The secret life of focus exponents, and what it tells us about fronted verbal projections

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Abstract   The paper investigates a complex word order phenomenon in German and the interaction of syntax and information structure it exemplifies: the occurrence of subjects as part of a fronted non-finite constituent and particularly the so-called definiteness effect excluding (many) definite subjects from this position. We explore the connection between focus projection and the partial fronting cases and show that it is the subject of those verbs which allow their subject to be the focus exponent that can be included as part of a fronted verbal constituent. In combination with the observation by Webelhuth (1990) that fronted verbal constituents need to be focused, this provides a natural explanation of the definiteness effect in terms of the information structure requirements in these sentences. Interestingly, the generally ignored exceptions to the definiteness effect are predicted by our analysis; we show that they involve definite noun phrases which can bear focus, which allows them to be part of a fronted verbal constituent. Finally, building on the integrated grammatical architecture provided in De Kuthy (2002), we formulate an HPSG theory which captures the interaction of constraints from syntax, information structure and intonation.

1   The phenomenon

Haider (1982, p. 13), Kratzer (1984, p. 45), and Grewendorf (1989, p. 23) observed that in German it is possible for ergative verbs to realize a subject as part of a fronted non-finite verbal constituent. This is exemplified in (1).

(1) a. [Ein   Fehler unterlaufen] ist meinem Lehrer noch nie.
        an_{nom} error   crept in   is my   teacher still   never
        'So far my teacher has never made a mistake.'

   b. [Haare   wachsen] können ihm nicht mehr.
        $hair_{nom}$ grow   can   him not   anymore
        'His hair cannot grow anymore.'

   Haider (1990) observed that this option also exists for unergative verbs, which is illustrated by (2).[1]

(2) [Ein   Außenseiter gewonnen] hat hier noch nie.
      an_{nom} outsider   won   has hier still   never
      'An outsider has never won here yet.'

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[1]Grewendorf (1989, pp.192f) also mentions Toman (1986) with an example in which a subject has been fronted with an unergative verb.

(i) ? [Eine Lösung gefehlt] hat uns   schon   lange
         a_{nom} solution lacked   has us_{dat} already for a long time
         'We have lacked a solution for a long time already.'

Nevertheless, the occurrence of subjects as part of a fronted non-finite constituent exhibits a number of restrictions. Meurers (2000, ch. 10) pointed out that the option is only available for subjects of raising verbs:

(3) a. [Ein   Außenseiter zu gewinnen] <u>scheint</u> hier eigentlich nie.
       a$_{nom}$ outsider   to win   seems here actually   never
       'An outsider never actually seems to win here.'

   b. * [Ein   Außenseiter zu gewinnen] <u>versuchte</u> hier noch   nie.
        a$_{nom}$ outsider   to win   tried   here actually never
        'An outsider never actually tried to win here.'

Kratzer (1984, p. 46), Grewendorf (1989, p. 24), and Haider (1990, p. 96) mention a definiteness effect disallowing definite subjects from occurring in this construction, an effect which has also received attention in the more recent literature (cf., e.g., Wurmbrand 2001). Using definite subjects for the sentences (1a) and (2) thus results in the ungrammatical sentences in (4).

(4) a. * [Dieser Fehler unterlaufen] ist meinem Lehrer noch nie.
        this$_{nom}$ error crept in   is my   teacher still never
        'So far my teacher has never made a mistake.'

   b. * Der Außenseiter gewonnen hat hier noch nie.
        the outsider   won   has here still never

There are, however, some clear counterexamples to this definiteness effect, which are rarely noted[2] and are not accounted for by any analysis we know of. Some examples are shown in (5).

(5) a. Das Herz geklopft und geschaudert hat dem Kind. (Wegener 1990, p. 98)
       the heart beaten   and shuddered   has the   child
       'The child's heart beat and it shuddered.'

   b. Die Hände gezittert haben ihm diesmal nicht. (Höhle 1997, p. 114)
      the hands trembled have   him this time not
      'This time his hands didn't tremble.'

   c. Das Telephon geklingelt hat hier schon lange nicht mehr.
      the telephone rang   has here yet   long not   anymore
      'The telephone hasn't been ringing here in a long time.'

In this paper, we want to discuss and explore an exciting parallelism between the restriction on what can be fronted as part of a non-finite verbal projection and the properties of focus projection in German. We will argue that the definiteness

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[2]E.g., in fn. 88 on p. 283 of Müller (2002).

effect should be viewed as reflecting the information structure requirements in such sentences, instead of stipulating it as a syntactic constraint—and we will see that the apparent counter-examples are predicted under such an information structure-based approach.

