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Andrea Lechler & Antje Roßdeutscher:
**Analysing German verb-particle
constructions with *auf* within a DRT based framework**

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Analysing German verb-particle constructions with *auf* within a DRT based framework

Andrea Lechler

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Abstract

The paper presents the results of a comprehensive case study which examined to what extent the semantics of particle verbs with *auf* can be understood as composed from the semantics of their parts. We give substance to our leading hypothesis that the semantics of particle constructions can be reconstructed as rule-based by means of semantics construction algorithms in a DRT-based framework. The compositional process is displayed through merging the semantic representations of the verbal root and the particle. Composition, as it is made operative in the DRT-framework, is akin to processes of presupposition justification as familiar from Dynamic Semantics. This method is shown appropriate for modelling the wide spectrum of compositional mechanisms which have to be taken into account in the formal semantics of particle verbs. The ambiguity of the particle *auf* can be reconstructed as restricted to only a few core meanings, some of which are familiar from the literature. We present lexical entries for the core meanings, apply them in the semantics construction and discuss sub-cases as well as metaphorical extensions.

1 Introduction

Verb-particle constructions have a bad press. We are facing judgements like the following:

There are a lot of myths surrounding German preverbal compounds: Myths trying to link their prefixes to telicity as in Slavic, myth trying to equip the prefixes with compositional meaning. True, there are productive pockets here and there and there are some connections with telicity. But even a very superficial look will deliver a pervasive picture on non-compositionality defying any quick generalisations. Kratzer (2003), p.22.

We do not want to deny the existence of myths around particle verbs, but there is one point here which we would like to reject. It is not the superficial look that provides the right picture. These verbal constructions deserve a second chance and a closer look. Therefore the present paper presents a detailed analysis of German verb-particle constructions with the particle *auf*. If the picture of non-compositionality is as persuasive

as Kratzer claims, the major hypothesis guiding our analysis, namely the idea that the interpretation of verb-particle constructions is in general rule-based, will be impossible to defend after such a closer look. We invite the reader to follow our investigation and judge herself.

Earlier studies of *auf* seem to confirm Kratzer's view. Thus in the first detailed analysis of *auf* in Kempcke (1966) verb-particle constructions with *auf* are classified according to the meaning of the entire construction, rather than according to the contribution *auf* makes to this meaning.¹ As Witt (1998) points out, early studies of verb-particle constructions were driven in their analysis by the existence of so-called semantic niches of verb-particle constructions. The members of such niches contain the same particle and have a similar meaning although the meanings of the base verbs are often very different and seemingly unrelated to the meaning of the verb-particle combination.

Yet not all experts share Kratzer's opinion. Authors like McIntyre (2002) hold that idiosyncratic, non-compositional verb-particle constructions are less common than often assumed. However, there is no in-depth study of *auf* which shares the compositionality hypothesis. All such analyses of *auf* are either part of a comprehensive treatment of different word formation patterns in German² or figure within a discussion of semantic issues concerning verb particle constructions in general.³

Although the compositionality hypothesis is at the centre of our investigation, it is not the only important theoretical assumption underlying our analysis. We subscribe to Discourse Representation Theory (DRT) as our semantic representation language.⁴ This choice of semantic framework is likely to affect what compositional patterns can be identified. Compositional mechanisms in DRT differ from those frameworks that follow principles of Montague Grammar, such as *Transparent Logical Form* (e.g. Stechow (1996)) or Kratzer (2003). DRT is not confined to functional application and composition. Although we make no attempt to prove that our unification based framework is better suited to model interpretation processes than e.g. those committed to Montague Grammar, the data show that the interpretation of particle verbs seems to have a lot in common with interpretation mechanisms familiar from presupposition justification. Such mechanisms may apply sentence-internally as well as between sentences (see e.g. Kamp (2001a)), and as far as we know cannot be easily dealt with within a standard Montague Grammar framework.

There is another fact to face when analysing particle verbs. This is the wide variety of compositional patterns. We had to learn that the idea of combining a fixed semantics of a verb with a fixed semantics of the particle does not take us far. Here is an example. In *Cannabispflanzen schießen auf* ('cannabis plants are shooting up') *auf-* is interpreted as contributing growth, and *schießen* is in turn understood as also expressing growth. Thus the standard meaning of *schießen* does not go into an interpretation of the verb-particle construction. But does that mean that our interpretation is not rule-based? If so, this would also hold for *Cannabispflanzen schießen aus dem Boden* ('cannabis

¹This is still true for the article on *auf*-particle verbs in the Digital dictionary of the Akademie der Wissenschaften, url: '<http://dwds.de/?qu=auf-&woerteruch=1>'

²E.g. Motsch (2004).

³E.g. Stiebels (1996), McIntyre (2002).

⁴See Genabith et al. (2004) for recent versions of the representation language.

plants are mushrooming', literal: 'shooting out of the soil'). Here too the verb adopts a special meaning in the context of a directional PP. In fact it seems that there is a special meaning of *schießen* in the context of plants as subjects (which probably do not move like, say, rockets). Hence this complication can be ignored in the present paper since it is not specific to particle verbs.

More serious problems seem to arise, however, in reconstructing e.g. *die Tür aufschließen* as rule-based. At first sight composition seems out of question because the meaning of the verb *schließen* appears to contradict the meaning of *aufschließen*. Yet composition mechanisms can be shown to be at work if one does not assume that the composed meaning is based on the meanings of *die Tür schließen* and *auf* in the sense of 'open'. What at first sight looks like the same transitive verb in both phrases can be shown to be very different with respect to semantic as well as syntactic properties. This difference can be made explicit in a word-syntactic framework.

We assume that verbs are constructed from their roots following principles that have been proved to be indispensable in another domain of word-formation, i.e. *ung-*nominalisation (see Kamp and Rossdeutscher (2008)). Our syntactic constructions follow principles of Minimalist Syntax which assume that all structure emerges from operations of MOVE and MERGE. We owe much to research in the field of Distributive Morphology, such as Marantz (1997), Marantz (2005). In particular we owe Marantz the concept of bi-eventive structures in syntax.⁵

We do not think that our semantic investigation of how the composition process of particle verbs can be made precise in formal terms is doomed to failure if some of our syntactic representations will turn out indefensible. On the other hand, syntactic representations must support semantic composition. So our proposals may be of some value in the ongoing discussion of word-syntactic principles.

We are not in the position to present a general theory accounting for the syntax and semantics of particle-verbs, not even for *auf*-particle verbs. Such a theory must be part of a more general theory of the formation of verbs from their roots. One component of such a theory, we believe, must contain word-syntactic principles. But in order to formulate hypotheses as part of such a theory more investigations in the syntax and semantics of particle verbs are needed. In the meantime the reader is invited to regard our word-syntactic representations as possible routes to the semantics of the verbal constructions to be composed. There may be different routes leading to the same semantics.

But we are running ahead. Syntax is not our central concern in this paper. Our central concern is to investigate how and to what extent interpretation of verb-particle constructions with *auf* is rule-based. Now, 'rule-based' needs qualification.

⁵The experts seem to agree that there is hardly any consent on the correct syntactic representation of particle verbs in German, see Den Dikken (2002). The discussion is complicated because what appears to be the same particle in different languages differs with regard to syntactic properties. A syntactic analysis that accounts for the English *up* would not apply to the German *auf*-; e.g. the analysis of Ramchand and Svenonius (2002) cannot be generalised for German. As for German verb-particle constructions there is not even agreement on the data about topicalisation, see e.g. Zeller (2001). And among those who agree on data there is no agreement on their explanation, compare Zeller (2001) vs. McIntyre (2001). So we are forced to present some preliminary syntactic representations.

First, ‘rule-based’ does not mean that interpretation always occurs spontaneously. We agree with Jackendoff and McIntyre that particle verbs might be listed. Nevertheless, we also considered neologisms (i.e. constructions not in Dudenredaktion (2001) or other dictionaries), mainly found over google, especially to test hypotheses about what compositional patterns are possible. Moreover we do not treat interpretations of verb-particle constructions which only occur in certain contexts as exceptions from some ‘actual’ meaning of the construction which can be determined in isolation. On the contrary, the focus of attention in judging whether or not an interpretation is possible is shifted from the properties of the base verb to those of the entire context a construction occurs in.⁶ Very often context does matter. Yet some combinations are so obvious or so frequent that they can be made sense of even out of context.

Second, ‘rule-based’ does not mean that there are no idiosyncrasies. *Aufhören* (to stop, literal: up + to hear / listen) is a clear case of that. But whether a construction is rule-based or idiosyncratic is not a black-and-white issue. There are cases which can at least be reconstructed as following a certain pattern. *Aufpassen* (to keep an eye on) could be seen as an example (cf. section 9). Here a meaning component of planning or foreseeing is detectable in *auf*, which can also be found in, for instance, *aufsparen*, *aufheben*, or *auflauern*. *Passen* (to pass) might contribute ‘refrain from acting, being ready to act’. We feel that these suggestions are worth being brought into discussion, but we are cautious not to describe them as instantiations of active rules.

Aufgeben is another instance within this grey area. As we discuss in section 2 reconstruction cannot even follow a particular pattern but may be done along several lines, neither of which is entirely free from speculation. (N.B. It is not uncommon that several interpretations of *auf-* are equally straightforward in a particular context. This raises the question of when we have an ambiguity that needs to be resolved (which is definitely the case for contradictory analyses) and when we can leave the resulting DRS underspecified with regard to what interpretation of *auf* is present. However, this issue cannot be addressed systematically in the paper. Similarly, we must leave for a later occasion the problem of how to present cases of the latter type in the underspecification framework of DRT.)

To discuss one last example in our ranking from ‘idiosyncrasy’ to ‘transparency’, *aufholen* might be judged non-transparent. But then *aufrücken* (to move up), *zu jemandem aufschließen* (to close the gap on someone), as well as *überholen* (to overtake) or *jemanden einholen* (to catch up with someone) would all have to be judged non-transparent. If we follow this view, non-transparency seems to become pervasive and all these verbs seem to be independent of one another. Yet this is not the view we adopt in this paper. We gain a new perspective on *aufholen* by doing away with the idea that *holen* in *aufholen* is a genuine transitive verb meaning ‘to fetch’. On our analysis the root in transitive *holen* is the same as in the other *holen*-particle-verbs, and ‘fetch’ is one context-dependent reading which a verbal construction with this root may gain.

For the sake of the idea that lexical knowledge is organised we want to give this view a chance. And we want to make it as precise as possible in that we commit ourselves to what the common contribution of the roots is. We are aware that the differences

⁶Here our approach seems to differ from that of Stiebels (see Stiebels (1996), p. 263).

among senses are often more subtle than can be expressed in our formalism; so we can only give approximations and capture most important meaning aspects. Yet we are convinced that trying to capture meanings of words, and thus also of particles such as *auf*, within a logical formalism such as that provided by DRT is an important enterprise.

Overview of the paper

The chapters of the paper follow the patterns of the contribution of the particle *auf*, most of which are widely assumed in the literature. These patterns we dub as '*auf* is ...' lines in the headers of the sections. In some sections the headers will be broken down to several variants of the pattern in question (see table of contents). The contribution of *auf* dealt with in the section headed by '*auf* is partition or summation' is not discussed as such in the literature. We also present a section on deverbal and denominal verbal constructions with *auf*. Although this section does not provide new interpretation patterns it raises questions of verbal constructions from denominal and deadjectival roots interacting with the particle.

The paper ends with an overview of the patterns and respective lists of verbs exemplifying them in the appendix.

2 *auf* is alignment with the vertical axis

2.1 *auf* as referring to a path of motion

All analyses of verb-particle constructions with *auf* mention as one sense of *auf* an upward movement. Indeed this is the original meaning of the particle, or rather its Old High German predecessor, the adverb *ûf*.⁷ Nowadays this compositional pattern is not as productive any longer and *auf* is often replaced by *hoch*. Nevertheless this sense of *auf* is still very frequent and can be clearly identified in many contexts. The following sentences show some examples:

- (1) *Zuerst stieg er auf, um Haken in die Wand zu schlagen und anschließend ein Seil zu spannen, an dem sich sein behinderter Freund hochziehen konnte.*⁸
'First he climbed [*stieg*] up [*auf*] to hammer hooks into the wall and subsequently attached a rope, on which his disabled friend could pull himself up.'
- (2) *Vom Aschenbecher, der auf dem Piano steht, steigt Tabakqualm auf.*⁹
'Tabacco smoke is rising [*steigt [...] auf*] from the ash tray, which is standing on the piano.'

⁷Grimm and Grimm (2007)

⁸This example is taken from the Huge German Corpus (HGC). Yet most other examples are taken from the internet, so unless stated otherwise this can be assumed to be the case.

⁹HGC

Although there is agreement in the literature that *auf* can express that something moves upwards (“aufwärts”, “nach oben”, “empor”), authors do not agree about what exactly such an upward movement consists in. Stiebels, who does not discuss this sense of *auf* in much detail, seems to think that it involves an object’s taking off from the ground.¹⁰ Her analysis of *auf* seems to provide correct interpretations of (1) and (2). However, the following sentences show that *auf* can also describe the movement of objects that stay on the ground.

- (3) *Es lohnt sich auch, vom Govc-Hof aus auf der Schotterstraße bis zum Bauernhof der Familie Prodnik-Vrsnik (Robanov kot Nr. 37) aufzusteigen und zuzusehen, wie drinnen in der schwarzen Küche Würste und Speck geräuchert werden [...].*¹¹
 ‘It is also worth climbing [*steigen*] from the Govc Farm on the gravel road up [*auf*] to the farm of the Prodnik-Vrsnik family (Robanov kot Nr. 37) and to watch how sausages and bacon are smoked inside the black kitchen [...].’
- (4) *Wer es gerne etwas ruhiger hat, kann auch zu Fuß zur Britanniahütte aufsteigen und am nächsten Tag über den Hohlaubgrat zum Gipfel aufsteigen.*
 ‘Those who like it a bit quieter can also walk [*steigen*] up [*auf*] to the Britannia Hut and on the following day climb to the summit via the Hohlaub ridge.’

Stiebels probably arrived at the assumption that movements described by *auf* involve an object taking off from the ground because she considers *auf* to describe movements as pointing in the opposite direction of gravity. Yet the movements described in (3) and (4) clearly deviate from the vertical axis, and a slight deviation is also likely to be the case in the situations described by (1) and (2). It seems that the paths of movements referred to by *auf* display a variety of different shapes.

Given that, it may seem sensible to give up the attempt to specify the form of these paths in the semantic representation of *auf* and instead to just describe the resulting position of the moving object in relation to its starting position or some other point of reference. This is in fact Eichinger’s approach in Eichinger (2000). He states that *auf* describes a movement into a space which is regarded as “absolute up” from the perspective of a normally oriented human being.¹² This is in accordance with his general characterisation of *auf* as expressing the reaching of a functionally appropriate, positive state (“funktional sinnvoller, im Sinne des Geschehens positiver Zustand”, *ibid.*). However, it seems that not all movements described by *auf* have such a definite goal or final point. A good illustration of this point is (2).

The foregoing also speaks against the view that *auf* expresses the requirement that the moving object be at a higher position after the movement than it was before. This

¹⁰“Da *tanzen* eine Bewegung mit regelmäßigem Kontakt zu einer Oberfläche bezeichnet, ist *auf*₂ mit der Bedeutung “empor”, also der vollständigen Loslösung von der Fläche unzulässig.” (Stiebels (1996), p. 267)

¹¹HGC

¹²“Bewegung in einen von der Normalorientierung des Menschen als absolutes Oben betrachteten Raum”, p. 238

is one meaning Lindner (1983) assigns to the English particle *up*.¹³ Lindner considers the projection of the path of a movement on the vertical axis and claims that *up* can be used to describe a movement if the distance between the point on the vertical axis corresponding to the starting point of the movement and a reference point, such as the ground, is smaller than that between the point corresponding to the final point of the moved object and the reference point. This analysis allows her to subsume different kinds of paths described by *up* under one abstract schema, and could be claimed to apply to the German *auf*, too.

Yet, as we have seen, in the case of *auf* there is not always a clear end position which could be compared to the starting point of the movement. Another problem with such an account is that it falsely categorises cases with significant deviations in the opposite direction as describable by *auf*. Thus an object which first moves 10 meters in the direction of gravity and then 10 meters and 1 centimetre in the opposite direction would hardly be described as having moved *auf*, even though its final position is higher than its initial position. Of course, slight deviations in the direction of gravity are allowed by *auf* and it may be possible to set up complex rules about how much deviation is allowed or even to just rely on an intuitive grasp of speakers of how much deviation is allowed. However, this puts into question the correctness of an analysis whose fundamental parameter is the position of the moving object. Such solutions would also have to give significant weight to the path of an object and thus the directions involved in its movement. Moreover, even the concept of height itself presupposes the concept of the vertical axis, and thus of a direction. In language in general the concept of direction seems therefore more fundamental than that of height. That an object is at a higher position as a result of a completed upwards movement has to be inferred on the basis of suitable axioms. And this is what we will indeed provide within this subsection.

We are thus back to the idea that *auf* in this sense refers to the direction or path of a movement. Yet we have to give up the idea that it describes the precise shape of a path. It rather introduces the direction of a motion with respect to a certain conceptualisation of space. Our assumption throughout this paper is that many natural language predicates only encode spatial relations with respect to a coordinate system which we call “primary perceptual space” (PPS). Kamp and Roßdeutscher (2005) capture this assumption in what they call the “principle of the Primacy of Orthogonality in Spatial Conceptualisation”: “Spatial orientations are perceived as much as possible in such a way that all relevant directions are parallel to one of the axes of PPS” (p. 7). In PPS a vector in the opposite direction of gravity (VERT), and a horizontal plane (HOR) orthogonal to it are fixed, whereas the two axes on the horizontal plane depend on the context. If we say that a path is in alignment with VERT with respect to PPS, then this means that given the three options PRIMARY PERCEPTUAL SPACE (PPS) offers, the movement is

¹³pp. 112ff. Although the German *auf* and the English *up* can obviously not be taken as identical in meaning, they did evolve from the same origin and there are still many similarities in meaning between them. In particular they have retained as one important meaning component, the original sense of an upward movement. Therefore Lindner’s analysis can be considered as relevant in this context. It is also interesting for our purposes because it is guided by the hypothesis that most verb-particle constructions with *up* are compositional or, in her terms, “analysable” in meaning.

most accurately described by being parallel to VERT.¹⁴

We will not attempt here to give a precise account of when a movement is regarded as parallel to or in alignment with VERT. In most cases assigning a movement to one of the axes of PPS and choosing a corresponding natural language predicate does not seem to be a problem for the speakers of a language. Moreover, what we are interested in here is how languages encode spatial relations.

Following our assumptions we can represent the contribution of vertical *auf* as in (6). The particle introduces the constraint that the construction describe a motion \underline{e} of some target \underline{y} the path \underline{w} or which follows VERT, i.e. the direction opposite to gravitation. We follow the convention that the underlined discourse referents must be bound during the construction.

$$(6) \quad auf \rightsquigarrow \begin{array}{c} \underline{w} \ \underline{e} \ \underline{y} \\ \text{MOVE}(\underline{e}, \underline{y}) \\ \text{WEG}(\underline{w}, \underline{e}) \\ \text{ALIGN}(\underline{w}, \text{VERT}) \end{array}$$

In order to present the semantics of *Rauch aufsteigen* we present without much discussion a tentative syntactic representation in the word-syntactic framework.

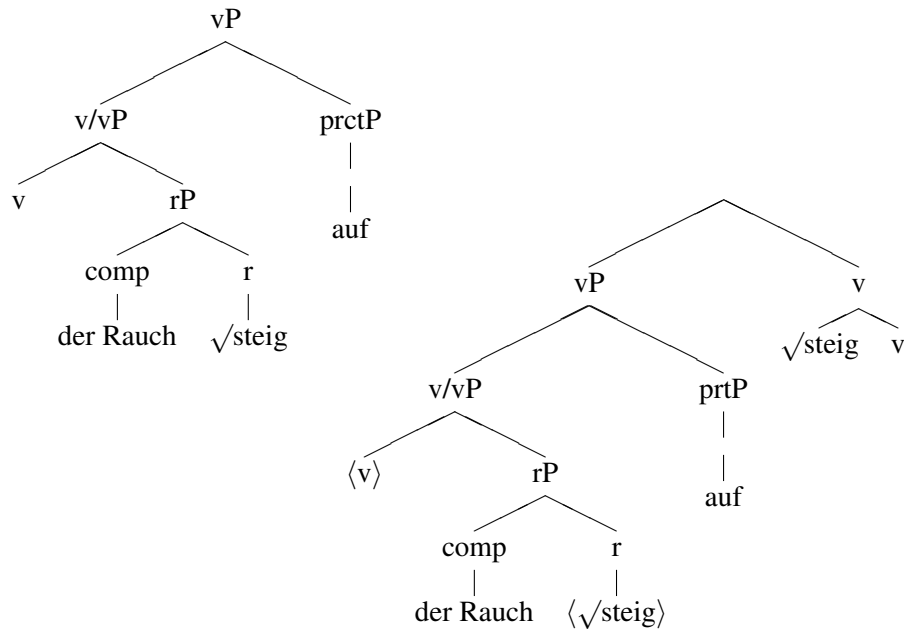
The verb phrase construction is a verbalised root-phrase, which introduces the internal argument of the verbal construction. The root incorporates into the functional projection v , which we assume in accordance with minimalist theories of German syntax (see Adger (2003)) to move to some higher functional projection like T(ense). We will later refrain from representing syntactic movement. A general discussion of the syntax of particle constructions must wait for another occasion. We confine ourselves here to present vP-constructions. For semantics construction see (8).

