Hidden quantification in prefix- and particle verbs

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1 Introduction

In this paper I will focus on certain verbal construction with the particle *aus-*. The problems to be discussed in this paper are not restricted to *aus*-verbs, but come with other particle verbs such as on *auf-* , *ein-* and *ab-*, but for simplicity reasons I will confine myself to *aus*-verbs. Some of the phenomena to be discussed are reminiscent to prefix-verbs in Slavic languages like *na-* and *po-* hence the mentioning of prefixes in the title. But lack of competence doesn't allow me to contribute anything to the analysis of these constructions. Whether and how the properties of *aus*-verbs that I would like to focus on can be dealt with in terms of quantification is one leading question of the paper. The properties I will focus on are as follows:

- The verbal predicates on *aus* have a determinate endpoint. That endpoint is overtly contributed by the particle *aus*.
- The events described in terms of the *aus*-verbs behave in certain respects like achievements, but they are non-instantaneous.
- Events described in terms of *aus*-verbs undergo incrementation in some stricter sense than verbal descriptions with 'strictly incremental themes' in the sense of (Krifka 1998).
- Still, for some of these *aus*-verbs a notion of an incremental theme apparently doesn't make much sense.

1.1 some examples

Here are some examples, presented if possible with simple alternates. For some reasons to become clear later in the paper I present the sentences in 'Plusquamperfekt' German 'pluperfect'.

(1) a. er hatte geschlafen / geweint / getobt
he had SLEEP.pf.prtc. / WEEP.pf.prtc. / RUMP.pf.prtc
/ geredet
/ TALK.pf.prtc
'he had slept' / wept / rumped / spoken'

b. er hatte ausgeschlafen / ausgeweint /
he had [out].SLEEP.pf.prtc. / [out].WEEP.pf.prtc. /
ausgetobt / ausgesprochen
[out]RUMP.pf.prtc / [out]TALK.pf.prtc.
' he had had a good sleep / cried until calm / rumped until calm / spoken until his point was made'

(2) a. die Banane war gereift
the banana had RIPE.pf.prtc.
'the babana had riped'

b. die Banane war ausgereift
the banana had [out].RIPE.pf.prtc.
'the banana had become fully ripe'

das Haar war ausgedünnt /
the hair was [out].THIN.pf.prtc. /
ausgeblichen
[out].PALE.pf.partc.

'the hair had thinned out / bleached out'

(3) [1]

a. sie hatten die Ergebnisse gedeutet /
they had the results DEUT.pf.prtc. /
bewertet
BE.VALUE.pf.prtc.
'they had given the results an interpretation / a grade'

[1] auslasten, ausstatten,

b. sie hatten die Ergebnisse ausgedeutet /
they had the results [out].DEUT.pf.prtc. /
ausgewertet
OUT.VALUE.pf.prtc.
'they had given the results all reasonable interpretations' 'they had given all results its interpretation / grade'

c. sie hatten sich Feuerwaffen gerüstet
'they had with fire weapons ARM.pf.prtc
'they had that themselves armed with fire weapons'

d. sie hatten sich mit Feuerwaffen ausgerüstet
'they had with fire weapons [out]ARM.pf.prtc
'they had that themselves armed with fire weapons'

(4) internet chat forum Radio Bremen4

a. Songs ausspielen!
songs [out]play
'play songs to their end, please.' [2]

b. Als Vorteil sehe ich bei diesem Sender, das alle Songs ausgespielt werden und nicht durch Werbung oder dummen Sprüchen des Moderators unterbrochen werden.

(5) [3]

a. er hatte das Lied gespielt
he had the song PLAY.pf.prtc.
'he had played the song'

b. er hatte das Lied ausgespielt
er had the song [out].PLAY.pf.prtc.
'he had played the song to its very end'

(6) a. er hatte das Buch gelesen
he had the book READ.pf.prtc.
'he had read the book'

[2]Kommentar von Hannoveraner - am 26.04.2003 08:07
Neuerdings breitet sich die Unsitte Songs abzuschneiden immer mehr aus! :mad: Was soll das?! Besonders bei RB4 ist mir diese Unsitte in letzter Zeit aufgefallen. Ich verstehe vor allem den Sinn dieser Maßnahme nicht. Bei einer wichtigen Verkehrsmeldung habe ich dafür ja Verständnis, aber ansonsten nervt es doch nur! http://www.mysnip.de/forum-archiv/thema/8773/34067/Songs+ausspielen.$html Commentary from a hearer from Hannover.''

[3]einen Arbeitsplatz ausleuchten (to fully light up a working disk)

b. er hatte das Buch ausgelesen
he had the book [out].READ.pf.prtc.
'he had read the book to its very end'

Some *aus*-verbs presented so far have alternates with simple verbs, some don't. For instance there is no predication of the form *das Haar dünnte*. From the current Stuttgartian view on verb formation this is of no surprise. We assume that all verbs, simple or complex are formed form their roots. We develop an account combining word-formation principles from *Distributed Morphology* with a DRT-based construction algorithms, (cf.(Lechler and Roßdeutscher 2009) (**?**), (Roßdeutscher 2010)). From our theoretical perspectives, both *reifen* and *ausreifen*,e.g. are formed from a property root $\sqrt{}$reif (ripe). The formation of simple de-adjectival verbs is very restricted and different from the restrictions on verbs formed from adjectival roots plus particles or prefixes. I present them in tandem for reasons of comparison only. Simple *reifen* in (**??**.a) denotes a simple change of states from the banana being not ripe to being ripe. The particle *aus-* requires a degree analysis of the of adjectives: the banana undergoes increase of degrees of ripeness up to the highest degree of ripeness a banana can have. Similarly, the hair undergoes all degrees of thinness or bleakness. The pattern is restrictive but productive, *ein Ding / ein Prinzip aushöhlen* (to hollow out a thing or principle) from $\sqrt{}$hohl (hollow) is to make it more and more hollow; *eine ausgelichene Bilanz* (a balanced budget) built from the adjectival root $\sqrt{}$gleich (equal) speaks of a budget) one where plus and minus come out as equal; *eine ausgerundete Ecke* is a rim that has been made as round as possible. [4]

In these cases a quantificational analysis of *aus*-verbs makes sense builing on an analysis of gradual change and a mapping from sequences of degrees into ordered stages of the described event. For every stage from the set of stages the theme adopt a lower (or higher) degrees of the property denotes by the adjectival root.

In the same vein verbs built from sortal roots such as $\sqrt{}$wert (value) or $\sqrt{}$deut (interpretation). These verbs follow the pattern of to apply the direcon object with an abstract entity. *die Ergebnisse deuten* or *die Ergebnisse werten* means to provide them with a meaning, i.e to bring about a state such the results have an interpretation, or to put it in German, have 'a Deutung'. With *aus*-constructions involving the same semantic construction pattern except that *aus-* has its impact. That impact can be analysed in terms of word-internal quantification: *eine Sache ausdeuten* means to give it all possible

[4]

(7) aushärten, auskühlen, ausgleichen, ausblenden, aushärten, ausgären, ausheilen,

interpretations; other cases involve quantification over parts of the direct object as in *etwas auswerten* (all parts get its grade, number or value). Again, the pattern is restricted but there is transparancy. Other examples following the pattern are *etwas ausmessen* (to provide each part long some dimension of the thing with a number representing its measure). [5]

Thus, the strategy to explicate the semantic impact of *aus-* in along the lines of word-internal universal quantification seems promising. However, the great majority of verbs are built from manner-roots, such as $\sqrt{}$wein (weep) in unergative intransitive verbs in (1) or manner-roots like $\sqrt{}$spiel (play) $\sqrt{}$les (read) in transitive verbs. In the latter the challenge concern the semantic differences between transitive alternates in (5.a) and (6.a) as opposed to (5.b) and (6.b). Both, (5,6.a, and b strictly incremental themes. For both the notion of 'culmination wrt. an argument' or 'telicity wrt. an argument' straightforwardly applies. (This also holds for the sketched analyses of (2.b) and (3.b), too, of course).

But how to make the semantic differences between the .a- and the b.-cases precise? The matter becomes more involved in the cases of type (1.b). The notion of an incremental theme isn't straightforwardly applicable, because there isn't a theme. We have subjects, only. And, according to wide-spread assumptions in current lexical semantic frameworks, subjects are introduced by voice and are not assumed to determine the semantics of verbal predicates. Since (Kratzer 1996) this is shared knowledge between people in the community of *Distributive Morphology* like (Marantz 1997), (**?**), (**?**), (**?**) and many others following .

I will tackle this problem in assuming that the incremental natural of the predicates can be reconstructed wrt. to the verbal root itself, instead of an argument. Roughly speaking, I will assume that manner roots denoting event properties such as $\sqrt{}$schlaf, $\sqrt{}$wein, $\sqrt{}$tob can be assigned degrees in a similar way as to individual properties in (2). Namely they can be assigned degrees. The idea is as follows. Manner roots describe actions of an agent. Actions require desire, power, enthusiasm, capability. I will dub those properties 'stamina'. In the outset of a weeping, a romping action the stamina for the action is high, and continually decreasing as the action is performed. When the agent cannot sleep any longer, cannot weep any longer or romp any longer or if there is no desire any longer that drives him acting, the agent will

[5] It is not always clear whether *aus-* in a denominal construction has the meaning under discussion here or a topological meaning. One examples is *den Lohn auszahlen den Lohn zahlen*, where the latter is which is constructed along the lines 'the wage is applied a number of monetarian value' $\sqrt{}$zahl (number). It is unclear whether *auszahlen* concerns the entire wage or a quasi-topological notion in the sense of 'out of the tills'. We come back to the problem of polysemy of *aus*-verbs in section 2.

terminate the action. Following these lines a requirement of *aus-* for some determinate endpoint of the action can be justified as well: the action undergoes decreasing degrees of 'stamina'. This account predicts that unergative *aus*-predicates are restricted to manner-root, for which decreasing stamina of action can be justified.

1.2 differences between simple telic verbs and *aus*-verbs

One characteristic property of sentences with *aus*-verbs in (1 — (6.b) as opposed to their simple alternates in (1-6.a) is that their use in German Präterium makes a German speaker frown. (NB. This is why I presented the sentences in pluperfect.). This makes itself felt in particular with *als*-sentences (when sentences).

(8)

a.	als der Junge schlief;	# als der Junge ausschlief,...;
b.	als die Banane reifte;	# als die Banane ausreifte;
c.	als sie das Lied spielten;	# als sie das Lied ausspielten;

The clauses with *aus* in (8) have no felicituous episodic interpretation compared to their plus-perfect variants in (1 — (6.b).[6] The reason, I assume is the fact that German Präteritum requires endpoints to be abstracted away from the descriptions. But as the particle overtly predicates about that endpoint no such abstraction is possible.