2 Information structure

German is a so-called intonation language in which focused constituents are signaled by pitch accent (cf., Féry 1993). The syllable bearing the pitch accent is called the *focus exponent*. Only one syllable is stressed by a pitch accent, but through *focus projection* larger parts of a sentence can be focused.

2.1 Focus projection and its connection to fronting

As illustrated in (6), the focus exponent in an all-focus sentence normally is one of the arguments of the main verb, but not the subject (Stechow and Uhmann 1986).[3]

(6) Was ist denn hier für eine Aufregung? / What's all the excitement about?

   a.   ⟦Ein   Politiker   hat das VOLK belogen.⟧$_F$
       a$_{nom}$ politician has the people lied to

   b. # ⟦Ein   POLITIKER hat das Volk   belogen.⟧$_F$
       a$_{nom}$ politician   has the people lied to

Interestingly, as discussed by Grewendorf (1989) and Uhmann (1991, p. 199ff.), in certain cases the subject *can* be the focus exponent. In addition to ergative subjects (7), this is also the case for the subjects of many intransitive unergative verbs (8).

(7) Was ist denn hier für eine Aufregung? / What's the matter here?

   a. ⟦Dem Präsidenten ist ein FEHLER unterlaufen.⟧$_F$
      the   president   is a   mistake   crept in

      'The president made a mistake.'

(8) Was ist denn hier für ein Lärm? / What's all the noise about here?

   a. ⟦Ein HUND bellt.⟧$_F$
      a   dog   barks

   b. ⟦Ein KIND weint.⟧$_F$
      a   child   cries

Connecting this state of affairs to the issue of fronted verbal constituents we started with, one makes an important observation: The examples (9)–(11) show that it is the subject of those verbs which allow their subject to be the focus exponent that can be included as part of a fronted verbal constituent.

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[3]We write the word that bears the pitch accent in capital letters and mark the entire focus domain with ⟦...⟧$_F$. Sentences which are not felicitous under the given context are marked with #.

(9) a. # ⟦Ein POLITIKER hat das Volk   belogen.⟧_F
          a_{nom} politician   has the people lied to

   b. * [Ein Politiker belogen] hat das Volk   noch nie.
          a   politician lied   has the people still   never

(10) a. ⟦Ein   HUND bellt.⟧_F
          a_{nom} dog   barks

   b. [Ein Hund gebellt] hat hier noch nie.
        a   dog   barked   has here yet   never

(11) a. ⟦Dem Präsidenten ist ein   FEHLER unterlaufen.⟧_F
          the_{dat} president   is a_{nom} mistake   crept in

   b. [Ein Fehler unterlaufen] ist dem Präsidenten bisher noch nie.
        an error   crept in   is the president   so far still never

This observation turns out to be a rediscovery: In a surprisingly neglected paper discussing evidence for a VP-constituent in German, Webelhuth (1990, p. 53) connects the issue of focus projection to the issue of subjects as part of fronted non-finite constituents. He claims that the fronted constituent can only contain dependents which are capable of projecting focus. This general claim is only substantiated with one example pair, though, and unfortunately seems to have been overlooked by the later literature.

Webelhuth (1990, p. 53) concludes that "we can explain these facts if we assume that a topicalized constituent containing a verb has to be focused" and relates this to a claim by Grewendorf (1989, p. 194, pp. 219f).[4] In order to illustrate Webelhuth's claim let us take a look at some focus-background structures of sentences with a fronted verbal projection. The question-answer pair (12) shows that a fronted verbal projection can be in the focus of an utterance.

(12) Was ist hier noch nie passiert? / What has never happened here?

     ⟦[Ein AUSSENSEITER gewonnen]⟧_F hat hier noch nie.
      an   outsider   won   has here yet   never

The examples (13) and (14) show, that it is not sufficient for part of the fronted verbal projection to be the focus.

(13) Was ist hier noch nie einem Außenseiter passiert? / What has never happened to an outsider?

     # [Ein Außenseiter ⟦GEWONNEN⟧_F] hat hier noch nie.

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[4]Close reading reveals that Grewendorf (1989) apparently did not realize the full generality of the connection between focus projection and fronting in that he restricts it to ergative and theme verbs, explicitly excluding agentive subjects such as the one in Webelhuth's example (i).

