Variable Unaccusativity and Verb Classes

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1 Variable unaccusativity

The notion of split intransitivity has been around since Perlmutter (1978). The basic idea is that intransitives group into two basic groups: a group in which the single argument is similar to the subject of a transitive as in (1), and a group in which the single argument is similar to the object of a transitive as in (2). The former type of intransitive is called *unergative*, the latter is called *unaccusative*.

(1) a. The boy sang. (unergative)
b. The boy sang a song.

(2) a. The chocolate melted. (unaccusative)
b. The chef melted the chocolate.

From the very beginning, the split intransitivity hypothesis was supported by a number of unaccusativity diagnostics that seemed to group intransitive verbs together into these two groups. Very soon, however, it became apparent that these diagnostics did not make as clean a split as one would like (Rosen (1984); Grimshaw (1987); Levin and Rappoport-Hovav (1992)), a phenomenon known as variable unaccusativity.

Variable unaccusativity can be used to refer to a number of different phenomena.

- One verb can test as unaccusative or unergative, based on which diagnostic is used.
- One verb can test as unaccusative or unergative with respect to a single diagnostic, based on other qualities of the predicate.
- Synonymous verbs can test as unaccusative or unergative in different languages with respect to language-specific diagnostics.

It is clear that no matter which phenomenon we are working with, an account of variable unaccusativity would boil down to an account of the various diagnostics involved. If one diagnostic picks out a slightly different group of verbs as another diagnostic, then it must be that the two diagnostics are not sensitive to exactly the same factors. If we can determine

exactly what factors these diagnostics are sensitive to, then we have an account of variable unaccusativity. For the purposes of this paper, I will be focusing on the first sense of *variable unaccusativity*. I will be looking at cases in which two diagnostics put a particular verb into two different categories.

I propose that the reason that (these) unaccusative diagnostics do not pick out the same two classes of verbs is because there are not two classes of verbs, but rather three classes. One class requires an external argument, either explicit or implicit, similar to the previously described unergative verbs. Examples are *laugh* and *bark*. A second class requires that there be no external argument, even an implicit one. Examples of this second class are *arrive* and *fall*. A third class is more flexible: these verbs can appear either with or without an external argument. Examples of this flexible class are *melt* and *roll*.

In this paper, I will first describe these three classes of verbs. Then, I will describe several unaccusativity diagnostics and show that each one picks out one of these classes, and excludes the other two. Then, I will compare the three-class analysis to a more traditional two-class analysis, and to a many-class analysis, and show that the three-class analysis does a better job of accounting for the diagnostics than the other two analyses. Finally, I will address the issue of how a verb comes to fall into one class or another. I will discuss a few possible answers to this question, but none will be entirely satisfactory. Then, I will conclude.

2 Three Verb Classes

2.1 Class 1: [+ext]

The first class of verbs I will discuss always requires that there be some sort of external argument. One intransitive example is *bark*. *bark* can appear with an overt external argument, as in (3-a). *bark* cannot appear with an additional external argument, as in (3-b). It cannot appear as a prenominal participle, as in (3-c). I will argue that the prenominal participle construction does not introduce an explicit or implicit external argument. It also cannot appear in an example of locative inversion, as in (3-d). I will argue that these constructions also do not introduce an external argument. Finally, a Class 1 verb like *bark* or *laugh* can appear in an impersonal passive, in a language that allows impersonal passives (Grimshaw (1987)), like German (3-e).

(3) a. The dog barked.
b. *The mailman barked the dog.
c. *the barked dog
d. *In the room barked a dog.
e. Es wurde gelacht. (German)
it became laughed
'it was laughed'

These intransitive Class 1 verbs are exactly those verbs commonly referred to as "unergatives".

Some examples of Class 1 verbs are transitives. These are transitives that always require an external argument, such as *cut* or *hit*. Like the intransitive examples, verbs like *cut* can appear with an external argument as in (4-a), but cannot appear without an external argument, as in (4-b). They also cannot appear with two external arguments as in (4-c) or (4-d).

(4) a. The child cut the paper.
b. *The paper cut.
c. *The teacher cut the child the paper.
d. *The teacher the child cut the paper.

Furthermore, verbs like *cut* can appear in situations with an implicit external argument, like passive constructions and *-able* constructions. I will argue that there is an implicit but semantically real external argument in these constructions. In fact, in (5), we see that the external argument can be specified using an optional *by*-phrase.

(5) a. The paper was cut (by the child).
b. This paper is cutable (by children using safety scissors).

The reason that intransitive Class 1 verbs cannot appear in these structures is because they require both an external argument and an internal argument. I will address this in more detail later.

2.2 Class 2: [-ext]

The second class of verbs is one where there is never an external argument. These are of course always intransitive. Two English examples are *arrive* and *fall* (Levin and Rappoport-Hovav (1992)). (6-a) shows *arrive* with an internal argument in subject position. (6-b) shows that *arrive* cannot have an external argument.

(6) a. The letter arrived.
b. *The mailman arrived the letter.

(7) a. The leaves fell.
b. *The wind fell the leaves.

Class 2 verbs cannot appear in situations with an implicit external argument. These include passives, as in (8-a) and *-able* constructions, as in (8-b).

(8) a. *The letter was arrived (by the mailman).
b. *This package is arrivable (by your regular mailman).

Class 2 verbs can also appear in locative inversion sentences, as in (9) (Levin and Rappoport-Hovav (1995)). I will also argue that these constructions have no external argument.

(9) a. At the station arrived a train.

2.3 Class 3: flexi-verbs

Finally, there is a third class of verbs that may have an external argument, but do not require one. Two examples of these verbs are *melt* and *roll*. These verbs can appear both with and without an external argument, as in (10-a) and (10-b) (Levin and Rappoport-Hovav (1992)).

(10) a. The bowling ball rolled.
b. Brian rolled the bowling ball.

Class 3 verbs can appear in constructions that do not have an implicit external argument, such as locative inversion, as in (11). I will argue that this is because Class 3 verbs do not require an external argument.

(11) Down the lane rolled the bowling ball.

Class 3 verbs can also appear in constructions that have an implicit external argument, such as passive constructions, as in (12-a), and *-able* constructions, such as (12-b).

(12) a. The bowling ball was rolled down the lane accurately (by Brian).
b. This bowling ball is light enough that it is rollable (by a small child).

I will argue that these constructions are possible because Class 3 verbs are compatible with external arguments.

2.4 The puzzling case of motion verbs

Verbs of personal motion, such as *walk*, *run*, and *swim* are a little puzzling. They often appear in an intransitive structure, as in (13), but in English, they can also be used transitively, as in (14).

(13) a. Brian walked.
b. Emily ran to the post office.
c. Dat swam back to shore.

(14) a. Brian walked the dog.
b. Emily ran the package to the post office.
c. Dat swam the shark bite victim back to shore.

Except for *walk the dog*, which has probably undergone some semantic drift, the meanings of these transitives are as follows: the Agent, causes the Theme to move to the Goal by using

a particular sort of motion, walking, running, or swimming. The Agent seems to instigate the motion, and the Theme undergoes it.

We are left wondering about the intransitive uses of motion verbs. Does the single argument correspond to the Agent, the Theme, or both? In the sentence *Emily ran to the post office*, Emily seems to be instigating the running, and in a sense she carries herself to the post office. In terms of Ramchand (2008), Emily is both the INITIATOR and the UNDERGOER. However, we need to know whether the single argument is structurally an internal argument, external argument, or somehow both.

If the single argument is an internal argument, then motion verbs pattern like Class 3 flexi-verbs in that they undergo the causative alternation. If the single argument is an external argument, then motion verbs pattern like Class 1 [+ext] verbs that have an optional internal argument. Since I have already claimed that these three classes exist, I propose that we determine the classification of motion verbs using the diagnostics that distinguish these classes.

Motion verbs can be transitive, which means that they can passivize and can host the suffix *-able*. We need to determine whether motion verbs can be used in locative inversion contexts. In (15), it looks like they can.

(15) a. In ran a group of small children.
b. In walked the head of the department.

Levin and Rappoport-Hovav (1992) claim that verbs of motion like *run* can only appear in locative inversion contexts if the locative in question is a goal, rather than a location. They claim that Class 3 verbs like *roll* and Class 2 verbs like *arrive* can have inverted locatives that specify the location of the action. These data are difficult to confirm, because the judgments on locative inversion vary a lot, but for the time being, I will assume that verbs of motion like *run* allow locative inversion. This means that they pattern like Class 3 verbs, and thus I will treat them as Class 3 flexi-verbs.

2.5 Some comments on the verb classes

I have defined the three classes in terms of their requirements concerning external arguments. Class 1 requires an external argument, Class 2 excludes an external argument, and Class 3 has no such requirements. However, I must reiterate that these external arguments need not be explicit. These are external arguments that are at least real in the semantics, and possibly real in the syntax as well.

For the purposes of this paper, I will assume that implicit external arguments are syntactically real. I will model this as quality of v: There are some v Heads that introduce

an external argument, implicit or explicit, and some v Heads that do not. However, I recognize that there may be a way to account for these unaccusativity diagnostics without an implicit but syntactically real external argument. For example, a powerful lexicon with lexical-semantic operations may do the trick.

Finally, classification of verbs may to some degree be derivable from their meanings. However, there must be some degree of language-to-language idiosyncrasy. This is shown by Hindi, in which the correlate of *arrive* acts as a Class 3 verb instead of a Class 2 verb, and as such can appear with an external argument. This is shown in (16).

(16) a. 5-baje Agra pahuc-ii (Hindi)
Train 5-o'clock Agra arrive-PFV.F
'The train arrived in Agra at 5.'
b. Dakiye-ne pahuc-aa-yaa
Postman-ERG parcel office arrive-CAUS-PFV
'The postman arrived the parcel at the office.'

In section 3, I will account for each of the unaccusativity diagnostics I have mentioned, explaining why each class of verbs behaves the way it does with respect to that diagnostic. Then, I will briefly explain why a three-class system accounts for these diagnostics better than the traditional two-class system and better than a many-class system as in Ramchand (2008).

2.6 Some comments on the nature of the verb classes

In this paper, I will use the notation [+ext] and [-ext] as shorthand to indicate the presence or absence of an external argument. I do not intend for these to be interpreted as formal syntactic features. Rather, these are shorthand for a lexical requirement. A Class 2 verb root must be embedded under a v that does not introduce an external argument. This is a requirement encoded on the lexical entry of the Class 2 verb root. For visual ease, I call the Class 2 verbs [-ext] verbs and I will call v heads that do not introduce an external argument [-ext] vs. Similarly, I call Class 1 verbs [+ext] verbs and I will call v heads that introduce an external argument [+ext] v heads.

