The prosody of German V1- and V2-sentences

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Abstract
The following paper is intended to give insights in the prosodic behaviour of constituents in German sentences with the finite verb in first or second position. It discusses the question whether metrical differences are related to underlying syntactic information or rather be surface oriented. It will be shown how prosodic information can be derived from syntactic and information-structural cues by reconstructing moved constituents to variables in the base position and by marking focus exponents, which are relevant for stress assignment. The prosodic structure of an utterance can therefore be created after syntactic structure building has taken place but it must – to some extent – be related to the underlying representation.

Keywords: stress, D-structure, S-structure, reconstruction, focus exponent

1. The point in question

There is a lot of agreement nowadays about the point that the prosodic organization of utterances is influenced by the syntactic structure of the respective sentences and the information status of their constituents. But the details of the interaction are still up for discussion. For that reason, I would like to take a closer look at the prosodic structure of verb-first and verb-second sentences in German and its derivation from syntactic information. A basic generative approach without intermediate projections will serve as syntactic foundation.

German differentiates three kinds of sentences by the position of the finite verb. The finite verb can occur in the final position (= VE), the first position (= V1), or the second position (= V2) of the syntactic surface structure.

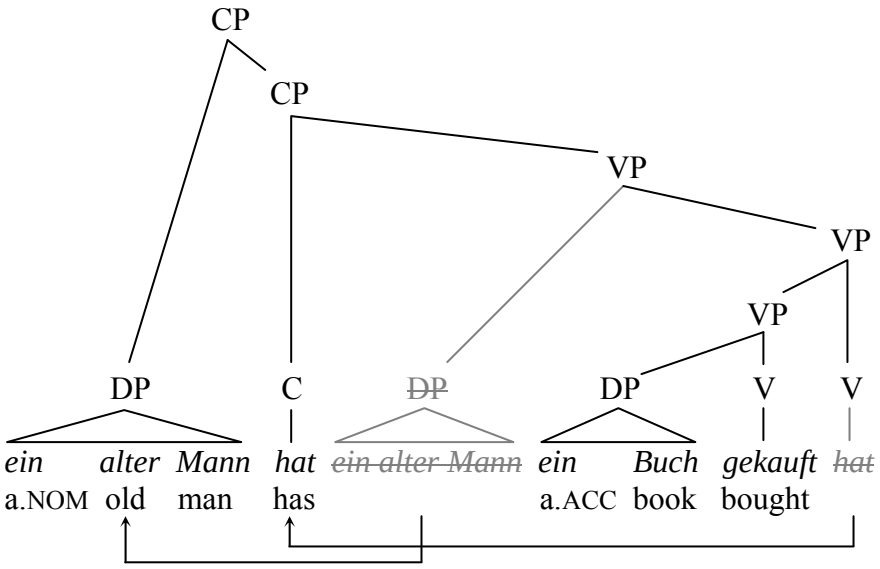
(1) a. *weil ein Mann ein Buch gekauft hat* → VE
because a.NOM man a.ACC book bought has
'...because a man bought a book.'

b. *hat ein Mann ein Buch gekauft* → V1
has a.NOM man a.ACC book bought
'Did a man buy a book?'

c. *ein Mann hat ein Buch gekauft* → V2
a.NOM man has a.ACC book bought
'A man bought a book.'

The structure of V1- and V2-sentences is derived from an underlying VE-structure. The finite verb is moved from its underlying final position to the sentential head. In V2-sentences, one maximal constituent is additionally placed in front of the finite verb (cf. (2)).

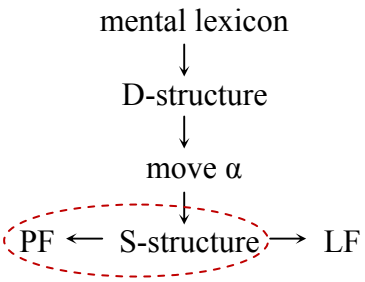
(2)



'An old man bought a book.'

But when does prosodic structuring takes place? The question arises whether the underlying deep structure (= D-structure) or the final surface structure (= S-structure) is relevant for the description of the interface to the prosodic component of grammar. Different views can be found in the scientific discourse. The classic view assumes that the phonetic resp. phonological form of an utterance (= PF) is related to the S-structure. Rules for prosodic structuring apply after the complete syntactic structure has been built. The classic view can be represented by the T-model given in (3), which goes back to Government-and-Binding Theory[1].

(3)

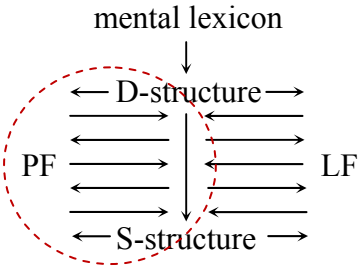


Other approaches assume a cyclic interaction of the derivation processes for syntactic and prosodic structure building. Early cyclic approaches are given by Bierwisch (1968) and Bresnan (1972). A current cyclic approach is Phase Theory[2], in which the phonetic resp. phonological form, including higher order prosodic structure, is assigned in multiple spell-out domains. Cyclic approaches can either be surface oriented or deep structure oriented. Surface oriented cyclic approaches work with a step by step derivation, in which rules for prosodic structure building apply iteratively after every syntactic cycle, but refer to the target position of moved constituents, whereas deep structure oriented cyclic approaches derive some parts of the prosodic structure from underlying syntactic information before movement takes place, so that syntactic and prosodic structure building processes go hand in hand. Only the latter ones will be of interest for the further discussion.

[1] Government-and-Binding Theory has been introduced by Chomsky (1981).

[2] The notion 'phase' goes back to Chomsky (2000; 2001). Since its beginnings, Phase Theory has been discussed by many researchers on the basis of many different languages. A selection of recent papers gives Grohmann (ed., 2009).

(4)

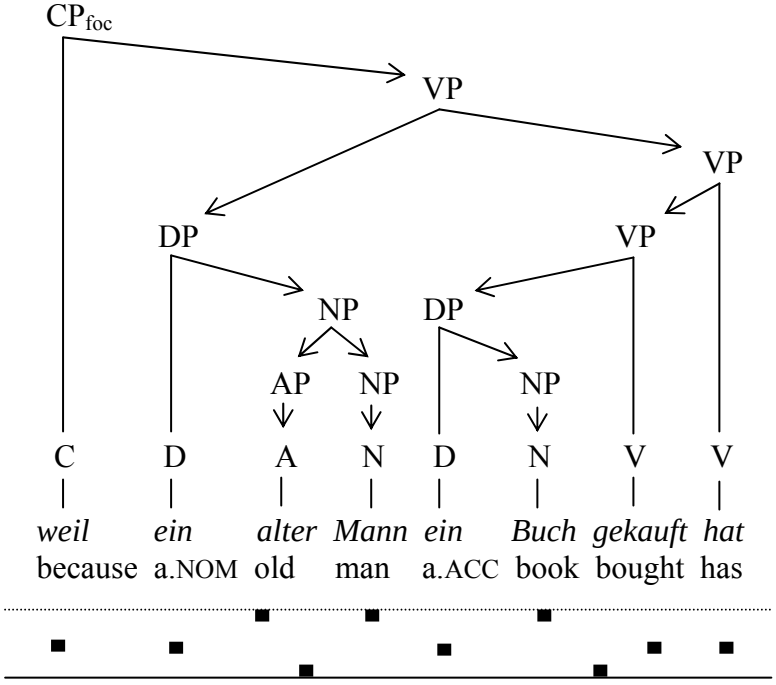


Whether a surface oriented view (let it be classic or cyclic) or a deep structure oriented cyclic view describes the German data more adequate and how the interface between syntax and prosody can be solved formally will be discussed in the next sections.