A further difference concerns their compatibility with measure adverbials and interval adverbials. In the cases where the simple predicate is a non-culminating activity as in (1.a) and in (1.b) a culmination one, we expect the a.- variants to be compatible with *for*-adverbials, i.e. German phrases of the type *drei Stunden / Tage lang*. Surprisingly, the -b.-sentences aren't felicitous with interval- adverbials, compare (9.a.), of the form *in drei Stunden / Tagen*. The 'simple telic' (2.b) doesn't combine with for-adverbials, which is expected (I refrain from presenting an examples), but in contrast to (5.a) in (5.b) not all sentences easily go with *in*-adverbials.

[6] They are felicitous in contexts of quantification over events of the negated type. E.g. (8.a) is justified where the boy never had a good sleep before, but finally did have. The addition of *endlich* makes the (8.b's) better.

(9)

a.	er hatte acht Stunden lang geschlafen	# er hatte in acht Stunden ausgeschlafen.
a'.	sie hatte drei Stunden lang geweint	# sie hatte in drei Stunden ausgeweint
b.	die Banane war in drei Wochen gereift	(?) die Banane war in drei Wochen ausgereift
c.	sie hatten das Lied in drei Minuten gespielt	(?) sie hatten das Lied in drei Minuten ausgespielt.
c'.	er hatte das Buch in drei Tagen gelesen	er hatte das Buch in drei Tagen ausgelesen.

Whether or not the predicates on the right side are felicitous depends on them making the beginning of the event under description available. For an event under description to be 'measured out' by means of an interval phrase, both, the beginning and the end must be available. This is hardly possible in (9.a, a') or (9.c). Typically the beginning is presupposed, not asserted. With songs played in radio stations the issue typically is that the songs are hardly ever played to their very end but terminated unduly. Speakers of German will recognise that substituting plu-perfect with Präsens perfekt. e.g. *er hat in acht Stunden ausgeschlafen* result in prospective readings we are familiar from both simple Präsens and Präsens perfekt of achievements, e.g. *in drei Stunden erreichen sie die Gipfel* ('in three hours they will arrive at the summit'). This indicates that the *aus*-predicates under discussion are achievements. Still they differ form ordinary achievements that they cannot be temporally located at a time points such as *um sechs Uhr* (at six o' clock) compare (10a,b). The respective time point can be located in the target state, only, s. (10.c).

(10) a. Sie erreichten den Gipfel um sechs Uhr

b. # er schlief um sechs Uhr aus.

c. er hatte um sechs Uhr ausgeschlafen.

Though the predicates qualify as achievements, they are non-instantaneous. An entire sequence of event stages part of the predication. Therefore I will dub the *aus*-verbs under discussion **sequential achievements**.

I conclude listing the differences by drawing attention to the way telicity can be inferred. As well known, German transitive verbs very often (maybe more often than not) allow atelic as well as telic interpretations. This makes itself felt in being felicitous both with *in*- and *lang*-adverbials. Whether (5.a) and (6.b) belong to this class isn't clear to me. Predicates of the form (12)

are (11) felicitous. I take them as a felicitous result of coercion. True or not, no coercion of that type is possible with the *aus*-verbs.[7]

(11) a. er hatte das Buch drei Tage lang gelesen

b. * er hatte das Buch drei Tage lang ausgelesen

(12) Er hatte das Lied drei Minuten lang gespielt

A phenomenon connected with the resistance against coercion is a difference in evalution in what counts as instance of a truthful telic description. (Kratzer 2004) made the point that the telic description *einen Berg besteigen* (to climb a mountain) can be truthfully said of events where a sufficient height of the mountain has been reached, even if the summit hasn't. In the same vein *ein Lied spielen* or *ein Buch lesen* is a true description of some playing of the song or reading of a book wrt. their characteristic parts. There is no such liberty, however, with *ein Lied ausspielen* or *ein Buch auslesen*. In the latter the very end must have been played or read.

1.3 overview of the paper

The *aus*- predicates under discussion are (i) achievements, (ii) involves sequences of stages of the event described in their terms. One the challenge i to make the differences between telic predicates and sequential achievements formally precise. To this end, we have to recall algebraic notions of 'telicty' as known from (Krifka 1998), (Kratzer 2004) and work out the differences. This will be done in section 3. For certain types of verb-formation with adjectival roots and nominal or sortal roots, as we call them, we have already sketched how composition in terms of degrees of properties and verb-internal quantification might be successful in a compositional reconstruction of the predicate. That will be done in section 4. In section 5 we will work out the idea of 'degrees of stamina' to apply in the construction unergative *aus*-verbs. In this connection we will recall work on Slavic *na*- prefixed verbs. But before we go into the formal semantics I would to like unfold the polysemy of the *aus*-particle to an extend that is relevant for the data. In this chapter we will present also a type of *aus*-verbs that have been in focus recently by [Svenonius: ??] and REF. In these cases the contribution of *aus*- to the effect of deriving sequential achievement are encapsulated with topological information.

[7] I deliberately refrain from presenting a corresponding (12.b) version. German speaker will insist in claiming that *er hatte das Lied drei Minuten lang ausgespielt* is felicitous. Right so. However, in this case *aus* has another meaning, than resulting in a 'sequential achievement'. *aus* is notoriously polysemous. I will go into this in the next section.

2 Polysemous *aus*

2.1 reflexive *aus*-verbs with manner-roots and kins

There are many ways in that a particle *aus-* may contribute to the verbal predicate. I will not go into them systematically. However, I feel obliged to direct the reader's attention to some readings that are in danger to be mistaken as instances of sequential achievements. One type is built from manner roots plus *aus-* and have reflexives, s. (13), (14a., b.). (13.a) is used, if the boy had no opportunity to romp, but full of energy. (13.a) is used, if the boy is already rumping (and is a sequential achievement). As indicated in the translations predicates are not (necessarily) telic and take *for*-adverbials (which, makes them telic in this case). They are fully felicitous in Präteritum. They are not all felicitous with *in-adverbials*.

(13) a. Lass den Jungen sich austoben
`let him the boy refl. [out]romp`
'Allow the boy to romp'

b. lass den Jungen austoben
`let the boy [out]romp`
'wait until he stops romping'

c. Lass den Jungen sich ausschlafen vs. Lass den Jungen ausschlafen

Parallel contrast go for √wein (weep), √sprech (speak, in a contexts like (13.a) meaning 'confide') and others. Sometimes, however, the distinction is blurred. In (13.c), e.g. there aren't any obvious differences.

(14) a. sie weinte sich (drei Stunden lang) bei mir aus
`she WEEP refl.acc (three hours long) with me [aus]`
'she fell into weeping (and continued weeping for three hours)'

b. er tobte sich (drei Stunden lang) aus
`he romped refl.three hours long out`
'he gave in to his romping desire (and continued romping for three hours)

As indicated in the free translation these predicates suggest themselves to be descibed in terms of 'stamina' as well: the agent brings his stamina of performing an action of the weeping or romping type into action. *aus-* contribute the onset rather than the outset of the action. Still the predicates support the natural inference that the agent calmed down. I will refer to this class to *stamina-execution aus*-predicates.

Whether there exist unergative *aus*-verb with a root or not, is a subtle matter. With $\sqrt{}$red (speak) there is none which is due to the 'propositional' profile of the root. (N.B. Whether or not these predicates are compatible with *in-phrases* is the mirror image to the sequential achievements in this respect: If an end point can be inferred they, the predicates are fine, — if not, they aren't.)

Such readings concerning the realisation aspect of action description also exist for many transitive verbs built from 'manner'-verbs. Good examples of the class are given in (15)

(15) einen Beruf ausüben (to execute a profession); einen Kampf austragen (to perform a fight); einen Plan ausführen (to execute a plan); etwas ausrichten (to have an effect); sich auf etwas auswirken (to have an effect on something), etc.

Alas there seem speakers of German that have an understanding of *ein Lied aussingen* as speaking of (the onset of) the execution of song singing, rather than singing a song, that has been sung halfway, to its very end. Sometimes the differences of the reading are blurred in that both the beginning and the end are spoken of.

2.2 sequential achievements with topological *aus*

In the following examples we have occurrence of *aus-* that have prepositional to effect that the denotation of a theme argument changes location from the inside to the outside of some container. The possible descriptions

(16) a. weil Jussi den Wein aus dem Fass laufen ließ
`Jussi wine out of the barrel run let`
'Jussi let wine run out of the barrel'

b. weil Jussi den Wein (aus dem Fass) auslaufen ließ
`Jussi wine (out of the barrel) [out]run let`
'Jussi let wine run out of the barrel'

c. weil Jussi das Fass (* von Wein) auslaufen ließ
`Jussi the barrel (* of wine ) [out]run let`
'Jussi let the barrel empty'

The particle *aus-* in (16.b) has the same meaning as in (16.a), i.e. the topological one. The (optional) prepositional phrase in brackets is governed by

the particle. In case the sentence lacks the prepositional phrase the container argument is presupposed and bound in context. The difference of interest is the contrast between (16.b) and (16.c). There are syntactic as well as semantic difference. The former, I claim, are a result of the latter: as opposed to (16.b), in (16.c) all wine is predicated have gone out the barrel that the say, the barrel is empty. We have a case of universal quantification over quanta of wine.[8] Universal quantification leads to demotion of the argument phrase the discourse referent of which is quantified over and to a promotion of the container-argument. In English and German the participant universally quantified over cannot gain a description, s. the starred PP in (16.c). There are case reasons for this impossibility. Languages like Greek have case marking of the appropriate kind. In recent syntactic literature following (Svenonius. 2004) the difference have been accounted in terms of passivised prepositional heads (cf. (Romanova 2006)). A DRT-based semantics construction from the roots can take a syntactic presentation following Svenonius' idea as its basis. The two accounts compete in what is the correct explanation for this phenomenon. The correlation between 'total affectedness' and figure-demotion has not come into view in the syntactic framework to my knowledge.

When is there figure-ground-alternation of the type (16.b) — (16.c)? Per hypothesis we have (i) particles with a relational semantics REL(y,z) such as topological *aus* (out), *an* (at), *ein*(in(to)). (ii) y changes properties by and by with respect to z; (iii) z changes properties by and by with respect to y. (iii) the change of property is exhaustive; there is a target state in the sense of (Parsons 1990). With *aus-* both, the topological and the universal aspects

[8] I have been told of people claiming that sentences of the form *das Fass ist ausgelaufen* allow continuations *..., aber es ist noch Wein drin.* This might happen, I speculate, in a context were the barrel is topic and the speaker avoids a topic change for information structural reason, even if according to truth conditions a sentence of the form (16.c) would be more appropriate. What is more, universal quantification is quantification over relevant entities. The left-overs need not be relevant in the first place, only in the second.

as in (16.c) are present.[9] Other examples where *aus-* encapsulates topological and universal aspects are listed in (18), where no topological aspect is vivid are listed in (19).

(18) den Kühlschrank ausräumen (to clear the fridge); das Glas austrinken (to empty the glass, drinking) [10]; den Eimer ausgießen (to empty the bucket); etc.