Class 3 verbs are different in that they have no lexical requirement for a particular kind of v. Class 3 verbs can occur freely under [+ext] and [-ext] vs. Logically, this means that any v that can embed a Class 1 verb or a Class 2 verb can also embed a Class 3 verb. This means that, barring any complications orthogonal to the nature of the external argument, any structure involving a v should be able to embed Class 3 verbs, and should be able to embed either Class 1 verbs or Class 2 verbs, but not both. In the section that follows, I will present a number of diagnostics that I will analyze in terms of such structures. All of these diagnostics follow this pattern: any structure that allows Class 1 verbs or Class 2 verbs also allows Class 3 verbs. Then, I will present a single diagnostic, *there*-insertion, that does not

follow this pattern. For *there*-insertion, Class 2 verbs are possible, while Class 3 verbs are impossible. This is a problem for my system, and I will leave its solution to future research.

3 Unaccusativity diagnostics

3.1 The Causative Alternation

3.1.1 Traditional description

First, I will introduce the causative alternation as it is traditionally described as an unaccusativity diagnostic. As a diagnostics, the causative alternation has very robust judgments (Levin and Rappoport-Hovav (1995)). A verb participates in the causative alternation if it can be found in constructions with and without an explicit external argument through a null-transitivization process. Most unaccusative verbs participate. In particular, Class 3 (flexi-verbs) participate in the causative alternation. The causative alternation is exemplified in (17).

(17) a. The chocolate melted.
b. The chef melted the chocolate.

(18) a. The bowling ball rolled down the lane.
b. The bowler rolled the bowling ball down the lane.

In each of the cases above, an unaccusative verb *melt* (17-a) or *roll* (18-a) alternates with a transitive verb *melt* (17-b) or *roll* (18-b). The subject of the unaccusative verb and the object of the transitive verb are essentially the same in both structures. In fact, the two structures may describe the same incident.

Unergative verbs in Class 1, the [+ext] verbs, do not participate in the causative alternation, presumably because their single argument is already an Agent.

(19) a. The dog barked.
b. *The mailman barked the dog.

(20) a. The boy laughed.
b. *The comedian/joke laughed the boy.

There is a small set of verbs that cannot participate in the causative alternation, despite the fact that they are assumed to be unaccusative. These fall into Class 2, the [-ext] verbs. This is exemplified in (21) and (22).

(21) a. The letter arrived.
b. *The mailman arrived the letter.

(22) a. The leaves fell.
b. *The wind fell the leaves.

In accounting for the causative alternation, one must account for the difference in behavior between Class 3 verbs like *roll* and Class 2 verbs like *arrive*.

It seems as if unaccusative sentences lack an implicit Agent (Zubizarreta (1985)). In passives, there is an implicit Agent that can control the subject of a purpose clause, as in (23-a) and (24-a), while these clauses are not allowed in unaccusative sentences, as in (23-b) and (24-b).

(23) a. The chocolate was melted to make truffles.
b. *The chocolate melted to make truffles.

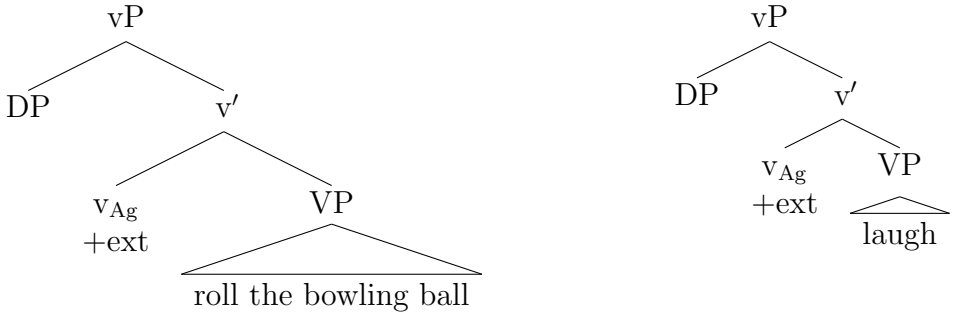
(24) a. The bowling ball was rolled down the lane to knock down pins.
b. *The bowling ball rolled down the lane to knock down pins.

Thus, it seems as though the causative alternation is simply the addition of an Agent or some other external argument to a structure with no external argument.

3.1.2 Account

Class 1 and Class 2 verbs are excluded from the causative alternation, whereas Class 3 verbs may participate in the causative alternation. Semantically, the causative alternation is the introduction of an external argument. I therefore claim that zero transitivization is the addition of a v layer that introduces an external argument. I will refer to this v as v_{Ag}. A semantics for v_{Ag} is provided below.

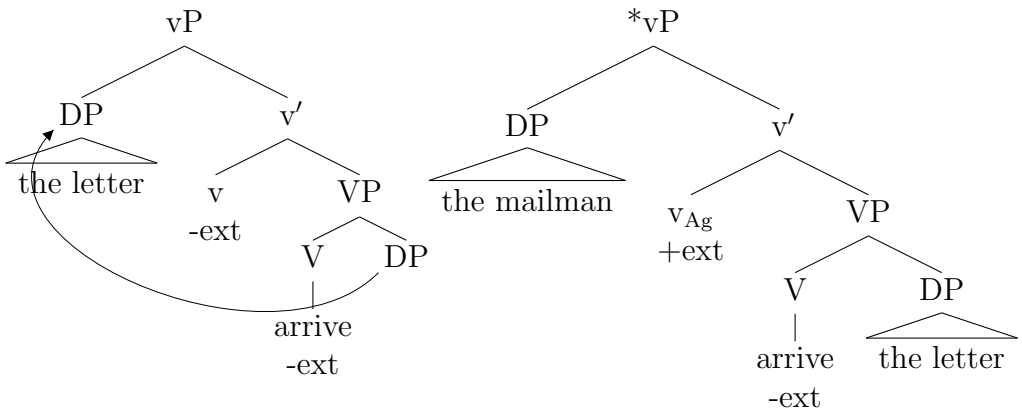
(25) $[\![v_{\text{Ag}}]\!] = \lambda P_{\langle st \rangle} \lambda x \lambda e\, [P(e)\ \&\ \text{Agent}(e)(x)]$



Since v_{Ag} introduces an external argument, (I will call it a [+ext] v,) it is incompatible with Class 2 verbs like *arrive* and *fall*, which are incompatible with external arguments. Therefore, Class 2 verbs do not participate in the causative alternation.

(26) a. The letter arrived.
b. *The mailman arrived the letter.

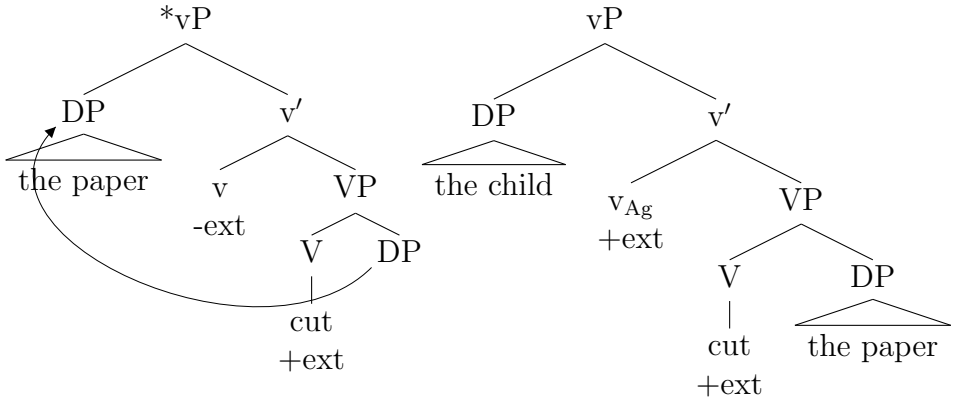
(27)



To participate in the causative alternation, a verb must have a form with an external argument, and a form without one. Class 1 verbs like *bark* and *cut* may appear with an external argument, and must not appear without one. For that reason, Class 1 verbs cannot participate in the causative alternation. However, the head introducing the external argument of a Class 1 verb may very well be the same v_{Ag} that creates transitive structures in the causative alternation.

(28) a. *The paper cut.
b. The child cut the paper.

(29)



In English, Class 1 verbs cannot have two Agents, as in (30).

(30) a. *John the baby laughed.
b. *John laughed the baby.

I claim that in English, recursion of v_{Ag} is not possible. Thus there can only be one Agent introduced by this silent morpheme. A different head would be required to bring in other Agents, for example, in *make*-causatives.

Since recursion of v_{Ag} is impossible in English, Class 3 flexi-verbs cannot have more than one Agent either. This is illustrated below.

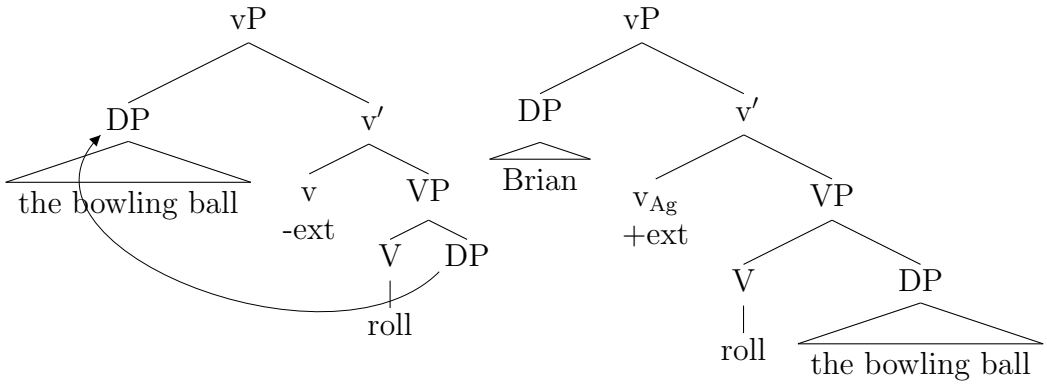
(31) a. *John Bill opened the door.
b. *John opened Bill the door.

In other languages, recursion of v_{Ag} may not be blocked. In these languages, we expect stacking of Agents with no additional morphology needed. The question of whether such languages exist is outside the scope of this paper.

Finally, Class 3 verbs can appear with and without an external argument, and as such, participate in the causative alternation.

(32) a. The bowling ball rolled.
b. Brian rolled the bowling ball.

(33)



In conclusion, we saw that only Class 3 verbs could appear in both structures with and without an external argument. Therefore, Class 3 verbs are the only verbs that can participate in the causative alternation.

3.2 Passive as an unaccusativity diagnostic

3.2.1 Traditional description

The passive construction has been used as an unaccusativity diagnostic in the past Perlmutter (1978); Grimshaw (1987). This is particularly relevant in a language like German or Dutch, where there are impersonal passives. In these languages, intransitives can passivize, but only if they are unergative (intransitive Class 1 verbs). Unaccusatives (Class 2 verbs) cannot passivize.