2. Two kinds of structural relationship

The following analysis concentrates on a basic generative model, which involves two kinds of structural relationship. Constituents can be combined either in a head-complement structure or in an adjunct structure. Stress of information-structural neutral VE-sequences can be derived by paying attention to these two kinds of relationship. Syntactic heads are metrically subordinate to their complement, whereas adjuncts receive stresses of the same strength. An example is given in (5). The arrows in the syntactic representation indicate the operation of the stress assignment process.

(5) Paul was satisfied yesterday...



'...because an old man bought a book.'

The corresponding metrical structure is represented in a relational model which is slightly different from traditional ones.[3] Marks for main stresses are placed on the upper bounds. Marks for unstressable syllables (with schwa or consonantal peak) are placed on the lower

[3] The metrical model is simplified for ease of presentation. For a more detailed description of the model involving neutral reference marks and subsyllabic structure cf. Korth (2010).

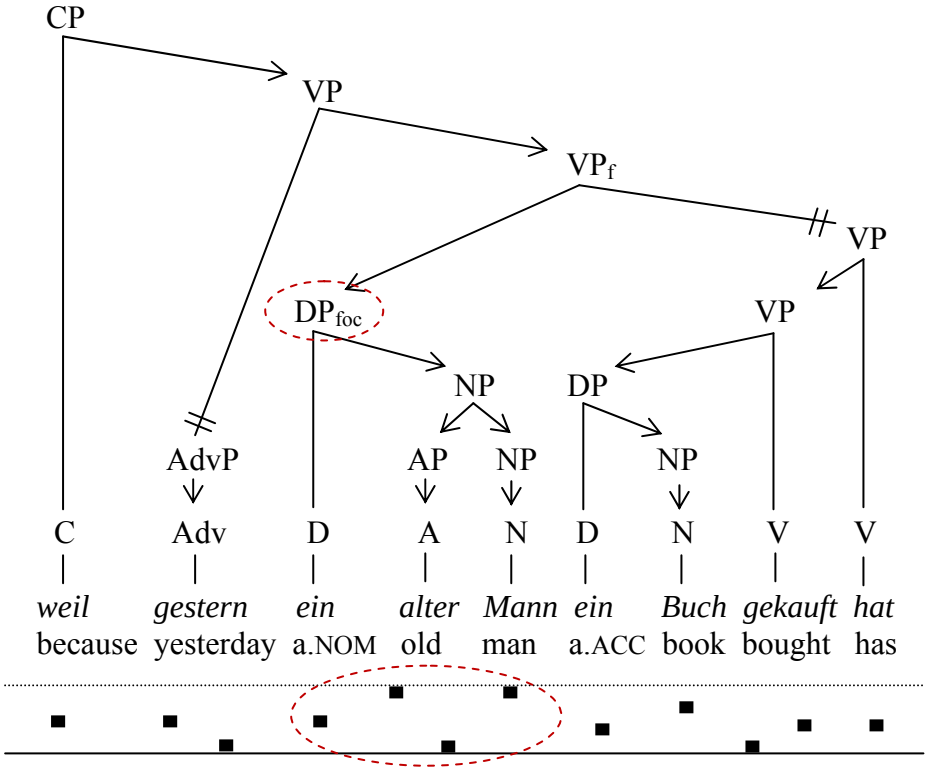
bounds. Further marks are arranged in the space between. Their precise position depends on the relative strength derived from morpho-syntactic information.

The whole CP of example (5) is under focus. It involves no further information-structural subdivision. The stress assignment process, which compares the syntactic status of adjacent constituents, results in three main stresses. According to the Nuclear Stress Generalization in (6), the last one is perceived as the nuclear one.

(6) NUCLEAR STRESS GENERALIZATION (Wagner 2005: 70)
Within each foot, nuclear stress is perceived on the last of those grid marks that project highest.

The metrical structure changes if we insert a narrow focus on a substring of this sentence, because the focused constituent attracts stress in comparison to its syntactic sister node (cf. (7)). The relative metrical strength inside the focused constituent as well as inside the non-focused constituents remains untouched.

(7) A: Paul was satisfied because someone bought a book yesterday.
B: Yes. I think he was satisfied...



'...because an old man bought a book yesterday.'

Foreground: an old man bought a book yesterday
Background: x bought a book yesterday
Focus: an old man

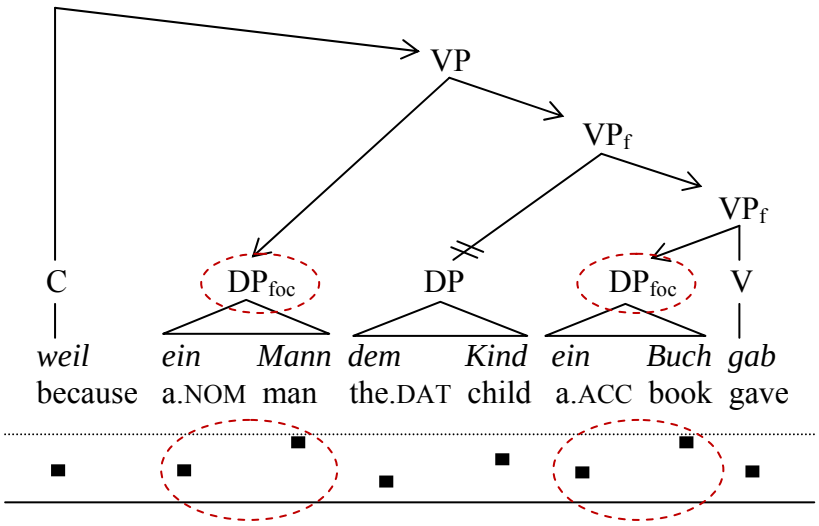
The feature 'foc' marks the focused constituent, which can be called the 'absolute focus' of the sequence. An absolute focus projects a stress-relevant 'f'-feature until the respective background is filled. The feature 'f' stands thereby for the relevance of focus at higher syntactic and information-structural levels. An 'f'-marked constituent can be called a 'relative focus'. The constituent *ein alter Mann ein Buch gekauft hat* (lit. 'an old man a book bought has') in (7) is such a relative focus. It contains the absolute focus of the sequence and is

therefore more informative (and relatively more focussed) than the adjacent constituent *gestern* ('yesterday'), which is given in the discourse context.

The necessity of a concept of relative foci becomes apparent in sentences in which two parallel focussed constituents are restricted to the same domain. The constituents *ein Mann* ('a man') and *ein Buch* ('a book') in (8) are absolute foci in the same background. The fact that the narrow focused subject and the narrow focused direct object attract stress in comparison to the non focused indirect object cannot be predicted without focus projection. The VP *ein Buch gab* (lit. 'a book gave'), which contains the focused direct object, would lack a stress relevant feature for relative focus and should therefore be of the same metrical strength as the adjacent non focused indirect object. At the next higher level, at which the subject is combined with the VP *dem Kind ein Buch gab* (lit. 'the child a book gave'), the focus marked subject would attract stress in comparison to the unmarked VP. The derivation process without focus projection is shown in (9). It operates on the same sequence as the derivation process in (8). The resulting metrical structure is incompatible with the intended information structure. The correct stress pattern can only be derived from the syntactic structure in (8), which involves focus projection.

(8) A: Paul was satisfied because someone gave something to the child.
B: Yes. I think he was satisfied...