(19) ein Kästchen (mit Stoff) auskleiden (to back the little box (with tissue), sich auskleiden (to undress), ein Kissen ausstopfen (to stuff a cushion); ein Formular ausfüllen (to fill in a form); etc.

aus- in the sequential achievements with topological impact is of a different nature wrt. polysemy that with *aus-* in combination of manner-verbs. In both cases, however, we should not be surprised if the different aspects are both vivid in a predication.

3 telic descriptions as opposed to 'squential achievement' descriptions

In this section I want to clarify the semantic differences between 'simple telic' (5.a) and (16.a), (16.b) on the one hand and (5.b) and (16.c) on the other hand in more formal terms. To this end I would like to recall explications of the notion of 'telic' that have gained some authority in the community, namely (Krifka 1998). ((Kratzer 2004), (Filip and Rothstein 2005)

[9]This is not always so with *ein*-particle verbs. Although the topological aspect of *in* is still valid, *ein-* merely involves (universal) quantification. (The cream doesn't "enter" the face.)

(17) a. den Kühlschrank einräumen
`the fridge [ein]sort`
'all food (that belongs there) is sorted **into** the fridge'

b. das Gesicht eincremen
`the face [ein]cream`
'to apply vanishing cream to every part of the face'

[10] I take it that examples of the form *den Wein austrinken* must be understood as ***das Glas*** *Wein austrinken*. A predication of the form *den Wein aus dem Glas austrinken* is not felicitous, if *aus dem Glass* is a PP governed by *aus* as in (16.a)

3.1 telicity in the Krifkanian tradition

The definition ((37), (Krifka 1998):9 [adjust!] relies much on the intitution that a description of an event is telic, if there are no initial or final parts of the events that qualifify for the description to be true yet. It is only the entire event that makes the description true.

> "[...] we can characterise telicity as a property of an event predicate X that applies to events e such that all parts of e that fall under X are initial and final parts of e." (Krifka 1998):9

The definitons rely on the notion of an *event structure* E, an algebraic structure on a Domain U_E of events e, whithin which temporal prededence $\gg_E$, adjacency ∞ , overlap $\bigotimes$, and a part-of relation $\leq_E$ between events are defined. [11]

(20) TEL (37:(Krifka 1998):9):
$\forall X \subseteq U_E$ [$\text{TEL}_E(X) \leftrightarrow \forall$ e,e' $\in U_E$ [X(e) $\wedge$ X(e') $\wedge$ e' $\leq_E$ e $\rightarrow$ INI_E(e',e) $\wedge$ FIN_E(e',e)]]

Applying the definition to *ein Lied spielen* as opposed to *ein Lied ausspielen*, both predicates qualify as telic. (The complication that *ein Lied auspielen* has the presupposition that a song-singing event must be underway to apply the predicate to the event as a whole has no impact on that.)

In order to catch the difference we must go deeper into the internal linguistic structure of the predication. In the Krifkanian framework this is done in terms of the relation between the participants of the event and the event itself. As I share the conviction that the semantics of an event in its constituted at the verb phrase already and various denotations dont' change much to the identity conditions of an episodic description (cf. e.g.(Kratzer 2004)) [12] I concern myself to the direct object.

In the Krifkanian tradition telic descriptions can be characterised as preserving structure between mereological structure of the denotation of the direct object and eventuality structure. The central notion in this context that of the thematic relation *incremental theme* and *strictly incremental theme*. The rational behind the notion is to catch a one-to-one-mapping between the parts of the denotation of the theme and the parts of the event. For *ein Lied spielen* one wants to catch to intuition that the event temporally

[11] Quantization is a stronger notion than telicity. An example: X is a predicate that applies to a all events that have a run time from 3.pm. to 4 pm. X is telic, but not quantized.

[12] I leave out problems of distribution over agents in this paper. This problems in this connection are of another quality and do not concern us in the paper

emerges as the song temporally emerges. We understand *ein Lied spielen* as follows: Every part of the song-playing event corresponds to exactly one part of the song itself. We already see that this notion will not help us to tell apart the telic *ein Lied spielen* from the sequential achievement *ein Lied ausspielen* because the one-one-mapping between parts of the song and parts of the events obtains for the latter as well. So the formal characterisation of (denotion of) the direct object *ein Lied* in *ein Lied spielen* and in *ein Lied auspielen* explicate its property in both verb-phrases. In order to understand the difference we have to make precise what they have in common.

3.1.1 listing the requirements for 'strictly incremental'

I will follow the list of axioms despite some danger of redundancy. (21) guarantees that (if there is theme) it is a unique theme. (If we have relational predicates as in (16) the 'theme' will be the direct object.).

(21) Θ shows *uniqueness of participants*, $\mathbf{UP(\Theta)}$, iff
$\forall$x,y $\in U_P$ $\forall$e$\in U_e$ [Θ(x,e) $\wedge$ Θ(y,e) $\rightarrow$ x = y]

Another very general property of thematic role is them inducing a homomorphism wrt. the part relation of the semantic arguments, called *cumulativity* or *summativity*

(22) Θ is *cumulative*, $\mathbf{CUM(\Theta)}$, iff
$\forall$x,y $\in U_P$ $\forall$e, e' $\in U_e$ [Θ(x,e) $\wedge$ Θ(y,e') $\rightarrow$ Θ(x $\bigoplus_P$ y, e $\bigoplus_E$ e')]

On it own, it doesn't tell apart non-incremental predicates like *push a cart* from incremental ones like *eat apples* or *eat the apples*.

(23) guarantees that whenever x described as the theme of an event e, then a propert part of y stands in the theme-relation to some proper part e' of e.

(23) Θ shows *mapping to subevents*, $\mathbf{MSE}(\Theta)$,iff $\forall$x,y $\in U_P$ $\forall$e$\in U_e$ [Θ(x,e) $\wedge$ y $<_p$ x $\rightarrow$ $\exists$ e' [e' $<_E$ e $\wedge$ Θ(y,e')]]

The concept becomes strengthened in requiring uniqueness of events in (24)

(24) Check $<_E$ vs. $\leq_E$
Θ shows *uniqueness of events*, $\mathbf{UE}(\Theta)$, iff $\forall$x,y $\in U_P$ $\forall$e$\in U_e$ [Θ(x,e) $\wedge$ y $\leq_p$ x $\rightarrow$ $\exists!$ e' [e' $\leq_E$ e $\wedge$ Θ(y,e')]

For *ein Lied spielen* this means that if melody phrases $a_1 \bigoplus a_2$ of the song are played, then there is unique part e' of e where a_1 is played. The condition

doesn't apply for *push a cart*. Krifka mentions that it is not even clear what pushing parts of a cart may mean.

The mirror-image of the latter two condition are (25) and (26)

(25) Θ shows *mapping to subobjects* $\mathbf{MSO}(\Theta)$, iff $\forall x \in U_p\ \forall e, e' \in U_e$ [$\Theta(x,e) \wedge e' \upharpoonright_E e\ \exists!y\ y <_P x \wedge \Theta(y,e')$]

(26) Θ shows *uniqueness of objects* $\mathbf{UO}(\Theta)$, iff [$\Theta(x,e) \wedge e' \leq_E e\ \exists!y\ y \leq_p x \wedge \Theta(y,e')$]

For every part of an a-song-singing event there is a unique melody-phrase that is performed in that part.

The final condition in the list concerns the exclusion of the event or the theme being punctual such as the predicate *making a dot*. Exclusion is made explicit in condition (ii) of the definition of *strictly incremental* in (27). (ii) requires there do be proper parts of the denotation of the theme as well proper parts of the events.

(27) Θ is *strictly incremental*, $\mathbf{SINC}(\Theta)$, iff
(i) $\mathbf{MSO}(\Theta)$, $\mathbf{UO}(\Theta)$, $\mathbf{MSE}(\Theta)$, $\mathbf{UE}(\Theta)$
(ii) $\exists x,y \in U_P\ \exists e, e' \in U_e$ [$y < x \wedge e' < e \wedge \Theta(x,e) \wedge \Theta(y,e')$]

(Krifka discusses complications to the effect that while reading a book (or probably also with singing a song) some parts of it might be read twice. We ignore this complication).

cumulative vs. quantized theme descriptions Finally Krifka demonstrates of the two descriptions *eat apples* (represented as '[APPLES(y) $\wedge$ EAT(x,y,e)]) as opposed to *eat two apples*, '[2APPLES(y) $\wedge$ EAT(x,y,e)]') a cumulative and a quantized description the former is atelic and the latter is telic, according to TEL in (20).

The proof makes use of the cumulativity of APPLES on the one hand and cumulativity of EAT on the other leading to cumulativity of *eat apples*. For *eat two apples* only *eat* is cumulative, but *two apples* is quantized. This results in *eat two apples* being quantized.

(28) **quantized** ($\mathbf{qua}_P(X)$) iff
$\forall X \subseteq U_P$ [$\text{QUA}_P(X) \leftrightarrow \forall x,y$ [$X(x) \wedge X(y) \rightarrow \neg\ y <_P x$]]

A predicate X is quantized iff, whenever it applies to x and y, y cannot be a proper part of x.

If a predicate is quantized, then it is telic. If a quantized predicate X applies to some event e, then it does not apply to any proper part of it. The only e' that is a (non-proper) part of e is e itself.

3.2 Kratzer's 'measure-functions' and 'sequential achievements'

Our search for explicating the surplus of 'sequential achievements of the form *ein Lied ausspielen* compared to the simple telic *ein Lied spielen* ended with a set of requirements for the description to be true for both predicates. In the meantime investigating telicity has taken some new turn through the contributution of (Kratzer 2004).

Kratzer builds on the algebraic notion of telicity as formulated in (Krifka 1998) but represents the conditions in a different manner. She presents sentences that are described in terms of quantized predicates, still are intuitively telic. I will not go into these examples do not suggest a direct to solve the challenge of the *aus*-sentence. Nevertheless her turn to use *measure-functions* to explicate telicity might be of use.

Her working example for making measure functions better means for explicating telicity is the predicate *to climb Mount Monadnock*.

> We could say, that those events [climbing processes] culminate, when the activity described by the verb has effected all relevant parts of the direct object referent. [...] the part structure relevant for measurement are often given by convention and can vary from one context to the next. When it comes to climbing mountains, for example, bands of equal elevation seem to determine the relevant part structure, cutting up a mountain into horizontal slices [...]. It is now legitimate to say that an event of climbing up Mount Monadnock culminates ciulminates the respect to Mount Monadnock, if every relevant part of that mountain has beeen climbed up. Amoung the relevant parts is to top part, of course, and assuming a sufficiently fine-grained part structure, having climbed up all relevant parts of the mountain means that the top of the mountain has been reached. (Kratzer 2004):393

Here the before mentioned footnote comes in.:

> Since there is contextual flexibility with respect to part structures, it is in principle possible for you to climb up all relevant parts of a mountain, whithout reaching the top. You could have a sufficiently big top part, for example. You could climb the up that part without climbing all the way up it. The smaller a part the harder it gets not to climb up all the up it when climbing up that part. The predicated consequences of part structure flexibility are welcome. It's not a contradiction to claim that I climbed Mount Monadnock, but didn't *quite* make it to the summit. On the approach illustrated [...] we could attribute this judgement to a relatively coarse part structure. The volatility of part structures matches the volatility of judgements (Kratzer 2004):418

Applying this *ein Lied singen*, *ein Buch lesen* as opposed to *ein Lied aussingen*, *ein Buch auslesen* differences show up.