(34) a. *Es wurde angekommen.
it became arrived
'it was arrived' (German)
b. Es wurde gelacht.
it became laughed
'it was laughed' (German)

In (34-a), *ankommen* 'arrive' cannot passivize, while in (34-b) *lachen* 'laugh' can passivize.

In both English and German, transitives can passivize, whether they are transitives that alternate with unaccusatives, such as *roll* (Class 3 verbs), or transitives that do not alternate with unaccusatives, such as *hit* (transitive Class 1 verbs). This is shown in (35) and (36).

(35) a. Der Ball wurde gerollt.
the ball became rolled
'the ball was rolled' (German)
b. The ball was rolled. (English)

(36) a. Der Ball wurde angeschlagen.
the ball became hit
'the ball was hit' (German)
b. The ball was hit. (English)

3.2.2 Passives used as adjectives

Passives can also be used as a nominal modifier, as in (37).

(37) the accurately rolled bowling ball

With longer passive phrases that modify nouns, the modifier appears after the noun.

(38) the bowling ball (that was) accurately rolled

Many of these passive nominal modifiers show essentially the same argument structure as the passive. For example, they can occur using Class 1 [+ext] verbs like *hit* and support by-phrases, as in (39-a), and Agent-oriented adverbs, as in (39-b).

(39) a. the target accurately hit by Brian
b. the accurately hit target

Meanwhile, Class 2 [-ext] verbs are disallowed in these structures.

(40) a. *the letter arrived by the mailman
b. *the deliberately arrived letter

In my analysis, these will have a very similar structure to the verbal passive.

3.2.3 Account of passives

The generalization is that transitives in English and German can passivize whether they are Class 1 [+ext] or Class 3 flexi-verbs. Intransitives in German can passivize if they are Class 1 [+ext], such as *lachen* 'laugh', but cannot passivize if they are Class 2 [-ext], such as *ankommen* 'arrive'. As with the causative alternation, the analysis utilizes a particular

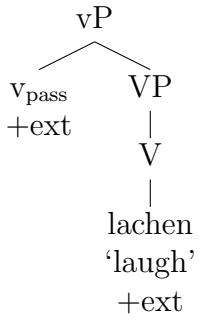
lexical item of the category *v*. I claim that passive *v* introduces an implicit external argument, and as such I will call it [+ext].

Functionally, v_{pass} existentially binds the Agent of the event. A semantics for v_{pass} follows.

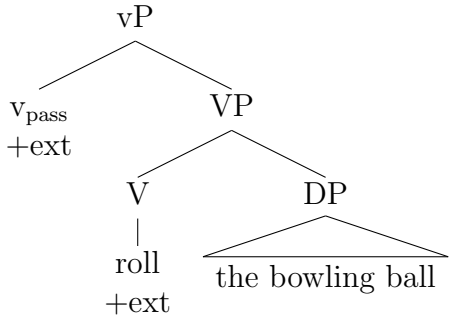
(41) $[\![v_{\text{pass}}]\!] = \lambda P_{\langle st \rangle} \lambda e \exists x \, [P(e) \;\&\; \text{Agent}(x)(e)]$

Since v_{pass} is [+ext], it can embed both [+ext] Class 1 verbs like *hit* and *lachen* 'laugh' and Class 3 verbs like *roll*, but cannot embed [-ext] Class 2 verbs like *arrive*.

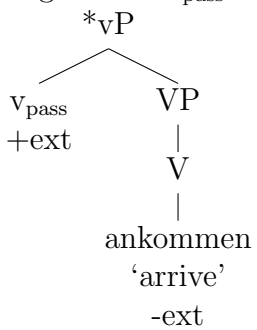
(42) gelacht$_{\text{pass}}$ 'laughed' (Class 1)



(43) rolled$_{\text{pass}}$ (Class 3)



(44) *angekommen$_{\text{pass}}$ 'arrived' (Class 2)



There is evidence that although there is no explicit Agent in a passive, there is an implicit Agent. This Agent can bind PRO in purpose clauses as in (45-a). In an unaccusative such as (45-b), there is no implicit Agent, and thus the purpose clause is disallowed.

(45) a. The chocolate was melted to make truffles.
b. *The chocolate melted to make truffles.

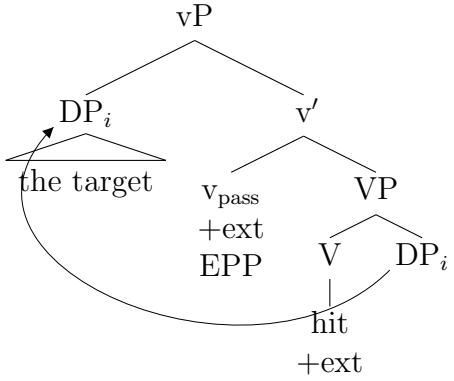
3.2.4 Account of impersonal passives

We have yet to explain why German has impersonal passives and English does not, a fact exemplified below.

(46) a. Es wurde gelacht.
it became laughed
'it was laughed' (German)
b. It was laughed. (English)

I propose that in English, there is an EPP feature on v_{pass} that must be filled through internal Merge. If there is no internal argument, then the EPP feature on v_{pass} will remain unchecked, and the derivation will crash. A successful derivation of a passive in English is represented below.

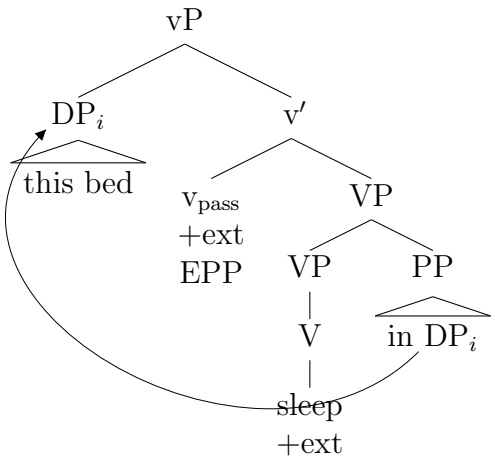
(47) The target was hit.



In German, there is no EPP feature on v_{pass}. There is an EPP feature on C, which may be checked through expletive insertion.

This explanation for English also predicts that if there is some VP-internal DP (perhaps in a PP) that can check the EPP feature on v_{pass}, then an unergative can be passivized. This appears to be borne out.

(48) This bed was slept in by the king.



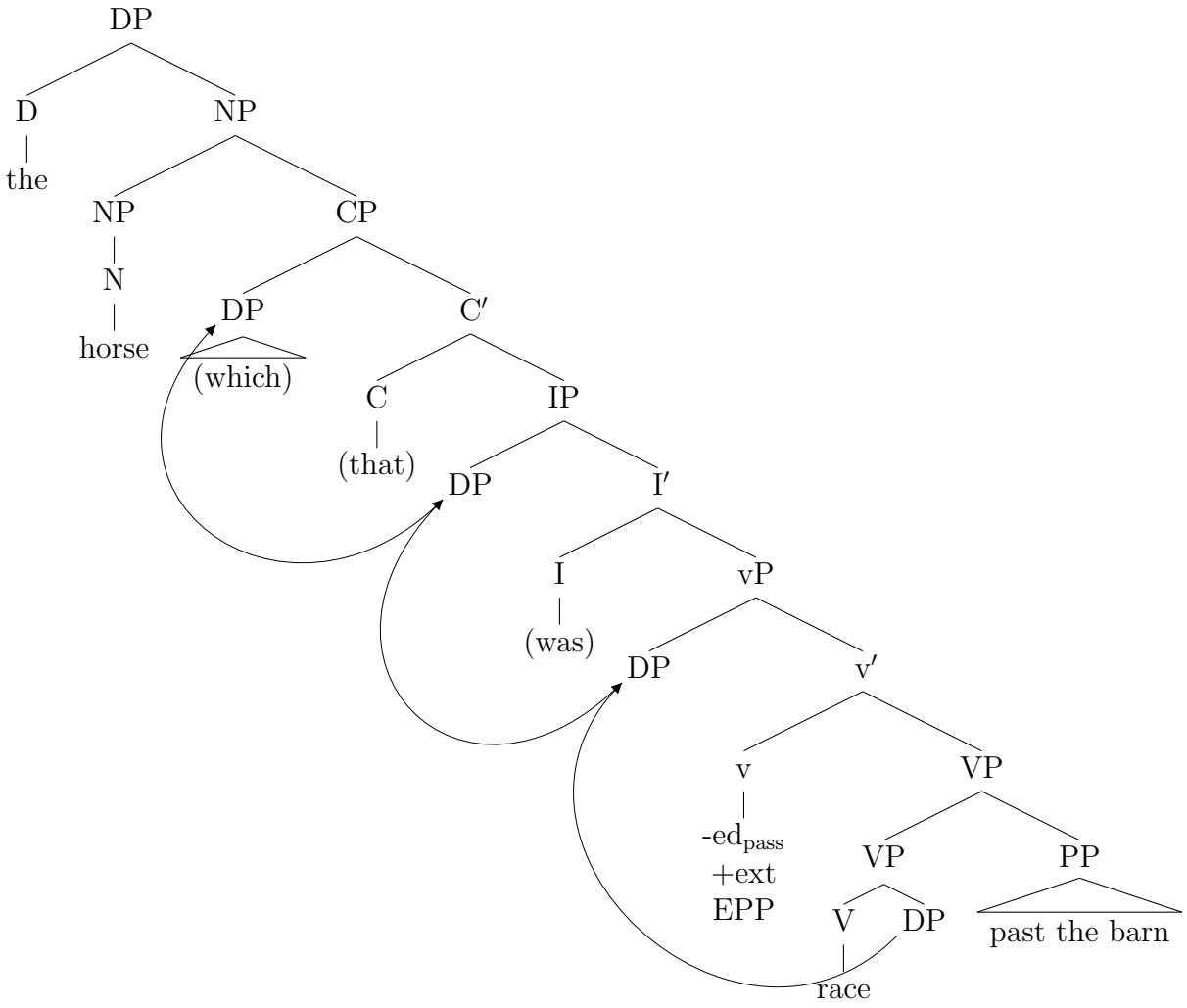
3.2.5 Account of resultative passives as nominal modifiers

Passive participles can also be used to modify nouns. I claim that in cases such as in (49), these are reduced relatives that have exactly the same structure as passives.

(49) a. The target hit by the best archer was very small. (Class 1)
b. The apple chopped into small pieces got brown very quickly. (Class 1)
c. The horse raced past the barn fell. (Class 3)
d. The biggest bowling ball rolled down the lane was blue. (Class 3)

The structure is as follows.

(50) the horse (which) (that) (was) raced past the barn



Just as with matrix passives, any DP in the VP can serve as the subject of the reduced relative passive.