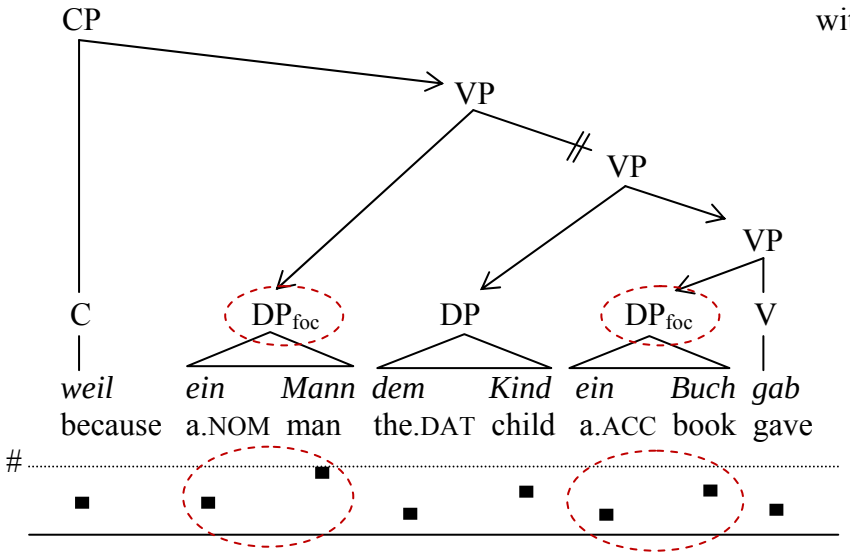
CP with focus projection



'...because a man gave a book to the child'

Foreground: a man gave a book to the child
Background: x gave y to the child
$Focus_x$: a man
$Focus_y$: a book

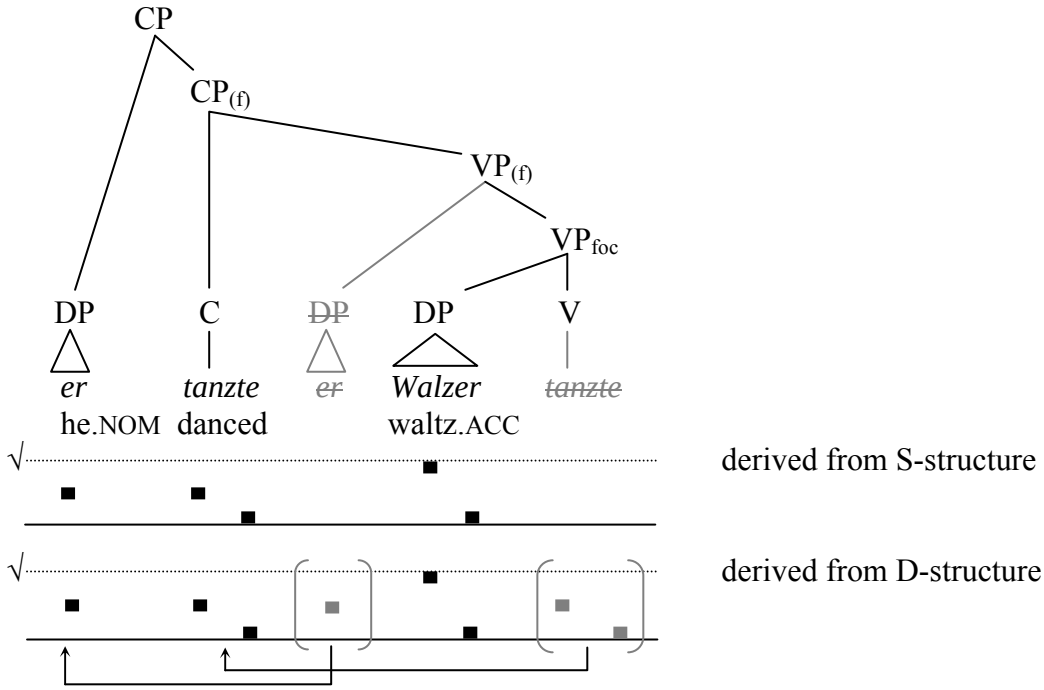
(9) A: Paul was satisfied because someone gave something to the child.
B: Yes. I think he was satisfied...



'...because a man gave a book to the child'

But what does happen if we transfer this analysis to V1- and V2-sentences? There are a lot of constructions in which it does not matter whether the metrical structure is derived from underlying information or from surface representation. Such a construction is given in (10)[4].

(10) What did Paul do yesterday?



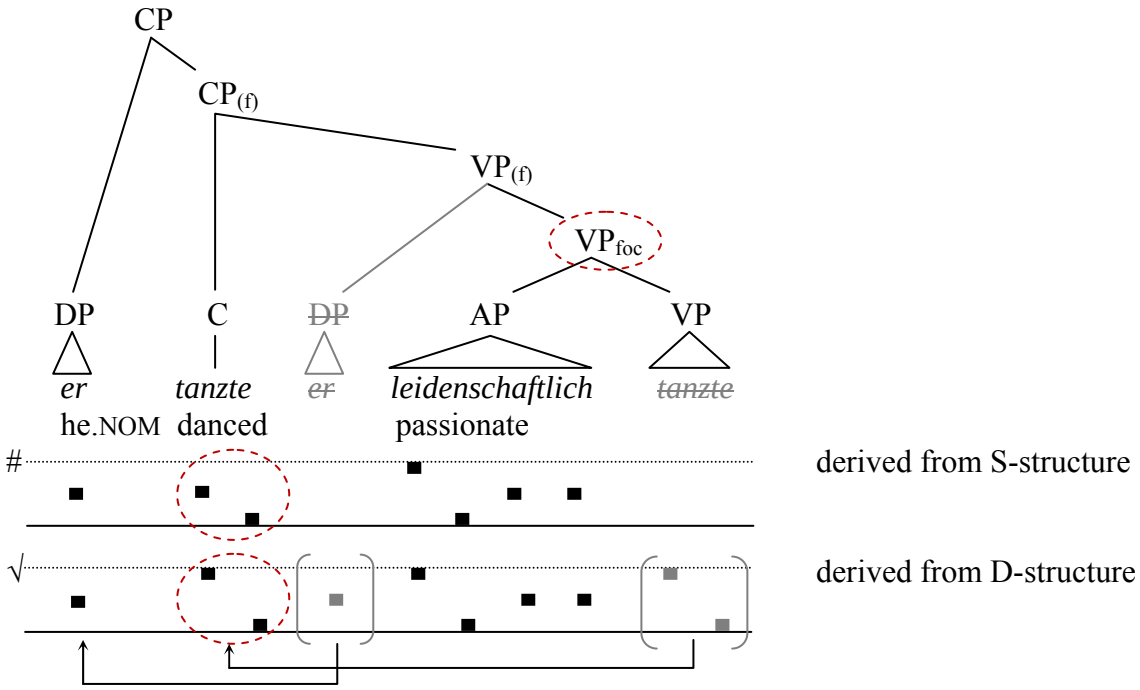
'He danced a waltz.'

The structural relationship of the moved constituents in S-structure is identical to the one in D-structure. The finite verb in (10) is a head in D-structure as well as in S-structure. It must

[4] Some of the following examples use bracketed 'f'-features. The bracketed features are relevant only if the surface representation is used as reference structure for metrical derivation. If the underlying representation is used instead, the background is already filled before the CP-level is reached and no further projection is possible.

therefore be metrically subordinate to its complement. The finite verb in (11) instead stands in an adjunct relationship to its sister node in D-structure but in a head-complement relationship to its sister node in S-structure. If metrical structure is derived from S-structure, the finite verb is subordinate to the complement-VP and therefore subordinate to AP. If metrical structure is derived from D-structure instead, verb and AP get stresses of the same strength.