¹⁴In the framework Kamp and Roßdeutscher (2005) every motion event e : MOVE(y) of a theme y has a path w (read w as German "Weg"), see AXIOM (5)

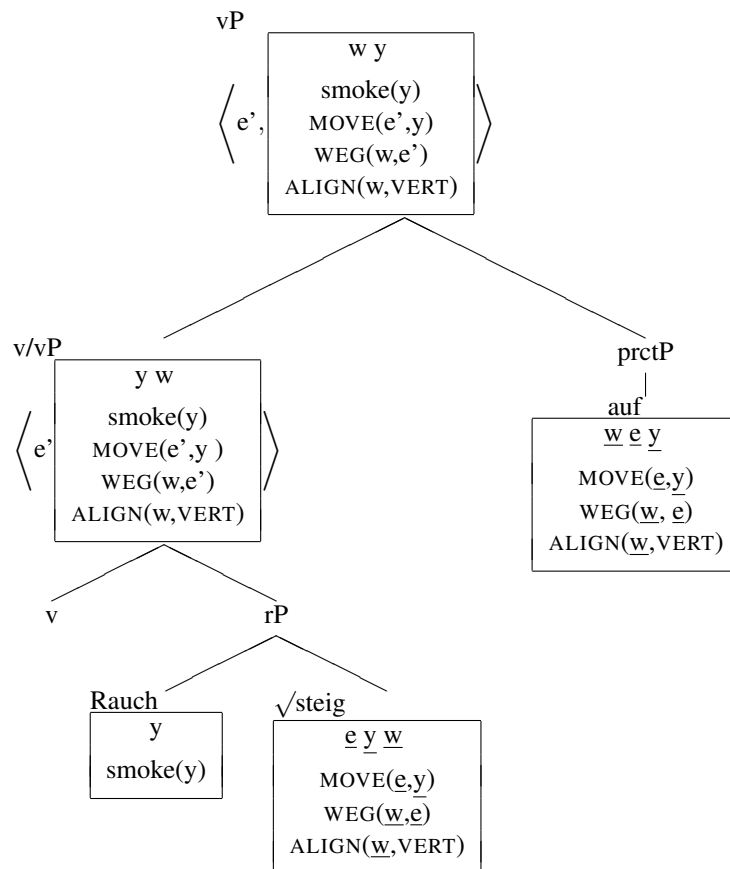
$$(5) \quad \begin{array}{c} \underline{e} \ \underline{y} \\ \underline{e}:\text{MOVE}(\underline{y}) \end{array} \Rightarrow \begin{array}{c} \text{lr} \\ \underline{w}(\underline{e}, \text{lr}) \\ \text{curve-segment}(\text{lr}) \\ \begin{array}{c} \text{lr}' \\ \underline{w}(\underline{e}, \text{lr}') \end{array} \Rightarrow \begin{array}{c} \text{lr}' = \text{lr} \end{array} \end{array}$$

According to (5) a path w is a unique one-dimensional linear region 'lr' of a motion e . With rectilinear motion the path w is a straight line. If we speak of a path w being in alignment with VERT, the corresponding motion is rectilinear. (In the following we will skip the reference of w to its corresponding motion event e . w is always the path of the motion event in context.)

(7)



(8)



Justifying the binding demands of *auf* is resolving them as semantic elements already introduced by the verb *steig(en)*, which lexicalises upward motion. As a consequence the requirement of *auf* for some path \underline{w} , motion \underline{e} , and theme \underline{y} is resolved

by unification: $\underline{e} = e'$, i.e. the referential argument of the verbal construction (which is according to the construction principles introduced by the verbalising v-head and which is represented to the left of the DRS representing the verb); $\underline{w} = w$ and $\underline{y} = y$, the internal argument of the verbal construction which enters the construction in the root phrase (rP) already.

Note that in some cases *auf* can denote a motion along the vertical functional orientation of an object, rather than along VERT. This is the case in the following examples.

- (9) *Hören Sie nach drei bis fünf Minuten keinen Rülpsen, können Sie Ihr Kleines wieder hinlegen. Dann war entweder nicht viel Luft im Magen oder sie kommt später hoch: Sie kann auch im Liegen aufsteigen.*
 ‘If you don’t hear a belch after three to five minutes, you can lay your little one down again. In that case there was either not much air in the stomach or it will come [*kommt*] up [*auf*] later: It can also rise [*aufsteigen*] when lying.’
- (10) *Falls Sie unter saurem Aufstoßen leiden, verschlimmert sich dieser Zustand auf Grund der Schwerkraft meist im Liegen.*
 ‘If you suffer from acid regurgitation [*Aufstoßen*], this state usually worsens when you are lying because of the effect of gravity.’

The semantics differ from those in the previous examples in that VERT is substituted by $\text{VERT}_{fun}(x)$ of some person x . Nonetheless we believe that these cases do not exemplify an additional sense of *auf* which fundamentally differs from (6). The respective sets of examples mainly differ in their conceptualisation of space, i.e. in what the vertical axis stands for. The matter is slightly complicated by the fact that perception also plays a role, here, which makes itself felt in the dative construction. We will discuss this sense of *auf* in more detail in section 4.

In the examples discussed so far the particle’s semantic constraints were ‘justified’ following principles known from theory of ‘presupposition justification’.¹⁵ The binding constraints in the DRS representing *auf* are fulfilled by the contribution of the verb the particle combines with. Composition can be modelled in these cases within a unification based theory of composition. Unification is possible if the context contains or allows to accommodate a motion that can plausibly be described as going upwards or along a functional vertical.

In cases where such a motion is not already present in the context, justification of the semantic constraints of *auf* is also possible if the context is appropriate for accommodating an upward motion. This is what happens in the following cases.

- (11) *Da wurden Bodenbrüter wie Goldammer und Baumpieper von freilaufenden Hunden aufgeschreckt.*¹⁶
 ‘Ground breeders such as yellowhammers and tree pipits were scared [*geschreckt*] up [*auf*] by loose dogs.’

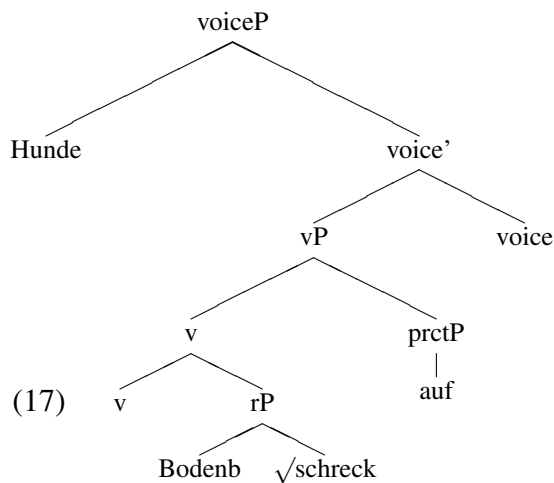
¹⁵See Kamp (2001b), Kamp (2001a).

¹⁶HGC

- (12) *Das Herz krampft sich einem zusammen, wenn Kletterer in einer Steilwand hängen und die wenigen brütenden Falken aufjagen.*
 ‘One’s heart clenches when climbers hang in a steep face and chase [jagen] up [auf] the few breeding falcons.’
- (13) *Orangebäckchen leben in erster Linie von Samen der zahlreichen Süßgräser, die sie in den Savannen und Steppen reichlich finden, vom Boden aufpicken oder direkt vom Halm aus den Rispen picken.*
 ‘Orange cheeked waxbills live primarily on seeds of the numerous varieties of sweet grass which they find abundantly in the savannahs and velds, and pick [picken] up [auf] from the ground or directly from the culm out of the panicles.’
- (14) *Mit der Hälfte der Hühnerbrühe ablöschen, dabei mit dem Kochlöffel den Bodensatz aufrühren.*
 ‘Add half of the chicken stock while stirring [rühren] up [auf] the sediments with a cooking spoon.’
- (15) *Nachmittags fing wieder ein verrückter Wind zu wehen an, der wirbelte Sand auf und hob sogar Steine hoch.*¹⁷
 ‘In the afternoon a crazy wind started to blow again, which swirled [wirbelte] up [auf] sand and even lifted stones.’

That the birds in (11) and (12) move (physically) is only expressed through *auf*, there is nothing else in the context which describes the birds as moving. In particular, it is not the case that the verbs in these sentences introduce motion. *schrecken* describes a psychological state, whereas *jagen* refers to an activity. Justification is, however, possible because it is plausible that the events described by these verbs cause birds to move upwards. Composition in (11) is as follows:

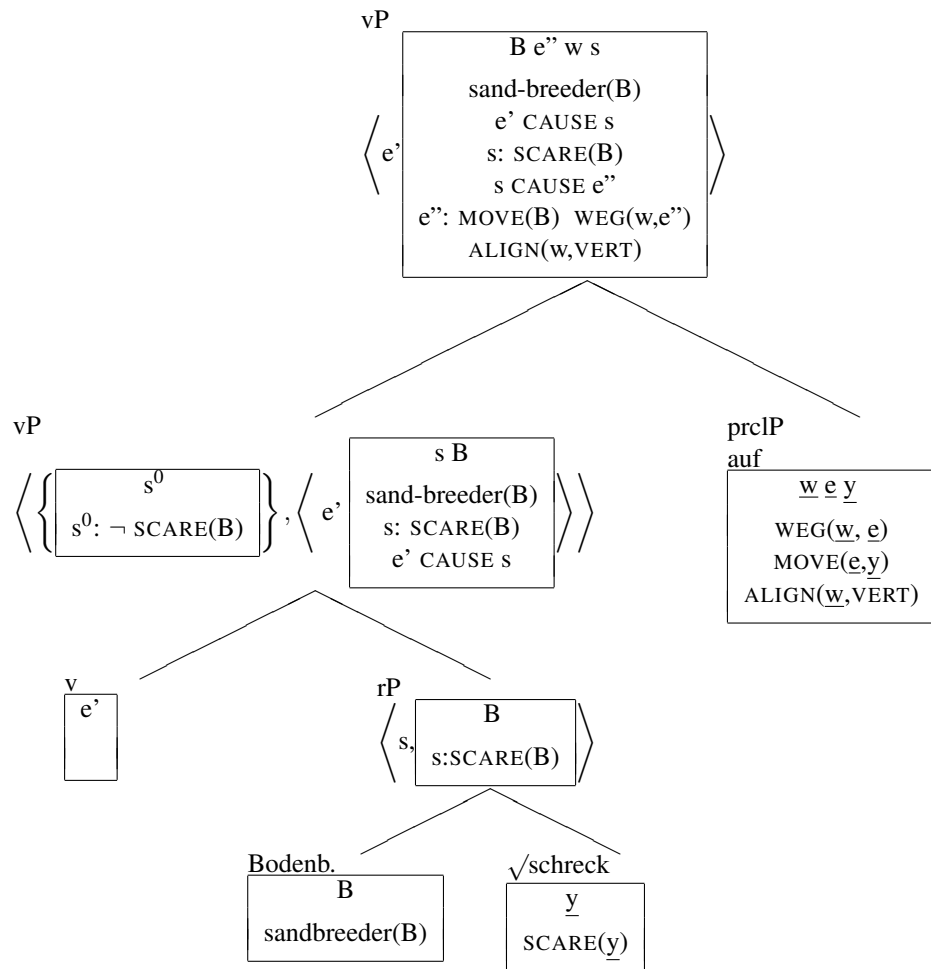
- (16) Hunde Bodenbrüter aufschrecken



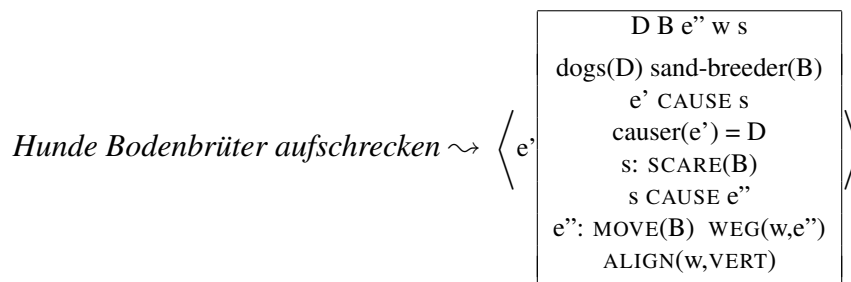
¹⁷HGC

The verbal construction up to level *v* is an instance of bi-eventive verbal construction, see Marantz (2005), Kamp and Rossdeutscher (2008). The root introduces an individual property, predicated on the birds. So the semantics of the rP is the state of the birds being scared, represented as (having)SCARE(B). The event introduced at little *v* is interpreted as the event to bring about that state.

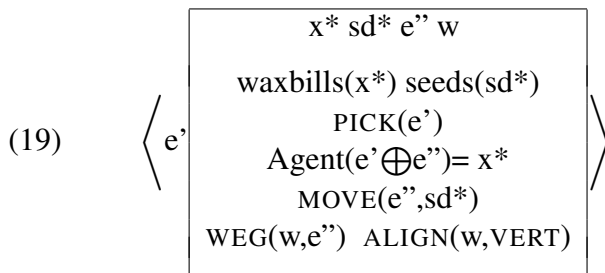
(18)



Justification of *auf*: (i) accommodation of a motion *e''* and *w* WEG(*e''*,*w*), such that *s* CAUSE *e''*; *e''* := *e*; *y* = *B*. (The final representation specifies the dogs as the causer of *e'*.)



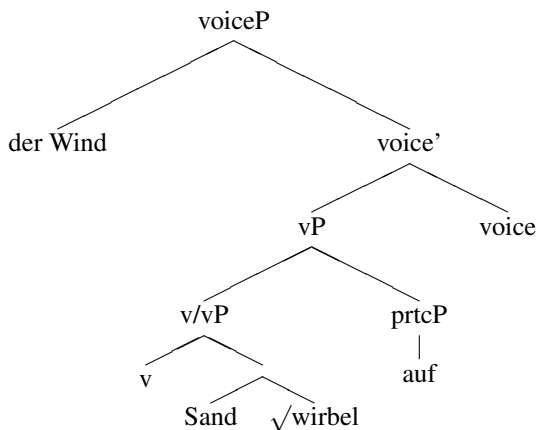
In (13) *auf* is most plausibly interpreted as referring to an upward movement that is part of a complex event which also involves an event of picking seeds; normally the picking will be partly co-temporal with the upward movement of the seeds. Typically verbs such as *aufgreifen* (*greifen* = to grasp, seize), *aufsammeln* (*sammeln* = to collect), or *aufnehmen* (*nehmen* = to take), are intentional 'routines' where an event of getting hold of something is a preparatory action of raising it. The raising event is accommodated in order to justify *auf*. *Samen aufficken* in (13) yields a presentation of the following form:



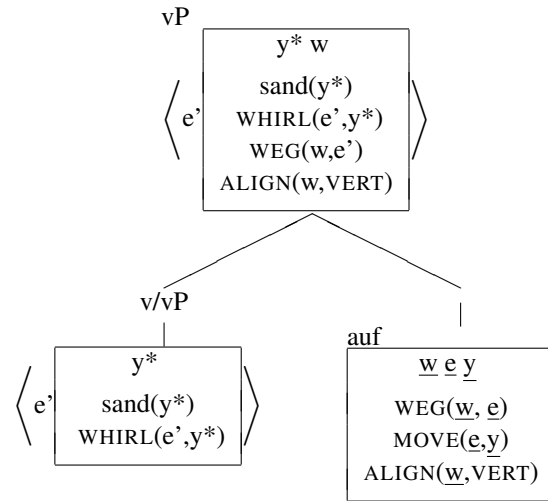
The relation ' \oplus ' indicates the close relation of the two aspects of the routine-like sequence of events of getting hold of and raising.

With *rühren* and *wirbeln* in (14) and (15) we seem to face a difficulty: Do *rühren* and *wirbeln* not describe motions on their own? And are these not motions within the horizontal? If so, how could *auf* combine with event descriptions of this type? The answer we propose here is that *rühren* and *wirbeln* do not necessarily describe a change of location. The sand might swirl without moving to another location. The verbs rather express a change of configuration. Therefore the event of stirring must be interpreted as causing the theme to move upwards, where the activity of stirring is going on while the theme moves upwards. Similarly, in (15) the wind causes the dirt to change configuration (which is described by *wirbeln*) and move upwards at the same time. Our assumed syntactic representation (20) provides a basis for the semantics construction (21).

(20)



(21)

voiceP: *Wind Sand aufwirbeln* \rightsquigarrow

ec e'' e' w y*
the wind(e'') sand(y*)
ec: e'' CAUSE e'
MOVE(e', y*)
WHIRL(e', y*)
WEG(w, e')
ALIGN(w, VERT)

The foregoing examples show that the meaning of *auf* can combine with the meaning of verbs in a variety of ways. This might be taken to indicate that no mechanism to model compositionality — be it unification or λ -conversion is powerful enough to determine the meaning of such verb-particle complexes, not even for the relatively basic sense of an upward movement. It might thus seem necessary to store their meaning in the lexicon, rather than compute it on-line.

We do not want to deny here that the meaning of certain constructions with *auf* is stored. Nevertheless we think that in most cases the contribution of *auf* within a particular context can be determined by regular interpretation mechanisms. Our view is supported by the observation that from the perspective of the interpretation mechanisms *auf* in this sense is not significantly different from other directional adverbials. In particular, it does not differ much from other adverbials which denote an upward movement, such as *nach oben*, *in die Höhe* or *aufwärts*. For most VPs which are modified by directional adverbials there are general correspondences between certain syntactic and semantic structures. Thus, if a directional adverbial modifies an intransitive VP, then the theme introduced by the subject is claimed to move in the specified direction. In contrast, if such an adverbial modifies a transitive VP, then the subject introduces an agent (or causer) that causes the theme introduced by the direct object to move in the specified direction. What the two cases have in common is that what moves is always a theme. In the case of intransitive constructions, the subject of VPs which express motion always introduces a theme and accordingly the perfect is formed with *sein*. All these observa-

tions apply to *auf* in the sense of describing an upward movement. This also means that the meaning of *auf* presented above is applicable in a variety of cases and that we do not need to postulate a large number of different senses in order to account for different kinds of contexts.

2.2 *auf* as referring to virtual paths

So far we have only considered cases where *auf* refers to motion of a material object along a path. This is in fact the typical context where it is appropriate to speak of a path. Yet there are some verbs which neither introduce motion nor support accommodation of MOVE, yet can combine with *auf* in the sense of (6). The most plausible explanation for why this is possible is that they introduce a virtual path, which satisfies the requirement in (6) of alignment with VERT.

- (22) *Das gewölbte Mittelschiff hat mit 26 m Höhe und 11 m Breite (Gesamtlängenlänge = 76 m) einen intimeren Charakter als andere vergleichbare Kirchen, die im Innenraum wesentlich höher aufstreben.*
 ‘The vaulted central nave has with a height of 26 metres and a width of 11 metres (total interior length = 76 metres) a more intimate character than other comparable churches, which rise [*aufstreben*, literally: strive up] significantly higher in the interior.’
- (23) *Von einer Seite aus betrachtet zeigen sich die Felsen wie Nadeln, die in den Himmel aufragen, von der anderen Seite kann man die Form einer Hand erkennen.*
 ‘Looked at from one side the rocks appear like needles looming [*aufragen*] into the sky, from the other side the shape of a hand is discernable.’
- (24) *Was sehen wir, wenn wir nachts zum Himmel aufblicken: Nur die unendlichen Weiten des Weltraums, oder ist es doch mehr?*
 ‘What do we see when we look [*blicken*] up [*auf*] into the sky at night: Only the infinite vastnesses of space, or is it more after all?’

In (22) and (23) the virtual path is identical with the vertical functional axis of the building and rocks respectively. *blicken* in (24) and other verbs which describe events of visual perception introduce the observer axis, i.e. the axis leading from the observer to the perceived object, as a virtual path. That these events are conceptualised as motions is indicated by the directional adverbials with which the particle and verb combine. It may be possible to find historical explanations for why such static events are conceptualised as motions. However, these are not relevant for our purposes. In the current context it is sufficient to know that such verbs do introduce virtual paths.

Note that in many cases where verbs of visual perception are combined with *auf* in the current sense the analysis just proposed is not the most plausible one. Consider the following example.

- (25) *Lars blickte von seinem Buch auf und schaute zum Fenster hin.*
 ‘Lars looked [*blickte*] up [*auf*] from his book and toward the window.’

This sentence clearly describes a change in the focus of attention. Yet the result of this change is not that the observer axis is in alignment with VERT. Thus, if (6) is to apply here, w must be justified by something other than the observer axis. It is unlikely that this role is played by the observer axis or the eyes (or head) of the perceiving person because they undergo a change of position, rather than a change of location. Therefore it is most plausible to assume that *auf* describes the path of the focus of attention. In our examples this moves from the book up to the window. This interpretation also involves a virtual path or movement because there is no actual material object which changes its location. Note that this interpretation is also possible for (24).

The case of visual perceptual verbs confirms our claim that *auf*, or directional adverbials in general, do not refer to the agent of an event. At first sight it might seem surprising that this class of verbs remain agentive when combined with directional adverbials, even if real motion is present. Yet what 'moves' here is not the entity denoted by the subject, but the focus of attention.

2.3 *auf* as expressing a change of position

Although the examples in the previous section differed significantly from paradigmatic uses of (6), which involve the upward movement of a material object, it was still possible to interpret them by means of (6). This, however, is not possible for the following sentence because the movement involved here is a change of position, rather than a change of location.

- (26) *Alleine aufstehen oder sich auch nur im Bett aufsetzen geht nicht mehr.*
 'Getting [*stehen*] up [*auf*] on one's own or even just sitting [*setzen*] up [*auf*] in bed is not possible any more.'

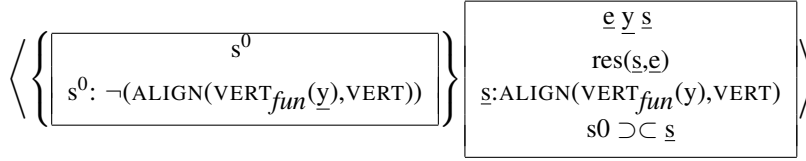
Here *auf* expresses that the functional vertical axis of an object (rather than its movement) gets in alignment with the vertical vector of PPS. Therefore a further representation for *auf* is required:¹⁸

¹⁸We represent the contribution of *auf* as a change. We opted for this representation although there are a few cases where *auf* combines with stative verbal roots, e.g. $\sqrt{\text{steh}}$ or $\sqrt{\text{bleib}}$. But that is entirely compatible with the *auf*'s contributing a change of state. In the case of $\sqrt{\text{steh}}$ the combination with *auf* (*aufstehen*) actually describes a change into the standing-eventuality. As the 'assertion'-part (specifying the change and the result state) as well as the 'presupposition'-part (specifying the pre-state of the *auf*-event are pre-suppositional in nature, the former will be justified with the standing-eventuality and the latter will be accommodated. Thus we gain the right prediction and wrong interpretations (e.g. standing in an upright position) are excluded. But what about *auf-sein* and *auf-bleiben*?