(51) a. the Congresswoman (who) (that) (was) sent the letter
b. the letter (who) (that) (was) sent to the Congresswoman

Again, this indicates that passives in English can be made on any Class 1 [+ext] verb or Class 3 flexi-verb, as long as there is a DP in the VP to satisfy the EPP on v_{pass}.

There is a participial form that can be found prenominally. These are either formed by a [+ext] v in which an Agent is existentially bound, or a [-ext] v in which there is no Agent. Verbs like *roll* are compatible with both. It is possible that this encodes the difference between resultative passives and stative passives (Embick (2004)), but that is outside the scope of this paper. I will discuss these cases a little bit later.

3.3 Adjectival verb forms

3.3.1 Description of prenominal participles

Some participle forms of verbs can be used prenominally in English, German, and other languages, as in (52-a) and (53-a). In all the Indo-European languages I know of that have this form, these participles are morphologically identical to the passive participle, as in (52-b) and (53-b). In all but Swedish, they are also identical to the perfect participle, as in (52-c) and (53-c) Ramchand (2009).

(52) a. the **eaten** apple (prenominal participle)
b. The apple was **eaten**. (passive)
c. Rajesh has **eaten** the apple. (perfect)

(53) a. der **gegessen**e Apfel
the eaten apple
'the eaten apple (prenominal participle) (German)
b. Der Apfel wurde **gegessen**.
the apple became eaten
'the apple was eaten' (passive)
c. Rajesh hat den Apfel **gegessen**.
Rajesh has the apple eaten
'Rajesh has eaten the apple' (perfect)

In (52-a), the participle is built on a transitive verb *eat*, and the modified noun *apple* fills the object role. The modified noun cannot be an Agent, so that (54-a) cannot describe a man who has just eaten an apple, and (54-b) is ungrammatical.

(54) a. #the eaten man (Class 1)
b. *the barked dog (Class 1)

Thus, we can see that transitive verbs like *eat* are allowed in prenominal participle form, and unergative verbs like *bark* are not. Class 3 verbs, which may or may not be made transitive through the causative alternation, are also allowed, as in (55).

(55) a. the rolled ball (Class 3)
b. the melted chocolate (Class 3)

However, there is still the lingering question of those few unaccusative verbs that do not participate in the causative alternation, the Class 2 verbs. They are allowed as prenominal participles, as in (56).

(56) a. the recently arrived recruits (Class 2)
b. the fallen leaves (Class 2)

With these modifiers, there is no purpose clause or Agent-oriented adverb allowed, as in (57).

(57) a. *the deliberately fallen leaves (Class 2)
b. *the leaves fallen by the wind (Class 2)

This suggests that the participial form here is really different from the passive participle we saw earlier, in which a purpose clause or an Agent-oriented adverb was allowed.

So it appears that the only verbs that are disallowed from the prenominal participle construction are intransitive unergative verbs. Thus, the prenominal participle construction can be used as a diagnostic that separates unergative verbs from transitives and unaccusatives.

3.3.2 Description of *-able* Adjectives

In English, a suffix *-able* can be attached to certain verbs to create an adjective[1]. Like the prenominal participles, these nouns that *-able* adjectives describe appear to be objects of the verbs.

(58) a. the pushable cart (Class 1)
b. the meltable chocolate (Class 3)
c. *the barkable dog (Class 1)
d. #the pushable woman (Class 1)

In (58-a), the cart could be pushed. Thus, *cart* is the object of *push*. In (58-b), similarly, the chocolate could be melted. (58-c) is an example of an intransitive Class 1 verb. These cannot be used in *-able* adjectives. (58-d) is inappropriate in a context where the woman could push a cart, showing that the modified noun must correspond to the object of the verb and not the Agent.

Again, the question lingers as to whether that small class of unaccusative verbs that do not participate in the causative alternation, Class 2 verbs, can appear as *-able* adjectives. The answer here is no.

(59) a. *the arrivable train/station (Class 2)
b. *the fallable tree/cliff/man (Class 2)

We have shown, therefore, that both the prenominal participle construction and the *-able* construction can be used as diagnostics for unaccusativity. Both allow Class 3 verbs and Class 1 transitives, but do not allow Class 1 intransitives. The difference in the sets of verbs

[1]In this section, I only intend to discuss the productive suffix *-able*. There are words that seem to be historically related, but which have become lexicalized and undergone some lexical drift. Examples include *fallible*, *laughable*, *incorrigible*, and *indefatigable*

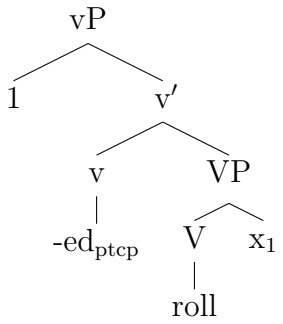
that they pick out is Class 2 verbs, like *arrive* and *fall*. These can be prenominal participles, but they cannot combine with -*able*.

3.3.3 Account

Intuitively, both the -*able* suffix and the participial -*ed* suffix are associated with binding off event argument of the verb. In *pushable*, the meaning is that the modified noun could be pushed by some arbitrary agent in an arbitrary pushing event. In *pushed*, the meaning is that the modified noun was pushed in some past event. I claim that -ed_{ptcp} and -*able* are both flavors of v.

An analysis of participial -*ed* could be as follows.

(60) rolled



(61) $[\![ed_{\text{ptcp}}]\!] = \lambda P_{\langle st \rangle}\,[\exists e\ P(e)]$

In the example above, *rolled ball*, the v' level would have the following denotation.

(62) $[\![\text{v}']\!] = \lambda P_{\langle st \rangle}\,[\exists e\ P(e)]\,(\text{roll}(x_1))$
$= [\exists e\ \text{roll}(x_1)(e)]$

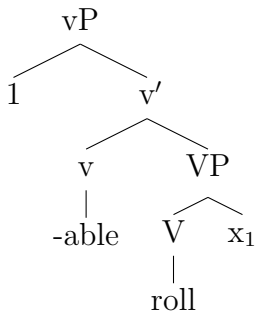
Thus, the entire vP would have the following denotation.

(63) $[\![\text{vP}]\!] = \lambda x_1\,[\exists e\ \text{roll}(x_1)(e)]$

In words, the vP is of type $\langle et \rangle$ and takes any individual to 1 iff there exists an event such that an individual rolled during the event.

The denotation for -*able* would be more complicated, because modality is involved, but the same general pattern should hold: -*able* would appear in the tree as a flavor of v, and would introduce an arbitrary Agent and event. It would also introduce a lambda binder that could bind a free variable, as with v_{ptcp}.

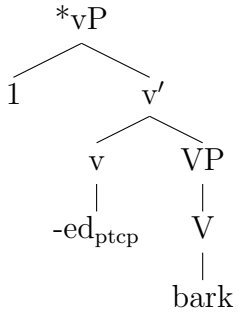
(64) rollable



(65) $[\![-\text{able}]\!] = \lambda P_{\langle st \rangle} \exists e^2 \exists x \, [P(e) \ \& \ Agent(x)(e)]$

How do we rule out Class 1 intransitives from the *-able* and *-ed*$_{\text{ptcp}}$ type adjectives? We could rule them out with a ban on vacuous binding. Thus, if there is no object variable to be bound, the derivation would be disallowed.

(66) *barked$_{\text{ptcp}}$ (Class 1 intransitive)

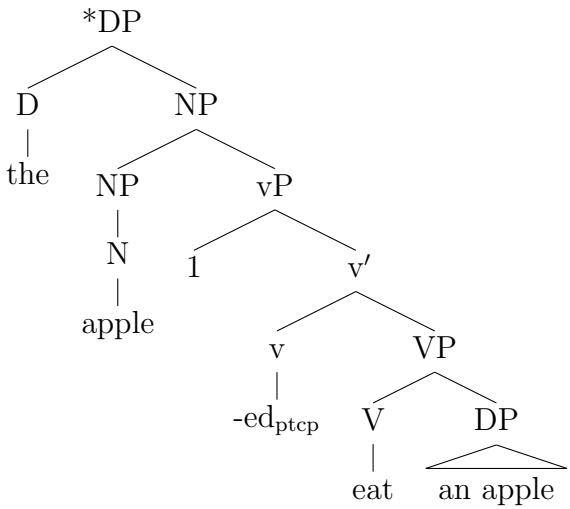


Since there is no object variable for the binder to bind, this structure is disallowed.

The ban on vacuous binding disallows other structures that we would like to rule out, such as vPs that have all their arguments filled.

(67) a. *the apple eaten an apple
b. *the eaten an apple apple

[2]I would imagine that this is where the modality comes in, but that is outside the scope of this paper.



Again, the binder has no free variable to bind. However, the examples in (67) would also be ruled out by Case.

So, with a ban on vacuous binding, we disallow Class 1 intransitives like *laugh* and vPs with all their argument positions filled. The remaining task is to rule out Class 2 verbs like *arrive* and *fall* in *-able* constructions, while allowing them in *-ed*$_{\text{ptcp}}$ constructions.

I claim that *-able* is [+ext]. It cannot embed unaccusatives like *arrive* because *arrive* is Class 2 [-ext]. It can only embed Class 1 [+ext] verbs or Class 3 flexi-verbs like *roll*.

Meanwhile, *-ed*$_{\text{ptcp}}$ is [-ext]. It cannot embed Class 1 verbs like *bark* because *bark* is [+ext]. It can embed Class 2 verbs like *arrive* because *arrive* is [-ext]. It can also embed Class 3 flexi-verbs like *roll*.

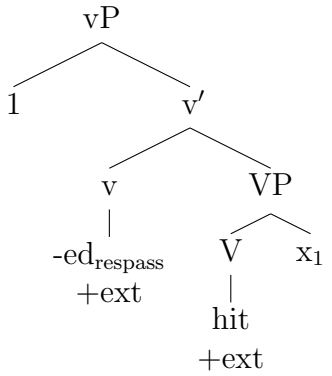
Thus, while *-able* appears only with transitives, *-ed*$_{\text{ptcp}}$ appears both with transitives and with Class 2 unaccusatives.

There appears to be a prenominal participle that can embed Class 1 [+ext] transitives like *hit* and *cut*.

(68) a. the accurately hit target
b. the cut string

I claim that this is another participle ending of category v that binds off an Agent argument as well as an event argument. I will call it v_{respass}. This v must be [+ext] in order to embed [+ext] verbs.

(69) hit



(70) $[\![ed_{\text{respass}}]\!] = \lambda P_{\langle st \rangle} \exists e \exists x \, [P(e) \ \& \ \text{Agent}(x)(e)]$

The difference between v_{respass} and v_{ptcp} may be the difference between resultative passives and stative passives (Embick (2004)). These are morphologically different in a small set of verbs including *empty* and *open*, as in (71) and (72).