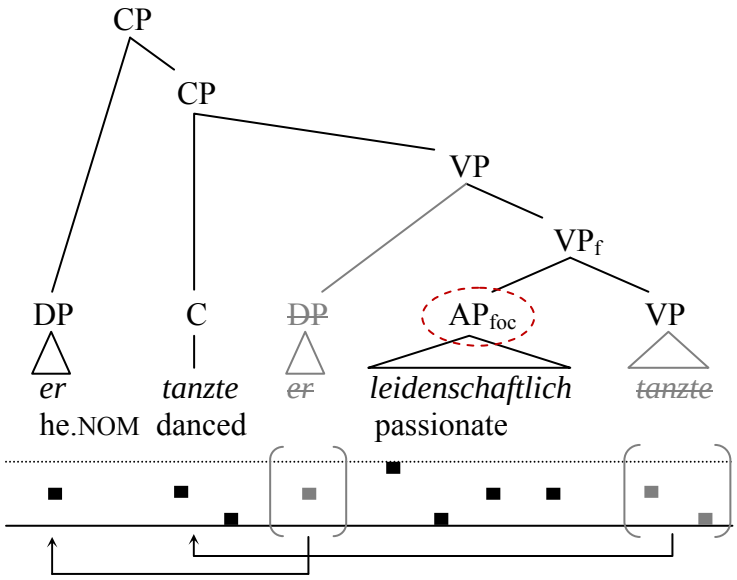
(11) What did Paul do yesterday?



'He danced with passion.'

Both stress patterns can be observed, but only the second pattern, which is derived from D-structure, is compatible with the syntactic representation and the focus-background structure given in (11). A metrical subordination of the finite verb relative to the AP would mean that *tanzen* ('dance') has to be given in the discourse or at least accessible from the textual or situational context. A corresponding context is given in (12). Only the AP *leidenschaftlich* ('with passion') is under focus in (12), whereas the focus in (11) involves more material and covers the VP *leidenschaftlich tanzte* ('danced with passion'). Example (7), discussed above, has shown that focused constituents attract stress in comparison to non focused ones. If a context as the one given in (12) requires a narrow focus on the AP, the VP *tanzte* ('danced') must be metrically subordinate to the focused AP because of its different information-structural status.

(12) A: Did Paul dance yesterday?
B: Yes...

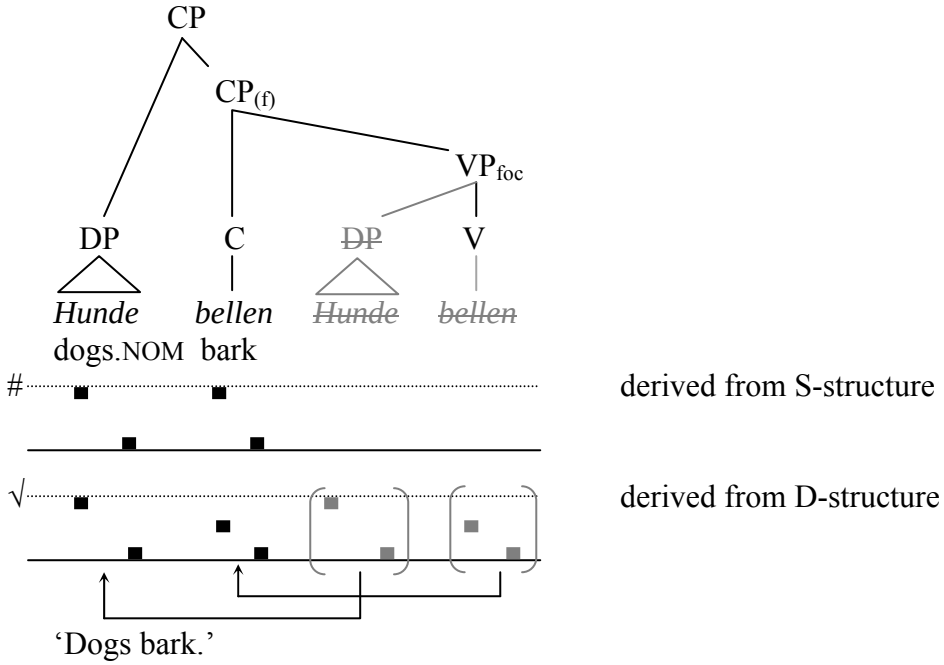


derived from D-structure

'He danced with passion.'

Further examples in which the structural relationship between a moved constituent and its sister node is different in D-structure and S-structure involve thetic constructions. Thetic sentences are predicated over an implicit / unmentioned stage topic (cf. Erteschik-Shir 1996). They have no overt information-structural subdivision.

(13) What's the matter?



derived from S-structure

derived from D-structure

'Dogs bark.'

The DP in the thetic sentence in (13) is the complement of the verb in D-structure but an adjunct to CP in S-structure. If the S-structure is assumed to be relevant for the derivation of metrical structure, the DP and the adjacent CP receive equally high metrical marks. The verb in C receives the strongest stress inside the lower CP per default, because it is the only phonologically overt element in this domain. But such a structure is not compatible with a thetic interpretation of the sentence. It forces a categorical interpretation, in which the DP is a

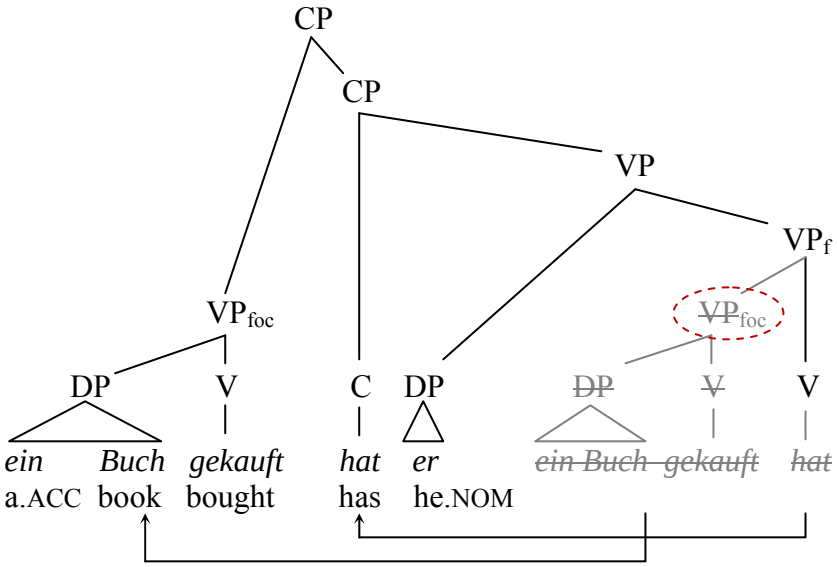
topic over which the verb is predicated.[5] Deriving metrical structure from D-structure instead leads to metrical subordination of the finite verb, because verb and DP stand in a head-complement relationship in D-structure.

The data presented so far lead to the conclusion that the D-structure rather than the S-structure is responsible for the observed stress patterns. Further evidence for the derivation of prosodic structure from D-structure comes from focus movement, which will be the topic of the next section.