One can consistently claim (29.a), but not (29.b). Similar observation can be made for (30.a) as opposed to (30,b). Admittedly Kratzer's observation

still applies for *aussingen*, too, as the felicity of (**??**.c) shows. Does this mean, that the predicates differ in granularity of the part-structure? It seems to me that the adverbial *ganz* is an operators on granularity. [13]

(29) a. Sie haben das Lied gespielt, aber nicht das Ende.

b. # Sie haben das Lied ausgespielt, aber nicht das Ende.

c. Sie haben das Lied ausgespielt, aber nicht *ganz*.

(30) a. Ich habe das Buch gelesen, aber nicht das ganze

b. # Ich habe das Buch ausgelesen, aber nicht das Ende.

c. Ich habe das Buch ausgelesen aber nicht ganz.

Intuitively inference to culmination in simple telic predicates and *aus-* predicates are different: The quantized description *ein Lied* or *das Lied* in the simple telic description gives rise to the inference of the culmination of the singing in the sense that its denotation measures out the event. Culmination is inferred. With *aus-* predicates the temporal endpoint is overtly predicated and the hearer has to make sense an endpoint in the context of the verbal root on the one hand and the denotation of the direct object on the other hand. With verbal manner roots such as singing or reading the denotation of the direct object of which are strictly incremental this leads to the inference that a final part of the incremental theme underwent performance, too. The one-to-one-homomorphism between stages of the event with a final stage on the side of the events results in making parts of the denotation of the direct object 'final' to. It is *aus-* that induces temporal ordering relation onto the denotation of the direct object.

This is attested with songs, that naturally have temporally ordered parts, say the melody phrases of the song (in a more fine-grained part-structure it could be the bars of the song). With reading the part-structure could be chapters, or pages, or even lines. *aus-* always brings the *final* chapters, parts or lines into play. Final parts come into play, even if there is no overt mentioning of those parts in the verbal predicate. An examples I have in mind is (31)

(31) Lass ihn ausreden; Lass ihn aussprechen
`let him [out]talk; let him [out]talk`
'let him finish speaking'

[13] It applies to achievements as well, s. *sie hat die Waesche sauberbekommen, aber nicht ganz*.

A natural situation where (31) is uttered is that the person is interrupted in the middle of his speech. The middle of what this is depends on the granularity of units spoken. The interruption might be one of the story of this life, an argument, a sentence, or, most rudely, a word. Crucially in focus and with *ausreden* are the *final* parts of the word, sentence, talk, story of this life.

For the semantics construction this has the consequence that the activity root $\sqrt{}$red or $\sqrt{}$sprech involves silent participant, namely the intended produced meaningful entity as part of the semantic representation. Whether this implicit semantic argument is necessarily there with simple unergative verbs as in *lass ihn reden*, *lass ihn sprechen* is a matter of debate.

Let's summarise this observation as an Hypothesis.

> **Hypothesis of the induced ordering on themes**. If an *aus*-verb has an incrental theme, the denotation of that theme has temporally underlies temporal ordering.

With *ein Lied spielen* this makes itself felt in the weirdness of the (32) (This is admittedly the only examples of that type)

(32) a. Sie hatten das Lied rückwärts gespielt
`They had the song backwards played`
'they had the played the song backwards'

b. # Sie hatten das Lied rückwärts ausgespielt
`They had the song backwards [out]played`

(32.b) is weird, because the natural ordering of the denotation of the parts doesn't fit the induced one.

Intermediate summary We have seen that Kratzer's notion of measure functions to apply for the notion of 'telic wrt. an argument' is helpful for our concerns insofar it allows to bring variants of part structures of on the side of the theme. This matter hasn't been in focus in Krifkian account, where telicity follows from quantization. (As for the examples in focus in the last subsection this is not so much progress because the measure function need not be an abstract one, but can be identity). We have made one step clear in the direction of representing *aus*-predicates, i.e. the mechanism of inducing a temporal ordering.

3.2.1 'accomplishments' vs. 'achievements' in Kratzer's account

Let's recall Kratzer's definition telicity in more formal terms, in (Kratzer 2004):394, (8).

> We could try now to adjust the denotation of [telic] by allowing not only the denotation by allowing not only the direct object referents themselves but also possible path's leading to them [14] as opposed to *einen Hasen schießen* , other entities to serve as "measuring rods" for the success the events described by the verbs. This gives us the denotations of the kind illustrated in
>
> (33) (=8)
> *climb-up* λy.λs.CLIMB-UP(y)(e)
> *shoot-at* λy.λs.CLIMB-UP(y)(e)
> [telic] λR λy.λe. [R(y)(e) & ∃ f [measure(f) & ∀y'[y' ⊆ f(y) → ∃e' [e'⊆e & R(y')(e')]]]
>
> The feature [telic] turns originally atelic stems like *climb-* or *shoot-* into telics.

As already mentioned the measure functions for the examples in the last subsection f is the identity function.

Crucially for the logical form of the operator [telic] is its being applies to a two-place relation between entities x and eventualities e. For Kratzer's account, that binds [telic] to the syntactic representation of direct objects in VP this is central. In her summary of that semantic side of her account (**?**) lies emphasis on this point.

> The strategy was to think of [telic] as an operator that can construct telic predicates in interaction with the lexical meanings of of verb stems, rather than merely selecting predicates that are already telic. By granting the direct object argument an essential role in defining culmination, it became possible to account for Tenny's generalisation that direct object arguments measure out the events a verb describes, and do justice to Ramchand's insight that affects the very way the referents of direct relate to their events.

I will not go into the syntactic theory of Kratzer's. Let's for the sake of paper describe how Kratzer would analyse *das Lied aussingen*. She would probable deal das Lied aussingen as the combination of an achievement stem *ausspiel* and its direct object. Achievements are built from stems that already imply culmination, they already start out as telic. Her focus is on German accomplishment verbs. "German accomplishments do not start out as telic. They are born as atelics".

As Kratzer focuses on the combination between verbal stems and direct objects there is nothing in particular to be done. All *aus*-verbs in our

[14] the pathes refer to pathes a bullet undergoes in the alternating descriptions *to shoot at a hare* (atelic

list would be represented alike. Their representation would involve no substantial challenge to her account. Achievements including *aus*-verbs are just degenerate accomplishment with a trivial (atomic) internal part structure on the side of event as well as on the side the denotation of the direct object.

We have seen that this view apparently doesn't do justice to the subtle semantic differences between *aus*-verbs on the one hand and 'ordinary' achievements such as *den Berg ersteigen*.

The Stuttgartian account combining word-formation from roots and morphological heads differs from Kratzer's in that we investigate in the internal structure of verbs. In this framework sequential achievements of the *auslesen* type are born as atelics just the same as accomplishment. Both have the same root $\sqrt{}$spiel and or $\sqrt{}$les introducing non-culminating processes. The difference come in from how the root *aus-* interacts with it and the internal argument. However, a further complication arises for frameworks going into sub-lexical structure (including not only frameworks of *Distributed Morphology* but those like Ramchand's) that we have culmination apparently without *arguments* such that culmination is gained by measuring out the (denotation of) the argument. *aus*-schlafen is an example of that sort.

3.3 Filip's measure-functions for *na*-verbs

I will go here briefly presenting Filip's account from (Filip 2000) that applied to Slavic *na*-verbs as in (34) below.

(34) Ivan **na**guljál**sja**^{P} po górodu
`Ivan ACC-walk.past refl around town.`
'Ivan walked a lot / enough / to his heart's content around the town'

On first view there seem to be parallels between Slavic *na*-verbs and German *verbs*, enough parallels as to investigate whether and how an explication strategy of Filip's could be applied to German *aus*-verbs. (I do not feel competent enough to judge data or analyses of Slavic data.) Filip's strategy is as follows.

> [Filip:2000]:25 [...] NA (and PO) yield quantized predicates by imposing a **measure** over the indivual or event variable introduced by one of the predicate's arguments.

E.g. in 'Ivan **na**guljalsjas' the event is **measured** by its associated path argument; the path is long wrt. some standard of comparison.

Regarding the discussion in the last subsection this account seems to work for eexamples like *das Buch auslesen* and also for *aussprechen* lassen

where the extension of the implicit argument may introduce a measure over the event-variabe, — given that the measure and therewith the obtained part structure of the events can be one-one-mapped from arguments to event or from events to arguments. But there is nothing new than compared to Kratzer except the idea that arguments that measure out the event might be given implicitly rather than overtly.

What makes this outline so attractive is that apparently quantization (there therewith telicity) can be derived for unergative verbs. For our starting examples (1.b) concerning *ausschlafen* (have a good sleep) or *ausweinen* (to cry until calm again) the idea turns out a disappointment. Where to take some ever so hidden argument of an unergative verb like *schlafen* from. There simply isn't any. The reader might object, saying, in any case there is the temporal trace of the event that could be measured out. (This is a line of argument Filip and others (e.g.(Romanova 2006)) follow.) I am not in the position to tell about slavic na-verbs. As for German *aus*-verbs this is a convincing analysis. The reason for this is the restriction of *aus*-verbs of this type. It *aus-* would just mean bounded that there is a bounded temporal trace, we would expect that aus-predicate could ber formed from just any manner-root. But quite the opposite is true. Let's for sake of illustration look at the predicate *ausleben* ([out]live (in the sense of one's life coming to an end, not in the sense of *Gefühle ausleben*(to live a life according to one's feelings). You will not find *ausleben* in this sense in any lexicon of German. That doesn't mean that people don't construct this verb on the spot. (**??**) is such an occurrence.

(35) Fr̈ sie war keine Quelle mehr, die den müden, abgetragenen Wanderer am schwülen Tag ergötzt. Kein Trunk mehr kühlte sie! **Sie hatte ausgelebt!** Den letzten Lebenstropfen kostete ihr dieser Vorfall. [15]

(36) Sie hatte ausgelebt. Er hat sie so verletzt. Noch eine kleine Lüge und sie wäre zerbrochen. short-story[16]

The formation of *ausleben* is justified because the power for living has come to an end.

My analysis of these cases builds on the the conviction that the appropriate measure function should not apply to any argument, but to the event property itself. The current account predicts that unergative action descriptions with *aus* can be formed only is the context justifies a change of stamina. As a matter of fact the pattern seem productive if the root describes natural

[15] Hippel, Theodor Gottlieb von. Lebenslüfe nach aufsteigender Linie, zweiter Teil. An den geneigten Leser und an den ungeneigten Kunstrichter

[16]http://www.iphpbb.com/foren-archiv/3/187200/186240/liebe-mit-hindernissen-64492123-10617-15.html

processes involving force of a certain type. (S. (37). Other examples where power for action, desire or ability comes into play the way it comes in with *ausweinen* are listed in (38). The list includes with direct object, where the measure function of decreasing stamina is not associated with the direct object, but applies to the event-property. How long playing on the silly jokes in (38) could not go on depends how appealing they were. With the converging debugging process it is standards of testing, how often to run program under what conditions that determine its success; the program itself might not undergo any changes at all.