(71) a. the open door (stative passive)
b. the opened door (resultative passive)

(72) a. the empty bucket (stative passive)
b. the emptied bucket (resultative passive)

3.4 Locative inversion as an unaccusativity diagnostic

3.4.1 Description of locative inversion

Locative inversion refers to a word order in which a locative phrase is initial in the sentence, followed by the verb, followed by the subject. It has often been claimed that this can only occur with unaccusative verbs and not with unergative verbs, as in (73) (Rosen (1984), Grimshaw (1987), Levin and Rappoport-Hovav (1995), Bresnan and Kanerva (1992)).

(73) a. Here comes the bus. Class 2 unaccusative
b. At the station arrived the train. Class 2 unaccusative
c. In ran several small children. Class 3 unaccusative
d. On the desk spun a colorful top. Class 3 unaccusative
e. *Here barks a dog. Class 1 unergative
f. *On the chair laughed a small girl. Class 1 unergative

Locative inversion is a tricky business because while there are many good and many bad examples, there is also a plethora of examples for which the judgments are mixed. Many native speakers of English think that these uses of locative inversion sound literary. It certainly seems to be true that locative inversion is only allowed with particular pragmatics (Levin and Rappoport-Hovav (1995)). For the purposes of this paper, I will assume that

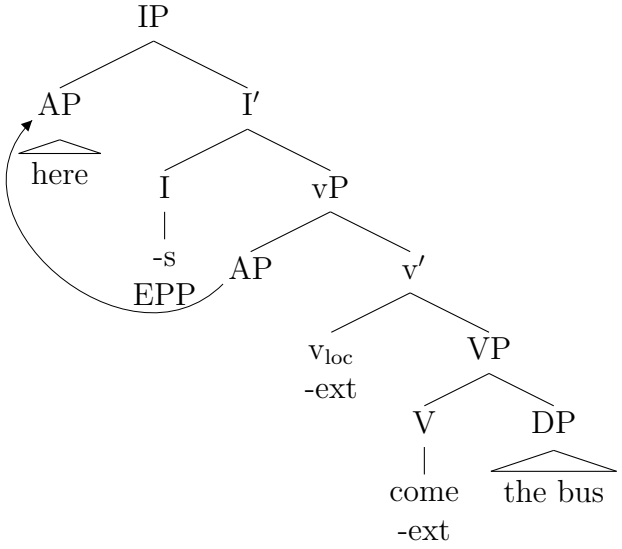
the judgments above are correct. Speakers of English with different judgments may have different structures for locative inversion, or a different v head involved.

In general, Class 2 [-ext] and Class 3 intransitives are allowed in locative inversion constructions. Class 1 [+ext] verbs are disallowed.

3.4.2 Account

Bresnan and Kanerva (1992) analyze locative inversion as movement of a locative phrase to Spec,IP. This accounts for the word order because the internal argument would not move from its θ-position after the verb. In order to put the locative phrase in a position to move to Spec,IP, it could be introduced in Spec,vP. Thus, I analyze locative inversion with a particular lexical item of category v that introduces a locative phrase, v_{loc}.

(74) Here comes the bus.

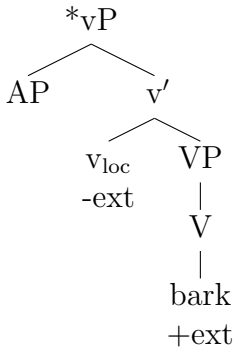


$[\![v_{\text{loc}}]\!] = \lambda P_{\langle st\rangle}\lambda Q_{\langle et\rangle}\lambda e\,[P(e)\ \&\ \text{Location}(e)(Q)]$

Thus, v_{loc} introduces a locative into its specifier. This prevents the DP from moving to Spec,IP because the locative is closer. This also means that v_{loc} does not introduce an external argument in its specifier, and so I call v_{loc} [-ext].

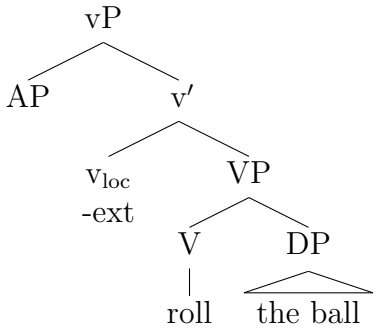
We have observed that Class 2 [-ext] verbs like *arrive* can participate in locative inversion, whereas Class 1 [+ext] verbs like *bark* cannot. This is because v_{loc} is [-ext] and can therefore embed Class 2 [-ext] verbs. It fails to embed [+ext] verbs, and therefore, *bark* is disallowed.

(75)



Levin and Rappoport-Hovav (1995) also claim that locative inversion does not occur with transitives such as transitive Class 1 [+ext] verbs or transitive Class 3 verbs like *roll*. This also falls out from the 2-layer analysis because there is no external argument introduced by *v*. If *roll* appears embedded under v_{loc}, no external argument will surface. Thus, only intransitive *roll* will appear in locative inversion contexts, not transitive *roll*, as Levin and Rappoport-Hovav (1995) say.

(76)



3.5 *There*-insertion

Deal (2009) addresses the unaccusativity diagnostic of *there*-insertion. *There*-insertion is allowed for Class 2 verbs, but not for Class 1 verbs or Class 3 verbs. This is exemplified in (77).

(77) a. *There laughed a man in the hallway. (Class 1)
b. There arrived a train in the station. (Class 2)
c. *There melted a block of ice on the front yard. (Class 3)

There-insertion presents a problem for my analysis because it is a structure in which Class 2 verbs are allowed and Class 3 verbs are not allowed. As I mentioned above, any structure that can embed a Class 2 verb root should be able to embed a Class 3 verb root. Even worse, Deal (2009) says that *there* originate in Spec,*v*P, which makes the choice of *v* especially relevant. I acknowledge that these data are a problem and I leave the solution for future research.

3.6 Summary of diagnostics

In this section, I presented several unaccusativity diagnostics, and showed that they teased apart the three verb classes. In the causative alternation, Class 3 flexi-verbs were allowed and Class 1 [+ext] and Class 2 [-ext] verbs were excluded. In passives, Class 1 and Class 3 verbs were allowed, while Class 2 verbs were excluded. In prenominal participles, all classes of verbs were allowed, but those without internal arguments were excluded. In -*able* constructions, Class 1 transitives and Class 3 verbs were allowed, while Class 2 verbs and Class 1 intransitives were excluded. Finally, in locative inversion, Class 2 verbs and Class 3 verbs were allowed, while Class 1 verbs were excluded.

The diagnostics are summarized in the following table. I will refer to Class 1 intransitives like 'laugh' as "1intr" and Class 1 transitives like 'hit' as "1tr". Of course, the transitives may not have two overt arguments in all structures. The external argument is silent in passives, prenominal participles, and the *able* construction.

Diagnostic	Allowed	Excluded
causative alternation	3	1, 2
English passive	1tr, 3	1intr, 2
German passive	1, 3	2
prenominal participle		
with agentive adverbs	1tr, 3	1intr, 2
without agentive adverbs	1tr, 2, 3	1intr
-*able*	1tr, 3	1intr, 2
locative inversion	2, 3	1

In the system I have laid out, there are two possible structures for prenominal participles: one that is compatible with agentive adverbs, and one that is not. The agentive adverbs are only allowed in the presence of a [+ext] v, but of course they are not required for grammaticality.

We can see from the above table that all three verb classes are singled out by some diagnostic. This supports the claim that there are really three verb classes to be considered, not the traditional two (unaccusative/unergative), at least with respect to these diagnostics. We also see that Class 3 verbs are allowed in all constructions. This is expected, since Class 1 and Class 2 have restrictions that Class 3 does not have. Class 1 and Class 2 each require a certain type of v, while Class 3 has no such requirement. The only exception, left off the table, is *there*-insertion, for which I have no explanation.

4 Comparison with other possible accounts

4.1 Two verb classes

The traditional account is that there are two intransitive verb classes, unaccusatives and unergatives. These are the verb classes that unaccusativity diagnostics pick out. Traditionally, unergatives are the verbs I call Class 1 intransitive verbs, while unaccusatives are the verbs I call Class 2 verbs and Class 3 intransitive verbs.

The problems with this account arise when Class 2 and 3 need to be differentiated from one another. One example is the causative alternation. The causative alternation picks out Class 3 and excludes Class 2. The two-class account has no explanation for this.

Two other problems are the passive and *-able* adjectives. Class 2 verbs cannot be passivized or appear with *-able*, while Class 3 verbs can. The two-class account must say that only transitives can be passivized, and then separate Class 3 transitives from Class 3 intransitives. The three-class account does not need to make this distinction in Class 3.

The two-class account works for locative inversion and prenominal participles, as these two diagnostics group Class 2 with Class 3.

The three-class account can explain the causative alternation, and has an easier time explaining passives and *-able* adjectives. I take this as support for the three-class account over the two-class account.

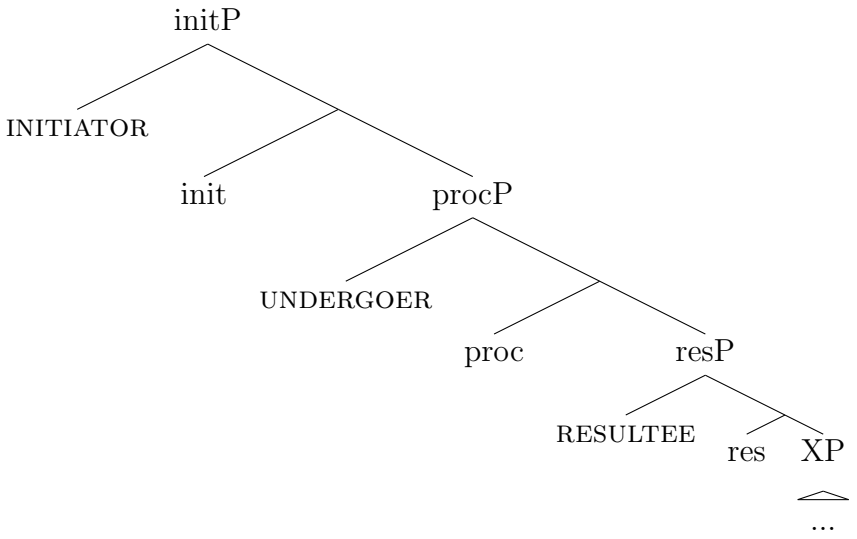
4.2 An account with a 3-layer first phase

I also claim that the three-class account does a better job explaining the unaccusativity diagnostics above than an account based on the framework in Ramchand (2008). First, I will explain this framework, and then I will show how it fails to account for some unaccusativity diagnostics.

4.2.1 A 3-layer first phase

In this section, I will briefly introduce Ramchand (2008)'s framework. The framework offers an answer to the question of what information is encoded in the lexicon and what information is in the structure. She says that the lexicon encodes the conceptual meaning of a verb and the categorial information. One important thing to realize is that in her framework, the categories are a little different from the familiar 2-layer vP. A maximal structure is as follows.