3. Focus movement

Focus movement contribute to our assumption of section 2 that parts of the prosodic information are related to D-structure rather than to S-structure. Example (2) of section 1 has shown that one maximal constituent is placed in front of the finite verb in V2-sentences. In the most neutral case, the first constituent of the core sentence, i.e. the first constituent of the highest VP-projection, is moved per default, independent of its informational status.[6] But it is also possible to move the focused part of the core sentence (cf. (14)).

(14) What did Paul do yesterday?



'He bought a book.'

Fanselow (2004) notices that speakers have the opportunity to move only the accented part of the focused constituent (= pars-pro-toto movement) rather than the whole focused constituent. Transferring Fanselow's findings to our model, we can state that the metrically strongest constituent of the focused part of a sequence can be moved, as long as it forms a maximal constituent. It is therefore possible for the DP in (15) to move, while the participle remains in its base position. The resulting prosodic structure of the sentence in (15) is ambiguous between the intended reading and a reading in which only the moved DP is under focus. The contextual information disambiguates the sentence.

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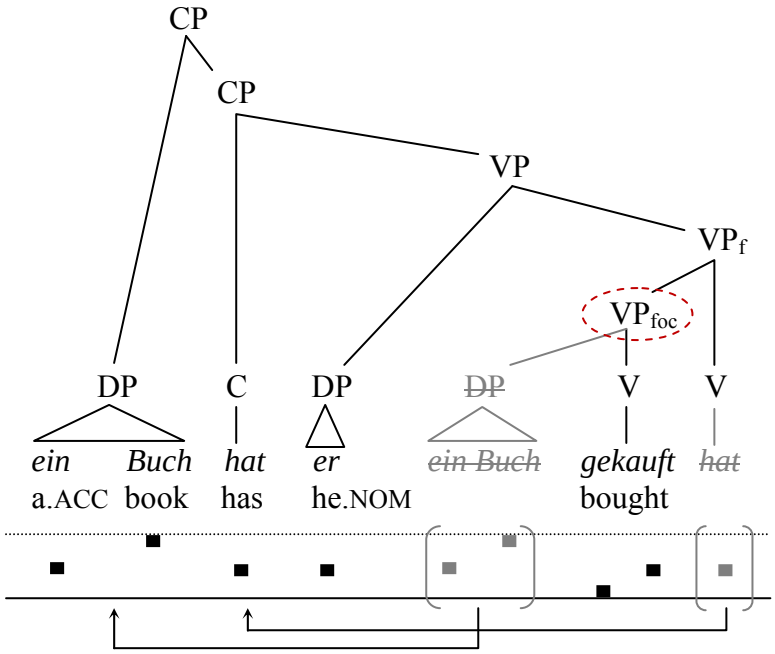
[5] For the differences of thetic and categorical constructions with respect to stress / accent cf. e.g. Kiparsky (1966) and Krifka (1984).

[6] It is in fact most often a topic which is moved. That depends on the fact that topics open the core sentence and stand in a position which is affected by default movement (cf. e.g. the discussion about a medial topic position in German by Frey 2004). That it is not always a topic, which is moved per default, can be seen in the thetic construction in (13).

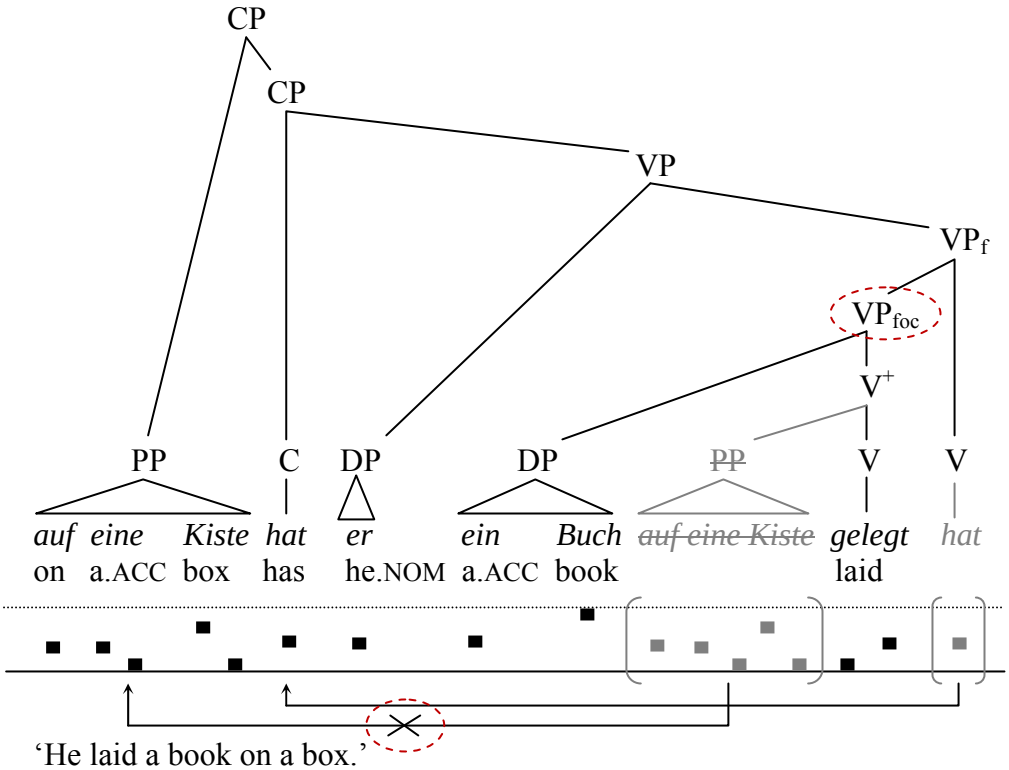
(15) What did Paul do yesterday?



'He bought a book.'

Maximal constituents which are part of the focus but do not carry the strongest stress inside the focus cannot be moved. The PP in (16) is a maximal constituent inside the focused constituent. But the movement is blocked because the PP is not the metrically strongest part of the focus.

(16) What did Paul do yesterday?



'He laid a book on a box.'

A sentence in which the PP is placed in front of the finite verb in C is not compatible with the information structure intended in (16). Movement of the PP is only possible if the PP (resp.

the PP plus participle) is focused, whereby it is the metrically strongest element inside the focus, or if the PP belongs to the background, by means of which it can be base generated outside the focus.

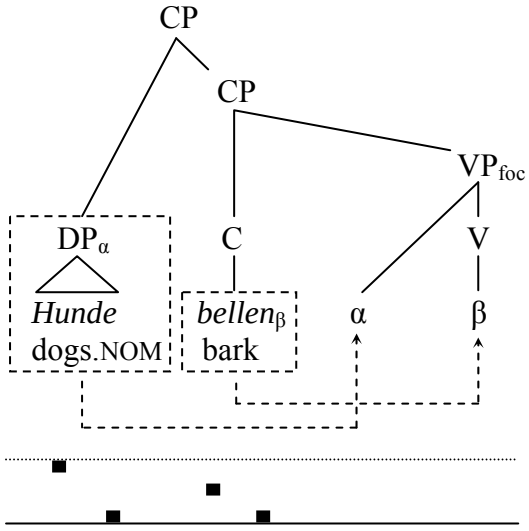
Carrying main stress is the core criterion maximal constituents have to fulfil to be affected by pars-pro-toto movement. But the necessary conditions cannot be reduced to stress differences alone. There are lots of sentences in which more than one maximal constituent carries main stress, so that more than one maximal constituent could potentially be affected by movement. Nevertheless, only the first main stressed maximal constituent can neutrally be moved to the first position in V2-sentences. The same holds for examples with two or more narrow foci in the same background. Only the first one of two or more narrow focussed constituents can neutrally be placed in front of the finite verb in V2-sentences. Responsible therefore are economy principles, which require high effort with low cognitive costs. A long distance movement has the same effort as a short distance movement but with higher cognitive costs. It is therefore uneconomic and much less preferred than a movement over a short distance. With respect to the economy of movement, focus movement behaves similar to default movement. Whereas default movement affects the first moveable constituent of the core sentence, focus movement (as well as its special form pars-pro-toto movement) affects the first moveable focused part of the core sentence, which can either be the absolute focus or a moveable subpart of it. Whether the whole focus or a part of it is moved depends on the syntactic complexity of the focused constituent as well as on the preferences of the respective speaker.