(37) die Glocke hatte ausgeklungen (the bell's ringing had been fading away), die Sirene hatte ausgeheult (the alarm had been fading away); die Kerze war ausgebrannt (the candle had burned down); die Uhr hatte ausgependet (the clock's pendulum had come to stop); das Tier ist ausgewachen (the animal os fully grown up), etc.

(38) a. man lernt nie aus (you never stop learning);

b. ich hab [...] jede Blödelei, die Gothic zu bieten hat, ausgereizt (I maxed out every silly joke of Gothic) google

c. der Müllsack hat ausgedient (the garbage sack is disused)

d. ein Programm austesten (sufficient debugging of a program)

4 analyses

4.1 'surplus' introduced by *aus*

Our discussion of the surplus of *ein Buch lesen* as opposed to *auslesen* ended up in the result that both share the internal algebracic structure of strict incrementation. There is a one-one-mapping in the followingw way:

- merelogical structure in the domain of event and the mereological structure of the denotation of the theme are one-one-homomorphic
  - there exists a function hom : $U_E \rightarrow U_P$ (the domain of events and the domain of entities and its parts) y' $\bigoplus_P$ y" = maps onto e' $\bigoplus_E$ e", where y' and y" are parts of part of a book and e' and e" are processes of reading y' and y" respectively

Every reading process is mapped onto *it's* part of the book. Think of a reading a dissertation. Let's say the dissertation has five chapters. Chapter 3 has been

told to provide a formal solution of a problem you are working on. The read it, but you don't understand. You believe reading the introduction and chapter 2 where framework is introduced might help you understand. But it doesn't. You continue reading chapter 4 and the conclusion in chapter 5. (In the end you still haven't got a clue). In this scenario this homomorphism holds. This situation would make (39.a,b) true; but it wouldn't make (39.c).

(39) a. Ich habe die Dissertation gelesen

b. Ich habe die ganze Dissertation gelesen. Ich habe Dissertation ganz gelesen

c. Ich habe die Dissertation ausgelesen.

The reason why (39.c') couldn't describe the situation is because the reading doesn't follow the natural order for the dissertation to be read.

What *aus*-requires in addition is one-one-homomorphism from the temporal order $\prec_t$ between the run times τ(e') $\prec_t$ τ(e') to a forseen order $\prec_{t,P}$ between parts of the denotation of the theme y.

- hom: T $\rightarrow$ $U_{T,P}$ (a one-one-function from T(ime) to temporally ordered merological parts of the theme's denotation) such that τ(e')$\prec_t$ τ(e") maps onto y' $\prec_{t,P}$ y", where τ(e') and τ(e") are the temporal traces of reading sub-events and y' and y" are parts of the theme that are naturally determined to be theme participant in that temporal order

- I will abbreviate the theme's property as SEQUENTIAL-MEREOLOGY(y) (to be read "y has a squential mereology")

Let's consider another example or reading crime fiction. You start reading a crime novel and make up a suspicion of who is the murderer. You are keen to know whether you are right in that suspicion and read the end of the novel. An event sequence of thus scenario doesn't qualify as a case *auslesen* either. That is case of *presupposition failure*. The presupposition *aus*-predicate come with that a process must have been underway to the effect that up the point *auslesen* speaks of as formulating an assertion which qualifies as reading the book along its parts its made to be read along.

Summing up, we have two requirements of *aus-* for verbs phrases built from manner roots incremental theme and *aus*. One is a presupposition of the event underway in the sequential way characterised in the last paragraph, the other is a selection restriction for the theme to allow an interpretation of SEQUENTIAL MEREOLOGY.

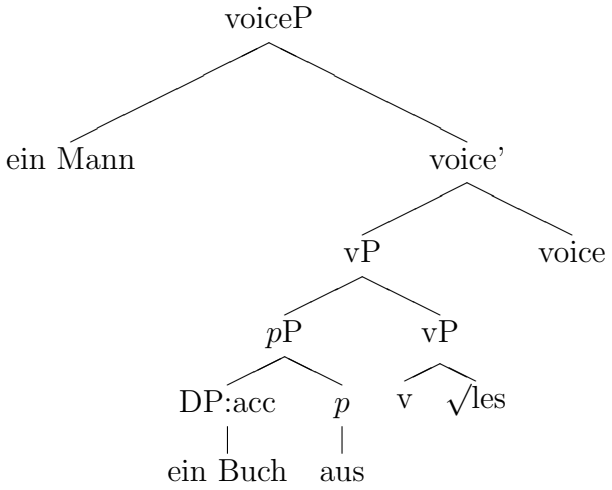
A representation of *ein Buch auslesen* has the following form (40)

(40) $\left\langle \left\{ \begin{array}{|c} \mathrm{e}^0\ \mathrm{y}^0 \\ \mathrm{READ}(\mathrm{e}^0) \\ \mathrm{e}^0\text{:}\ \begin{array}{|c} \mathrm{e}_i^0\ \mathrm{y}_i^0 \\ \sum_{\bigoplus_E}^{0\leq i\leq m} \mathrm{e}_i \\ \mathrm{participant}(\mathrm{e}_i) = \mathrm{y}_i^0 \\ \mathrm{y}_i^0 \subset_P \mathrm{y} \end{array} \end{array} \right\}, \left\langle \mathrm{e'},\ \mathrm{y}\ ,\ \mathrm{s}, \begin{array}{|c} \mathrm{book(y)} \\ \mathrm{READ(e')} \\ \mathrm{res(s,e')} \\ \mathrm{e'}\text{:}\ \begin{array}{|c} \mathrm{e}_i\ \mathrm{y}_i \\ \sum_{\bigoplus_E}^{m+1\leq i\leq n} \mathrm{e}_i \\ \mathrm{participant}(\mathrm{e}_i) = \mathrm{y}_i \\ \mathrm{y}_i \subset_P \mathrm{y} \end{array} \\ \mathrm{e}^0 \supset\subset \mathrm{e'} \supset\subset \mathrm{s} \end{array} \right\rangle \right\rangle$

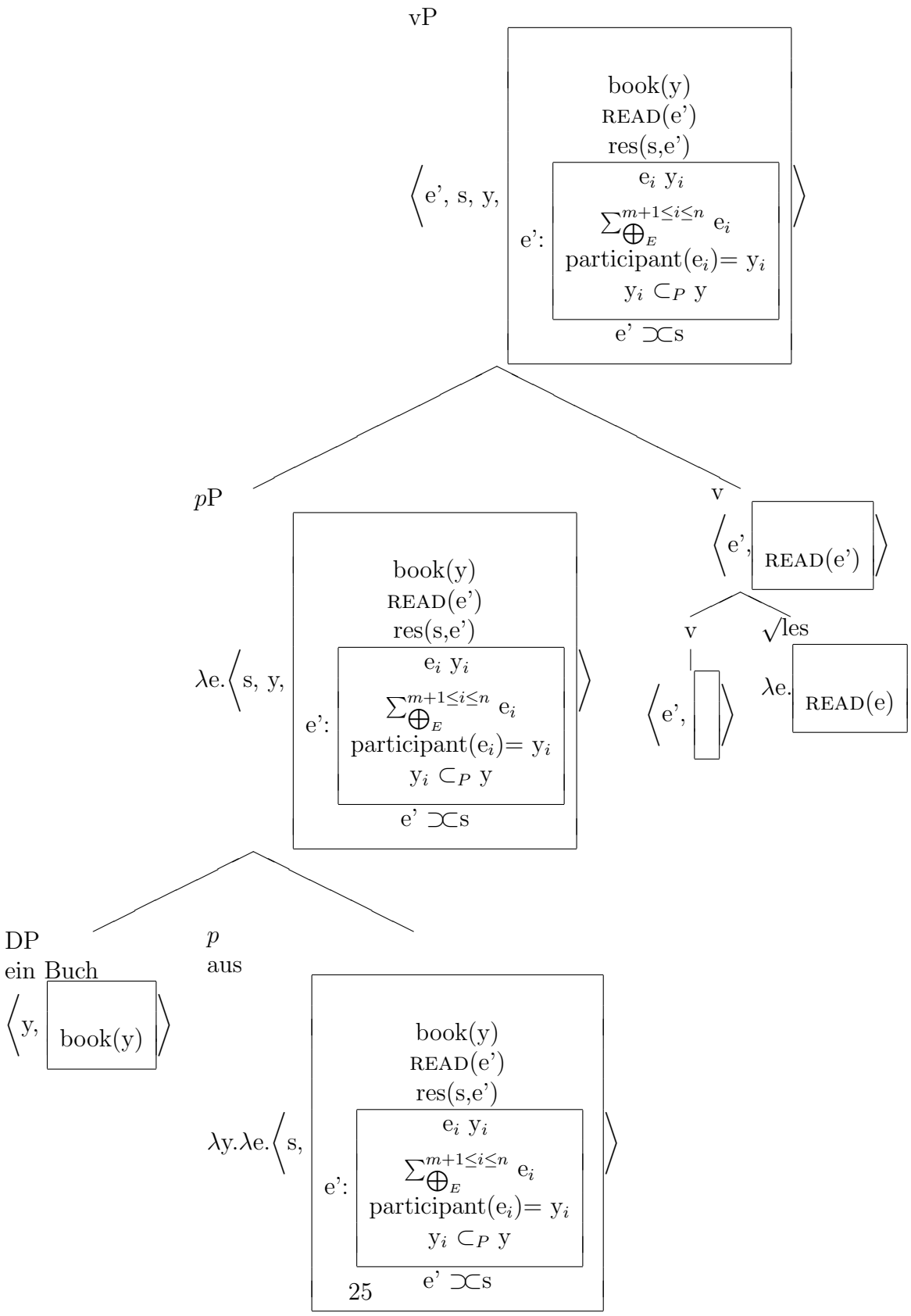
For the sake of symplicity I have refrained from representing the fact that the agent must be identical in the presupposed and the asserted event.