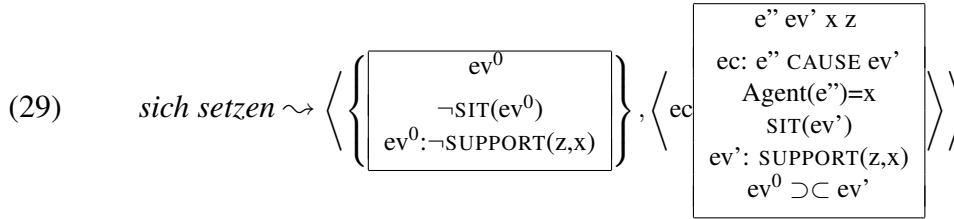
- (27) *Ich war schon früh auf und hatte mir eine Zeitung zur Frühstücksektüre besorgt.*
 'I was up [*auf*] early and had got a newspaper for my breakfast reading.'

Although *sein* and *auf-sein* both describe states the state of being in an upright position (contributed by *sein*) is interpreted as the result of an action of getting up (from bed). A similar process of accommodation takes place if *auf* occurs with *bleiben*. Here the interpretation is to the effect that the person has been in an upright position for some time and did not terminate that state by going to bed; that latter state, in turn is the result of a change from his being in horizontal position: he was in bed in the morning. Being not in upright position is required by *auf*, but easily accommodated in consistency with what the copula *bleiben*

(28) auf \rightsquigarrow

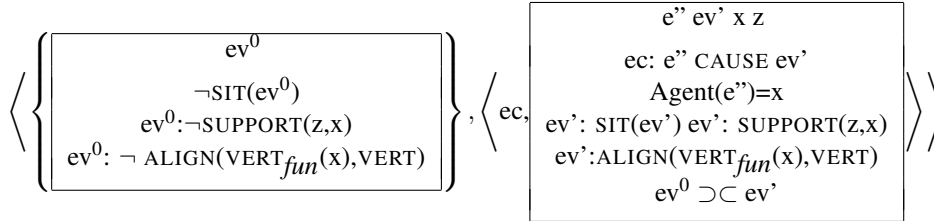


The semantic construction of *sich aufsetzen* goes accordingly as follows.¹⁹



(i) justification of *auf*: $s^0 = ev^0$; $\underline{e} = e''$; $\underline{s} = ev'$; $\underline{y} = x$;

sich aufsetzen \rightsquigarrow



(N.B. the functional vertical of a person x , $\text{vert}_{fun}(x)$, can be thought of as the person's spine.)

A further instance of (28), not speaking of a person, but of a hill, seems present in the following example.

(30) *1894 ließ Lilienthal in Berlin-Lichterfelde auf seine Kosten einen 15 m hohen Hügel aufschütten, der sehr bald als "Fliegeberg" in aller Munde war.*
 'In 1894 Lilienthal had a 15 m high hill, which was soon known as "Fliegeberg" everywhere, heaped [*schütten*, literal: pour] up [*auf*] at his own expense.'

Here *auf* can be interpreted as stating that the vertical functional axis of the hill which comes into existence through an activity of pouring is in alignment with VERT.²⁰ However, another interpretation is possible, too. Thus *auf* can be understood as indicating that the hill grows along VERT. As this sense of *auf* can also be found in other

presupposes on its own.

¹⁹Verbs of position, e.g. *sitzen* (to sit), refer to eventualities, rather than states. We assume here that position verbs and change of position verbs imply a relation of support with some discourse referent z .

²⁰Note that the ambiguity between the theme standing for the material at the centre of an activity and the object which results through the activity is a general phenomenon and thus does not need to be mentioned in the lexical entry of *auf*. Compare, for instance, the distinction between "Teig kneten" and "Figuren kneten".

contexts and it is not immediately obvious what exactly *auf* contributes to the discourse in such cases, we will examine this issue in more detail in the next section.²¹

2.4 *auf* as describing growth along the vertical axis

(31) *Rauchen verboten heißt es ausgerechnet an den Wänden jener Aufenthaltsräume, in denen die Cannabis-Pflanzen jetzt zwischen Schießscharten zum künstlichen Licht aufschießen.*

‘No smoking is written just on the walls of those common rooms where the cannabis plants now shoot up [*aufschießen*] toward the artificial light.’

It is obvious that in this example *auf* identifies the vertical as the main dimension of growth of an object. Yet it is not clear what sense of *auf* is relevant in this context and what justifies its use. Different analyses seem possible. *auf* may be used in the original sense of (6) and refer to the motion of the top of the growing object, in this case the top leaves of the plants. On the other hand it is unlikely that there is a top part which stays the same throughout the process of growth; it is more likely that new leaves are added at the top. Therefore this interpretation can at most be a simplified conceptualisation of what happens when objects grow along the vertical dimension.

Alternatively, one could assume that growth is conceptualised as motion and thus introduces a virtual path without postulating the movement of a particular part of a growing object. In this case *auf* can easily be justified through unification with the virtual path.

A further possibility would be to simply see growth as an increase in height. Although growth is in this case not subsumed under motion, we can present the contribution of *auf* in a form that can be interpreted in model theory without a loss of conceptual motivation in terms of VERT: *auf* contributes that the length of d_{vert} , the height, of some three-dimensional object y had been shorter in context than during a later state:

$$(32) \quad auf \rightsquigarrow \left\langle \left\{ \begin{array}{c} s^0 \perp^0 \\ s^0: \text{LENGTH}(d_{vert}(\underline{y})) = \perp^0 \end{array} \right\}; \begin{array}{c} \underline{e} \leq \perp \underline{y} \\ \text{res}(\underline{s}, \underline{e}) \\ \underline{s}: \text{LENGTH}(d_{vert}(\underline{y})) = 1 \\ s^0 < \underline{s} \\ \perp^0 < 1 \end{array} \right\rangle$$

We believe that this sense of *auf* can also mark an increase in volume of three-dimensional objects, as in the following examples.

(33) *Die neue geleeartige Substanz ist eine Weiterentwicklung der so genannten Superabsorber, die bis auf das Hundertfache ihrer Größe aufquellen und Wasser oder andere polare Flüssigkeiten aufnehmen können.*

‘The new jellylike substance is a further development of so-called superabsorbers, which swell [*quellen*] up [*auf*] to their hundredfold size or are able to absorb other polar liquids.’

²¹Another possibility is to interpret *auf* as denoting a SUPPORT relation. This sense of *auf* will be discussed in section 3.

- (34) *atme tief ein, lass die Luft so langsam zwischen den Lippen entweichen, dass die Wangen dick aufgebläht sind.*
 ‘take a deep breath, let the air escape slowly between your lips so that the cheeks are grossly bloated [*aufgebläht*].’
- (35) *Wer je mit dem Mund eine Luftmatratze aufgeblasen hat, weiß, wie viel 60 Liter Luft sind*
 ‘Whoever has blown up an airbed with his mouth will know how much 60 litres of air are’.

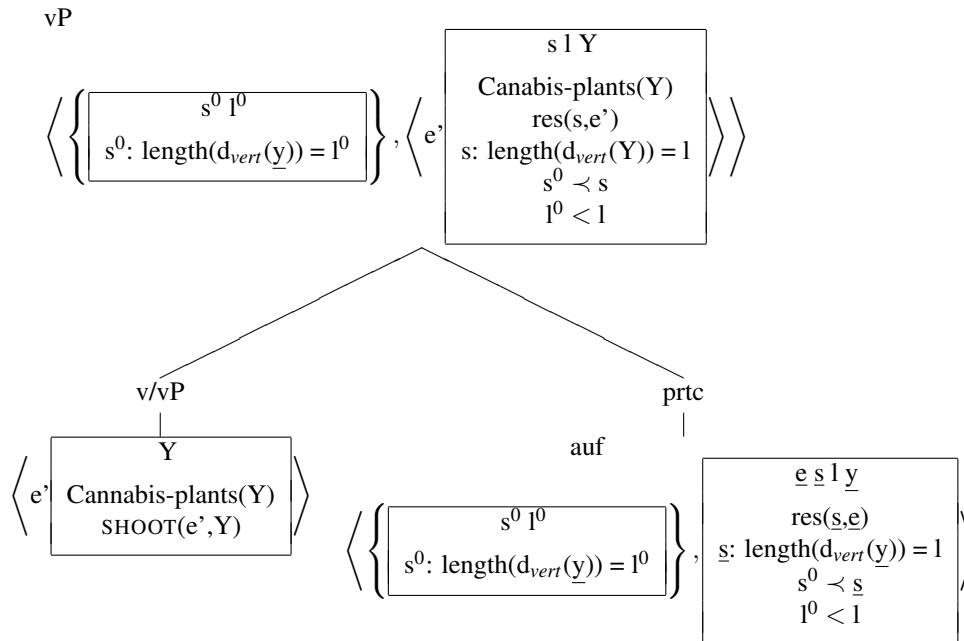
Note that increase of volume is expressed with the help of *auf* only if the material object described in the direct object is conceptualised as three-dimensional. Increase of extension of two-dimensional objects or two-dimensional regions is typically described with the help of *aus*-particle verbs. See for instance (36) and the minimal pair in (37).

- (36) *Der Becher kippt und auf dem Tisch breitet sich eine schwarze Pfütze aus.*
 ‘The mug topples and a black puddle spreads on the table.’
- (37) *Teig auf einem bemehlten Küchentuch zu einem Rechteck von ca. 30 x 40 cm ausrollen. Füllung auf einer Längsseite verteilen und zu einem Strudel aufrollen.*
 ‘Roll out dough on a floured tea towel into a rectangle of about 30 x 40 cm. Spread the filling on one of the long sides and roll up to a strudel.’

We speculate that there are conceptual reasons for the difference in linguistic form: Think of a ball-like object, say a balloon. Although the ball-like object grows in all three dimensions, growth of length with respect to the dimension d_{vert} , i.e. the dimension of the object that aligns with VERT, is the most salient one. True or not, linguistic description chooses d_{vert} to mark growth of volume of three-dimensional objects in terms of growth of the length of the object’s axis d_{vert} . With brick-like objects d_{vert} may be either the maximal, the intermediate, or the minimal dimension. An example of the last possibility is the airbed in (35). With the cannabis plants, which are three-dimensional objects as well, it is the maximal dimension that follows VERT.

So much for our explanation of why growth is described with the help of *auf*. What we still have to make precise is the semantic contribution of *auf* in these cases. All three interpretations of growth discussed here can be used to model an increase in volume. We will here only show this by means of the analysis of growth as an increase in length and the corresponding sense of *auf* in (32). With a syntactic representation as in (38), (31) can thus be represented in the following way. As the syntactic representation is like (7) we only present the main steps. Composition is straightforward involving unification of the change-of-state denotation variable \underline{e} from *auf* with the referential argument e' of the verb phrase.

(38) Cannabispflanzen aufschießen

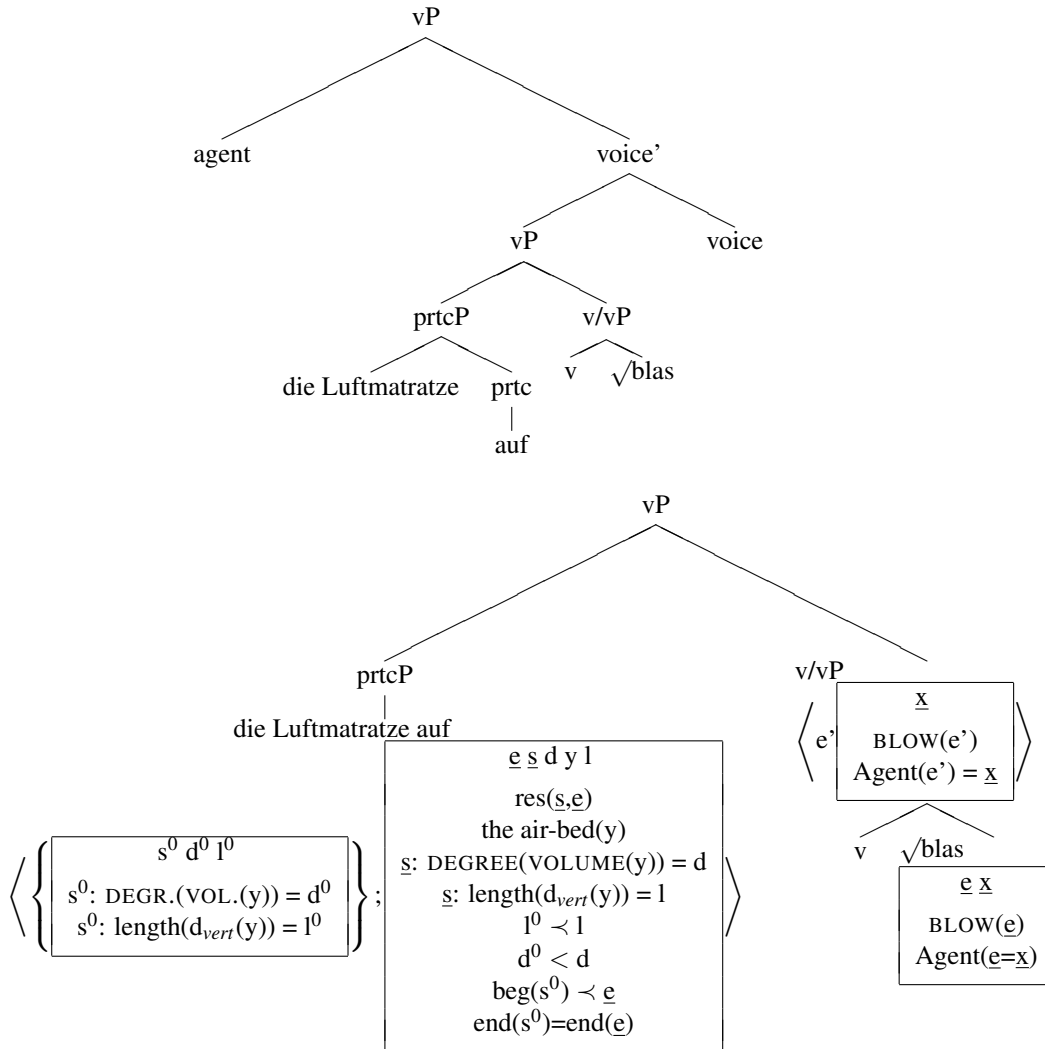


Composition succeeds, once it is inferred that *schießen* describes an event of growing. As already alluded to in the introduction, this interpretation is compelling because plants, unlike rockets, do not leave the ground. The theme of the description, Y, is a three-dimensional object undergoing growth along VERT. With (33) composition is similar insofar as the increase in the volume of the direct object described by *quellen* justifies the constraint of *auf* in (32).

With (35) composition is more involved. First, *blasen* (to blow) is an intransitive action verb, whose only argument is an agent x. Second, x does not introduce an object whose vertical grows in length, so it is not sufficient to justify the constraints set by *auf*. We must assume that the discourse referent for the direct object of *aufblasen* is contributed by the particle *auf*, rather than the verb *blasen*. We represent this argument as the referential argument of the particle *auf*.²²

²²We follow the widely assumed idea that structural case-marking is a matter of syntactic configuration. Projections with voice license accusative; nominative is a matter of finite tense.

(39) (Agens) die Luftmatratze aufblasen



The direct object y of the transitive *etwas aufblasen* (to blow up something) qualifies because y increases in volume and at the same time the vertical dimension of y , $d_{vert}(y)$, increases in length. For instance, in (35) the minimal functional dimension of the airbed aligns with VERT and increases in length.

(i) Justification of *auf* in context: a blow action results in an extension in volume. Extension in volume instantiates extension of length along $d_{vert}(y)$.

Justification of the variables: \underline{e} in the prtcP is identified with the referential argument e' of the verbal construction. (N.B. the agent variable \underline{x} will be bound in voiceP.)

2.5 Metaphorical extensions

The following sentences are examples of a further class of occurrences of *auf* where the idea of an upward movement may have come to be replaced by a more specific sense.

- (40) *Den Ball so hoch wie möglich schießen und durch Nachlaufen wieder auffangen.*
 ‘Shoot the ball as high as possible and catch [auffangen] it again through running after it.’

In cases where *auf* is combined with literal uses of *fangen* a downward movement is stopped by an upward movement. Although the aspect of moving upwards is clearly what originally caused the use of *auf* in such cases, the aspect of acting against a downward movement has become more prominent, so that it is often not clear what sense is more prominent. That there is this distinct sense of *auf* as stopping a downward movement is shown by cases such as (41) where no upward movement takes place.

- (41) *Mit entsprechenden Sammelgefäßen lässt sich das Regenwasser auffangen und anschließend wieder im Garten, für die Waschmaschine oder auch für die Toilette verwenden.*
 ‘Rain water can be collected [auffangen] with appropriate storage containers and subsequently be used again in the garden, for the washing machine or for the toilet.’

This analysis might be questioned by pointing to cases where *fangen* combines with *auf* and refers to the stopping of a movement, but where this movement is not directed downwards. It might be thought that there is another sense of *auf* which explains both (41) and (42).

- (42) *Ein Hühnerei reagiert mit Essig in einem Zylinder, der oben durch einen Gashahn verschlossen ist, damit man das aufsteigende Gas auffangen kann.*
 ‘A chicken egg reacts with vinegar in a cylinder, which is sealed at the top through a gas tap, so that the rising [aufsteigende] gas can be collected [auffangen].’

Yet (42) can also be accounted for by slightly extending the sense of *auf* just discussed, so that it comprises not only downward movements in the literal sense of the term, but also downward movements in an abstract sense, e.g. movements in a direction that is considered negative or undesirable. Thus the evasion of the gas in (42) is regarded as negative and thus as something to be stopped or prevented. *auf* in this sense can also refer to events which do not involve any spatial movement, but rather movements at an abstract level, as can be seen in the following examples.

- (43) *Siemens will Mitarbeiter der Handysparte auffangen*
 ‘Siemens wants to save [auffangen, literally: catch] employees of the mobile phone sector.’
- (44) *Ausgleichszahlungen können Preissenkung nur teilweise auffangen*
 ‘Compensations can only partly make up [auffangen] for price cut.’

- (45) *Den größten Teil der Preissteigerungen konnten wir jedoch durch größere Einkäufe auffangen, so dass der Preis für unseren Gartenzaun für Sie trotzdem nur 7,90 DM pro Meter beträgt.*
 ‘We could make up [*auffangen*] for the greatest part of the price increases through bigger purchases, so that the price of our garden fence is only 7,90 DM per meter for you.’
- (46) *Therapeutische und medikamentöse Behandlungen können den Krankheitsverlauf um wenige Jahre verzögern. Aufhalten können sie ihn nicht - Alzheimer ist bislang unheilbar.²³*
 ‘Therapeutical and medicamentous treatments can delay disease progression by few years. But they can’t stop [*aufhalten*] it - Alzheimer’s is so far incurable.’

These examples refer to people descending to the socially and financially inferior state of unemployment, to a decrease in, and thus downward movement of, prices, and to a deterioration of people’s state of health. (45) appears not to fit into this pattern because it speaks of preventing an increase of prices. Yet this can be explained by the fact that a price increase is here conceived of as something negative (because it is seen from the perspective of customers) whereas in (44) a decrease is considered as negative (because it is seen from the perspective of farmers who want to sell their products). This suggests that such metaphorical uses of *auf* are regular extensions of the original spatial meaning of *auf* and do not need to be stored as idiomatic expressions. When we look at a wider range of data, we can in fact see that many non-spatial uses of *auf* lie within a limited set of meanings which are all related to its original spatial meaning.

- (47) *Nur bei wenigen Arbeitgebern kann man vom Platzwart zum Abteilungsleiter aufsteigen*
 ‘Only few employers allow one to rise [*aufsteigen*] from a groundkeeper to a head of department.’
- (48) *Bonn’s Trainer Michael Koch musste seine enttäuschten Spieler nach der Niederlage gegen Ludwigsburg moralisch aufbauen.*
 ‘Bonn’s coach Michael Koch had to cheer up [*moralisch aufbauen*] his disappointed players after the defeat against Ludwigsburg.’
- (49) *Die Öffentlichkeit will zu ihren Adelslieblingen aufblicken können.*
 ‘The public wants to be able to look [*blicken*] up [*auf*] to their favourite nobles.’

²³Note that in this case *aufhalten* refers to the prevention of a negative course of events, whereas in other cases it only describes the delay of negative developments. E.g. in the sentence “Können Vitamine & Co. den gefürchteten Gedächtnisschwund möglicherweise verhindern oder aufhalten?” *aufhalten* is explicitly contrasted with *verhindern* (prevent). This means that either the current sense of *auf* leaves open whether the prevention of the described event is temporary or permanent, so that this has to be made clear through the context, or there is a separate sense of *auf* which can account for cases where *aufhalten* expresses a delay. The latter hypothesis will be discussed in section 9.