(78)



init, **proc**, and **res** are verbal categories. A verb can project any number of these, as specified by the lexicon. For example, some verbs like *roll* may only project a **proc** shell, while other verbs like *arrive* may project all three shells. The complement of any shell can be a Rheme. The only examples of Rhemes I will deal with in this paper are Paths that merge in as complements of **proc**.

The various verbal heads have semantics that specify the structure of the event. **init** brings in a state that causally implicates a process. **proc** brings in a dynamic process. **res** brings in a resulting state. These verbal heads also assign a particular thematic interpretation to their specifiers. These thematic interpretations are not mutually exclusive, so one DP could inhabit several specifier positions. **init** introduces an INITIATOR in its specifier position, similar to an external argument. **proc** introduces an UNDERGOER. Finally, **res** introduces a RESULTEE.

The lexicon specifies which verbal shells are projected by a single verb, but also specifies whether its specifier position is filled through internal or external Merge. For example, the lexicon specifies *push* as [init,proc], meaning that there is an INITIATOR and an UNDERGOER, which are distinct. Meanwhile, the lexicon specifies *laugh* as [init$_i$,proc], meaning that there is a single DP with an INITIATOR-UNDERGOER interpretation. The subscript i indicates that the **init** head is a raising head.

It is easy to see that with all of these verbal heads, there are many possible classes of verbs. For this reason, it makes sense that a system like this could have the capability to encode a more fine-grained system of verb classes than the two- and three-class systems we have discussed. However, Ramchand (2008) seeks to account for a number of phenomena, some having to do with external arguments and some having to do with internal arguments and Aktionsart. The diagnostics I have discussed have to do with the external arguments,

and so Ramchand (2008)'s 10 verb classes collapse into 3 verb classes that are of interest to me.

4.2.2 Ramchand-style verb classes

One class of verbs in Ramchand (2008) are those in which there is an INITIATOR that is distinct from another argument lower in the first phase. These are transitives or ditransitives. Examples of these include *drive*, *eat*, *throw*, *defuse*, and *give*. This class corresponds to the transitive members of my Class 1. They are transitive verbs that have an INITIATOR, which is essentially the same as an external argument.

A second class of verbs in Ramchand (2008) are intransitives in which there is an INITIATOR that is the same entity as the UNDERGOER. (All action verbs project a **proc** layer, so all of them have an UNDERGOER.) Some examples are *run*, *enter*, *arrive*, and *dance* (Ramchand (2008)). This class includes the verbs that I classify in Class 2, plus the intransitive verbs in Class 1.

The third relevant class is those that have no INITIATOR because there is no **init** layer. These include *melt*, *dry*, and *break* (Ramchand (2008)). These are exactly the verbs that I classify as Class 3.

Ramchand (2008) makes many other distinctions between verbs. These distinctions have to do with what happens deeper in the first phase. For example, *melt* simply has an UNDERGOER, while *break* has an UNDERGOER-RESULTEE. I remain agnostic about what happens deeper in the first phase: I have not seen evidence that the unaccusativity diagnostics I am discussing are sensitive to these distinctions. As far as this paper is concerned, Ramchand (2008) may be correct.

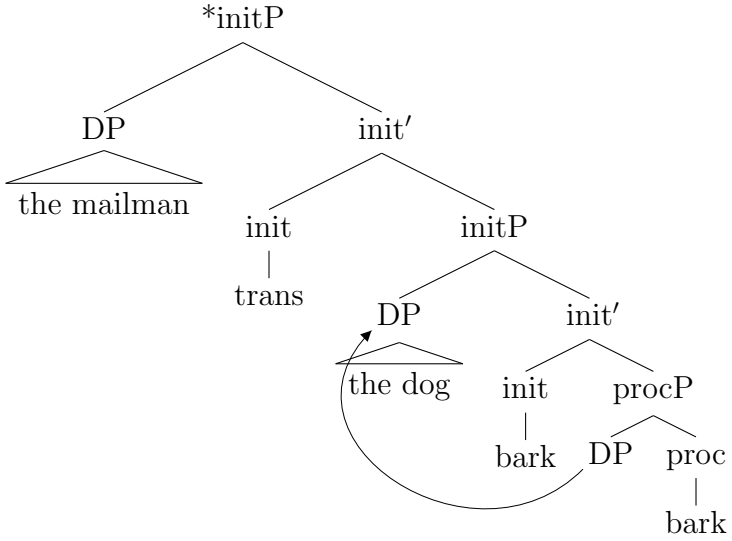
4.2.3 Ramchand-style analysis of the causative alternation

In the three-class system, Class 3 flexi-verbs participate in the causative alternation, while Class 1 and Class 2 are excluded.

Ramchand (2008) addresses the causative alternation directly and has a clear account for it. Causativization is the addition of an **init** layer to a predicate. There is a null morpheme of category **init** which introduces an INITIATOR. This **init** layer can only be added to a verbal structure that does not already have an **init** layer, because **init**P is not recursive. Thus, any verb that already projects the category **init** cannot participate in the causative alternation.

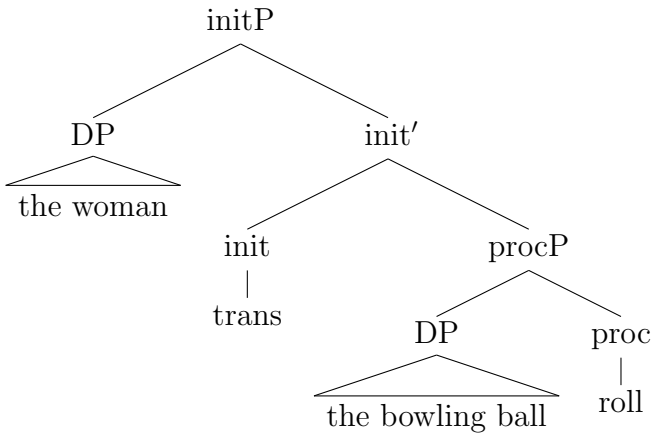
bark cannot participate in the causative alternation because it already has an **init** layer.

(79) *The mailman barked the dog.



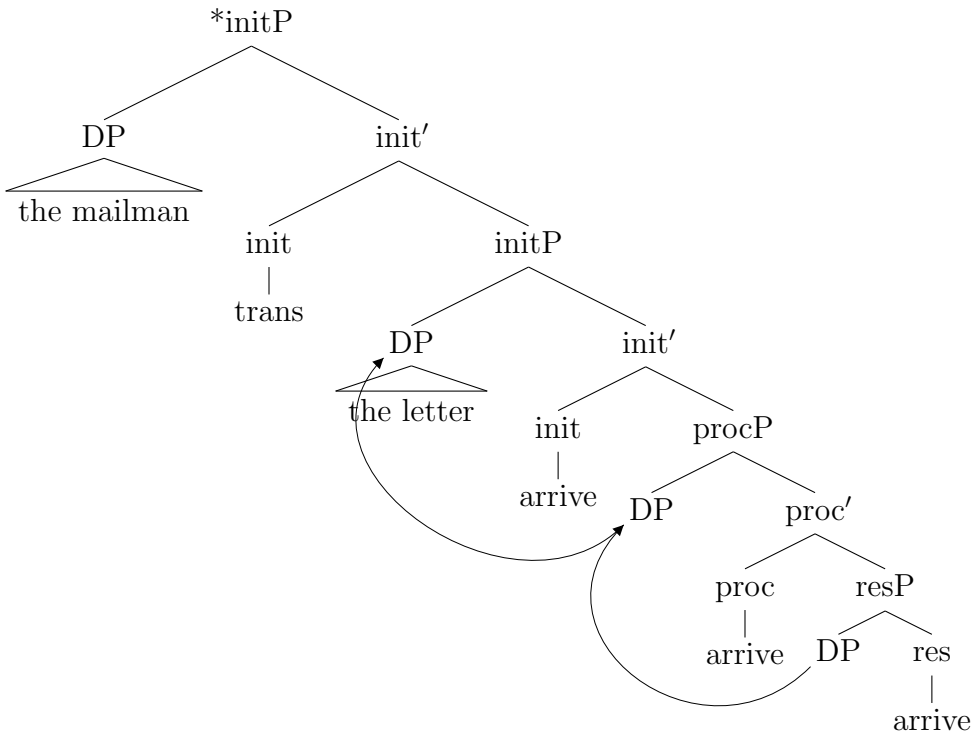
Meanwhile, *roll* can participate in the causative alternation because it only has a **proc** layer.

(80) The woman rolled the bowling ball



Finally, *arrive* cannot participate in the causative alternation because it already has an **init** layer.

(81) *The mailman arrived the letter.



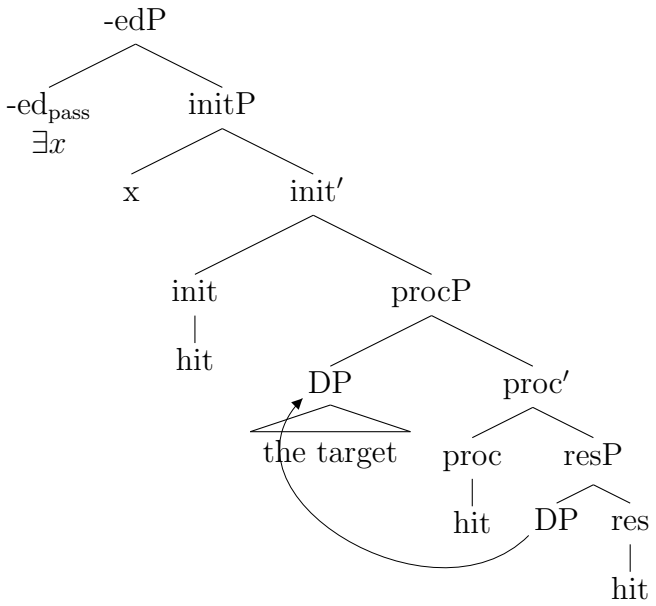
Thus, the categorial information about the various verbs dictates whether that verb can participate in the causative alternation.

Both my 3-class system and Ramchand (2008) account for the causative alternation, but the Ramchand (2008) explanation is somewhat unsatisfactory. For her analysis to work, verbs like *arrive* and *fall* must have an INITIATOR, and this is not intuitively true. In a sentence such as *The letter arrived*, it is difficult to imagine the letter initiating such an event. In order to make this analysis fully satisfactory, one would have to give up the notion that the **init** head introduces an INITIATOR, which would really sacrifice the semantics of the system.

4.2.4 Ramchand-style analysis of passives

Ramchand (2008) analyzes the passive as morphology that Merges above the **init** head and existentially binds off the INITIATOR argument.