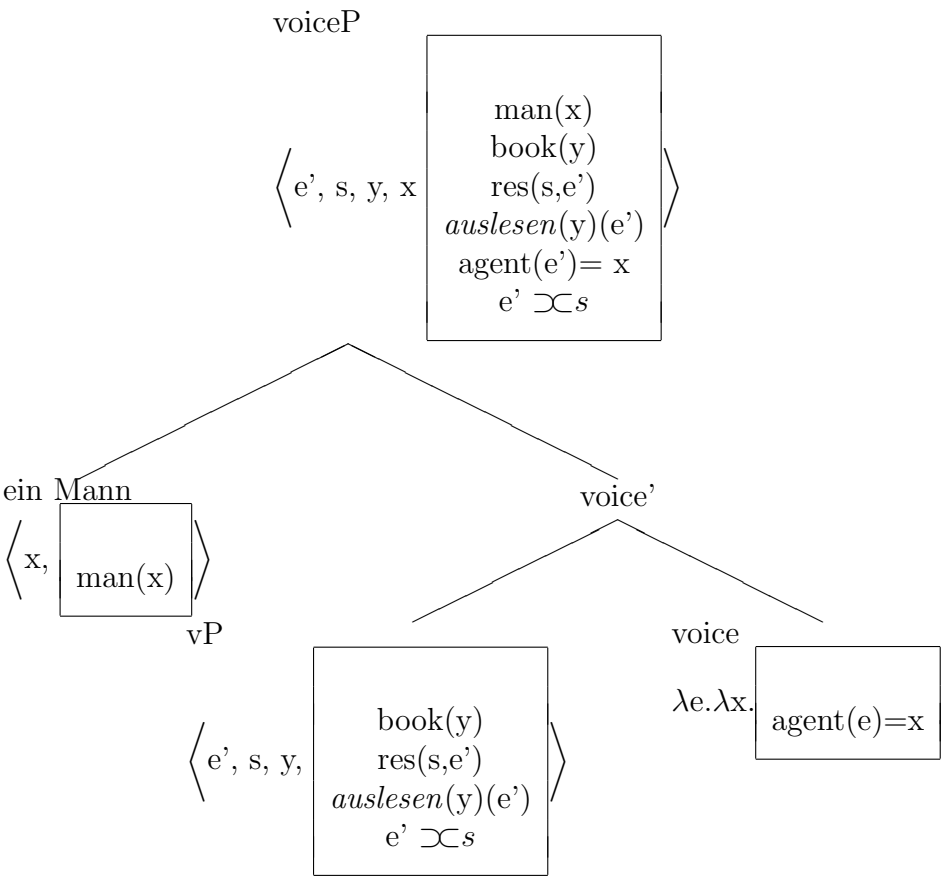
4.1.1 construction algorithm

(41) ein Mann ein Buch auslesen



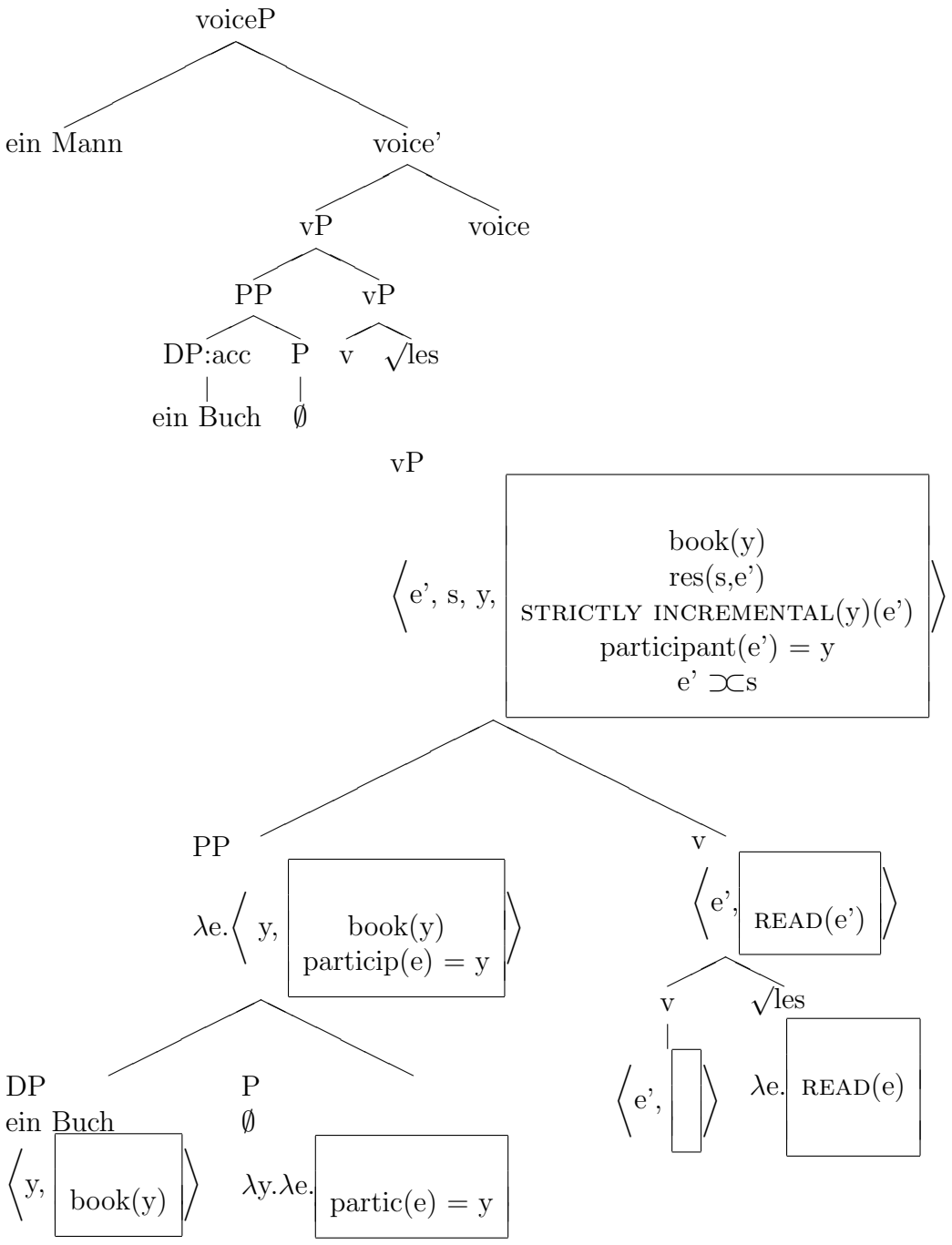
(42)


vP
book(y)
READ(e')
res(s,e')
⟨e', s, y,
e':
e_i y_i
∑⊕_E^{m+1≤i≤n} e_i
participant(e_i)= y_i
y_i ⊂_P y
e' ⊃≺ s⟩
pP
v
⟨e', READ(e')⟩
book(y)
READ(e')
res(s,e')
λe.⟨s, y,
e':
e_i y_i
∑⊕_E^{m+1≤i≤n} e_i
participant(e_i)= y_i
y_i ⊂_P y
e' ⊃≺ s⟩
v
√les
⟨e', ⟩
λe. READ(e)
DP
ein Buch
⟨y, book(y)⟩
p
aus
book(y)
READ(e')
res(s,e')
λy.λe.⟨s,
e':
e_i y_i
∑⊕_E^{m+1≤i≤n} e_i
participant(e_i)= y_i
y_i ⊂_P y
e' ⊃≺ s⟩


voiceP
⟨e', s, y, x
man(x)
book(y)
res(s,e')
auslesen(y)(e')
agent(e')= x
e' ⊃≺ s
⟩
ein Mann
⟨x,
man(x)
⟩
voice'
vP
⟨e', s, y,
book(y)
res(s,e')
auslesen(y)(e')
e' ⊃≺ s
⟩
voice
λe.λx.
agent(e)=x

4.1.2

(43) ein Mann ein Buch lesen



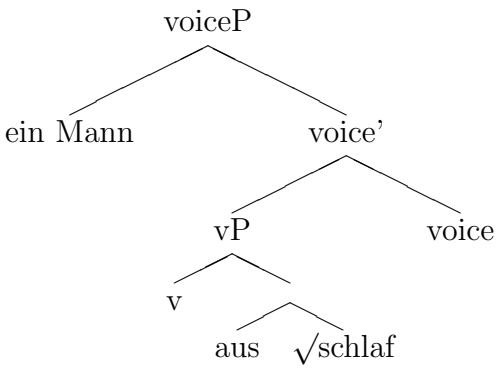
(44) der Mann ausschlafen

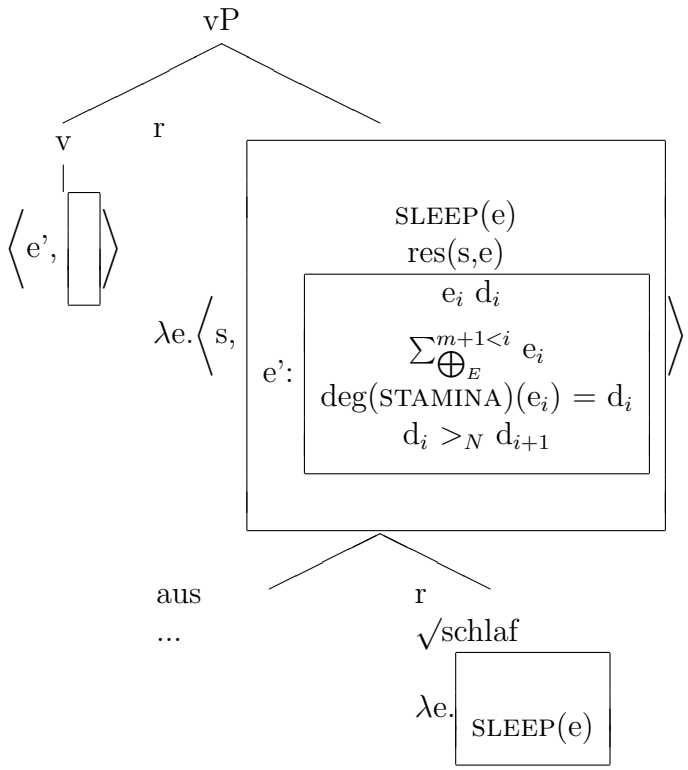
- The notion of STAMINA is defined for a sub-class of decriptions of processes, namely processes that are described with the help of manner-predicates.
- Background theory: set D of degrees of STAMINA, D = { n,...,n-i,...,0 & $n_i \in \mathbf{N}$ } where n represent the highest degree of stamina, that degree the participant has at the onset of the action (or process) and 0 is the degree of stamina when action comes to and end.
- hom: E $\rightarrow$ **N**
  for every e' $\subset_E$ e MANNER(e) & MANNER(e') and there is a certain number d' $\in$ D such such n is degree(STAMINA(e') = d'.
- In a certain context the concept of *decreasing stamina* with respect to the event property can be justified,
- $\surd$schlaf and its denotation λ.e SLEEP(e) can be justified undergoing decreasing

$$\text{SLEEP(e)} \Rightarrow \text{e:} \left[\begin{array}{c} d_i \\ \sum^{i}_{\bigoplus_E} e_i \\ \deg(\text{STAMINA}(e_i)) = d_i \\ d_i >_N d_{i+1} \end{array} \right]$$