- (50) *Einer israelischen Forderung folgend legt der Plan fest, dass beide Seiten nicht zur Gewalt aufhetzen dürfen.*
 ‘Following an Israelian request the plan stipulates that both parties must not incite [*aufhetzen*] to violence.’
- (51) *Es gibt Zeiten, da wünscht man sich eindeutig eine Wohnung, wo man solche Musik aufdrehen kann und im Gute-Laute-Feeling baden kann.*
 ‘There are times where one clearly wishes a flat where one can turn [*drehen*] up [*auf*] such music and bathe in a good-mood-feeling.’
- (52) *Ein mit Dosencreme gepflegter Schuh lässt sich auch mal zwischendurch auf die Schnelle in wenigen Sekunden aufpolieren, ohne dass zuvor neue Creme aufgetragen werden müsste.*
 ‘A shoe which is cared for with tinned shoe polish can be polished [*polieren*] up [*auf*] at odd moments quickly within few seconds without having to apply new polish first.’
- (53) *Seit den 60er Jahren sind insgesamt mehr als 70 Millionen Bäume gepflanzt und rund 140 000 Hektar Berge zum Aufforsten abgesperrt worden.*
 ‘Since the 1960s more than 70 million trees have been planted altogether and about 140,000 hectares of mountains have been closed for reforestation.’

In many cases *auf* denotes increase, enhancement or improvement. All these concepts can be considered as expressing a kind of upward movement in an abstract domain. A further common metaphorical extension of *auf* is an upward movement within a social order. As Lindner points out, these extension principles are not restricted to *auf* (or *up*); they apply to the vertical axis in general.²⁴

There are many different ways in which the interpretation mechanisms can arrive at the correct meaning of a discourse containing such a metaphorical extension of *auf*.²⁵ In some cases it is necessary to start with the spatial meaning and only switch to an abstract domain, once part of the meaning of the discourse has been constructed in the spatial domain. This can be seen in (47), where *auf* and *steigen* have to be interpreted together as standing for an upward movement before their joint representation can be transferred to the domain of professional rankings.

steigen does not add much to the spatial meaning of *auf*, so its metaphorical use is fairly flexible. Yet other verbs add more detailed information about the upward movement and its causing event. The meaning of these verbs is also relevant when transferral to an abstract domain is required. This effect can be seen when we compare contexts where the meaning of *auf* is transferred to the domain of feelings or mental states. For instance, *bauen* describes the construction of something and thus has a positive connotation. Therefore it can in (48) together with *auf* stand for encouragement and the bringing about of a positive state of mind. In contrast, if a being is caused to move

²⁴Lindner (1983), pp. 119ff.

²⁵The following applies to a certain extent also to other words which refer to the vertical axis.

upwards through an action of *hetzen*, it is negatively affected. This negative connotation remains when the expression is transferred to the domain of emotions and political action as in (50).

Note that such metaphorical extensions are often not unique to individual verb-particle constructions, but are similar for groups of related verbs. Thus *hetzen* belongs to a large group of verbs which can be used in combination with *auf* to describe the strong negative feelings or attitudes of a group of people, often accompanied by violent actions, against another group of people, often in a socially higher position.²⁶ Similarly, visual perception verbs used in combination with *auf* regularly have the meaning of admiring someone, so *auf* here refers to some sort of ranking of people.²⁷ A regular metaphorical extension can also be found with some verb-particle constructions where *auf* denotes an increase in volume. Thus *aufblähen*, *aufplustern*, *aufblasen* and *aufbauschen* can mean that something is assigned more importance than it deserves.

In many cases, *auf* can be interpreted as having a metaphorical reading on its own. It can then be combined with verbs which retain their literal spatial meaning or with verbs that cannot be used to refer to a spatial upward movement at all. For instance, *drehen* in (51) refers to the physical action of *drehen*, whereas *auf* is used in an abstract sense, as standing for an increase in sound volume.

An example of the second type is *polieren*. It would be difficult to find a context where *polieren* can be combined with *auf* to describe an actual upward movement. Yet it can be combined with *auf* in an abstract sense to denote an improvement that is brought about through the process of polishing. Note that *auf* can here be interpreted as having the further connotation that the improvement puts the object back into its original state, or a state similar to its original state. This meaning of *auf* is frequent and occurs especially in the context of crafts. It is unlikely that the additional meaning aspect of putting something in its original state is derived online from the spatial meaning of *auf*. Rather, it has to be learned as a distinct meaning of *auf*.

This meaning of *auf* can also be used to illustrate the point that there are different ways or degrees of being rule-based. Even in cases where general rules are not sufficient to determine the meaning of a complex expression within a context, there can be regularities which help to correctly memorise the meaning of a complex expression and retrieve it from the lexicon. This phenomenon can be observed with what is often called ‘analogical formations’ or ‘semantic niches’, whose meaning is not clearly compositional, but where a group of verb-particle constructions have a similar meaning. A good example is the group of verb-particle constructions comprising *aufputzen*, *aufstylen*, *aufdirndeln*, *aufmachen*, *auftakeln*, *aufdonnern*, or *aufbrezeln*. In all these constructions *auf* can denote the attempt to improve a person’s appearance by extreme or exaggerated means. With *aufputzen* or *aufstylen* the attempt to improve one’s external appearance is already expressed in the verbs, so *auf* only adds the aspect of enhancement or intensity, which it also contributes in other contexts. The meaning of the complex construction is thus clearly compositional. Yet in some of the other examples the content of the verb is bleached and *auf* contributes the meaning which in the other cases only came into

²⁶Further examples of such verbs are *rühren*, *wählen*, *reizen*, *wiegeln*, *mischen*, or *putschen*.

²⁷See (49).

place through compositional mechanisms. There are different explanations in the literature for how such verb-particle constructions are built, which we do not have room to discuss here.²⁸ What matters for our purposes is the fact that despite the apparent non-compositionality of these constructions *auf* makes a regular meaning contribution which is cognitively relevant. Thus in order to use and understand such expressions correctly and efficiently it is probably not sufficient to store the meaning of each individual item in the lexicon.

3 *auf* is support or contact

- (54) *Jogger sollten sich beim Training im Winter eine Mütze aufsetzen.*
‘Runners should put [*setzen*] on [*auf*] a hat when exercising in winter.’
- (55) *Ich habe gewöhnlich Zeige- und Mittelfinger vorne auf der Maus aufliegen.*
‘I usually have my index and middle finger lying [*aufliegen*] on [*auf*] the front part of the mouse.’
- (56) *Zum Schutz der Wunde sollten Sie für 30 min auf einen Tupfer aufbeißen.*
‘To protect the wound you should bite [*aufbeißen*] onto [*auf*] a pad for 30 minutes.’

(54) can be understood as expressing an upward movement and thus as containing the original meaning of *auf*. Nevertheless another sense of *auf*, namely a support relation between objects, seems more prominent here.

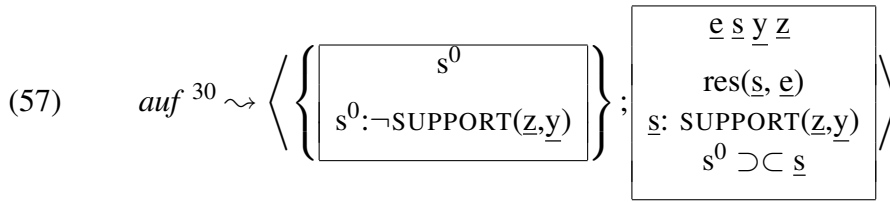
it seems appropriate to analyse this sentence as making use of a different sense of *auf* because the aspect of support provided by another object which results from the upward movement is similarly, or even more important than the movement itself. This use of *auf* corresponds to the most prominent meaning of the preposition *auf*. As, for instance, Grimm and Grimm (2007) point out, this preposition has resulted from merging the Old High German words *ûf* and *ana* (which roughly correspond to the English *up* and *on*).

(55) gives a clearer example of this sense of *auf*, where the aspect of an upward movement does not seem present at all. Yet it can be seen as implicitly contained in the fact that the supported object whose position is described is prevented by another object from moving in the direction of gravity. Thus *auf* can again be understood as stopping or preventing a downward movement. The following lexical entry captures this sense of *auf*.²⁹

²⁸Cf. McIntyre (2002), pp. 110ff

²⁹The two-place relation SUPPORT is implied by the resultant state of position verbs such as *sitzen* and its causative alternates e.g. *setzen*. Typically these verbs subcategorize support prepositions such as *auf*, e.g. *sitzen auf* (to sit on), and *an*, e.g. *lehnen, hängen an* (to lean on, to hang on).

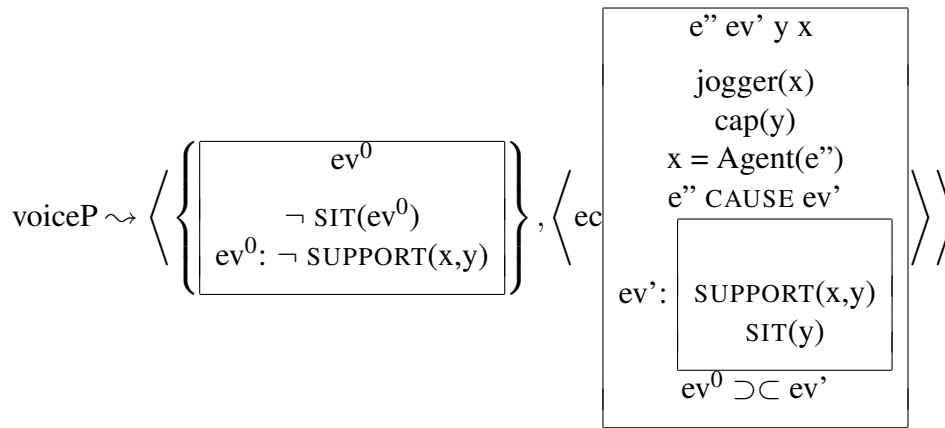
The support relation between material objects *z* and *y* always implies contact between certain faces, rims or edges of the respective objects. For example think of two bricks *z* and *y*, where *z* supports *y*. This can be expressed by ‘*y auf z*’, where *y* is the discourse referent of the external argument of the preposition and *z* is describes by the internal argument. We can infer contact between the top-face of *z*



During the composition of *Jogger (sich) eine Mütze aufsetzen* the supporter \underline{z} of *auf* is identified with some jogger x , which introduced into the description by means of the reflexive dative *sich*, which in turn is anaphorically bound to *Jogger*. The theme \underline{y} of *auf* is the cap and the state \underline{s} of the support-relation to obtain is the cap sitting on the (body part of) an agent x .³¹ The support state from *auf* is identified with the brought about eventuality ev' representing the cap being in the sitting position supported by the jogger.

Justification of *auf*'s requirements: $s^0 = ev^0$; $\underline{e} = e''$; $\underline{s} = ev'$; $\underline{y} = y$; $\underline{z} = x$.

(58) *ein Jogger sich eine Mütze aufsetzen*



Note that in some rare cases the meaning of *auf* is merely contact between objects. This sense of *auf* seems present in the following example.

(59) *Völlig unvermittelt ist an der Ampel ein Kleinlaster auf ihr Auto aufgefahren.*
 'All of a sudden a light lorry drove [*gefahren*] into [*auf*] her car at the traffic lights.'

The same reading of *auf* can also occur in combination with the verbs *brummen*, *kommen*, *laufen*, *prallen*, *rücken*, *rutschen*, and *schließen*. It is not clear whether this

and the bottom-face of y , where 'top' and 'bottom' are top and bottom with regard to the brick's position in **Primary Perceptual Space**. Which faces (or rims and edges) have contact depends on the object schemata of z and y . We omit details here. What is crucial for our investigation here is that SUPPORT always implies CONTACT.

³⁰As with *auf*- in the sense of change into a state of an upright position, support-*auf* combines with homogenous verbal predicates of position, see (55). And again the state of position can be justified in context as the result of a change. Note that the justification of change is also natural in contexts with *für*-phrase, s. (56). *für*-phrases generally measure out resultant states.

³¹We simplify the example a bit avoiding the distributive reading and the modal.

sense of *auf* is related to or has the same origin as the support reading. There also seems to be a connection to one of the interpretations of *auf* which we encountered in the previous section, namely the stopping of a movement. The contact interpretation allows for similar metaphorical extensions. Thus in the following sentences *auf* expresses that a gap or deficit is bridged and a positively valued state reached.

- (60) *BDI: Deutschland muss zu den führenden Online-Nationen aufschließen*
 ‘BDI (Federation of German Industries): Germany must close [*schließen*] up [*auf*] with the leading online nations.’
- (61) *Deutschland muss die ökonomischen und technologischen Vorsprünge anderer Länder auf dem Gebiet der Informationstechnologie aufholen.*
 ‘Germany must catch up [*aufholen*] with the economic and technological advantage of other countries in the area of information technology.’

With the support interpretation of *auf* it is again the case that one variable, namely the supported object *y*, always refers to the theme of the sentence, or some part of it. This can be clearly seen in the above examples. In (56) the supported object is not explicitly specified, but the verb makes clear that it consists in the teeth of the subject. This meaning of *auf* differs from the one discussed in the previous section in that a second variable, namely the supporting object *z*, has to be resolved. For this variable there are even more possibilities of how it can be realised. In simple cases the supporting object is introduced by a dative object, such as *sich* in (54), or by an *auf*-PP as in (55), (56) and (59). A further way of expressing it explicitly are denominal verbs, many of which only occur in combination with *auf* or other particles. The following sentences present some examples.³²

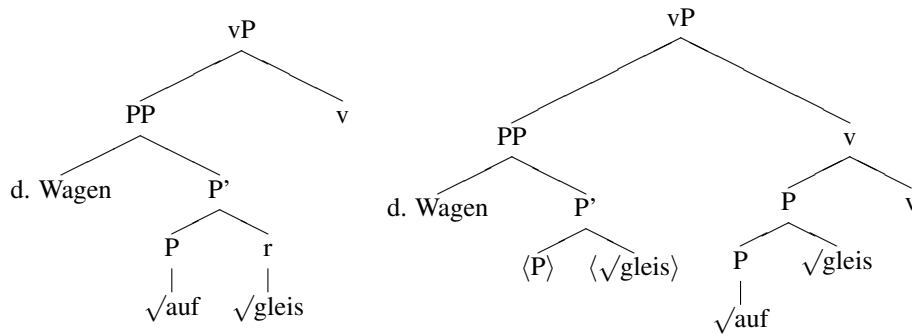
- (62) *In Köln hat man schon in der Innenstadt die Qual der Wahl unter mehreren Hundert Restaurants, die Speisen und Getränke aus nahezu jedem Land der Erde auftischen.*
 ‘In the centre of Cologne alone one is spoiled for choice among several hundred restaurants, which dish [*tischen*] up [*auf*] meals and drinks from almost every country in the world.’
- (63) *LGB-Loks und Wagen lassen sich sehr leicht aufgleisen, auch von Kindern.*
 ‘LGB engines and waggons can very easily be rerailed, even by children.’

We present the semantics-construction of *einen Wagen aufgleisen* as follows. *Auf* acts in this context as a preposition like head contributing a support-relation between an entity introduced by the root $\sqrt{\text{gleis}}$ which described an artefact and the direct object of the verbal construction. Thus in syntax both arguments are introduced in a prepositional

³² Further examples of verb particle combinations which can be interpreted in this way are *aufbahnen*, *aufbuckeln*, *aufspießen*, *aufspulen*, *aufrollen*, *aufbänken*, *aufbaumen*, *aufbetten*, *aufblocken*, *auffädeln*, *aufbuckeln*, *aufgabeln*, *aufkanten*, *auflisten*, *aufständern*, and *aufstabellieren*.

phrase.³³ As displayed in (64) the sortal root $\sqrt{\text{gleis}}$ incorporates into the P-head *auf*, which in turn incorporates into the v-head.³⁴

(64)

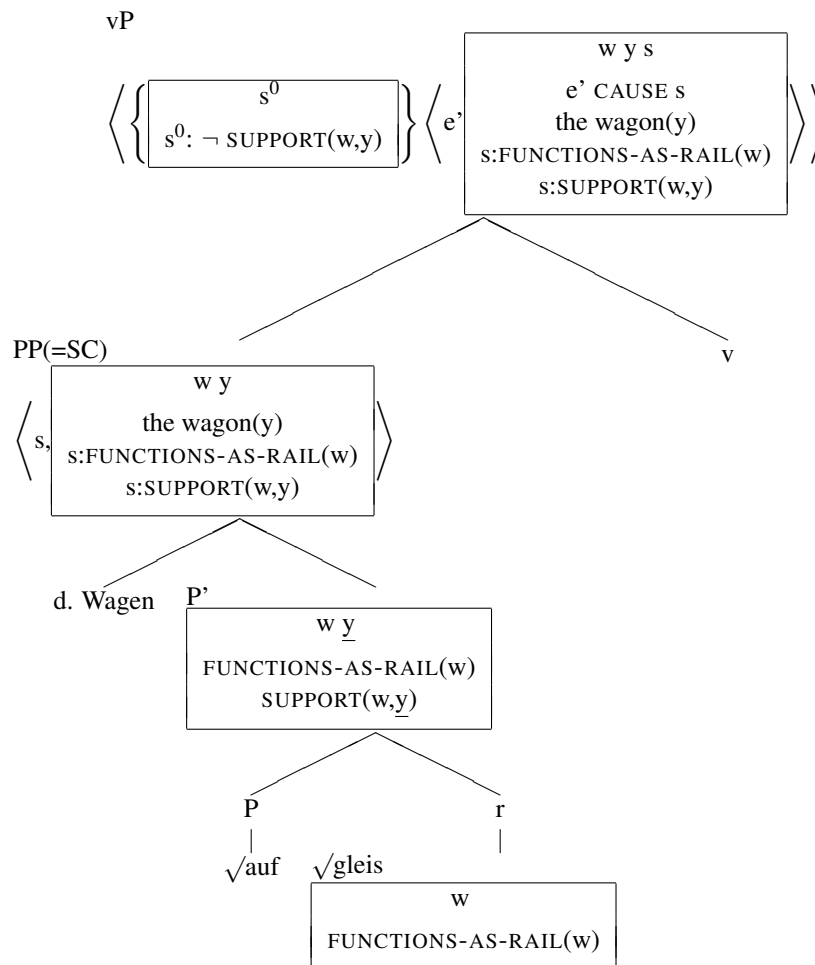


We observe particular restrictions contributed by the incorporated entity root. *Auftischen*, e.g. only speaks of food in support-relation of entities functioning as tables in a situation of eating and drinking (or metaphorical extensions thereof). *Aufbahnen* (to lay someone) restricts the internal argument of the verbal construction to dead persons. By the same token almost everything may function as a 'table' in *auftischen*-events, chairs and even the ground may do; almost everything can function as a 'bier' in *aufbahnen*-events, 'tables' may do; etc. An investigation of these restrictions appropriately is a matter of further research; here we only make sure that the root contributes a discourse referent that describes something functioning as the sort of entity in question, see (65).

³³Kamp and Rossdeutscher (2008) present a theory of *ung*-nominalisations. According to this theory it is necessary for a verbal construction to have an *-ung*-nominalisation that the v-head merges with a complement phrase which introduces a state. Merging v and that phrase is interpreted as establishing a causal relation between the referential argument e' and the state: e'CAUSE s. As *auftischen*, *aufbahnen* and many of the verbal constructions have *-ung*-nouns, we present a construction that suffices that crucial condition.

³⁴This construction does not explain why the particle $\sqrt{\text{auf}}$ can be separated from the verbal head combined with the root $\sqrt{\text{tisch}}$, as in *er Tischte Essen auf* (he dished up dinner). As already mentioned in the introduction there seems no widely accepted view on the data let alone on their explanation in this respect. See Zeller (2001), who defends a view that particles are syntactic phrases in nature. As a complication the treatment of *ung*--nominalisations involves reconstruion. This is not so in our representation.

(65)



Yet in many cases the supporting object remains implicit and has to be determined by means of world knowledge.

- (66) *Das Pferd ist fertig gesattelt und der Reiter möchte aufsteigen.*
 ‘The horse is saddled and the rider wants to mount [*aufsteigen*].’
- (67) *Crème-Rouges können auch mit den Fingern als Lippenfarbe aufgetupft werden.*
 ‘You can also dab [*tupfen*] cream rouges on [*auf*] your lips with your fingers.’
- (68) *Wenn ihr auf den Knien aufgekommen seid, setzt ihr euch seitwärts hin, ohne euch mit den Händen aufzustützen.*
 ‘When you have landed on [*aufgekommen*] your knees sit sideways without resting on your hands.’
- (69) *Die Kaninchen haben heute mit den Hinterläufen immer so stark aufgestampft, dass es einen Riesenkrach gemacht hat.*
 ‘Today the rabbits stamped on their feet [*mit den Hinterbeinen aufgestampft*] so strongly that they made a big noise.’

(68) and (69) also show another phenomenon: *auf*-PPs or *mit*-PPs can be used to specify the part of the theme which is in contact with the supporting object. This means that *auf*-PPs can have two functions in connection with such verb particle combinations, and which is present has to be determined by means of the context and world knowledge.

The most prominent metaphorical extension of this sense of *auf* has developed from uses of *auf* in the context of heavy loads which have to be carried (and thus supported) by a person. Thus *auf* has come to stand for non-physical burdens, especially for the possession of an obligation, responsibility, commitment, or another kind of constraint on a person's action. This meaning of *auf* is present in the following examples.

- (70) *Die Kirche dürfe nicht der gesamten Gesellschaft Dogmen und Gebote aufzwingen.*
'The church must not force [zwingen] dogmas and commandments on [auf] the entire society.'
- (71) *Es besagt, dass Lehrende ihren Schülern nicht ihre Meinung aufnötigen dürfen.*
'It says that teachers must not force [nötigen] their opinion on [auf] their students.'
- (72) *Die Forschung zeige zudem, dass Lehrer, die häufig Hausaufgaben aufgeben, ihre Schüler zu besseren Leistungen bringen.*
'The research also shows that students of teachers which frequently assign [aufgeben] homework achieve better performances.'
- (73) *Viele Kinder wissen manchmal nämlich nicht, was sie aufhaben.*
'Indeed many children sometimes don't know what they have been assigned [no English equivalent in active voice].'
- (74) *Lassen Sie sich keine so genannten "Nebenprodukte" wie beispielsweise eine Unfall-Versicherung aufschwätzen.*
'Don't let yourself be talked into [aufschwätzen] so-called "byproducts", such as for instance an accident insurance.'