To explain pars-pro-toto movement, it seems to be necessary that prosodic information is available before the syntactic structure has been completed. Rules for focus movement seem to need information about stress differences to affect only main stressed constituents. The next section will focus on the question whether it is really necessary to built parts of the prosodic structure before movement takes place.

4. Reconstruction and focus exponents

The model presented so far is able to explain the prosodic behaviour of V1- and V2-sentences in German; but it is intuitively not very convincing to assume that metrical structure is built before movement takes place and that the moved constituent has to take its metrical structure along with it while moving. Therefore, the question arises whether there is a possibility to connect the moved constituents to their syntactic base position, which would give us the opportunity to derive metrical differences at the surface while involving structural information from D-structure at the same time. Reconstruction by variables offers such an opportunity for the examples discussed in section 2. A constituent which moves to another position is replaced by a variable in its base position. The moved constituent is linked to the remaining variable and can be reconstructed to the base position when the stress assignment process applies. The stress assignment process thereby has access to the underlying representation, even after movement has taken place (cf. (17)).

(17)



'Dogs bark.'

But reconstruction cannot explain why rules for focus movement affect only constituents which contain the strongest stress inside the focused constituent respectively the whole focused constituent, which contains the strongest stress of the focus per default. Different to our assumptions of section 3, Fanselow (2004) originally proposes that accent features (rather than metrical differences) are relevant for focus movement. Features for accentuation can be represented as part of the syntactic structure and can therefore easily be moved along with the respective syntactic constituents. But assuming that accents are assigned in D-structure is problematic because of two facts:

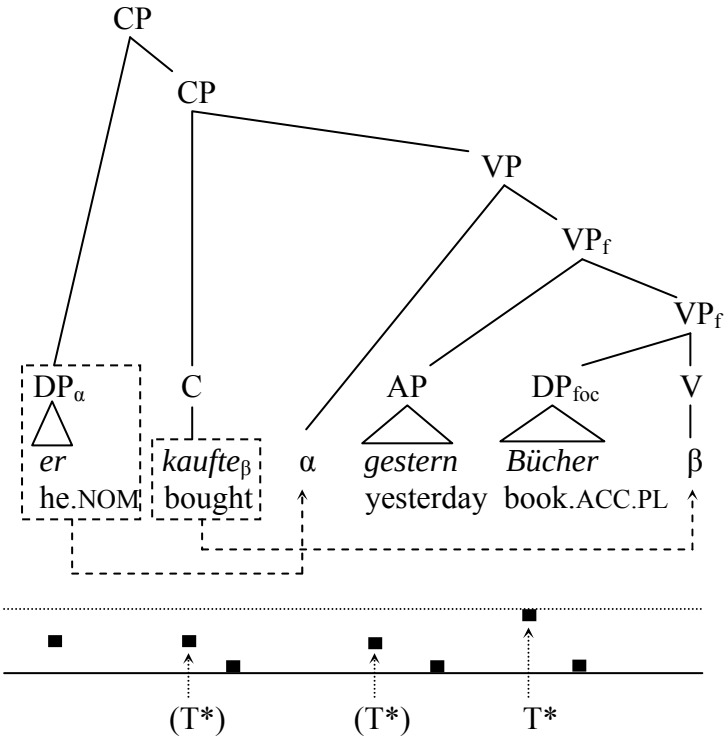
First, constituents which are not part of the focus (or topic) of a sentence can carry an accent as well, as long as they precede the focused part of the sentence (cf. (18))[7]. Figure 1 shows a picture of the acoustic correlates belonging to the sentence in (18). The finite verb and the AP are generally realized with an accent, although they are not part of the focus. The DP *Bücher* ('books') is nevertheless perceived as focus because of an upstep in fundamental frequency[8].

Second, not every focused constituent contains an accent. Second occurrence foci (= SOF) which follow a first occurrence focus (= FOF) in the same utterance cannot be realized by an accent. They are rather marked by duration and/or higher amplitude, as e.g. the investigations of Beaver et al. (2007) as well as the investigations of Ishihara and Féry (2006) show. The focus feature of the SOF in (19) is restricted to the lowest VP, where its background is filled. Higher projections behave like other unmarked constituents. The SOF itself is part of the background of the FOF. The FOF attracts stress because of its focus feature and the constituent containing the SOF becomes metrically subordinate to it. The focus feature of the SOF has no relevance any more at the level at which the SOF-containing VP is combined with the FOF.

[7] Cf. also Wagner (2005), who assumes that heads can be accented if they precede their arguments, but must occur unaccented if they follow their arguments.

[8] A blocking of downtrend by focused constituents is found in several languages, cf. e.g. the Japanese data given by Ishihara (2008) or the assumptions on focus alignment by Selkirk (2000).

(18)[9] What did Paul buy yesterday?



'He bought books yesterday.'

