

Figure 5: Representation of causative-inchoative verbs

$\text{break}_{\texttt{caus-incho}} \rightsquigarrow$
    $\lambda y \lambda x \lambda e [\exists e'[(\text{BREAK})_2(e, e', x) \wedge (\text{BREAK})_1(e', y)]] = \quad$ (by (50))
    $\lambda y \lambda x \lambda e [\exists e'[\text{Performer}(e, x) \wedge \text{Cause}(e, e') \wedge \text{Theme}(e', y) \wedge \exists s[e' \ll s \wedge \text{Broken}(s) \wedge$
      $\text{Theme}(s, y)]]]$

Figure 6: Representation of *break*$_{\texttt{caus-incho}}$

Causative-inchoative verbs are represented as in Figure 5, where '$(\cdot)_n$' is interpreted as a function that picks out the *n*-th member of an ordered *n*-tuple. Basically, the derivation of a causative-inchoative verb consists in appropriately intersecting the two members of the ordered pair in (49) and in existentially quantifying over the caused event. The result is a three-place relation between events *e*, ordinary objects *x*, and ordinary objects *y* such that *x* is the performer of *e* and *e* caused an event *e'* whose theme is *y* and which is immediately followed by a state *s* of type *State* whose theme is *y* as well. Recall that this result is similar to Parsons's analysis of causative-inchoative verbs (see (33b)).

The result of substituting ALTERNATING-STEM in Figure 5 with BREAK from (50) is shown in Figure 6, which is the analysis of *break*$_{\texttt{caus-incho}}$.

As we saw in section 1.2, languages may mark the derivation of a causative-inchoative verb from its alternating verb stem. This is the case in what Haspelmath calls causative alternations and equipollent alternations. For example, in the causative alternation *xajl-uul-ax*/*xajl-ax* 'melt$_{\texttt{caus-incho}}$/melt$_{\texttt{incho}}$' in Khalkha Mongolian the affix *-uul* can be viewed as marking the derivation of *xajl-uul-ax* 'melt$_{\texttt{caus-incho}}$' from *xajl-ax* 'melt$_{\texttt{stem}}$' (but not from the inchoative verb *xajl-ax* 'melt$_{\texttt{incho}}$', as the surface morphology might suggest). In the equipollent alternation *megszárít*/*megszárad* 'dry$_{\texttt{caus-incho}}$/dry$_{\texttt{incho}}$' in Hungarian (see (19)) the suffix *-ít* marks the derivation of *(meg)szárít* 'dry$_{\texttt{caus-incho}}$' from *(meg)szár-* 'dry$_{\texttt{stem}}$' (recall that *meg* is a perfective preverb). Here, of course, the surface morphology makes clear that the causative-inchoative verb is not derived from the inchoative verb directly.

The analysis of inchoative verbs is shown in Figure 7. An inchoative verb denotes a two-place relation between events *e'* and ordinary objects *y* such that *y* is the theme of *e* and *e* is immediately followed by a state *s* of type *State* whose theme is also *y*. Unlike in Levin and Rappaport Hovav's analysis (see (43)), inchoative verbs are monadic and not dyadic in terms of their nominal arguments. Moreover, inchoative verbs are *decausative* in that no causal relation

$$\lambda y \lambda e'[(\text{ALTERNATING-STEM})_1(e',y) \wedge$$
$$\neg \Box \forall e'' \forall y'[(\text{ALTERNATING-STEM})_1(e'',y') \rightarrow$$
$$\exists e \exists x[(\text{ALTERNATING-STEM})_2(e,e'',x) \wedge \text{Agent}(e,x)]]] = \quad \text{(by (49))}$$
$$\lambda y \lambda e'[\text{Theme}(e',y) \wedge \exists s[e' \ll s \wedge \underline{\text{State}}(s) \wedge \text{Theme}(s,y)] \wedge$$
$$\neg \Box \forall e'' \forall y'[\text{Theme}(e'',y') \wedge \exists s'[e'' \ll s' \wedge \underline{\text{State}}(s') \wedge \text{Theme}(s',y')] \rightarrow$$
$$\exists e \exists x[\text{Performer}(e,x) \wedge \text{Cause}(e,e'') \wedge \text{Agent}(e,x)]]]$$