The fact that a person acquires a constraint on her future action which is conceived of as negative is in some cases made clear by verbs such as *zwingen* or *nötigen*, which express the exertion of force. Sometimes the theme of the sentence (also) clearly expresses a constraint. *Gebote* (commandments) or *Hausaufgaben* (homework) are examples of this phenomenon. Typical verbs in this context are verbs of possession or change of possession, and verbs of utterance.

The constraint or the object which is associated with the constraint is usually the theme of the sentence, whereas the person who is thus constrained is normally referred to via a dative object or, in the case of possession verbs, the subject. If it is obvious who acquires the constraint, the recipient does not need to be specified explicitly. Thus consider the following example.

- (75) *Wenn Sie ein Paket aufgeben wollen, melden Sie sich an einer Packstation mit Ihrer Kundenkarte und der PIN an.*
 ‘If you want to post [aufgeben] a parcel, please sign in at a packing station with your customer card and PIN.’

This example can also be analysed as displaying a different perspective on the event of transferring a constraint: the focus is on the person who gives away responsibility, rather than on the person who receives it. Such a usage of *auf*, especially in combination with *geben*, could be seen as extending to cases where there is no recipient of a constraint and all that is expressed is that a person loses or gives away a constraint. For instance, in the following sentence a sports team ends its participation in a competition and thus its commitment to win.

- (76) *Nach einem leichten Zusammenstoß musste die Germany 1 das Rennen vorzeitig aufgeben.*
 ‘After a slight crash the Germany 1 had to give [geben] up [auf] the race early.’

Note, however, that the foregoing is not the only possible analysis of *auf* in this context. It may in fact be more adequate to regard the ending of a constraint as a separate sense of *auf*, which might have derived from different spatial meanings of *auf*. For instance, the following way of using *auf* in combination with *stecken* may have resulted from spatial uses of those words in describing the placing of needles in a save position when stopping one’s daily knitting work. This etymological explanation is suggested by the lexical entry for *aufstecken* in Grimm and Grimm (2007).

- (77) *Wenn Sie jetzt schon Herzprobleme haben, sollten Sie in jedem Falle das Rauchen aufstecken!*
 ‘If you already have heart problems right now, you should in any case give up [aufstecken] smoking.’

In contrast, the similar meaning of *aufheben* in the next example can be understood as being derived from its literal spatial meaning, namely the lifting of an object, where *auf* stands for an upward movement.

- (78) *Der Landtag soll am Donnerstag die so genannte Handymastensteuer aufheben.*
 ‘The Parliament is supposed to lift the so-called “Handymastensteuer” [mobile phone tower tax] on Thursday.’

From these metaphorical uses of entire verb-particle constructions, the meaning of *auf* as the end of a constraint seems to have developed. *auf* in this sense can be combined with verbs which have no spatial meaning:

- (79) *Das haben ihm die Soldaten verübelt und ihm die Treue aufgesagt.*
 ‘Because of this the soldiers resented him and withdrew their loyalty to him.’

Although this use of *auf* differs significantly from its use in (70) to (74), it is interesting to see that there is at least some overlap in meaning in that *auf* always refers to a change in constraints on people's actions. It is possible that this meaning overlap provides some help in learning the different uses of *auf*.

4 *auf* is perception

In this section we will argue that one distinct sense of *auf* is something's being or coming to be (sensually or cognitively) perceived. This interpretation of *auf* is, for instance, possible in the following cases:

- (80) *Irgendwie ist er mir gleich aufgefallen. Zuerst hörte ich seine Musik, die sich von weitem durch das Gewirr von Stimmen Strassen und Luftverkehr zu meinen Ohren vorkämpfte.*
 'He somehow attracted my attention [*ist mir aufgefallen*] immediately. First I heard his music, which made its way to my ears from far through the tangle of voices, streets and air traffic.'
- (81) *Besonders kritisch ist die Situation, falls unverhofft unwetterartige Gewitter aufziehen*
 'The situation is particularly critical if thunderstorms come [*ziehen*] up [*auf*] unexpectedly.'
- (82) *Nun dürfen in Wunsiedel an diesem Samstag doch Neo-Nazis aufmarschieren.*
 'Now neo-nazis are allowed after all to parade in Wunsiedel on Saturday.'
- (83) *Das Musical "Die Schwarzen Brüder" feierte am 31. März 2007 in der Stahlgießerei Schaffhausen Weltpremiere und wurde seither ohne Zwischenfälle 40 Mal aufgeführt.*
 'On 31 March 2007 the musical "The Black Brothers" celebrated its world premiere in the steel foundry Schaffhausen and has since been performed 40 times without incident.'
- (84) *Seitdem wird am Querweg einmal wöchentlich geprobt und bei den verschiedensten Gelegenheiten dem Publikum aufgespielt.*
 'Since then rehearsals have taken place in Querweg once a week and audiances have been played for at a wide variety of occasions.'
- (85) *Nachdem alle einmal aufgetanzt haben, gibt es einen Rücktanz, bei dem sich aber nur noch sechs Paare beteiligen, einige davon gemeinsam.*
 'After all have danced once, there is a reverse dance, in which, however, only six couples participate, some of which together.'
- (86) *Da ich einer der wenigen war, der verkleidet dort aufgetanzt ist, gibt es doch tatsächlich ein Bild von mir*
 'As I was one of the few people who appeared there in disguise, there is in fact a picture of me.'

In the literature this sense of *auf* has been identified by Eichinger (2000), who speaks of a movement across the horizon of perception (“Bewegung über den Wahrnehmungshorizont”). He draws on Lindner’s work on *up*, where *up* is said to describe a path into the “range of viewer’s access”.³⁵ Both think that this sense of *auf* has evolved directly from the original sense of an upward movement since objects can be thought to become perceivable by moving upwards. The connection between an upward movement and this meaning of *auf* has also been noted by Grimm and Grimm (2007). They say that *aufreten* (engl. appear, perform) was originally used to denote events where someone had to move upwards, for instance on a pulpit or stage. For certain verb-particle combinations, this meaning may also have evolved via the sense of causing a support relation between things. Thus Kluge (2002) states that *aufführen* (engl. perform) originally meant to take something on (*auf*) the stage. This explanation might also be possible for *aufmarschieren* and similar combinations.

However, for our purposes, it is not necessary to settle this issue. We are only interested in whether *auf* currently has the function of referring to a perceptual event. The fact that this sense may have evolved from various other senses and that these original senses can sometimes still be used as an alternative interpretation does not speak against our analysis. There is no reason why one particular sense of a word could not have evolved from two other senses of the same word. Moreover it is an important caveat throughout this paper that different senses of *auf* cannot always be clearly distinguished and that often several interpretations are possible. We suggest the following lexical entry for this sense of *auf*.

$$(87) \quad \text{auf} \rightsquigarrow \begin{array}{c} \underline{e} \ \underline{x} \ \underline{y} \\ \text{PERCEPTION}(e) \\ \text{Experiencer}(e) = \underline{x} \\ \text{Stimulus}(e) = \underline{y} \end{array}$$

On our view the perception event is a change state of the theme *y* coming into the experiencer’s field of vision.³⁶ In most of the examples (80) – (86) the event described by the vP and the event of experiencing cannot be temporally told apart. We represent this temporal overlap as a sum \bigcirc of the respective event discourse referents e' and e . Note that this representation leaves open how much overlap there is between e' and e , so it leaves open whether or how long the contingency e' has been going on before the stimulus starts to be perceived. It does not specify either how long the event of perception (e) lasts.

³⁵Lindner1983, p. 125.

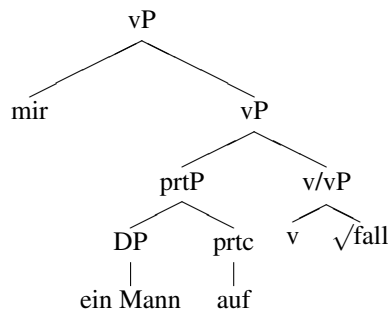
³⁶

$$(88) \quad \text{auf} \rightsquigarrow \left\langle \left\{ \begin{array}{c} s^0 \\ s^0: \neg (r_y \subseteq r_{\text{vision}(x)}) \end{array} \right\}, \begin{array}{c} \underline{e''} \ \underline{s''} \ r_{\text{vision}(x)} \ \underline{x} \ \underline{y} \\ \text{res}(s'', e'') \\ e'': \text{BEC} (\lambda s''. s'': r_y \subseteq r_{\text{vision}(x)}) \end{array} \right\rangle$$

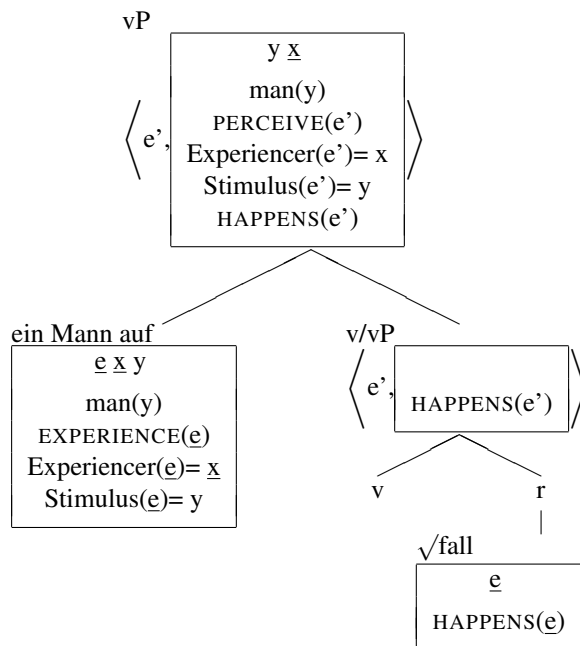
With (80) the relation is stricter: as the root $\sqrt{\text{fall}}$ contributes nothing but the occurrence of an event of some type³⁷, the discourse referents e' from vP and the perception e from *auf* can be unified.

In the syntactic representation (89) we represent the stimulus coming into the field of vision as argument in the particle phrase headed by *auf*.³⁸ The construction licenses an experiencer dative. The semantics construction of (80) up to v/vP is displayed in (90).

(89)



(90)



All the other examples above can also be interpreted using (87). Determining the referents for the stimulus y is fairly straightforward. In the first four cases the verb

³⁷The verbal root in *auffallen* is the one we find in *falls* (if), and *der Fall Oppenheimer* (the case Oppenheimer) introducing the usually nonpredictable occurrence of an event of some type. You find the root in *die Klausuren sind gut ausgefallen* (the results of the exams were good), *die Wahl fiel auf ihn* (he was chosen), *mir ist etwas eingefallen* (something occurred to me). The root does not introduce any arguments.

³⁸In this case the particle *auf* will not incorporate into the verb. The particle phrase is adjunct to vP. Still we have the correct word order when the v/vP head moves to a higher functional projection.

describes an event e' which overlaps with the event of perception e of which the theme of the sentence (introduced by the subject in (80), (81) and (82), and by the object in (83)) is the stimulus. This analysis is not possible for (85) since this sentence does not contain a theme. Here the stimulus can be identified with the event itself. Thus, as in the case of *auf* referring to an upward movement, it is again the case that the particle refers to an internal participant of the event described by the verb.

It is interesting to compare (85) to (86). In the latter the perfect is formed with *sein*, so the event is conceptualized as motion and the subject thus introduces a theme, which can then be interpreted as the stimulus. The contents of the sentences make clear that these different ways of unifying the DRS of *auf* with the context are justified. In (85) the entire activity of dancing is said to be perceived, whereas in (86) the speaker arrives at the event he talks about and thus comes to be perceived by the other people who are present there, while engaged with the activity of dancing (in a metaphorical sense).

This hypothesis about the correspondence between the thematic roles in a sentence and the identification of the stimulus was confirmed when we considered a wider set of data. We are hence in a position to answer the question of why certain verb-particle constructions with *auf* occur in the perfect with different auxiliaries. This question has been raised, and left unanswered, by Stiebels regarding the combination of *auf* with certain acoustic and optical verbs. We will come back to Stiebels' analysis of this group of verbs later.

Finding the experiencer x in the above examples is less easy. Although there are cases where the experiencer is clearly specified, there are no clear rules for how it must be introduced. One common way of introducing it is by means of a dative object, as in (80) and (84). Moreover in most cases the experiencer is not explicitly introduced and needs to be determined by means of world knowledge, taking into consideration the context. In (83), as in many other cases, the subject of perception is the audience in a public performance. Frequently the perceiver is the general public, as in (82). A further possibility is that it is left open who experiences the event because it either does not matter who is the experiencer or because the experiencer is only virtual. In the latter case the situation is only conceptualized as an event of perception and it would probably be more adequate to speak of an event becoming perceivable, rather than coming to be perceived. Yet it seems that in most context where *auf* is used in this sense some kind of experiencer is thought to be present.

In all the examples above an event of perception is only introduced by *auf* and related to the event expressed by the verb through unification. Yet *auf* in the sense of (87) also frequently combines with verbs whose lexical entries already contain an event of perception. The simplest case are verbs of perception, as in the following examples.

- (91) *Mehrere Personalien bei Ebay Deutschland lassen einen aufhorchen, gerade weil Ebay im Stammgeschäft doch zunehmend unter Druck gerät.*
 'Several particulars at Ebay Germany make one prick up one's ears, precisely because Ebay comes more and more under pressure in its core business.'

- (92) *Verstärkt auftretende Beben im Neuwieder Becken und im Aachener Raum und eine zunehmende Entgasung im Laacher-See lassen Böhm aufmerken.*
 ‘More frequently occurring earth quakes in the Neuwied Basin and in the Aachen area and an increasing degasification in the Laach Lake call Böhm’s attention.’

It is typical that such constructions involve the verb *lassen*, whose subject introduces the stimulus. In this case the experiencer is expressed by the direct object. Unification is similarly straightforward in the following examples since the verbs involved already refer to events of perception.

- (93) *Der Systemadministrator Thomas A. Limoncelli hat daher speziell für seine Berufskollegen ein Buch über Zeitmanagement geschrieben, in dem er typische Probleme aufzeigt und praktische Lösungen für den Alltag anbietet.*
 ‘Therefore the system administrator Thomas A. Limoncelli wrote a book about time management specifically for his colleagues, in which he shows up typical problems and offers practical solutions for everyday life.’
- (94) *Das Buch fängt sehr detailliert und vielversprechend mit dem Aufdeuten von Zusammenhängen der menschlichen Psyche mit dem Gehirn an.*
 ‘The book starts with a very detailed and promising discussion of connections between the human psyche and the brain.’
- (95) *Der seit letzten Donnerstag vermisste US-Diplomat Thomas Mooney (SN berichtete) wurde am Montag von einem Bauern tot aufgefunden.*
 ‘The U.S. diplomat Thomas Mooney, who had been missing since last Thursday (SN reported), was found dead by a farmer on Monday.’
- (96) *Sie können ungenutzte Bibliothekselemente auffinden und löschen, um ein Dokument zu organisieren.*
 ‘You can find and delete unused library elements in order to organise a document.’
- (97) *Ich habe, wie empfohlen, einen Experten aufgesucht.*
 ‘As recommended, I consulted an expert.’
- (98) *Mit “Trojan Check” können Sie Trojanische Pferde auf Ihrem Rechner aufspüren und beseitigen.*
 ‘With “Trojan Check” you can detect and remove Trojan Horses on your computer.’
- (99) *Wir haben wieder lesenswerte und online abrufbare Zeitungsartikel für Sie aufgestöbert.*
 ‘We have again tracked down for you newspaper articles which are worth reading and available online.’

The lexical entries of *zeigen* and *deuten* express that through an event of pointing the theme is placed within in the perceptual field of others. Similarly, *finden* expresses that something comes to be perceived (in this case by the agent), so unification with (87) is possible. The examples show that this is the case for intentional uses of *finden*, which carry the presupposition that an object was sought, and for non-intentional occurrences. The presupposition that a person tries to make it the case that an object enters his perceptual field is the main meaning of *suchen*, *spüren* and *stöbern*. A unification of the lexical entries of these verbs with that of *auf* leads to the conclusion that this attempt has been successful.

Let us now come back to Stiebels' analysis of *auf* in combination with acoustic and optical verbs, such as *weinen*, *schreien*, *brummen*, *blitzen*, *leuchten*, *glimmen*, *glühen*, or *flackern*. Some examples of such constructions are given in the following.

- (100) *eine der Szenen hat sogar auffällige Verfärbungen, die aber glücklicherweise nur kurz aufflimmern, bevor sich das Bild wieder beruhigt.*
 'one of the scenes even has noticeable stainings, which, however, luckily only flicker up briefly before the picture gets back to normal.'
- (101) *Ich muß noch hinzufügen, dass die Öllampe nach längerer Fahrt daheim kurz aufgeleuchtet hat, obwohl genügend Öl vorhanden ist.*
 'I must add that the oil light flashed up briefly at home after a longer drive although there is enough oil.'
- (102) *Ab Freitag werden in tschechischen Wohnzimmern, Bars und Gaststätten wieder verstärkt die Fernsehgeräte aufflimmern. Und zwar in schöner Regelmäßigkeit bis einschließlich zum 13. Mai. Denn genau in den dazwischen liegenden siebzehn Tagen wird in den russischen Städten Moskau und Mytishi die 71. Weltmeisterschaft im Eishockey ausgetragen.*
 'From Friday onward television sets will flicker up again more frequently in Czech living rooms, bars and restaurants. This will happen regularly until 13 May because exactly on the 17 days in between the 71st world championship in ice hockey will take place in the Russian cities Moscow and Mytishi.'
- (103) *also ich möchte eine LED dazu bringen, langsam aufzuleuchten und dann nach einer gewissen Zeit, wenn sie nicht mehr angesteuert wird, wieder langsam zu erlöschen.*
 'I want to get an LED to slowly start to glow and then after a certain time, when it isn't activated any longer, to slowly die down again.'

We suggest that in these cases *auf* is most plausibly understood in the sense of (87). For instance, the stainings in (100) can be interpreted as a stimulus that becomes perceivable during an event of flickering. Such an analysis is supported by the fact that verbs such as *flimmern* refer to optical or acoustic qualities which depend on events of perception for their very existence. A similar interpretation is suggested by Eichinger (2000) for *aufheulen* (yet not for *aufklappen*). However, like most analyses of *auf* in the literature³⁹ he also regards *auf* in such cases as an aspectual marker which indicates

³⁹E.g. Kempcke (1966), Kühnhold (1973), Fleischer and Barz (1992), Motsch (2004).

that an event begins or is only of a short duration. This view is also held by Stiebels.⁴⁰ In criticising this kind of analysis we will in the following focus on Stiebels' account because she offers the most thorough discussion.

According to Stiebels, *auf* is a marker of punctuality and thus describes a closed interval during which the state or process denoted by the verb holds and which is preceded and followed by states where this activity does not hold. When *auf* occurs together with an optical or acoustic verb, the activity expressed is in fact often described as being of a short duration. This is the case in (100) and (101). Yet more often than Stiebels is willing to admit *auf* occurs in sentences where events are described as gradually beginning or lasting for a while. Examples are given in (102) and (103).

Therefore, if *auf* is analysed as an aspectual marker, then it must be understood as being able to indicate both the beginning of and a short duration of an event or state. This analysis has in fact been presented in the literature and it is also the analysis which Stiebels offers for the prefix *er-*, which similarly combines with acoustic and optical verbs, but is not productive any more.⁴¹ She thinks that the main difference between the meanings of *auf* and *er-* is that *auf* is always punctual whereas *er-* can be a punctual or ingressive marker. It will therefore be interesting to consider her discussion of *er-*.

Stiebels holds that *er-* is interpreted differently depending on the verb it combines with. Thus, if the verb describes a continuous process or a permanent state, then the prefix denotes a change into this state or process. Whereas if the verb describes a punctual event or a short state, then the prefix indicates that this event or state is only of a short duration. Yet Stiebels rejects the idea of distinct lexical entries for these interpretations of *er-* because the different interpretations occur due to different base verbs. She holds that the entry for *er-* leaves open whether the described process or state lasts, or whether it lies within a closed interval. Although this view seems plausible, it is misleading that she speaks of the prefix having different denotations, depending on the verb it is combined with. It seems more accurate to say that there is one meaning of the prefix, which leaves open how long the event or state lasts, and that this aspect of duration has to be fixed by the context.

A similar account could be proposed for *auf*. It must, however, be noted that the meanings of the verbs with which *auf* combines determine the temporal structure of the events they denote less clearly than it would have to be the case if Stiebels' analysis of *er-* was correct for *auf*.⁴² If people want to express that an event is of a very short duration or that it lasts for a longer period, then they often have to make this clear by means of adverbials. Thus the events of flickering and flashing in (100) and (101) are interpreted as punctual because they are modified by the adverb *kurz*, whereas (102) describes longer lasting events of flickering since it is made clear in the context that these events always last for the duration of an ice hockey match. Yet this is not a real

⁴⁰Stiebels (1996), pp. 74ff. This analysis is supported, and probably partly caused, by the definitions of the relevant verb-particle constructions in the Duden dictionary. Stiebels states that she got the set of particle verbs she tried to account for from the edition from 1989, but the definitions are still similar in the latest version. For most of these constructions it is stated that the activity described by the verb suddenly begins and/or lasts for a short while.

⁴¹Stiebels (1996), pp. 72ff

⁴²We do not have time here to discuss whether her analysis is adequate for the case of *er-*

problem for the account as such because it can allow for the context to play a larger role in determining the temporal features of the interpretation and often details about the duration of events can even be left underspecified.

We have thus arrived at an analysis where *auf* merely denotes the beginning of an event. As our examples have made clear, it cannot even be understood as expressing that an event begins slowly or suddenly. On the basis of what we have said so far this analysis cannot be excluded. However, the fact that it has to be postulated especially for a very limited group of verbs or contexts speaks rather against it, especially given that there is an available analysis which is necessary anyway to account for a variety of other contexts in which *auf* occurs. A particular problem is that the lexical entry needs strong selectional restrictions in order to avoid significant overgeneration or misinterpretation. Imagine *auf* had the following representation.

$$(104) \quad auf \rightsquigarrow \left\langle \left\{ \begin{array}{c} s^0 \\ \boxed{e'} \\ s^0: \neg \\ \boxed{e': \alpha(\underline{x})} \end{array} \right\}, \left\{ \begin{array}{c} \underline{x} \ e \\ s^0 \supset \subset e \\ \underline{e}: \alpha(\underline{x}) \end{array} \right\} \right\rangle$$

This representation could easily be unified with a variety of contexts, definitely more than Stiebels and others would want to allow for. In order to avoid this the entry would have to specify that it can only be used in combination with certain verbs.