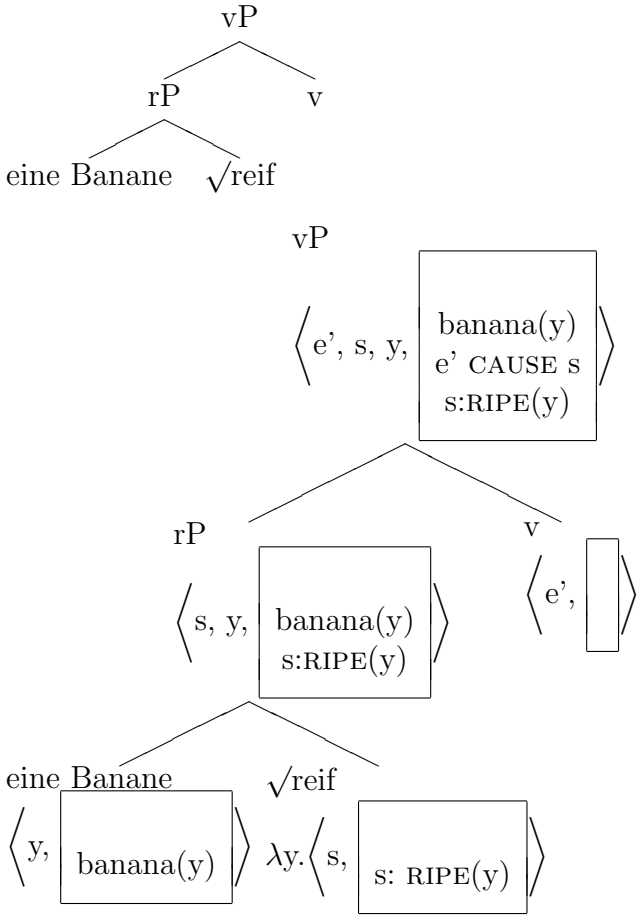
(45) ausschlafen

$$\text{vP} \left\langle \left\{ \left[\begin{array}{c} e^0\ y^0 \\ \text{SLEEP}(e^0) \\ e^0: \left[\begin{array}{c} e^0_i\ d_i \\ \sum^{i<m}_{\bigoplus_E} e_i \\ \deg(\text{STAMINA}(e_i)) = d_i \\ d_i >_N d_{i+1} \end{array} \right] \end{array} \right] \right\}, \left\langle e', s, \left[\begin{array}{c} \text{SLEEP}(e') \\ \text{res}(s,e') \\ e': \left[\begin{array}{c} e_i\ d_i \\ \sum^{m+1<i}_{\bigoplus_E} e_i \\ \deg(\text{STAMINA}(e_i)) = d_i \\ d_i >_N d_{i+1} \end{array} \right] \\ e^0 \supset\subset e' \supset\subset s \end{array} \right] \right\rangle \right\rangle$$

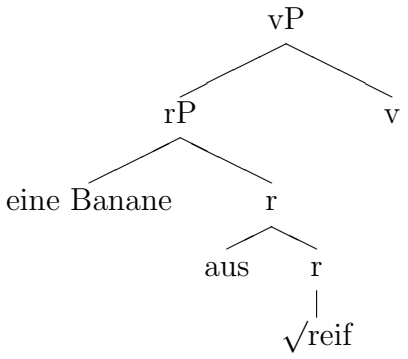

voiceP
ein Mann
voice'
vP
voice
v
aus
√schlaf

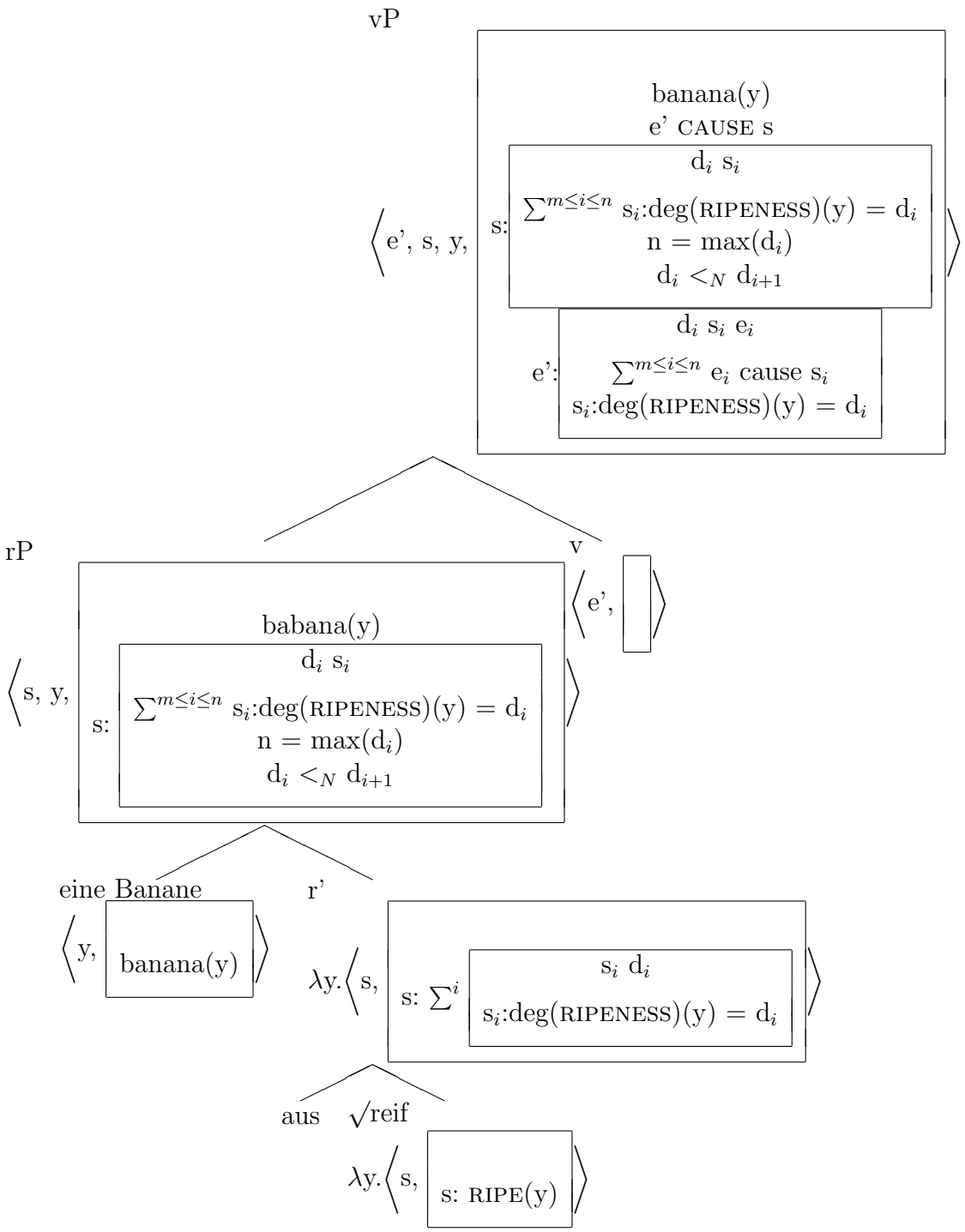

vP
v
r
⟨e', ⟩
SLEEP(e)
res(s,e)
e_i d_i
λe.⟨s,
e':
∑⊕_E^{m+1<i} e_i
deg(STAMINA)(e_i) = d_i
d_i >_N d_{i+1}
⟩
aus
...
r
√schlaf
λe.
SLEEP(e)