Figure 7: Representation of inchoative verbs

$$\text{break}_{\text{incho}} \rightsquigarrow$$
$$\lambda y \lambda e'[(\text{BREAK})_1(e',y) \wedge$$
$$\neg \Box \forall e'' \forall y'[(\text{BREAK})_1(e'',y') \rightarrow$$
$$\exists e \exists x[(\text{BREAK})_2(e,e'',x) \wedge \text{Agent}(e,x)]]] = \quad \text{(by (50))}$$
$$\lambda y \lambda e'[\text{Theme}(e',y) \wedge \exists s[e' \ll s \wedge \text{Broken}(s) \wedge \text{Theme}(s,y)] \wedge$$
$$\neg \Box \forall e'' \forall y'[\text{Theme}(e'',y') \wedge \exists s'[e'' \ll s' \wedge \text{Broken}(s') \wedge \text{Theme}(s',y')] \rightarrow$$
$$\exists e \exists x[\text{Performer}(e,x) \wedge \text{Cause}(e,e'') \wedge \text{Agent}(e,x)]]]$$

Figure 8: Representation of *break*$_{\text{incho}}$

figures in their assertive content. At the same time, though, an inchoative verb makes implicit reference to a causing event in that it adds the proviso that it is not necessary for all changes of state of this type to be caused by an event with an agent. In other words, an inchoative verb is *deagentive* in the sense that the changes of state that it denotes are not necessarily caused by an event with an agent. I will call this the *deagentivity condition*.

The substitution of BREAK for ALTERNATING-STEM in Figure 7 yields the analysis in Figure 8 for *break*$_{\text{incho}}$. Crucially, the deagentivity condition does not say that there cannot be a causing agent in any situation in which something breaks. For example, if Rebecca (acting as an agent) breaks the pencil, then the pencil surely breaks (see (1)), but this is no problem since the deagentivity condition is satisfied as long as it is possible for there to be events in which something breaks that are not caused by an agent. But this is indeed the case, because there is nothing about the breaking of pencils or other ordinary objects that requires them to be broken by agents. In particular, they can also be broken by instruments, e.g., falling rocks.

From the present perspective, it is not surprising that the predominant pattern crosslinguistically is to mark the inchoative member of an alternating pair (anticausative alternations in Haspelmath's terms). This is because the semantic derivation of an inchoative verb from an alternating verb stem crucially introduces the nonlogical constant Agent, whereas the derivation of a causative-inchoative verb from an alternating stem makes use of logical constants only. Given the choice between marking nonlogical (or lexical) content and marking logical content, it would seem more natural (and less marked) to mark the former. For example, in the anticausative alternation *złamać/złamać się* 'break$_{\text{caus-incho}}$/break$_{\text{incho}}$' in Polish (see

(25)) the reflexive clitic *się* derives the inchoative verb *złamać się* 'break$_{\text{incho}}$' from the alternating verb stem *złamać* 'break$_{\text{stem}}$' (and not from the causative-inchoative verb *złamać* 'break$_{\text{caus-incho}}$', as the surface morphology would suggest). Taking the equipollent alternation *megszárít/megszárad* 'dry$_{\text{caus-incho}}$/dry$_{\text{incho}}$' in Hungarian again (see (19)), the suffix *-ad* signals the derivation of *(meg)szárad* 'dry$_{\text{incho}}$' from *(meg)szár-* 'dry$_{\text{stem}}$'.

A consequence of the deagentivity condition in Figure 7 is that any causative-inchoative verb that is necessarily agentive will lack an inchoative counterpart. Notice that the causative-inchoative verbs in (39)–(42), which lack inchoative counterparts, all seem to be necessarily agentive. Just as only people can break promises, only people can crack codes. While we may occasionally say that computers can randomize numbers or crack codes, they can do such things only by virtue of running the software that people have written—computers as hardware alone cannot do such things. Finally, only people or animals can dirty diapers in the intended sense.[14]

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