Stiebels herself rejects arbitrary selectional restrictions.⁴³ Nevertheless she seems to think that in the case of *auf* as an aspectual marker, some such restrictions are needed. Thus she claims that *auf* in this sense only combines with verbs which express the emission of acoustic or optical signals and with some agentive verbs which describe the display of emotions.⁴⁴ Yet she thinks that within this group of verbs no selectional restrictions are needed because *auf* as a punctual marker has the implicit semantic restriction that the verb it occurs with must be able to denote processes which can be contracted into a point.

However, her analysis is not convincing. She claims that this interpretation is not possible for the combination of *auf* with the punctual verb *klopfen* because it does not denote a process that can have a culmination point.⁴⁵ But she does not explain why this would be required by a punctual marker. It seems that the aspect of punctuality is not strong enough a constraint and she needs to introduce further selectional restrictions to explain the data. Furthermore we have seen that punctuality is not the best analysis of *auf* in such contexts anyway. And the analysis we arrived at when considering *auf* as an aspectual marker (104) seems to introduce even less constraints on the kind of verb it can combine with.

Of course, there is always the possibility that particular interpretations of certain verb-particle combinations are excluded because they are blocked by similar, but more

⁴³Stiebels (1996), pp. 12 + 261.

⁴⁴Stiebels (1996), p. 74

⁴⁵Stiebels (1996), p. 279

frequent or even lexicalised contexts where *auf* is used in a different sense. This phenomenon is in fact mentioned by Stiebels. Yet it seems unlikely that this can account for all the cases that have to be excluded. Moreover the fact remains that the suggested analysis of *auf* as an aspectual marker definitely needs selectional restrictions about the class of verbs that can combine with *auf*. Such arbitrary restrictions are clearly not in accordance with the idea that the question of whether or not a word can be interpreted in a certain way in a particular context mainly depends on whether or not the relevant representation can be unified with the representations of the context. Even though we have to allow for some arbitrary restrictions, in particular due to historical developments, the fact that such restrictions are needed for this analysis to work is a pro tanto consideration against it.

The foregoing consideration gains in weight if we can show that our proposed analysis does not need such arbitrary selectional restrictions. This may seem questionable on the grounds that our analysis is similarly general, and as most activities can be perceived one would expect *auf* in this sense to occur in more contexts than it actually does. Hence our analysis might be thought to require selectional restrictions too.

In response to this we must first note that (87) is present in more contexts than those considered by Stiebels and others for *auf* as an aspectual marker. This has become apparent in the examples above. Besides there are explanations other than selectional restrictions which can account for the fact that *auf* in the sense of (87) does not occur more often. One of them is blocking through similar contexts, which we mentioned above. Another reason is that (87) introduces stricter constraints for unification than may seem at first sight. It is only a plausible interpretation if it makes sense to emphasize that a theme or event comes to be perceived (or perceivable). This is, for instance, the case if there is a transition from non-perceivability to perceivability of a theme or event, if the perceivability of the theme or event allows of degrees, or if the theme or event is displayed in front of an audience or for the general public. That the aspect of perception is relevant in a given context is more easily detected by the unification mechanism if the concept of perception already figures in the context, e.g. in the meaning of the verb. This is why acoustic and optical verbs, but also the verbs in (93) to (99), occur particularly often together with *auf* in this sense.

As we have seen above, a further advantage of (87) over (104) is that it can explain the fact that some verbs can occur with different auxiliaries in combination with *auf*, depending on the context. Stiebels offers some possible explanations for this variation, yet in the end she has to admit that her account is unsatisfactory because it cannot adequately explain the fact that *er*-verbs always form the perfect tense with *sein*. Her hypothesis is (following Kaufmann (1995)) that the perfect tense is formed with *haben* if the event is restricted to a closed intervall, and with *sein* if the event has a resultant state. Given that her analysis of *auf* and *er*- are similar in the relevant respects, her hypothesis should be able to account for both particles. However, according to Stiebels there are *er*-verbs which form the perfect with *sein*, yet do not have a clear resultant state. A further problem with regard to *auf* is that the perfect is often formed with *sein* in descriptions of punctual events. This is the case in (105) and (106).

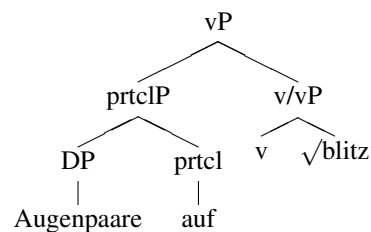
- (105) *Dunkel war es dort gewesen, aus der einen oder anderen Ecke hatten sie ein Flattern gehört, und gelegentlich waren diamanthelle Augenpaare aufgeblitzt.*
 ‘It was dark there, from some corner or other they heard a flutter and occasionally diamond-bright pairs of eyes flashed up.’
- (106) *Und so schlecht war die Dramaturgie der Performance als Ganzes ja auch wieder nicht, dass die lautere Absicht nicht doch immer wieder aufgeblitzt wäre.*
 ‘And after all the dramaturgy of the performance as a whole wasn’t so bad that the sincere intention would not have flashed up occasionally.’
- (107) *Während er sie angesehen hatte, hatte er beinahe unmerklich eine Augenbraue gehoben, und seine Augen hatten aufgeblitzt.*
 ‘While he was looking at her, he almost unnoticed lifted one eyebrow and his eyes flashed up.’

Thus Stiebels’ hypothesis cannot explain why, for instance, in (105) and (107) different auxiliaries are used. Yet our analysis identifies a significant difference between the two sentences. The eyes of the person referred to in (107) are perceived before and after the event described by the sentence; what is said to be perceivable only for a short time is a certain activity of his eyes. In contrast, in (105) it is the pairs of eyes referred to that are only perceivable for a short time. Therefore the subject of the sentence introducing them is an internal argument of the verbal construction and the perfect is consequently formed with *sein*.

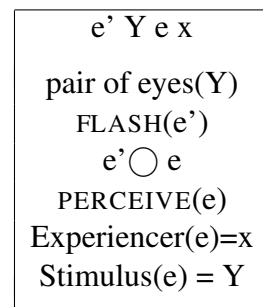
The syntactic structure of (105) is (108.a). The semantic representation is (108.b). In (107) we have a transitive structure (109.a), here represented with a voice-projection housing an agent. The semantics representation is displayed in (109.b).

(108)

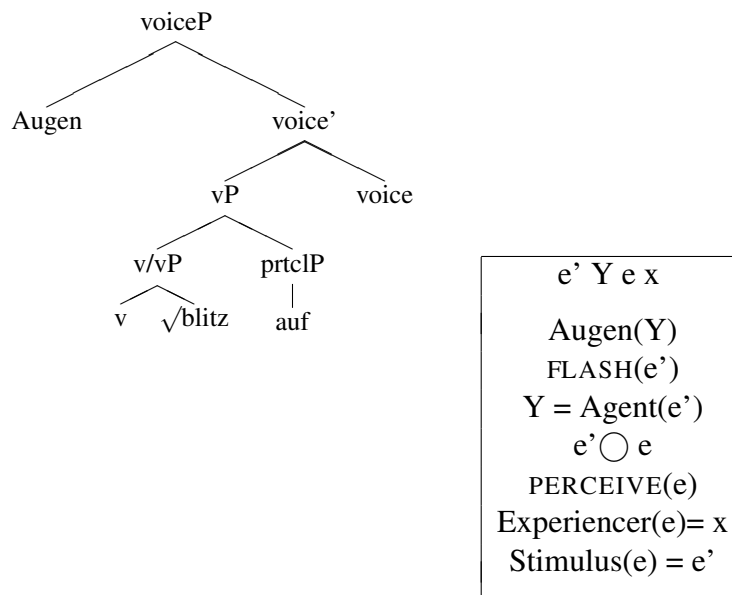
a.



b.



(109)



We can conclude that contexts where *auf* has been interpreted as an aspectual marker are better accounted for by (87). This sense of *auf* is present in seemingly very different contexts, which have been analysed in different ways in the literature or have even been left without analysis. Yet all these contexts can be interpreted by means of one lexical entry for *auf* and general interpretation mechanisms. The fact that some special meaning aspects have evolved through historical processes does not affect this general conclusion. Of course, in some cases alternative interpretations of *auf* may be possible. Thus the original vertical interpretation may sometimes still be adequate or even more plausible. In other cases, such as the following, (87) competes with the aspects of increase or openness.

(110) *Ich habe jeden Morgen aufgeatmet, wenn sie noch am Leben war.*
'I respired every morning if she was still alive.'

(111) *In den letzten vier Wochen sind überall die Tulpen aufgeblüht und oft auch schon wieder verblüht.*
'During the last four weeks tulips have started to blossom everywhere and have often withered again already.'

However, which interpretation is chosen does not seem to matter much for the meaning of the entire context. As the different interpretations are compatible with each other, they do not lead to ambiguities which would need to be resolved. Which one is chosen in a given context may depend on individual speakers or communities.

5 *auf* is open

The predicates *auf* and *offen* are historically of the same origin. Just like *offen*, *auf* can be used as a predicator for nominal descriptions if the denotation of the description either has a barrier that makes some second region inaccessible or if it is such a barrier itself. So both the adjective *offen* as well as the particle used in a predicative expression involve two related regions.

(112) *das Zimmer, das Gurkenglas, das Geschäft, das Auge ist auf/offen.*
the room, the cucumber jar, the shop, the eye is [up]/ open

(113) *die Tür, der Glasdeckel, der Riegel, das Augenlid, ... ist auf/offen.*
the door, the glass lid, the bolt, the eye-lid,... is [up]/open

The entities in (112) function as Ground entities in the predicate, whereas those in (113) introduce figures. In verbal constructions only the *particle* is grammatical; for instance, **das Glas offenmachen* is ungrammatical.⁴⁶

(114) *Sie sollten zu jederzeit Ihren Besucher identifizieren, und zwar bevor Sie die Tür aufmachen.*
'You should always identify your visitor, and do so before opening the door.'

(115) *Denn Nüsse sind in ihren Schalen frostsicher verpackt, und die Eichhörnchen müssen nur noch die Nussschale mit ihren scharfen Nagezähnen aufbeißen.*
'This is because nuts are packaged frost-proof in their shells, and the squirrels only have to open the nutshell with their sharp gnawing teeth.'

In *die Tür aufmachen* we conceptualise the door as a barrier with reference to some spatial region that is accessible or inaccessible along some path through the opening. *Auf* contributes this spatial relation between the region which provides accessibility and the barred region.

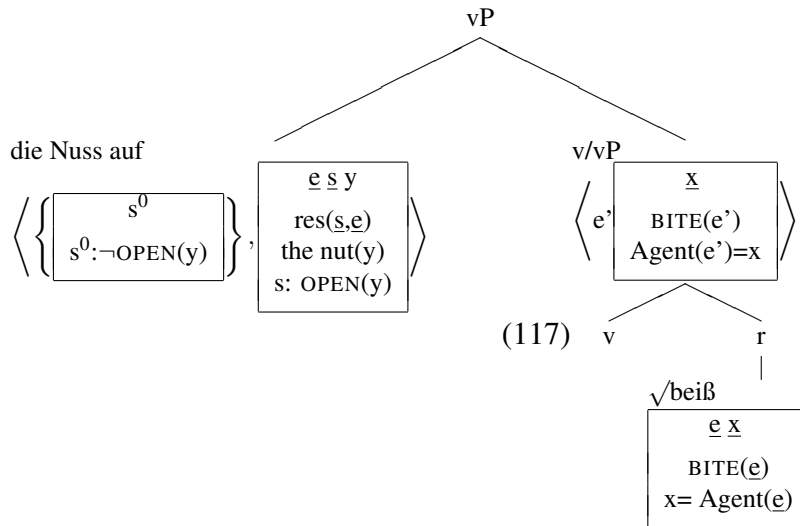
Auf in the sense of 'open' can function like other individual properties and does therefore not require special interpretative mechanisms. Thus, whether or not this interpretation is possible mainly depends on whether the object to which it refers can be described as open (in the original spatial sense as well as in abstract senses), though other aspects of the context are of course relevant too. For example, in resultative constructions it must be possible that the theme becomes open through the event described by the verb. Whether or not this is possible has to be determined in the particular context and cannot be decided for certain verb-particle constructions considered in isolation.

The construction algorithm for (115) involves the following steps. *Beißen* is a non-core-transitive action verb, which occurs with internal arguments, e.g. which undergoes change of property. We assume that the internal argument is introduced by the particle *auf*. The stative property of the nuts being open is the target state of the action. As for syntax the vP contributes an activity and the internal argument is introduced

⁴⁶See Kratzer (2005). Kratzer does not provide an explanation for this observation, neither can we. We can only guess that *ûf* might be older and *offen* came to be used in non-verbal contexts.

in the particle phrase which is combined with the vP node by adjunction. Adjunction semantically means unification of the change \underline{e} with the referential argument e' . We display the semantics construction in (117).

(116) Eichhörnchen die Nuss aufbeißen⁴⁷

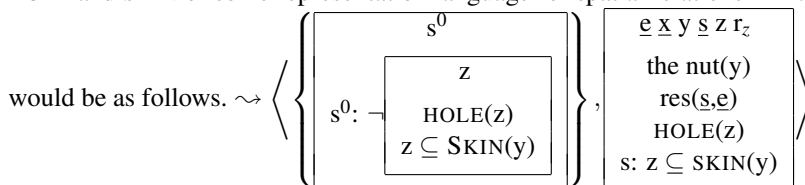


Although this meaning of *auf* seems fairly straightforward, one type of context where *auf* means open has been regarded in the literature as requiring special treatment. These are cases where *auf* is combined with a verb which is thought to have as a resultant state an object's being *zu* (closed), and which would thus on the basis of the interpretation mechanisms assumed so far be excluded from combining with *auf* in the sense of open.⁴⁸

(118) *Ich kam nach Hause und wollte die Haustür aufschliessen, aber mein Schlüssel ließ sich nicht drehen.*
 'I got home and wanted to unlock the door, but I couldn't turn the key.'

(119) *Will ich die Bänder auf etwa 50 cm kürzen, muss ich sie abschneiden und jedesmal aufknoten und neu verknoten, weil sie zu kurz sind, um sie über den Kopf zu ziehen.*
 'If I want to shorten the laces to about 50 cm, I have to cut them and each time unknot them and knot them again because they are too short for being pulled over my head.'

⁴⁷We leave the last construction step to the reader. A refined representation of the vP using the primes HOLE and SKIN of some representation language for spatial relations in Kamp and Roßdeutscher (2005)



⁴⁸ Further examples of such verbs are *binden, decken, falten, flechten, knöpfen, knüpfen, korken, riegeIn, rollen, schnüren, sperren*.

Stiebels claims that special semantic mechanisms are needed in the case of such constructions. Yet she suggests that the combination of certain particles with verbs which express an aspect that contradicts the meaning of the particle is made possible through removing this aspect from the meaning of the verb before combining it with the particle (bleaching).⁴⁹ So according to her *auf* or other particles can be combined with a particular verb if either the unification of their meanings makes sense or such bleaching is possible for the verb.

We take a different perspective on the problem: According to our construction that 'bleaching effect' results from a different role the root plays in the construction. *Die Tür aufschließen* has not been derived from *die Tür schließen* in the sense of bringing about the state of the door being not open. The semantics which the verbal root $\sqrt{\text{schlie\ss}}$ in *schlie\ss(en)* contributes must be characterised as follows: acting towards the door in a particular manner of manipulating it. This might involve using an instrument like a key. But the root $\sqrt{\text{schlie\ss}}$ does not commit to any particular result of acting in this manner. It concerns the activity time span. Which result is intended by the agent is contributed by other elements in the verbal construction. We find this particular contribution of $\sqrt{\text{schlie\ss}}$ also in (a) *die Tür abschließen* (to lock the door); (b) *die Tür zuschließen*; (c) (to lock the door) (to *zweimal herumschließen* (to give the key a double turn) and in other constructions. We claim that in none of these complex verbal predicates the semantic contribution of the verbal root implies that the door (or whatever is manipulated) becomes closed. In (a) and (b) this meaning aspect comes from the particle *ab-* (becoming inaccessible) or *zu*, (not open); in (c) it is only a plausible pragmatic inference.

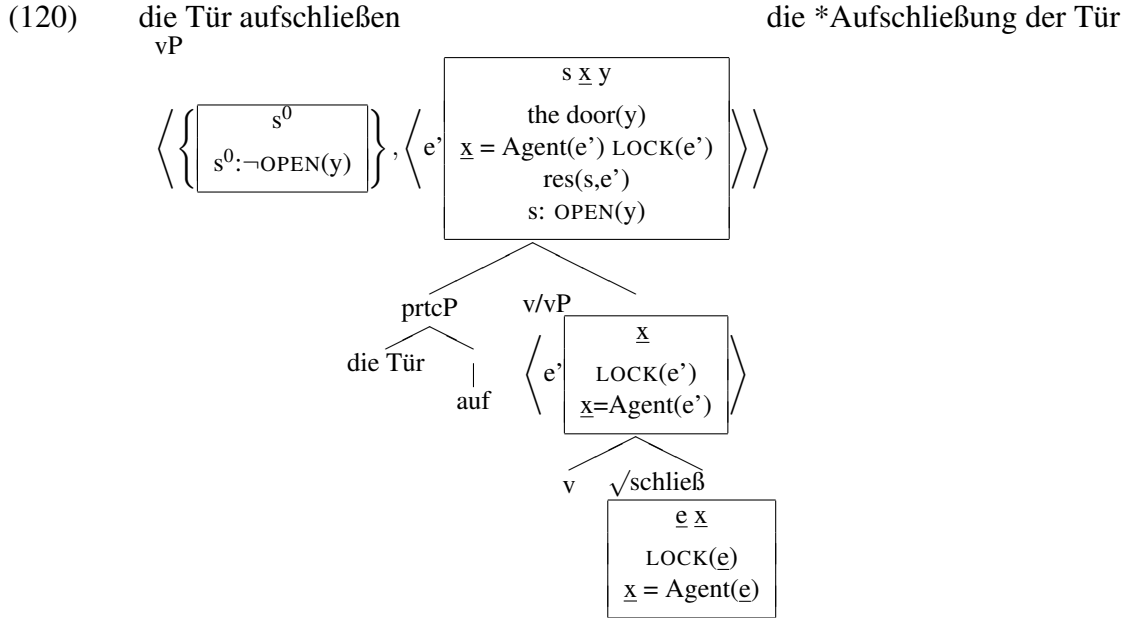
What is the evidence for our claim? — That the 'underlying' verbs in particle constructions are different makes itself felt in that they do not undergo *-ung*-nominalisation. There is no *-ung*-nominalisation of any of the complex verbs mentioned above: neither **die Aufschließung der Tür*, **die Abschließung der Tür*, **die Zuschließung der Tür*, nor **die zweimalige Herumschließung* are grammatical. All those *ung*-nominalisations are ungrammatical for the same reason that **die Schreibung des Briefes* (corresponding to 'write the letter'), **die Wischung des Tisches* (corresponding to 'wipe the table'), **Laufung* (corresponding to 'run') or **Hustung* (corresponding to 'cough') are ungrammatical: All these verbs characterise the manner of an event, either of an intransitive event description or of a 'non-core'-transitive verb in the sense of Levin (1999). To put it like Kratzer (2000), 'these verbs enter syntax as intransitive verbs'.

We will not go further into the theory of *ung*-nominalisation (see [Kamp/ Rossdeutscher:2008] for the semantic and syntactic preconditions for *ung*-nominalisation).⁵⁰ But in order to get across at least a slight idea of the difference between *die Tür schließen* with the grammatical *ung*-nominalisation *die Schließung der Tür* as opposed to *die Tür aufschliessen* we present the construction or decomposition of both verbal constructions.

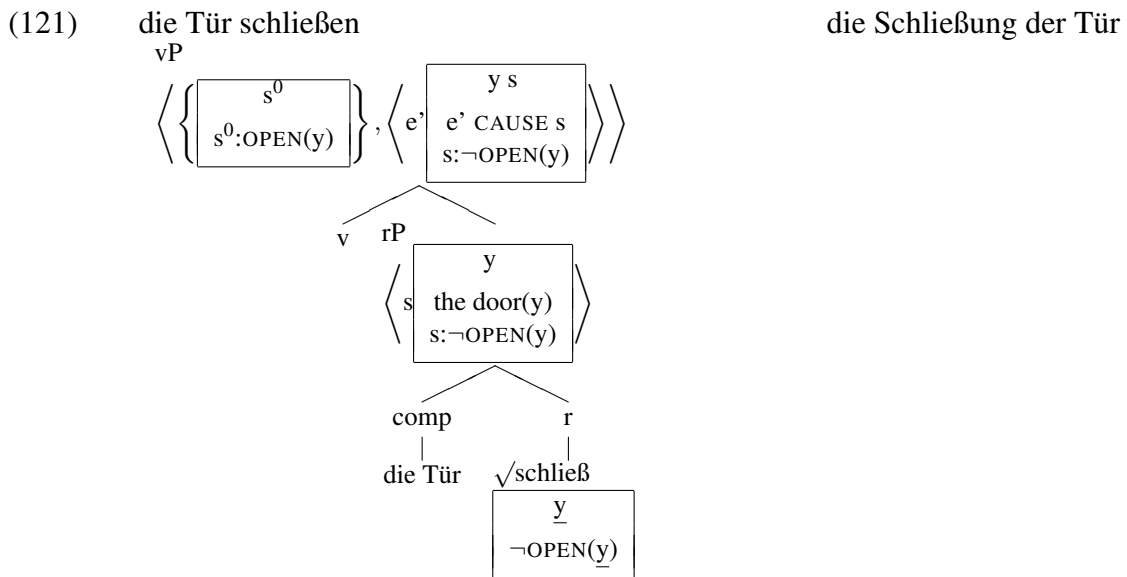
⁴⁹She calls this "Bedeutungsentleerung" (Stiebels (1996), p. 237).