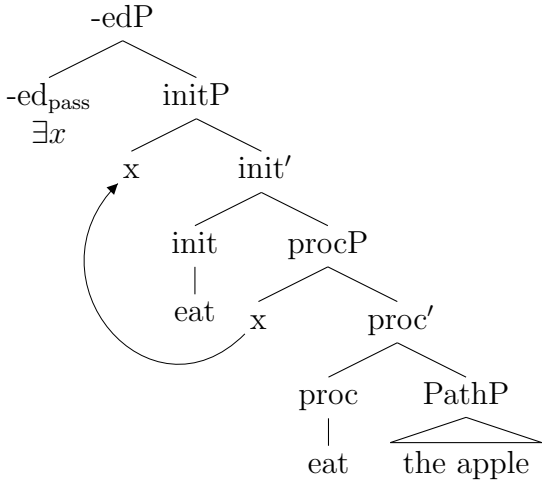
(82) The target was hit.



$[\![-\text{edP}]\!] = \lambda e \exists x \exists e_1 \exists e_2 \exists e_3 [hit(e_3)$ & State(e_3) & Subject(the target$, e_3)$ & $hit(e_2)$ & Process(e_2) & Subject(the target$, e_2)$ & $hit(e_1)$ & State(e_1) & Subject(x, e_1) & $e = e_1 \rightarrow e_2 \rightarrow e_3]$

As an illustration of a more complicated example, we will consider the verb *eat*. *Eat* is [init$_i$,proc], with the same argument serving as an INITIATOR-UNDERGOER, and can also select a Path optionally. When *eat* selects a Path, the passive is grammatical in English, as in (83). The INITIATOR-UNDERGOER argument is a variable that is bound off by the passive layer above **init**. The Path, *the apple*, eventually raises to the Spec,IP position.

(83) The apple was eaten.



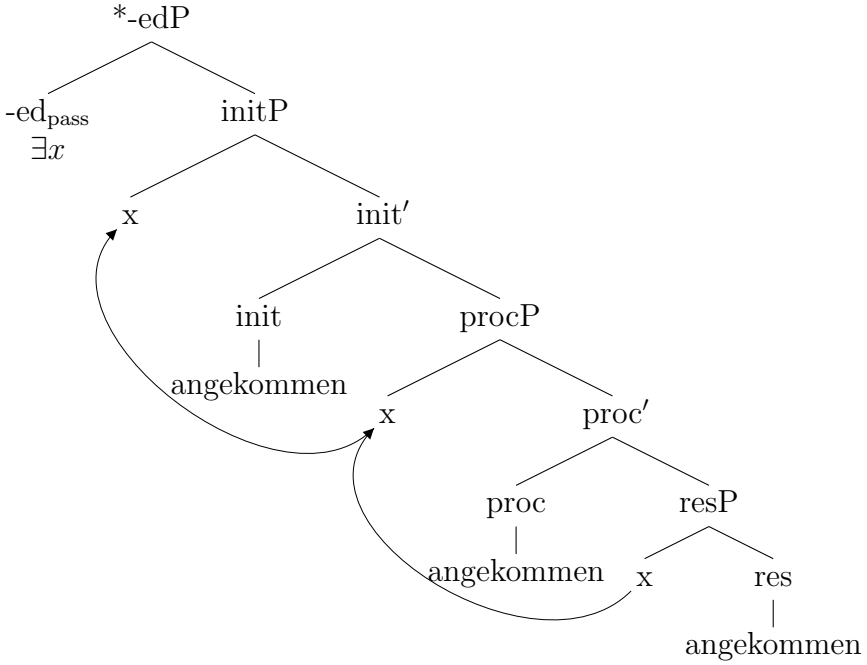
$[\![-\text{edP}]\!] = \lambda e \exists x \exists e_1 \exists e_2 [\text{Path(the apple)}(e_2)$ & $eat(e_2)$ & Process(e_2) & Subject(x, e_2) & $eat(e_1)$ & State(e_1) & Subject(x, e_1) & $e = e_1 \rightarrow e_2]$

Since unaccusative verbs do not project an **init** layer, then there is no INITIATOR for -ed_{pass} to bind off. Similarly, if the zero **init** intransitivizer is present in the structure, the passive should be fine. This accounts for situations like (84).

(84) a. The chocolate was melted.
b. The bowling ball was rolled.

We have observed that in English, two arguments must be present for a passive to be grammatical: the silent external argument, and an overt internal argument or lower DP. In German, however, intransitives can passivize, with no overt arguments in the resulting sentence. In Ramchand (2008)'s system, it is difficult to see why a verb like *arrive* cannot passivize in a language like German. *Arrive* is [init$_i$,proc$_i$,res], with the same DP occupying the specifier of all three projects. So *arrive* has all three first-phase layers with a single INITIATOR-UNDERGOER-RESULTEE argument. The derivation for 'arrived'$_{\text{pass}}$ is below. As we will see, nothing in the Ramchand (2008) system goes wrong, and so there is no explanation for why 'arrived'$_{\text{pass}}$ is ungrammatical.

(85) *Es wurde angekommen.
'It was arrived.'



$[\![-\text{edP}]\!] = \lambda e \exists x \exists e_1 \exists e_2 \exists e_3 [arrive(e_3)$ & State(e_3) & Subject(x, e_3) & $arrive(e_2)$ & Process(e_2) & Subject(x, e_2) & $arrive(e_1)$ & State(e_1) & Subject(x, e_1) & $e = e_1 \rightarrow e_2 \rightarrow e_3]$

In this case, the system laid out in Ramchand (2008) does not seem to account for the distribution of the passive. In fact, Ramchand (2008) predicts that any verb should be able to passivize, at least in a language in which intransitives can passivize. We have seen that her

system for passivization rules in Class 1 [+ext] verbs like *hit*, Class 2 [-ext] verbs like *arrive*, and Class 3 flexi-verbs like *melt*. Meanwhile, the system involving a [+ext] -ed_{pass} head of category *v* will rule out [-ext] verbs like *arrive*, but keeps [+ext] verbs like *eat*. Furthermore, the decision that -ed_{pass} is [+ext] is consistent with the observation that passives have an implicit agent. For these reasons, my 3-class analysis works better than the Ramchand-style analysis.

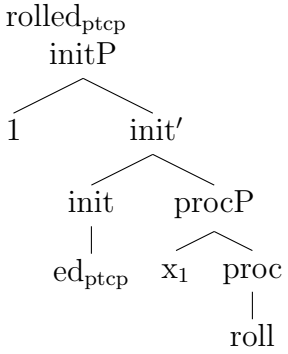
4.2.5 Ramchand-style analysis of adjectival forms

This Ramchand-style system can account for -*able* constructions in approximately the same way as the 3-class system.

An analysis of the participial prenominal modifiers would be more difficult in this Ramchand-style system, because we need to rule in *arrive* and *roll* while ruling out *laugh*. If the participial ending Merges above **init**, then we will need lambda abstraction over INITIATOR-UNDERGOER-RESULTEEs like in *arrive*, and UNDERGOERs, like in *roll*, but no lambda abstraction over INITIATOR-UNDERGOERs like in *laugh*. It does not seem that we will be able to make this work. *arrive* and *roll* simply do not represent a natural class that does not include *laugh*.

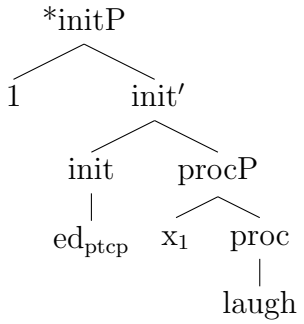
If, however, we think that the participial ending comes in as a flavor of **init**, then we might be able to get *roll* without getting *laugh*. We would do this with lambda abstraction over the free variable below **init**.

(86)



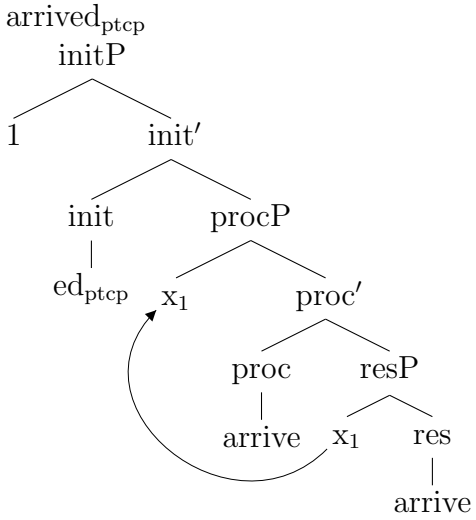
In (86), we can get lambda abstraction over the UNDERGOER.

(87) *laughed$_{\text{ptcp}}$



In (87), we can get lambda abstraction over the UNDERGOER, but there is no INITIATOR. This is contrary to the category specification of *laugh*, which requires an INITIATOR-UNDERGOER, and is therefore disallowed.

However, this system breaks down when we try to apply it to *arrive*.

(88)


In (88), we can get lambda abstraction over the UNDERGOER-RESULTEE, but there is no INITIATOR. This is contrary to the category specification of *arrive*, and would be ruled out. However, we know that *the recently arrived recruits* is grammatical. Thus, this system cannot account for *arrive*.

There is no way to account for prenominal participles in the Ramchand-style system. Any account that allows for *arrived*$_{ptcp}$ will also allow **laughed*$_{ptcp}$. Thus, although the two systems do equally well in accounting for *-able*, the 3-class system works better in accounting for prenominal participles.

4.2.6 Ramchand-style analysis of locative inversion

It is unclear how a system like that in Ramchand (2008) would be able to account for locative inversion. However, it seems as though it would be difficult because the verbs

that participate in locative inversion do not constitute a natural class in that system. For instance, both *arrive* and *roll* can appear in locative inversion contexts. *Arrive* projects [init,proc,res], with all the specifiers filled by the same DP. *roll* only projects [proc]. Finally, *laugh* is [init,proc], with the specifiers filled by the same DP. There does not seem to be a way to make a natural class of *arrive* and *roll*, excluding *laugh*. *Laugh* has fewer heads than *arrive* and more than *roll*, and the same number of distinct arguments as both.

With a 3-class, locative inversion is merely the result of a v head that selects for a locative in its specifier. Since the v head is [-ext], it fails to embed a [+ext] **V**. This means that we get the fact that some verbs can participate in locative inversion and some cannot simply through a single licensing feature. The Ramchand-style system simply does not have a straightforward account of locative inversion. Thus, the 3-class account is more successful in accounting for locative inversion as an unaccusativity diagnostic.

5 Discussion of underlying causes of verb classes

In this section, I will address the question of how a verb comes to be in one class or another. I will first describe two analyses which are roughly equivalent: the argument structure of each verb must be specified in the lexicon. Then, I will describe an analysis which is more principled: the argument structure of a verb comes from the conceptualization of the event it describes. Although this conceptual analysis is tempting, it does not explain how verbs in different languages can fall into different classes.