(46) eine Banane reifen

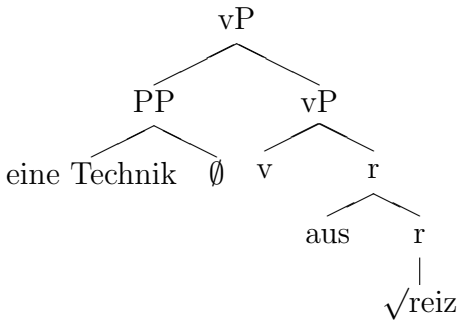


(47) eine Banane ausreifen

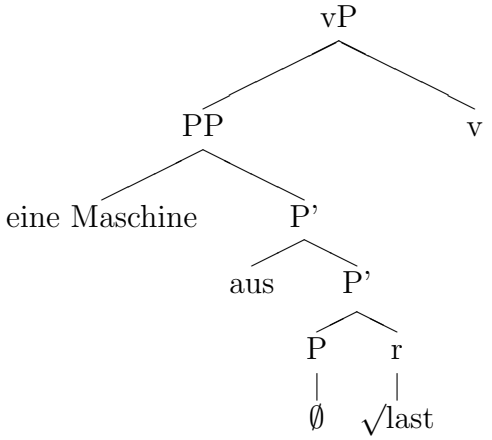


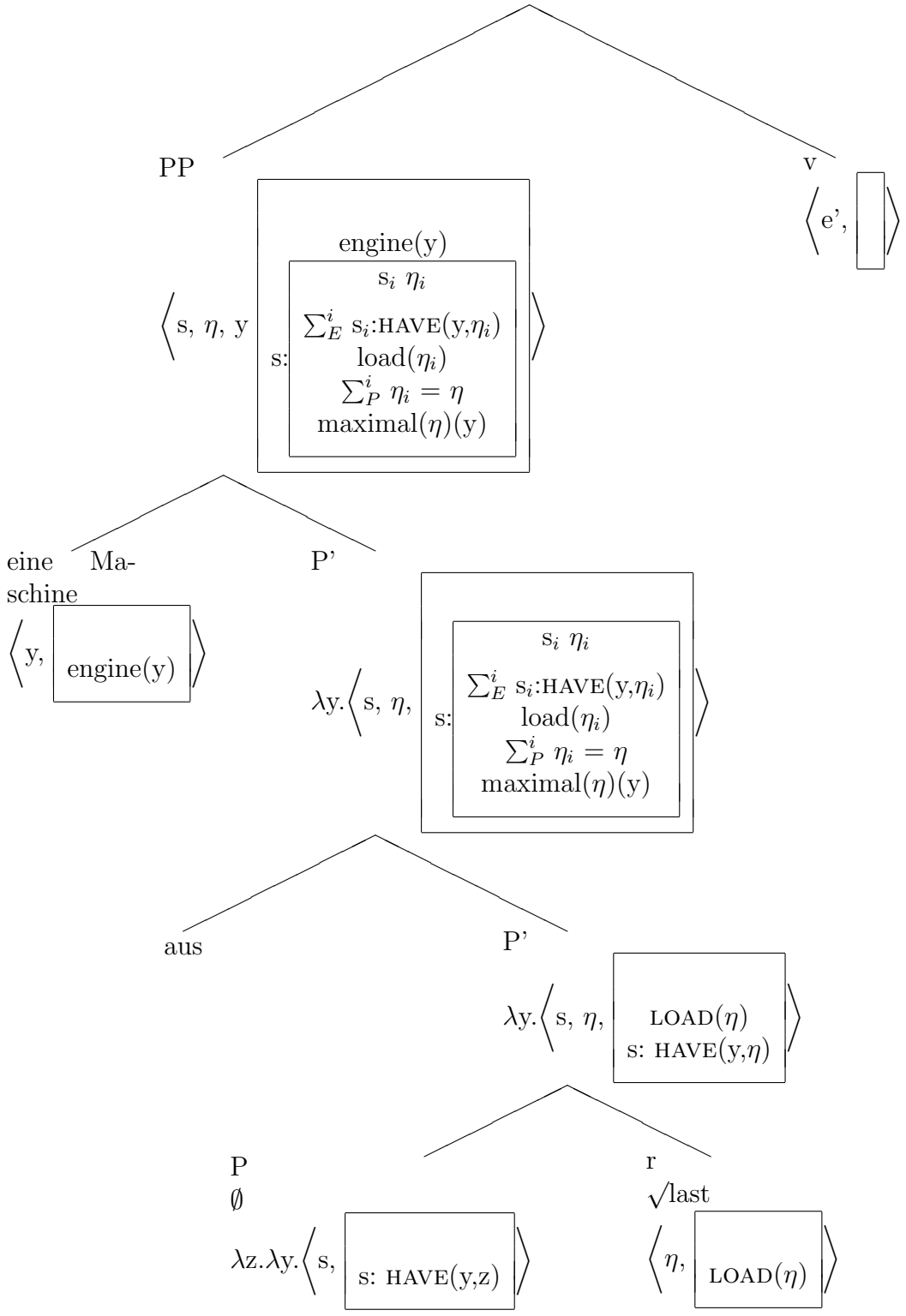

vP
banana(y)
e' CAUSE s
d_i s_i
$\sum^{m\leq i\leq n}$ s_i:deg(RIPENESS)(y) = d_i
n = max(d_i)
d_i $<_N$ d_{i+1}
⟨e', s, y, s:
e':
d_i s_i e_i
$\sum^{m\leq i\leq n}$ e_i cause s_i
s_i:deg(RIPENESS)(y) = d_i
rP
v
⟨e', ⟩
babana(y)
d_i s_i
$\sum^{m\leq i\leq n}$ s_i:deg(RIPENESS)(y) = d_i
n = max(d_i)
d_i $<_N$ d_{i+1}
⟨s, y, s:
eine Banane
r'
⟨y, banana(y)⟩
λy.⟨s, s: $\sum^i$
s_i d_i
s_i:deg(RIPENESS)(y) = d_i
aus
√reif
λy.⟨s, s: RIPE(y)⟩

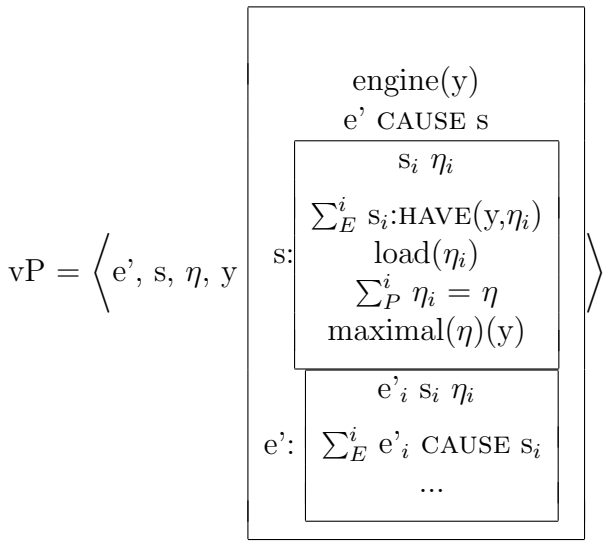
(48) eine Technik ausreizen



(49) eine Maschine auslasten




PP
v
⟨e', ⟩
engine(y)
s_i η_i
⟨s, η, y
s:
∑_E^i s_i:HAVE(y,η_i)
load(η_i)
∑_P^i η_i = η
maximal(η)(y)
⟩
eine Ma-
schine
P'
⟨y, engine(y)⟩
λy.⟨s, η,
s_i η_i
∑_E^i s_i:HAVE(y,η_i)
load(η_i)
∑_P^i η_i = η
maximal(η)(y)
⟩
aus
P'
λy.⟨s, η, LOAD(η)
s: HAVE(y,η)⟩
P
∅
r
√last
λz.λy.⟨s, s: HAVE(y,z)⟩
⟨η, LOAD(η)⟩



5 Patterns

6 aus is a modifier of an event type

(50) ausschlafen (SLEEP); ausweinen (WEEP); austoben (ROMP; auslernen (LEARN); ausdienen (ausgedient) SERVE; *er hat ausgelitten* (leiden, SUFFER);

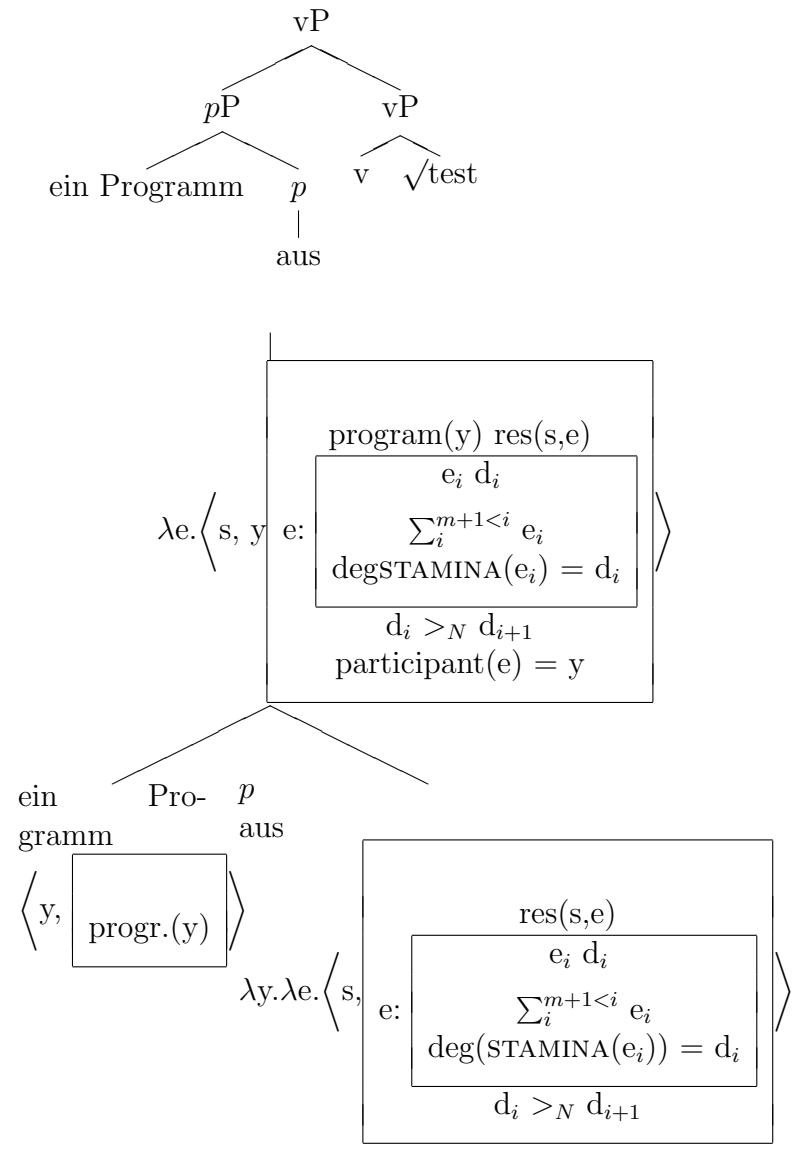
(51) an einem Ort ausharren (at some place WAIT to resist despite negative circumstances);

(52) die Glocke ausklingen (bell, SOUND); die Sirene AUSHEUELEN (the alarm HOWL; eine Uhr auspendeln (a clock PENDULAR); Kerze ausbrennen (candle BURN); ein Tier auswachsen (an animal GROW; Blume ausblühen (flower BLOOM), den Motor auslaufen lassen (machine RUN);

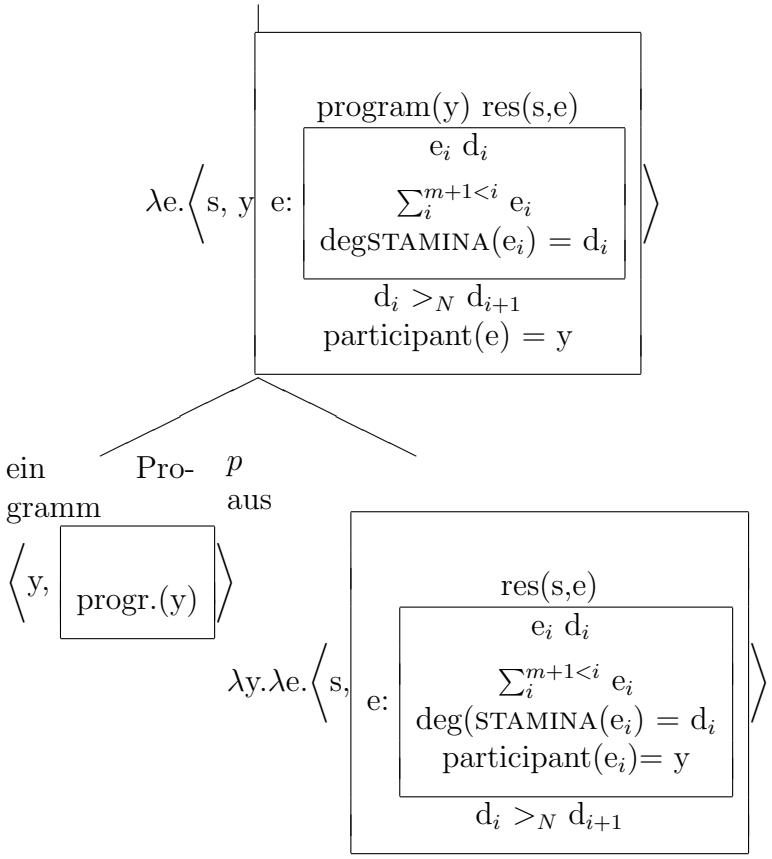
6.1 no incremental theme, but Stamina increases wrt. theme

(53) ein Programm austesten (sufficient debugging of a program); jede Blödelei ausreizen (max out every silly joke); Apfelscheiben ausbacken (apple slices BAKE); ein Fahrzeug ausbremsen (vehicle BRAKE); ein Ei ausbrüten (to hatch an egg); ein Thema ausdiskutieren (DISCUSS); ein Tier auspeitschen WHIP; eine Sache ausfechten (FIGHT);

(54) ein Programm austesten



Alternative


program(y) res(s,e)
e_i d_i
$\sum_i^{m+1<i}$ e_i
degSTAMINA(e_i) = d_i
$d_i >_N d_{i+1}$
participant(e) = y
λe.⟨s, y e:
ein Programm
Pro-
p aus
⟨y, progr.(y)⟩
res(s,e)
e_i d_i
$\sum_i^{m+1<i}$ e_i
deg(STAMINA(e_i) = d_i
participant(e_i)= y
$d_i >_N d_{i+1}$
λy.λe.⟨s, e:

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