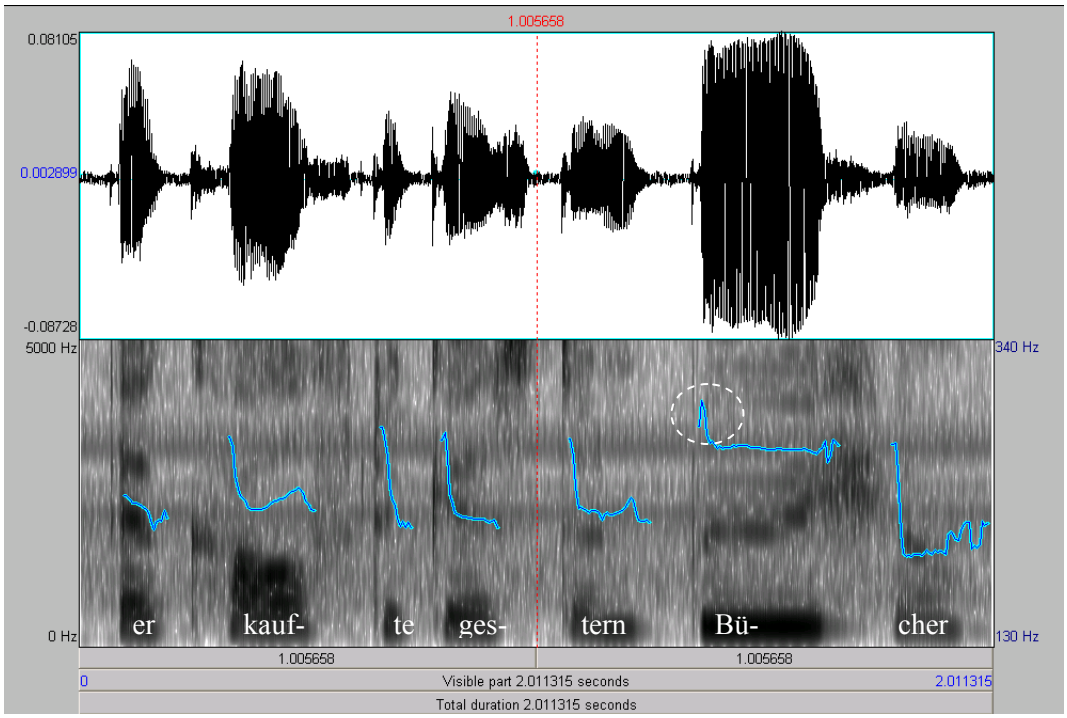
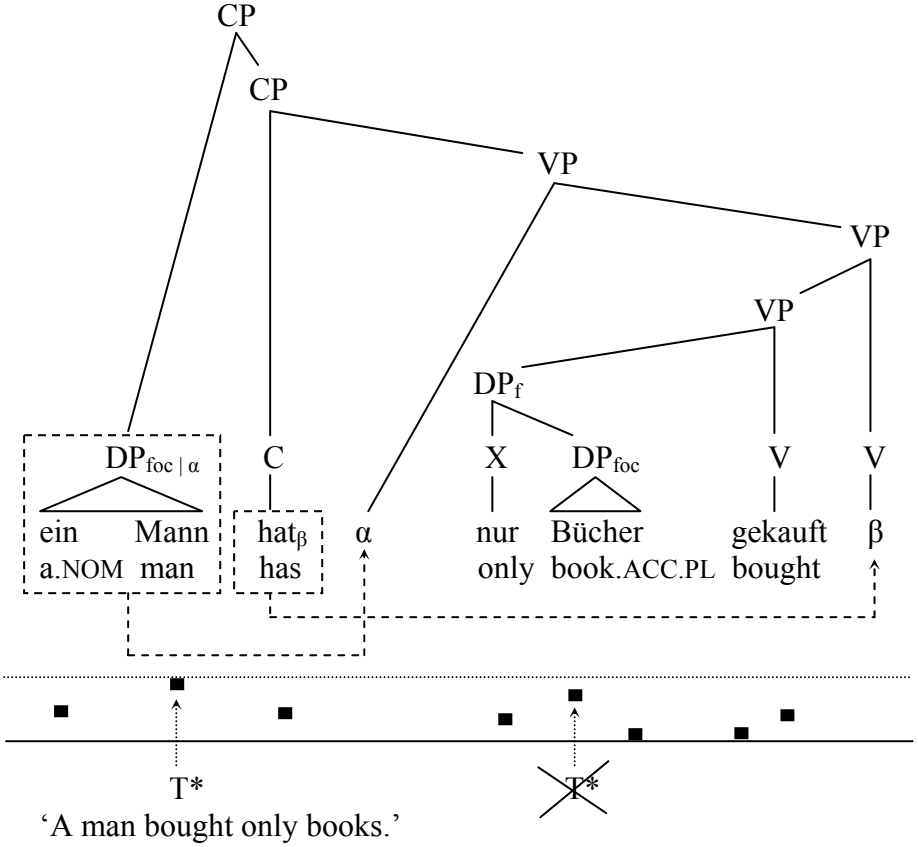


Figure 1. Acoustic correlates of example (18)

[9] T* stands for 'tone' resp. 'pitch accent'. For a specification of tones in German cf. the GToBI model by Grice and Baumann (2002).

(19)[10] Someone bought only books yesterday. Who did?



'A man bought only books.'

Foreground$_{FOF}$:	a man bought only books
Background$_{FOF}$:	x bought only books
Focus$_{FOF}$:	a man
Foreground$_{SOF}$:	bought only books
Background$_{SOF}$:	bought only x
Focus$_{SOF}$:	books

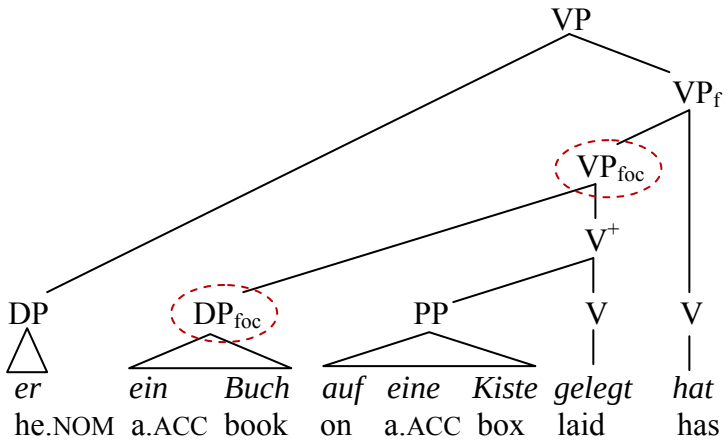
Taking these facts into consideration, accents should be related to differences in metrical strength (as will be shown below) and should therefore be assigned after the syntactic structure has been completed. But we can retain the basic idea for the explanation of focus movement with a slight modification, if we assign features for focus exponents rather than directly for accents. Focus exponents are used e.g. by Fuchs (1976) and Krifka (1984). They are most often motivated by their prosodic realization as accents. I will use the term in a more general way. Focus exponents are relevant for the prosodic realization of sentences, but they are not the same as accents. They are sub-constituents of foci which are able to represent the focus prosodically and syntactically.

The assignment of focus exponents mirrors the derivation of metrical differences discussed in section 2 and is therefore based on the same structural facts. The process for the assignment of focus exponents depends on the structural relationship of adjacent syntactic constituents in the same way as it was observed for the derivation of stress. The maximal focus exponent in head-complement structures is always represented by the complement (cf. (20)). Example (20) repeats the D-structure of example (16) supplemented by a feature for the maximal focus exponent of the focused VP. It is marked by the same feature 'foc' as the whole focus because

[10] The particle has the un(der)specified category X, which is permeable to the category of its complement.

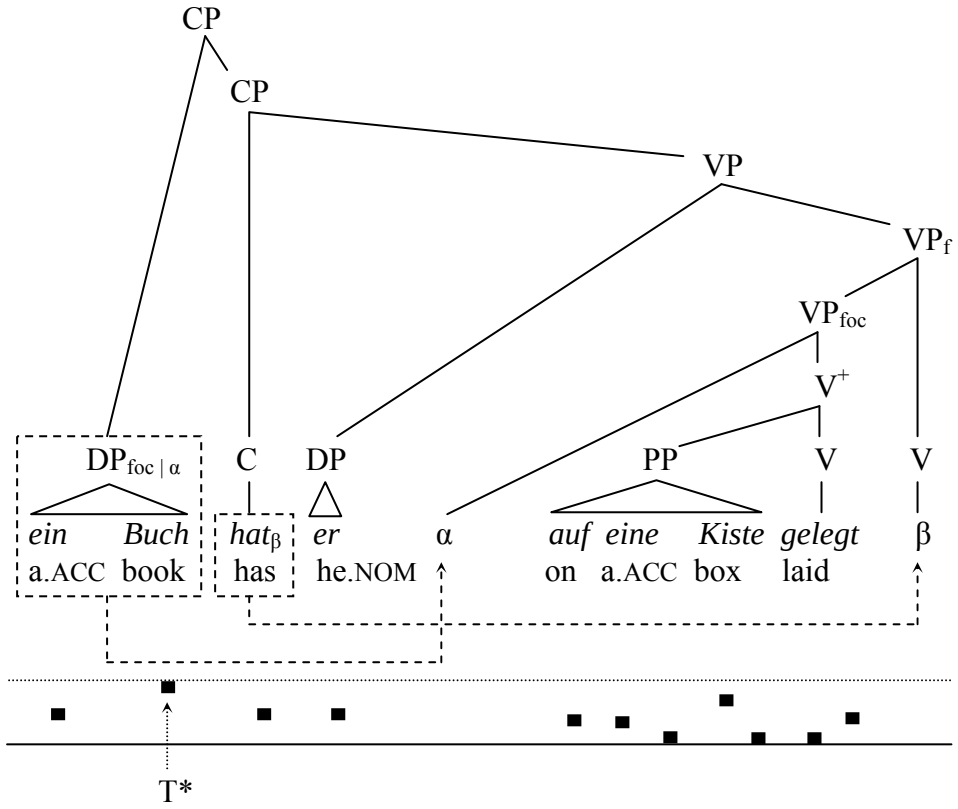
it behaves with respect to stress and movement as if it were a focus itself. The PP cannot be a focus exponent because it is dominated by a higher ordered head, which cannot serve as a mediator for the assignment of focus exponents.