5.1 Flavors of *v*

Essentially the analysis I have been describing is one in which certain verb roots require certain flavors of v. Class 1 verbs are only compatible with [+ext] varieties of v, Class 2 verbs are only compatible with [-ext] varieties, and Class 3 verbs are compatible with either sort. But where does this compatibility come from? One possible explanation is akin to a Ramchand (2008)-style view of the lexicon. In Ramchand (2008), the information about the category of a verb is encoded in the lexicon. This includes information about whether the verb will project the **init**, **proc**, and **res** heads, and whether those heads will introduce new arguments in their specifiers, or whether they are raising heads.

In the same way, the possible flavors of v could be encoded as something like category information in the lexicon. For Ramchand (2008), the lexical entry for a verb specifies whether it projects an **init** head, and whether that **init** head introduces a new argument. For us, the lexical entry for a verb could specify whether it projects a v head, and whether that v head introduces an Agent or not. For Class 1 verbs, the lexical entry would require a v head that introduces an Agent. For Class 2 verbs, the lexical entry would require a v head that does not introduce an Agent. For Class 3 verbs, the lexical entry would not require any sort of v, leaving that position empty to be filled by another lexical item of category v.

This sort of analysis is problematic in two ways. First, I have proposed more than two flavors of v. For example, I have a passive v that introduces an implicit Agent and has an EPP feature in English. I also have a locative inversion v that introduces a locative in its specifier position and no Agent of any sort. These are lexical items that can embed certain verbs, not projections of the verbs themselves. A Ramchand (2008)-style lexicon would have to be tweaked in order to allow for these many flavors.

The other problem is that this analysis is no more satisfying than simply having a formal feature or diacritic assigned to each verb. This analysis says that whether a verb has an Agent is something that is specified in the lexical entry for each verb. The language learner would have to learn the category information for every verb, and there would be no reason for a connection between the presence of an Agent and the semantic information for a particular verb. This would be counter to observations about unaccusativity from the very beginning: that verbs of change of state and inherently directed motion are unaccusative, etc. (Perlmutter (1978); Grimshaw (1987); Levin and Rappoport-Hovav (1992)).

5.2 Blocking Account

Deal (2009) addresses an unaccusativity diagnostic that I have not explained: *there*-insertion in English. This is exemplified in (89).

(89) a. There arrived a train in the station. (Class 2)
b. *There laughed a man in the hallway. (Class 1)

Her analysis is that *there* originates in the specifier of v. Thus, *there*-insertion is blocked for unergative verbs like *laugh* because these verbs have an external argument in this position.

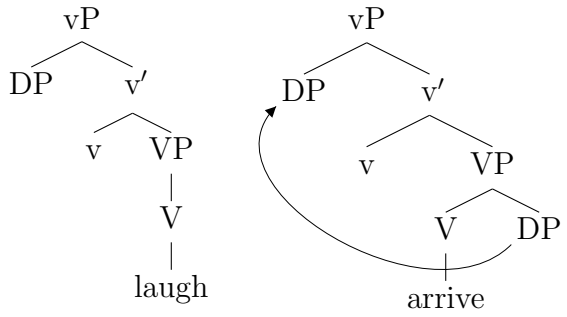
Deal (2009)'s analysis has the advantage that it avoids stating a negative requirement. She does not have to say that unergatives cannot participate in *there*-insertion while unaccusatives may participate. Rather, there is a positive requirement: unergatives require an external argument, which blocks *there*-insertion because there is just no room.

I have said that Class 1 verbs require an external argument, Class 2 verbs are incompatible with an external argument, and Class 3 verbs can go either way. This is, apparently, a negative requirement for Class 2 verbs. In the spirit of Deal (2009), I will attempt a blocking account, turning this negative requirement into a positive requirement. Class 1 verbs require an external argument. Class 2 verbs cannot have an external argument, which means that there must be something already occupying that position. But what? One option is that the internal argument of Class 2 verbs originates in the same position as an external argument. This is undesirable for several reasons. First, we would not expect to notice any differences between the single argument of Class 2 verbs and the single argument of Class 1 intransitives. However, we have seen that there are many differences: every difference between Class 1 and

Class 2 verbs that I have discussed. Second, this is incompatible with Deal (2009) because if Class 2 verbs had an argument in the specifier of v, then we would not expect *there*-insertion.

Another possibility is that Class 1 verbs introduce an external argument in the specifier of v, while Class 2 verbs introduce an internal argument that then raises to the specifier of v. This is shown in (90).

(90)



Essentially, then, Class 1 verbs have a v that introduces a new argument, while Class 2 verbs have a raising v. In this case, the blocking account and the Ramchand (2008)-style account end up being the same and have essentially the same problem. This is that although this analysis accounts for the distribution of the different verb classes, there is still no principled way of telling which class one verb will be in over another. That fact is something that must be specified in the lexical entry for each verb.

5.3 Conceptual Account

One last analysis that I will discuss is a Borer (2005)-style analysis. What I mean is that the reason that Class 2 verbs have no external argument is that it is impossible to imagine what an external argument would be for a Class 2 verb. Unlike the blocking analysis, this analysis gives us a principled reason for certain verbs to fall in certain classes. *laugh* has an external argument because it is impossible to imagine a laughing event that does not have an external argument. *arrive* does not have an external argument because we simply don't know what an external argument of *arrive* would mean.

As tempting as this account is, I'm just not sure that it tracks in this case. This account would mean that the unacceptability of (91) is because we just don't know what it means. I don't think that is the case.

(91) *The mailman arrived the letter.

Furthermore, a Borer (2005)-style account would mean that there could not be any cross-linguistics variation as to verb classes. So if *arrive* is Class 2, then no synonyms of *arrive* in any other languages would be compatible with external arguments. This does not seem to be borne out, as Hindi has different verb classes from English.

Hindi verbs depart from English verbs in terms of verb classes (Richa (2008)). For example, a large number of verbs of inherently directed motion have a transitive form, meaning that they participate in the causative alternation. These include the verbs 'ascend', 'descend', 'enter', 'fall', etc. These verbs do not participate in the causative alternation in English, but they do in Hindi. With a Borer (2005)-style account, the reason that a verb does not participate in the causative alternation is because we would not know what an Agent of that sort of event would mean. Thus, this account would have to say that English speakers cannot conceive of an Agent of a falling event, but Hindi speakers can. This is not plausible, and so the Borer (2005)-style account is also not satisfactory.

5.4 Summary

In this section, I have presented a Ramchand (2008)-style analysis of verb classes, a blocking analysis, which was very similar to the Ramchand (2008)-style analysis, and a Borer (2005)-style analysis. The first analysis was unsatisfactory because the argument structure for each verb had to be specified in the lexicon. The second analysis was unsatisfactory because it did not account for cross-linguistic variation in verb classes.

The choice between these two analyses really boils down to whether we can see a principled reason for verbs to be in one Class or another. In particular, we would like to think of a reason why a verb might be in Class 1 [+ext] instead of Class 3. Or why a verb might be in Class 2 [-ext] instead of Class 3. (The difference between intransitives in Class 1 and Class 2 might simply be the difference between internal and external arguments.) If we want a reason for a verb to be in Class 1 rather than Class 3, then that would be a difference between the Class 1 verb *cut* and the Class 3 verb *rip*. It seems that these verbs are pretty similar. Similarly, we might look for a difference between the Class 2 verb *fall* and the Class 3 verb *drop*. These two verbs also seem pretty similar. These seem like minimal pairs, and it would be difficult to argue for a non-arbitrary conceptual difference to distinguish them. I therefore conclude that the differences between verbs in the three classes are diacritics encoded in the lexicon and memorized.

6 Conclusions

In this paper, I presented a system of verb classes that divided verbs into three classes. Class 1 verbs required an external argument, Class 2 verbs required that there be no external argument, and Class 3 verbs had no such requirements. The external arguments did not have to be explicit, but they had to be real, at least in the semantics. I showed how a series of diagnostics picked out one class of verbs over another, and that the constructions involved in these diagnostics involved explicit, implicit, or absent external arguments, accordingly.

The three classes of verbs did a better job of accounting for the diagnostics than a more traditional two-class approach. Surprisingly, they also did a better job than a Ramchand

(2008)-style approach. I take this as support for my three-class account.

Although I modeled the analysis of these unaccusativity diagnostics with various v heads, some of which introduced external arguments and some of which did not, it is possible that there is an account of these facts which derives the behavior of these three classes of verbs directly from presence or absence of a semantically real implicit external argument. Perhaps such an analysis would involve making all of these implicit arguments syntactically real, as well as semantically real. I will leave that question to further research.

There are a number of unaccusativity diagnostics that I did not discuss. I propose that the three verb classes I presented are the relevant verb classes for external argument typology, which is relevant for the unaccusativity diagnostics I did discuss. Other diagnostics may be sensitive to other qualities, such as presence of internal arguments or telicity.

References

Borer, Hagit. 2005. *Structuring sense ii: The normal course of events*. Oxford Linguistics.

Bresnan, Joan, and Jonni M. Kanerva. 1992. Locative inversion in chichewa: A case study of factorization in grammar. In *Syntax and semantics 26: Syntax and the lexicon*, ed. Tim Stowell and Eric Wehrli, 53–102. San Diego.

Deal, Amy Rose. 2009. The origin and content of expletives: evidence from "selection". *Syntax* 12.

Embick, David. 2004. On the structure of resultative participles in english. *Linguistic Inquiry* 35:355–392.

Grimshaw, Jane. 1987. Unaccusatives: An overview. In *NELS*, ed. J. McDonough and B. Plunkett, volume 17, 244–259. GLSA.

Levin, Beth, and Malka Rappoport-Hovav. 1992. The lexical semantics of verbs of motion: The perspective from unaccusativity. In *Thematic structure: Its role in grammar*, ed. I.M. Roca, 247–269. Berlin.

Levin, Beth, and Malka Rappoport-Hovav. 1995. *Unaccusativity*. MIT Press.

Perlmutter, David. 1978. Impersonal passives and the unaccusativity hypothesis. In *Papers from the Annual Meeting of the Berkeley Linguistic Society*, volume 4, 157–189.

Ramchand, Gillian. 2009. personal communication.

Ramchand, Gillian Catriona. 2008. *Verb meaning and the lexicon*. Cambridge University Press.

Richa. 2008. Unaccusativity, unergativity and the causative alternation in hindi: A minimalist analysis. Doctoral Dissertation, Jawaharlal Nehru University.

Rosen, Carol G. 1984. The interface between semantic roles and initial grammatical relations. In *Studies in relational grammar 2*, ed. David M. Perlmutter and Carol G. Rosen, 38–77. Chicago: University of Chicago Press.

Zubizarreta, Maria Luisa. 1985. The realtion between morphophonology and morphosyntax: The case of romance causatives. *Linguistic Inquiry* 16:247–289.