⁵⁰The reader may have noticed that the verbs listed in footnote 48 share with *aufschließen* that there are no *ung*-nouns. (*Aufdeckung* does not speak of taking away a cover.)

The main difference between *die Tür schließen* and *die Tür aufschließen* lies in the fact in the former the verbal root contributes the property of the door not being open, whereas in the latter the root contributes the agent's manner of manipulating the door. We display the construction of the latter in (120).



We contrast that construction with *die Tür schließen*, which provides an bi-eventive construction, see (121).⁵¹ It is crucial here that the door is represented as bearing the property \neg open, i.e. the discourse referent y is constructed as participant of the target state of the event from the very beginning, and thus in the center of the construction. The event e' is interpreted as bringing about that state. This syntactically given causal relation is a necessary precondition for *ung*-nominalisation.



⁵¹We simplify the analysis a bit: the root semantics of $\sqrt{\text{schließ}}$ contributes universal quantification over regions with respect to some frame: there is no hole in that frame.

If $\sqrt{\text{schlie\ss}}$ functions as a modifier of little *v*, providing the manner-component of an action exclusively, the predicate provided by the root is compatible with the prediction of a change of state of the door from $\neg\text{OPEN}$ to OPEN .

We are aware of the fact that our line of argument requires more thorough investigation. But we are convinced that the semantico-syntactic differences in the constructions play an important role, even if the semantic result makes itself felt as 'bleaching', as Stiebels and others put the effect.

Note that the way we represent *auf-schlie\ss*en and *zu-schlie\ss*(en) also throws an explanatory light on the following empirical hypothesis by McIntyre (2002):

"If a verb *V* entails a result *R*, the reversal of *R* may be expressed by combining *V* with a particle contradicting *R*." McIntyre (2002), p. 116.

Our competing claim is as follows: Constructions with manner contributing roots in a verbal construction are open for result specification contributed by particles because no result specification is provided by the manner specifying root.

By the way, as far as the verb *öffnen* is concerned McIntyre's hypothesis fails. There is neither *die Tür zuöffnen* nor *das Haar zusammenöffnen*, or whatever. This is straightforward in our account, because there is no verbal construction in German, where the root $\sqrt{\text{offen}}$ would contribute a manner specification of the event. This mirrors the fact that there are no verbal constructions with *öffnen* that lack *-ung*-nouns.

6 *auf* is Germ. *alle*

There is a strong correlation between one possible contribution of the particle *auf* and the German adjective *alle*. German *alle* contains the lexical root $\sqrt{\text{all}}$ which is known as quantifier *alle* (Engl. *all*). The predicate *alle* as well as the predicate *auf-* as a particle involves universal quantification over parts of the predicate bearer. For instance, *das Eis ist alle* (the ice cream is gone) describes the target state of an eventuality of decrease in existence of mereological parts of the denotation of the predicate bearer. A predication involving negation *das Eis ist nicht alle* implies the existence of parts of the ice cream. In the following examples *alle* and *auf* have the same contribution.

- (122) Zum Eis: Nein der hat das nicht allegefutert, das war ich selbst. Warum überlebt Schokoeis nie länger als ein paar Tage im Gefrierschrank?
'No, it wasn't him who finished the ice cream, but me.'
- (123) Nein der hat das nicht aufgefutert, das war ich selbst.
'No, it wasn't him who ate [gefutert] up [auf] the ice cream, but me.'

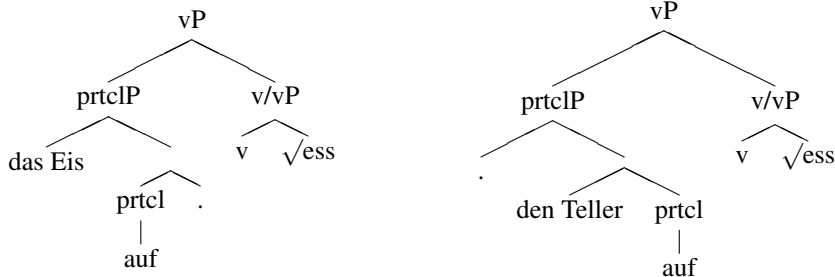
The contribution of *alle* in resultative constructions as well as *auf* in particle verbs presupposes some deconstructive or consumptive action — which is contributed by the verbal description — with respect to the existence of the theme. What is asserted is the culmination of the decrease (see above).

How is (123) constructed? Our proposal is as follows:

(124)

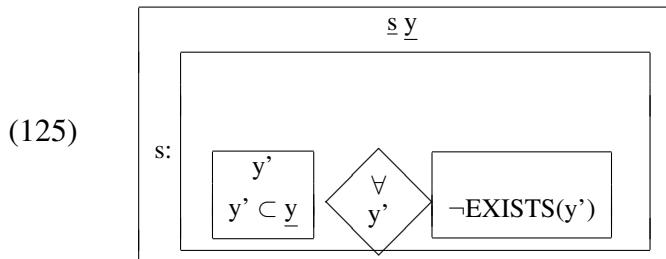
a. *das Eis aufessen*

b. *den Teller aufessen*



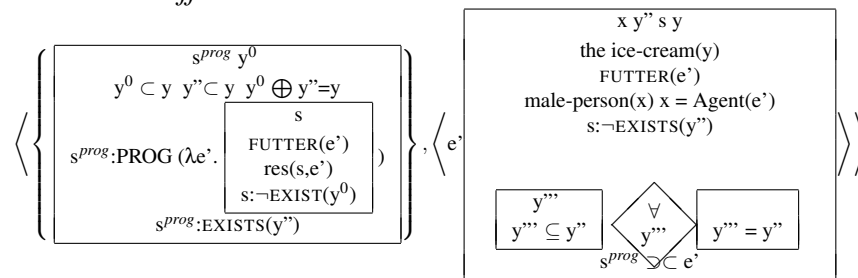
We take it that the incremental theme arguments in (124.a) and (124.b) instantiate a Figure/Ground-alternation. (This speaks for a view that the head dubbed as 'prtcl' is preposition-like. But we leave the labels as they are.) The alternation is not seldom in German see, e.g. *den Laden aufkaufen*, meaning to buy everything out of a shop, *die Schachtel (Zigaretten) aufrauchen*, (to consume all the cigarettes contained in the packet) *das Glas auftrinken* [DUDEN] (to finish the glass), *die Spielsachen aufräumen* (to tidy away the toys) vs. *das Kinderzimmer aufräumen* (to tidy up the children's room), etc. .

The following condition (125) displaying universal quantification on the incremental theme variable in the spirit of Kratzer (2002) provides the crucial condition for the application of *auf* in the sense of *alle*.



There are some verbs of consumption where *auf*, just as *alle* involves universal quantification and evokes the presupposition of the state of progression of change. The presupposition makes itself felt in negative contexts such (123). (123) gives rise to the implication that someone had consumed parts of the ice-cream already. However, the presupposition arises with incremental themes exclusively: *etwas aufschlucken* and *aufschlingen* (to gulp (up)), conceptualised as consuming with one gulp, do not give rise to such a presupposition. So the presupposition does not arise from *auf* on its own. How the mechanism of creating a presupposition must be described is a matter of further research. It might turn out as being pragmatic in nature. We represent without further comment the presupposition/ assertion component of *das Eis auffuttern*.

The presupposition is to the effect that in the immediate pre-state of the described eventuality the following state of affairs obtains: There still exist some parts different from the final one which the agent is consuming. Thus the composed predication asserts the consumption of the final part, only.

(126) *er das Eis auffuttern* \leadsto 

7 *auf* is partition or summation

In the following examples *auf* expresses change of spatial properties of entities to the effect that there exists spatial 'sections' that make up the entire space occupied by the theme of the *auf*-verb. In contrast to the use of *auf* discussed in the previous section, where *auf* implies the entire consumption of an object, *auf* in this sense does not denote any diminution in the size of the object.

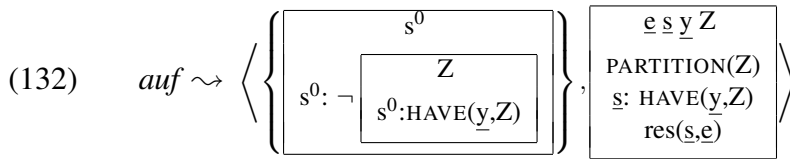
- (127) *Das Brautpaar muss die Torte aufschneiden, die dann auch gegessen wird.*
'The bride and groom must cut up the cake, which will then also be eaten.'
- (128) *Mitten in dieser Zone lag Berlin, aufgeteilt in vier Sektoren, von denen jeder von einer Siegermächten [sic] verwaltet wurde.*
'Berlin was situated in the middle of this zone, divided up into four sections, each of which was administered by one of the allies'
- (129) *Berlin ist seit dem 1. Januar 2001 durch eine Verwaltungsreform in zwölf Bezirke aufgeteilt...*
'Since 1 January 2001 Berlin has been divided up into twelve districts through an administrative reform.'
- (130) *Zwischen 1949 und 1990 war die Stadt geteilt*
'Between 1949 and 1990 the city was divided'

Other instances of this concept are

- (131) *auffächern* (divide up, root: compartment), *aufgliedern* (divide up, root: element, limb, member), *Beiträge aufschlüsseln* (to break down the fees, root: key), *aufsplintern* (to fragment, root: splinter), *aufsplitten* (to split up), ...

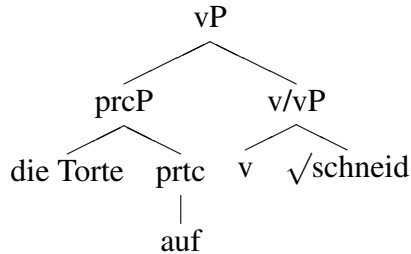
To cut up a cake is to make sections out of the parts. It does not mean that the cake ceases to exist, or is affected in the way the city of Berlin is presented in (130). There is merely an implication that there are spatial sections that make up the region as a whole. This is essentially the meaning of (129), too. The Figure/Ground-relation contributed by *auf* is justified with reference to sections that sum up to the whole region. Let's focus on (127). Assume (counter-factually) that the bridal couple cuts the cake into two pieces only. Then there exists a sum Z of the parts $z_1 \oplus z_2$ such that the cake y 'is' or 'has'

those parts. This action has both a destructive and a creative aspect: the region r_0 which the cake occupies in the pre-state of the action is no longer connected, but regions of those parts r_{11} and r_{12} are created, where r_{11} and r_{12} are the regions occupied by z_1 and z_2 , respectively. The union of the spatial regions $r_{11} \cup r_{12}$ is r_0 . It is this latter aspect that is salient in (128) and (129) as opposed to (130), which may exclusively speak of the destructive aspect of the city being divided. This is not the case with (128) and (129), to which we will come back in the next section. (132) displays the contribution of *auf* meaning partition of the internal argument of the verbal construction.

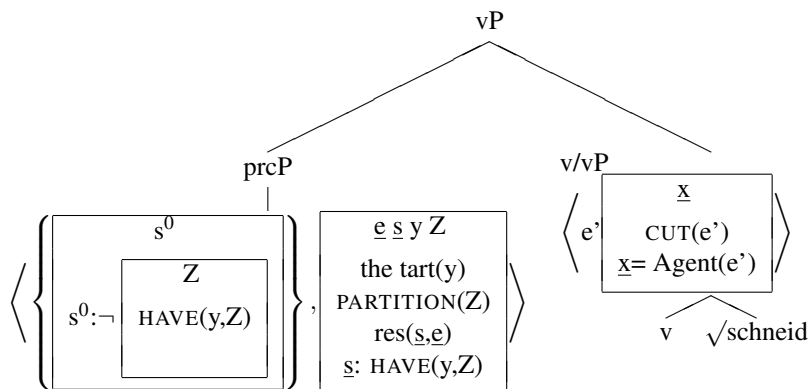


Along the syntactic representation (133) we display the semantics construction (134). We leave out the final vP-representation which is gained via unification of \underline{e} and the referential argument e' of the construction. Accommodation of a partition Z is straightforward in the context of verbs of division such as to cut or to split.

(133) die Torte aufschneiden



(134)



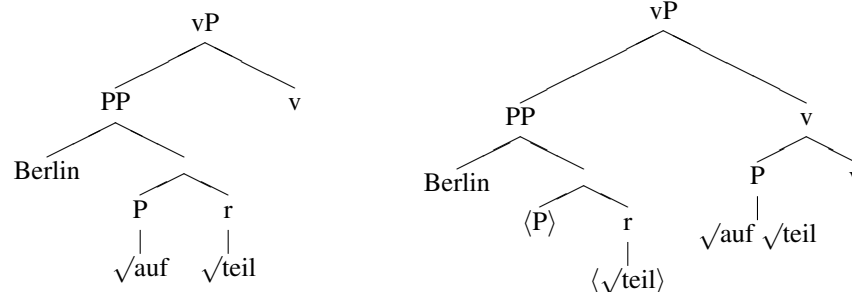
8 *auf* in denominal and deadjectival verbs

Denominal verbs

We have already alluded to the differences between (129) and (130). The latter construction implies that there are parts, but it is the former which predicates on the spatial aspect of those parts. *Aufteilen* seems to predicate more specific properties than *teilen* on its own does. The question arises whether this 'additional' effect is built 'on top' of the *teilen*-predication or whether the constructions are structurally different. We opt here for the latter, representing *Berlin aufteilen* as in (136).

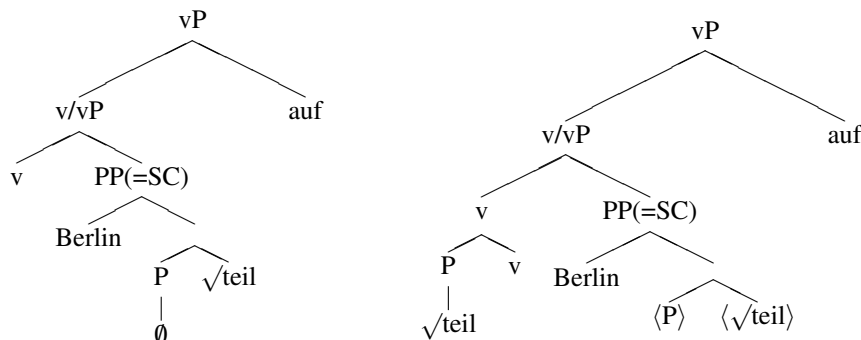
(135) Berlin aufteilen⁵²

(136)

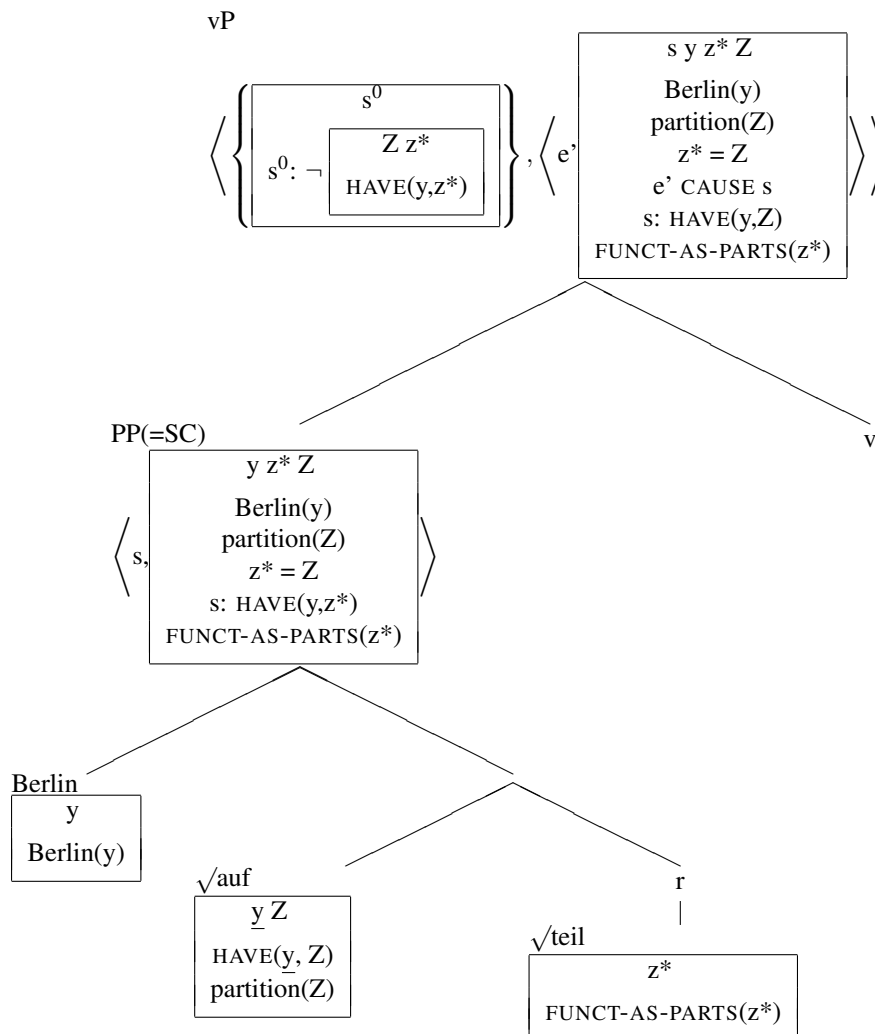


⁵²We considered but finally rejected a solution along the former lines for a syntactic representation, because that solution would complicate the word-syntactic construction of *Aufteilung*. In that case the particle *auf* in *Aufteilung* would be attached to a nominal *Teilung*. There are solutions along these lines in the literature, too, see Zeller (2001), but they lead to 'bracketing paradoxes' for other constructions. It should be noted that (136) is not without difficulties (arising through particle stranding) either.

Now, in the current case the difference between the solutions hardly affects the principles of semantics construction: In any case the discourse referent z^* introducing something functioning as parts will be unified with *auf*'s requirement for a partion Z.



(137)



There are a couple of denominal constructions with *auf* that do not denote an action of making a partition out of a single entity, but – contrariwise – denote an action of constructing an entity which denotes a set, collection or mereological sum made out of the entities denoted by the plural direct object of the construction. For instance: *Namen auflisten* (to list [up] names) (see (138)); *Perlen aufreihen* (make a string out of pearls); *Beträge aufsummieren* (to sum up the figures). The construction is analogous to that of (137), except that the set of entities undergoes change into a mereological sum of entities denoted by the root. $\sqrt{\text{list}}$ (list) denotes an entity out of items; $\sqrt{\text{reihe}}$ (string) denotes an entity or configuration out of an (ordered) set of entities, in turn; $\sqrt{\text{sum}}$ denotes an abstract entity out of figures, etc.

(138) *Lobbyisten.[...] Auf dieser Seite sind die bisher bekannten Fälle von "externen Mitarbeitern" nach den einzelnen Bundesministerien aufgelistet.*
 ‘Lobbyists.[...] On this page the currently known cases of ‘freelancers’ are listed [aufgelistet] by the federal ministries.’

(138) can either be constructed as in (136) In this construction a list is made out of the names of the lobbyists. But another possibility is that there is a list pre-supposed in context and the names are added to this pre-existing list, following the pattern of (65), where *auf* introduces a support relation. Similar remarks can be made for *die Perlen aufreihen* (make a string out of perls) or *Beträge aufsummieren* (to sum up the figures).

Deadjectival verbs

auf occurs in combination with a number of deadjectival verbs. Such constructions have sometimes been analysed as instantiating a special sense of *auf*. On this view *auf* is thought to express that an object acquires the property described by the adjective, and thus that the resultant state of the event introduced by the verb is achieved.⁵³ This would imply that *auf* does not add much to the meaning of a deadjectival verb occurring in isolation (i.e. without *auf*). The fact that some deadjectival verbs which combine with *auf* cannot occur in isolation could be taken to support this view. *Auf* could be seen as a mere means of turning an adjectival root into a verb.

However, even in such cases the semantic contribution of *auf* ususally seems to be stronger. Moreover it is not the case that *auf* makes the same semantic contribution whenever it is combined with deadjectival verbs and that there is a special meaning of *auf* in the context of deadjectival verbs. Rather, in such contexts *auf* normally has one of the meanings discussed in the previous sections. Thus whether it can occur in combination with a deadjectival verb and how it is to be interpreted in such a case depends on the meaning of the adjective.⁵⁴ Let us support these claims by discussing some examples.

(139) *Nun findet sie aber ihre Augenbrauen viel zu dunkel und möchte diese etwas aufhellen.*

‘But now she finds her eyebrows much too dark and wants to lighten them up a bit.’

(140) *Es ist keine einfache Aufgabe, die sie sich für ihr Praktikum ausgesucht hat, denn sie muß schwerkranke Kinder aufmuntern und gramgebeugte Eltern trösten.*

‘She hasn’t chosen an easy task for her placement, as she has to cheer up seriously ill children and comfort deeply afflicted parents.’

(141) *Die gerade für Biobauern wichtigen Regenwürmer können in Ruhe weiter den Boden auflockern.*

‘Earth worms, which are especially important for organic farmers, can continue in peace to loosen the ground.’

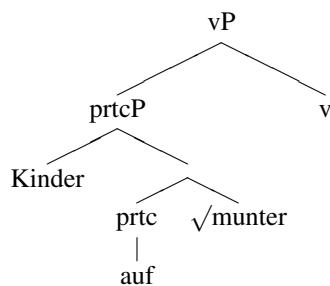
⁵³E.g. Kühnhold (1973), Motsch (2004)

⁵⁴Of course, as discussed in previous sections, there can also be non-semantic reasons, such as blocking through common existing combinations, for why certain combinations are not possible.