(20)



Focus movement can affect a constituent which is marked with a focus feature. That can either be the whole focus or a focus exponent. Focus movement is therefore possible for the focused VP in (20) as well as for its focus exponent, the DP *ein Buch* ('a book'). The metrical structure is derived by reconstruction after movement has taken place and the syntactic structure has been completed (cf. (21)).

(21) What did Paul do yesterday?



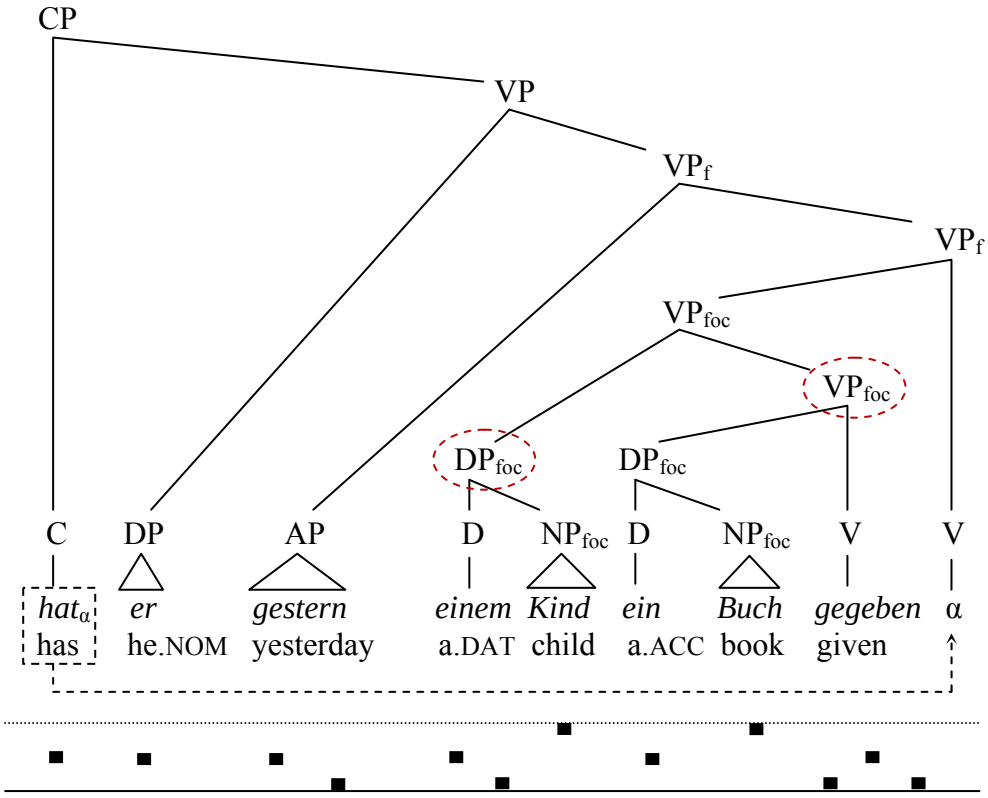
'He laid a book on a box.'

Accents are obligatorily assigned to every metrical top mark. The sentence in (21) contains only one top mark and receives only one accent thereby. Syllables which are represented by lower metrical marks can only be realized by an accent if they are not preceded by metrically

stronger constituents in the same utterance. An accent on a lower metrical mark which precedes a higher mark can be compensated by a following upstep in fundamental frequency (resp. a blocking of downtrend) whereas an accent on a lower mark which follows a higher mark would be indistinguishable from a downstepped accent in neutral contours. These assumptions make it possible to explain both, why non-focused material can be realized with accents (cf. (18)) and why focused constituents can remain unaccented like the SOF in (19). The SOF in (19) carries a focus feature but cannot receive an accent because it follows the FOF, to which it is metrically subordinate. The focus feature can only be realized by other phonetic effects like duration and/or higher amplitude.

Analysing the assignment of focus exponents in parallel to the stress assignment process in section 2, our model predicts that a neutral adjunct structure is split into two direct focus exponents as can be seen in (22). The VP *einem Kind ein Buch gegeben* (lit. 'a child a book given') is the information focus of the utterance. It has two direct maximal focus exponents – the DP *einem Kind* ('a child') and the VP *ein Buch gegeben* (lit. 'a book given'), which have maximal focus exponents themselves. The assumption, that one constituent can be split in more than one maximal focus exponent, contrasts to Krifka's proposal, who assumes that only the rightmost sub-constituent of an adjunct structure functions as focus exponent. The difference in Krifka's analysis depends on the fact that early theories of focus and stress concentrated on the explanation of *nuclear* stress. But nuclear stress is a perception phenomenon. The two DPs inside the focus of (22) contain two equally strong main stresses, which are realized by accents. According to Wagner's Nuclear Stress Generalization in (6), the last one is only *perceived* as strongest.

(22) What did Paul do yesterday?



'Did he give a book to a child yesterday?'

Evidence for the assumption, that adjunct structures have two direct maximal focus exponents comes again from pars-pro-toto movement. Focus movement is only possible for the whole focus or a focus exponent. The DP *einem Kind* ('a child') cannot be affected by focus

movement if only the rightmost constituent of an adjunct structure is a focus exponent, as it is assumed in traditional theories of focus exponents. But movement of the DP *einem Kind* ('a child') is compatible with a reading in which the VP *einem Kind ein Buch gegeben* (lit. 'a child a book given') is focused (cf. (23)). It must therefore be a focus exponent, too. Taking the economy of movement of section 3 into consideration, the DP *einem Kind* ('a child') is in fact the only subpart of the focus which can be affected by pars-pro-toto movement.

(23) A: What did Paul do yesterday?

B: [*einem Kind*] *hat er gestern* [~~*einem Kind*~~ *ein Buch gegeben*]$_{foc}$

a.DAT child has he.NOM yesterday a.ACC book given

'He gave a book to a child yesterday.'

5. Conclusion

The discussion was focused on the question whether a surface oriented view, which derives the whole prosodic structure from syntactic S-structure, or a deep structure oriented view, which derives parts of the prosodic structure from syntactic D-structure, makes the right predictions for the prosodic organization of utterances. The analysis was concentrated on the derivation of metrical structure in German V1- and V2-sentences. It has been shown that both approaches are right to some extent. The metrical structure of an utterance can be derived after the syntactic structure has been completed (→ surface oriented view) but it has to take the underlying representation into consideration (→ deep structure oriented view). Such an analysis becomes possible with two concepts. Reconstruction by variables guarantees that prosodic processes, which operate on S-structure, have access to D-structure. Focus exponents serve as relevant concept for focus movement. The presented model mediates between the surface oriented view and the deep structure oriented view and offers a compromise for the derivation of prosodic structure.

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