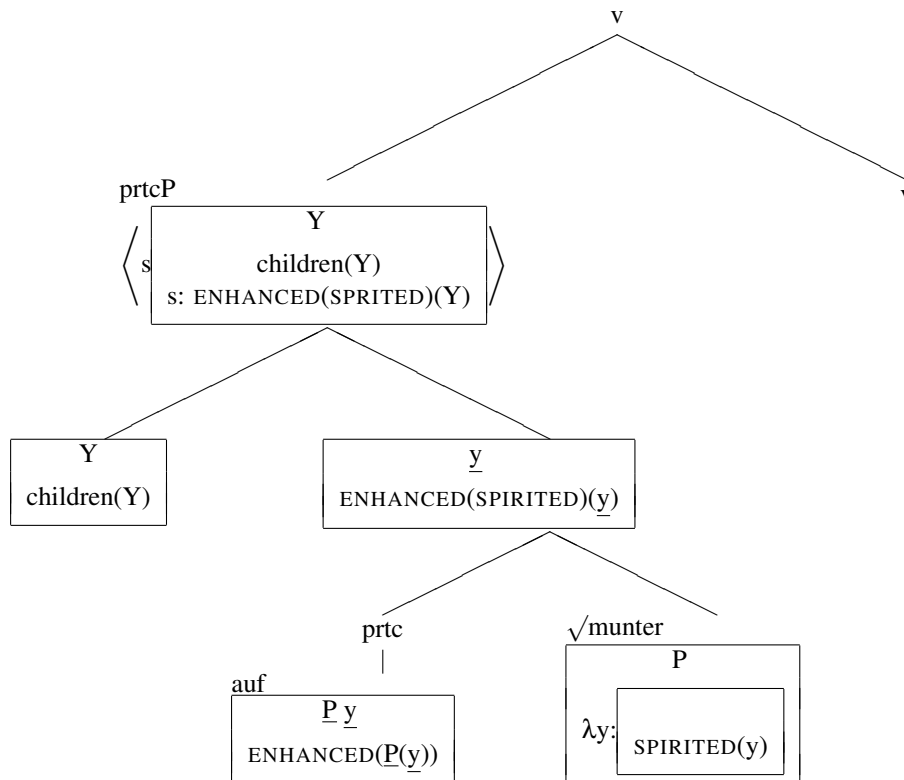
The combination of *auf* and *hellen* in (139) may appear to mean no more than that an object becomes light (*hell*). In fact, nothing else is expressed in the English translation. Yet in accordance with the metaphorical meaning of *auf* discussed in (2), *auf* expresses the further fact that the acquired property (in this case lightness) is regarded as positive by the speaker (or the language community which established this use of the verb-particle construction). This is also the case in the other three examples and most other cases where *auf* is combined with deadjectival verbs.

Another line of interpretation would be that the adjective on its own denotes some degree of the respective property, which *auf* in turn increases. Our representation of *Kinder aufmuntern* leaves this question for further research. We confine ourselves to an analysis where the particle *auf* selects a property for its internal argument and predicates this property to an enhanced degree of the internal argument of the verbal construction. We believe that enhancement or increase can be made precise in terms of a change from a lower degree of the theme \underline{y} satisfying the property P to a higher degree of satisfaction.

(142)



(143)



The following examples show that *auf* can also have other meanings in contexts of verbs constructed from adjectival roots.

- (144) *Der ständige Wind hat dazu beigetragen, dass das wenige Wasser noch schneller aufgetrocknet ist.*
 ‘The permanent wind contributed to the little water that was there drying up even more quickly.’
- (145) *Globuli velati [...] sind Kügelchen aus Zucker, auf denen Arzneistofflösung aufgetrocknet [literal: dry on] wurde.*
 ‘Globuli velati [...] are little sugar pellets which are impregnated with a medical dilution.’

In (144) the fact that an object dries (up) completely, and thus disappears, seems to be emphasized. Thus the meaning of *auf* discussed in section 6 plays a role here. Moreover, as in constructions with other verbs of cleaning where the unwanted substance is moved upwards⁵⁵ the vertical aspect of *auf* may here be relevant, too. All the meaning aspects discussed so far are related and can occur in combination. Moreover, their semantic contribution to the meaning of the sentence is not very strong. Therefore it is often difficult to judge what exactly *auf* means in a given context. In contrast, the sense of *auf* relevant in (145) does not seem to share these other aspects. Here *auf* introduces a support relation: a substance is added to an object through putting liquid containing it on the object and letting the liquid evaporate.

The fact that some of the senses of *auf* discussed in earlier sections are responsible for combinations of *auf* with deadjectival verbs also means that such constructions are still built online and may newly come to be established within a language community, as can be seen in the following examples. This contradicts Motsch’s claim that the combination of *auf* with deadjectival verbs is an inactive word formation pattern.⁵⁶

- (146) *Bei mir half eine Färbung, ich bin blond und habe mich eine Stufe aufblonden lassen, die Haare sind dann viel stärker*
 ‘For me dyeing helped, I’m blonde and had my hair dyed to a slightly lighter shade of blonde, the hair is then much stronger.’
- (147) *Dies ist überhaupt kein Problem, du musst einfach das Gelände am Anfang und am Ende des Tunnels aufebnen damit dies schön flach ist.*
 ‘That’s no problem at all, you just have to level the ground at the beginning and end of the tunnel so it is nice and flat.’

⁵⁵E.g. *putzen, wischen, kehren, saugen.*

⁵⁶Motsch (2004)

9 auf marks planning

There seems a further niche of *auf*-particle constructions which do not fit into any of the patterns discussed so far, and which have the flavour of idiosyncrasy at first and even at second sight. These few constructions, however, throw some light on the polysemy of the preposition *auf*, if one is willing to accept such a semantic impact on *auf* at all. Note that we find the same item as both a preposition and a particle in the following list. There is one construction that has *auf* as a particle *and* heading a phrase in 'prepositional case' (148). In other types of construction the same *auf* acts either as a particle or as a head of complement, bearing the same semantics (149).

- (148) aufpassen auf etwas/jemanden (to look out for something, to keep an eye on someone)
- (149) auf etwas lauern (to lie in wait for something) vs. jemandem auflauern; auf etwas achten (to mind something, pay attention to) vs. etwas aufachten (out of use; references from Goethe's oeuvre); auf etwas warten (to wait for something) vs. jemandem aufwarten (to serve somebody)
- (150) etwas aufschieben (to delay something)
- (151) Geld/ Essen aufsparen (to save money, food) /aufheben (to preserve something) / aufbewahren (to keep, to preserve something)
- (152) auf etwas hoffen (to hope for something), sich auf etwas freuen, (to look forward to something); auf etwas zielen (to aim at something), auf etwas sparen (to save in order to spend the saved money on something), sich auf etwas/jemanden verlassen (to rely on someone), auf etwas wetten (to bet on something), auf etwas verzichten (to do without something),

A closer look at the constructions shows that more is involved than just case marking. All these predicates have something in common: they all involve state of affairs to come: if you keep an eye on someone (*aufpassen*), wait for someone (*warten*), or lurk in wait for someone (*lauern*) you expect events to come or at least you believe in the possibility that they might happen. This is why you keep an eye on someone or wait for someone. This also holds for betting on something (*wetten*), aiming for something (*zielen*), or saving food or money (*sparen*). One important point of this pattern of belief and intention is that while the agent expects events to happen (either because the agent plans to act later) or else because the occurrence of the expected event is beyond his possibilities he does not act. He just waits. The root of *warten* lexicalises watching; he just lies in wait (*lauern*). You do not eat food or spend money, but save it for later occasions. You do not have a party now, but delay the party (*aufschieben*) [lit. push].

Let's focus on *aufpassen*. Assume that the reading of the root $\sqrt{\text{pass}}$ as *passen* in an active reading involves not acting. *Da muss ich passen* is what you say if you do not have the power or knowledge to do something.

Aufpassen auf etwas is more than just not acting. It involves non-acting but willing to act later, if contingencies make interference necessary. Different from *warten auf*

there is no plan of some particular action. Planning is only conditional: The agent's intentions are as follows: in case interference is needed he will do the appropriate thing. *Aufpassen* is understood as being on the watch. But vision is only the most important sense, it might also involve hearing or smelling. Using your senses is what you do if you decide not to act now but to act in the case of something happening.

According to this outline the semantic representation of the contribution of the particle *auf* as well as the representation of the preposition *auf* in *auf etwas warten* involve a complex intentional structure part of which is conditional planning. Part of the structure is the decision to not act now but later, or to not act blindly.

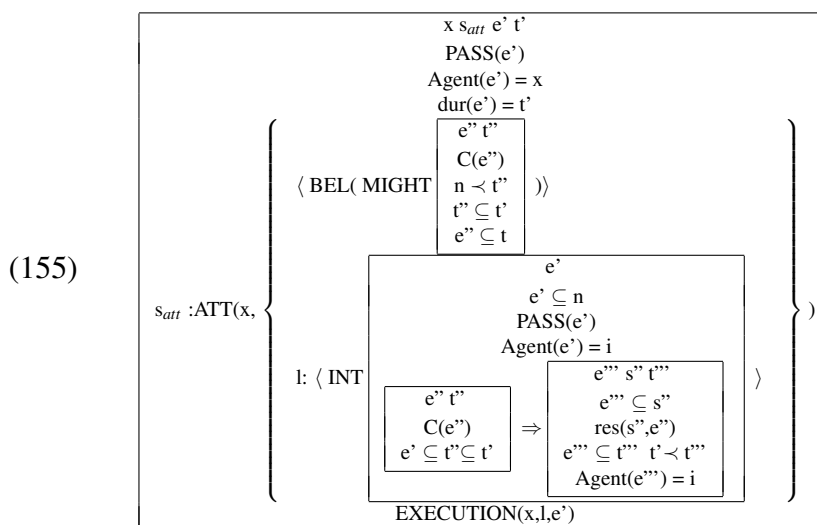
This aspect makes itself felt in negative constructions which imply action but missed chances of conditional interference in appropriate contexts:

(153) Warte nicht! (Do not wait). Implication: Act now.

(154) Er hat nicht aufgepasst. (He did not pay attention) Implication: Some harm was done which could have been prevented.

Towards a semantic representation of *aufpassen*

Elements of the semantic representation: (i) the agent believes in the possibility of an event of a certain type C to occur in the future or near future. For instance, the little sister the brother has to keep an eye on may fall or may run onto the street; or there will be a step to be minded along her path. (ii) The agent is capable of reacting to the eventuality in question. This might involve either preventing the event or dealing in an appropriate way with the results of the event in question. (iii) He has the intention to act at the occurrence of an event of the type that he must react to. He has a conditional plan: If an event of the respective type occurs, he will act in one way or another. (iv) He directs his attention towards the occurrence of such an event. He does so during the entire duration of the *aufpassen*-activity.



According to this analysis *aufpassen* is an intentional 'passen' where the agent does nothing until a certain eventuality occurs. *Passen* in the sense of non-action or

letting an opportunity go also involves intention, but it does not involve intending any later action. We assume here that the attention paid during the non-action is a general implication of acting according to a plan. The agent must always keep an eye (or an ear) on how things develop for him to act appropriately.

The contribution of *auf* The semantics of *auf* in this construction type seems to be as follows: It contributes a prospective temporal relation between the time of some attitudinal state of an agent and the event time of an eventuality to come, to be feared, believed, desired. The particle *auf* modifies action descriptions (including omission). The attitude towards the event to come leads the described action.

Is this characterisation precise enough for a compositional account of, say *aufsparen*? *Sparen* is agentive and describes a non-action in a presupposed course of events of consuming or spending food or money. *Aufsparen* according to the analysis tells us that the *sparen*-action is done with regard to some event to come. It does not say anything about the nature of that event. But to spare things in order to consume them later is a natural plan to pursue. Similar remarks apply to the contribution of the preposition in *auf ein Motorad sparen*. Sparing money is pursued with regard to the planned purchase of a motor bicycle. It should be clear that this contribution of *auf* is not productive. There is no rule providing e.g. *auffasten* meaning confine yourself to non-eating with respect to some event to come.

Notwithstanding that our 'story' might seem coherent there remain doubts as to whether all this justifies speaking of 'rule based' interpretation. As things stand this is hard to judge because there are just a few verbs where such a rule could apply.

A Overview over different meanings of *auf*

This section includes examples of verbs which allow for the various interpretations of *auf*.

Upward movement (of a material object)

intransitive verbs:

branden, brausen, brodeln, dampfen, fahren, flattern, fliegen, frieren, gehen, laufen, schnellen, schrecken, schwimmen, schwingen, spritzen, sprudeln, sprühen, steigen, stieben, streben, tauchen, wirbeln, wogen, ziehen, züngeln, rauschen, brausen, schießen, wallen, kochen

transitive verbs:

raffen, klappen, schleudern, spülen, stoßen, werfen, winden (mit der Winde bewegen), scheuchen / jagen, schlagen, seilen, (Bodensatz) rühren, drehen, schürzen, arbeiten, hängen (compare English 'hang up the washing'), biegen, bürsten, kämmen, binden, stecken, hängen, wölben, zwirbeln, schrecken, krempeln, falten

Getting hold of something + raising it

nehmen, greifen, fischen, sammeln, heben, lesen, picken, raffen, saugen, lecken, tupfen, schlecken, dippen, klauben, fegen, kehren, wischen, suchen (vom Boden)

Virtual path

ragen, streben

verbs of visual perception: sehen, blicken, schauen, gucken, schielen, starren

further possibility for verbs of visual perception: upward movement of focus of attention

Growth

sprießen, wachsen, schießen, schütten, türmen, bringen, stapeln, häufe(l)n, hocken, kegeln (old, doesn't occur in isolation in this sense), schichten, stauen, werfen, (Swabian: beugen)

schottern, schlicken, schlämmen, sanden, teeren, mulchen

Increase of volume of 3D-objects, conceptualised through growth of functional vertical

schwellen, quellen, laufen (Auflauf: Souffle)

trans / refl: bauschen, blasen, schlagen, schäumen, blähen, plustern, pusten, schwemmen, rollen,

metaphorical extension: negative, do something in an unproportional way (i.e. too much, too big), pretend to be more important

Upward movement of bottom

krempeIn, schürzen

Stopping of downward movement

fangen, wiegen

Vertical position

kommen, springen, stehen, stellen, richten, setzen, recken, bäumen, raffén, rappeln, helfen, peitschen

Not in bed

sein, bleiben, stehen

Metaphorical uses

Awake, lively, healthy, grown-up, ready for action

intransitive:

wachsen, schrecken, wachen, drehen, leben,...

transitive:

ziehen, füttern, bringen (veraltet), rütteln, küssen, wecken, raffén, pulvern, put-schen, richten, bauen, möbeln, päppeln, sich aufrappeln

Strong negative emotions, agitation

(sich) aufregen, (sich) aufnerven (Pferd)

aufführen (can also be uprising), aufwühlen

Uprising against people in higher positions

intransitive:

aufbegehren (changes in argument structure): trans → intrans) Grimm and Grimm (2007): zornig auffahren oder auf/hoch wollen), aufstehen, aufmucken, (sich) auflehnen,

transitive:

aufbringen, aufreizen, aufwiegeln (argument structure: verbal basis also intransitive, but rare), aufhetzen, aufhussen, aufmischen, aufstacheln, aufputzen,

Enhancement

aufdrehen, aufheizen, aufwerten, aufbrisen, aufstocken, aufholzen, aufforsten, aufsiedeln, aufbetten, aufrunden, aufladen (elektrisch + Motor: Leistung erhöhen), aufstufen, aufrutschen

(sometimes in opposition with *ab-*, z.B. abrunden, abholzen, abstufen, abwerten)

aufatmen,

Improvement

backen, polieren, mischen, bauen, beizen, binden, braten, bürsten, kämmen, bügeln, färben, forsten, holzen, füllen, tanken, polstern, pudern (alt), arbeiten?, schwärzen (alt), rühren?, tunen

deadjectival: aufhellen, aufwärmen, aufbessern, auflockern, aufbereiten, aufhören (always property regarded as positive, could also be interpreted as resultative, iteration)

Improve one's external appearance (in an extreme or exaggerated way)

aufstylen, auftakeln, aufbrezeln, aufdonnern, aufmachen, aufpoppen, aufmotzen, aufmöbeln, aufdirndeln, aufputzen, aufpeppen (not for one's own appearance?)

***auf* marks a spatial support relation or similar relations**

support

ruhen, sitzen, liegen, schwimmen (Aquaplaning)?

(Hut) haben / lassen / behalten / bekommen

(intransitive, ground sometimes specified in auf-PP; sometimes (body) part that has contact specified in auf- or mit-PP or in verb, e.g. beißen, knien):

default support (ground, subject), ground can be land or seabed: treten, prallen, treffen, kommen, krachen, klatschen, fahren, laufen, schlagen, stampfen, bumsen, tippen

springen, steigen (both lexicalised, only for vehicles, horses..., not for mountain, chair...)

knien, gleiten, sitzen (understood as motion verb), hocken, beißen

(Aspect of contact often contained in base verb: klatschen, prallen; sometimes the part of the object which is in contact with the ground is specified: treten, sitzen, knien, hocken, stampfen)

many verbs in this group from gymnastics: aufknien, aufhocken, aufgrätschen

(transitive, theme specified as accusative object, ground sometimes specified as dative object, auf-PP):

setzen, stellen, binden, brennen, bringen, bügeln, bumsen, applizieren, dampfen, drehen, decken?, drucken, drücken, flicken, gabeln, geben, gießen, hängen, heften, hucken, kleben, kaschieren, knöpfen, knüpfen, laden, lagern, lasten, legen, leimen, löten, malen, montieren, packen, pappen, pflanzen, pfropfen, plätten, prägen, probieren, schmelzen, schnallen, schnüren, schrauben, schreiben, schrumpfen, schweißen, spritzen, spannen, sprayen, sprühen, stemmen, stecken, stoßen, streichen, stülpen, stützen, tragen, treiben, walzen, wickeln, winden, zeichnen, ziehen, fegen?, kehren?, nehmen

Denominal verbs

aufbahnen, auftischen, aufbuckeln, aufspießen, aufspulen, aufrollen, aufbänken, aufbauen, aufbetten, aufblocken, auffädeln, aufbuckeln, aufgabeln, aufgleisen, aufkanten, auflisten, aufständern, auftabellieren,..

Contact

intransitive: fahren, rutschen, rücken, schließen, brummen (car), laufen (sport), kommen (sport)

Metaphorical: constraint

reden, schwatzen, schwindeln, → utterance verbs (AS: intrans → ditrans)

force: drängen, nötigen, oktroyieren, zwingen,

verbs of giving: geben, tragen, (er)legen, bürden, lasten, binden, hängen, laden, stützen, drücken? (in cases where a physical object is involved, there may still be a support relation, e.g. Duden: die Flüchtlinge hatten ihr Hab und Gut einem Esel aufgebürdet; but this is only the case if the obligation expressed in the discourse is an obligation to carry something)

pelzen, sacken, halsen, buckeln, hucken → denominal

brummen

subject receives constraint/obligation: haben, bekommen, kriegen, nehmen

***auf* is perception**

spüren, stöbern, treiben, suchen, finden (non-intensional sense), legen, werfen (Frage, Problem), stellen, fahren, führen, sagen

zeigen, deuten, weisen

marschieren, kommen, kreuzen, reiten, ziehen, fallen, fahren, gehen, brauen, liegen (zur Ansicht), fallen, spielen, geigen, fiedeln, leiern, tanzen, rocken, treten

blitzen, leuchten, glimmen, weinen, schreien, atmen / schnaufen, brausen, blöken, bellen + many other optical and acoustic verbs

***auf* is open**

sein, bleiben, stehen, klaffen

haben, halten, lassen

fliegen, brechen, gehen, platzen, reißen, schnappen, schnellen, schwingen, springen, blühen (Knospe), krachen

machen, baggern, beißen, bekommen, biegen, blättern, bohren, brechen, brennen, bringen, drehen, dröseln, drücken, feilen, fetzen, hacken, kauen, klappen, klinken, klopfen, knacken, kratzen, kriegen, lösen, nesteln, reiben, reißen, reiten, ritzen, scharren, scheuern, schieben, schießen, schlagen, schlitzen, schnallen, schneiden, schrauben, schürfen, schwingen, spalten, spannen, sprengen, stemmen, stoßen, trennen, tun (refl), ziehen, wehen, zupfen

decken, schliessen, riegelein, sperren, knüpfen, falten, packen, flechten, knoten, knöpfen, korken, schnüren, binden, rollen, wickeln

alle

fressen, füttern, füttern, kaufen, knabbern, lutschen, rauchen, sacken, schlucken, tragen, zehren, trinken, reiben, arbeiten, bekommen, opfern, aufgehen (Rechnung, zu verteilende Menge), räumen, lösen

auf is partition or summation

Partition:

teilen, schlüsseln, gliedern, fächern, bröckeln, splintern, splitten, spalten, schneiden,

summation or composition:

messen, zählen, summieren, addieren, reihen, listen

Deadjectival verbs

aufweichen, aufmuntern, aufklären/aufklaren, auffrischen, aufhellen, aufweißen, aufgrünen, auflockern, aufrauhern, aufwärmen, aufwachen, aufbessern, auflösen?, aufdörren, aufhöhen, aufbereiten, aufreinigen, aufrunden, auffüllen (obwohl adjektivische Basis nicht mehr so deutlich; halb füllen, aber nicht: halb auffüllen)

old: aufspitzen (may be denominal), auftrüben

new (i.e. not in dictionaries?): aufbleichen, aufsäubern, aufnässen, aufbräunen, aufröten (may be older in context of meat), aufhärten, aufdicken, aufdünnen (Wem die Suppe zu dickflüssig ist, kann sie mit Wasser aufdünnen), aufstärken (Alkoholgehalt aufstärken und herabssetzen: here technical term, but also used in other contexts), aufglätten (eg Kleidungsstücke), aufebnen, aufblonden, aufblauen, aufweiten, auffeuchten, aufsüßen, aufschöne(r)n, aufkürzen, aufcoolen (google),

Planning

bewahren, heben, behalten, speichern, sparen, halten, schieben

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