(i) [Leute getanzt] haben hier noch nie.
     people danced   have   here never

(14) Wer hat hier noch nie gewonnen? / Who has never won here?

    # [⟦Ein AUSSENSEITER⟧$_F$ gewonnen] hat hier noch nie.

    The three examples thus support Webelhuth's claim that a fronted verbal projection has to be focused. Webelhuth's conclusion leaves open whether the fronted verbal projection can also be part of a larger focus. This is tested in (15).

(15) Was ist denn hier für eine Aufregung? / What's all the excitement about?

    # ⟦[Ein AUSSENSEITER gewonnen] hat hier noch nie⟧$_F$

    The fact that the answer is infelicitous in such an all-focus context shows that only the fronted verbal constituent must be focused, not more.

2.2 The definiteness effect

We are now ready to return to the definiteness effect and the counter-examples from the beginning of this paper. We saw that many definite subjects cannot be part of a fronted verbal projection (4), whereas other definite subjects can (5). The pattern becomes transparent when one considers the focus projection possibilities in these examples: Example (16a) and (17a) show that in the sentences disallowing the fronting, the subject cannot be the focus exponent, whereas it can be the focus exponent in the second class of sentences, (16b) and (17b).

(16) Was ist denn hier für eine Aufregung? / What's the matter here?

    a. # ⟦Dem Präsidenten ist schon wieder dieser FEHLER unterlaufen.⟧$_F$
        the president is yet again this mistake crept in

    b. ⟦Dem Präsidenten zittern die HÄNDE.⟧$_F$
        the president tremble the hands

(17) Was ist denn hier für ein Lärm? / What's all the noise here?

    a. # ⟦Der AUSSENSEITER gewinnt.⟧$_F$
        the outsider wins

    b. ⟦Das TELEPHON klingelt.⟧$_F$
        the telephone rings

    The last missing ingredient of an information-structure based explanation for the definiteness effect and its exceptions is a categorization of definite NPs in terms of their discourse potential. De Kuthy (2002, sec. 6.5) discusses that one can distinguish definite NPs which function anaphorically and thereby have to be part of the background of a sentence from a second class of definite NPs which are used deicticly, endophorically or as a semantic definite.[5] This second class can occur as the focus of a sentence. A closer look at the examples where the subject can be the

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[5]Following Löbner (1985), we use *semantic definite* to refer to cases where the definite article is combined with a noun that represents a concept that necessarily only applies to one object, such as *the weather*, *the moon*, *the president*, or body parts like *the heart*.

focus exponent, (16b) and (17b), shows that the definite NPs in those sentences are indeed instances of semantic definites. In conclusion, given Webelhuth's generalization that a fronted verbal constituent has to be focused, such a constituent can only contain those definite subjects that can be a focus exponent, namely definite NPs which are used deicticly, endophorically or as a semantic definite.

3 An HPSG analysis

We couch our analysis in the encoding of information structure in HPSG developed in De Kuthy (2002, sec. 6.6). Her approach builds on the proposal of Engdahl and Vallduví (1996) in which a focus-background structure for every sentence is build up compositionally from the focus-background structures of its subparts.

The information structure is encoded in the attribute INFO-STRUC that is appropriate for signs and has the appropriate features FOCUS and TOPIC, with lists of so-called meaningful expressions (semantic terms, cf. Sailer 2000) as values. The background of a sentence in De Kuthy's approach is defined to be that part of the logical form of the sentence which is neither in focus nor in topic. This characterization of background closely resembles the definition of background employed by the so-called *structured meaning* approaches to focus of Stechow (1981), Jacobs (1983), or Krifka (1992). The INFO-STRUC value of a simple sentence with the focus as indicated in (18) is thus structured as shown in figure 1.

(18) Peter [[liest ein BUCH.]]$_F$
     Peter reads a   book

$$
\begin{bmatrix}
\text{S}|\text{LOC}|\text{CONT}|\text{LF } \exists x[book'(x) \land read'(p,x)] \\
\text{INFO-STRUC } \begin{bmatrix} \text{FOCUS } \langle \lambda y \exists x[book'(x) \land read'(y,x)] \rangle \\ \text{TOPIC } \langle \rangle \end{bmatrix}
\end{bmatrix}
$$

Figure 1: A sign representation including information structure

The phonology of signs is altered as shown in figure 2 to include an ACCENT attribute to encode whether a word receives an accent or not, and whether it is a rising or a falling accent in case it receives one.[6]
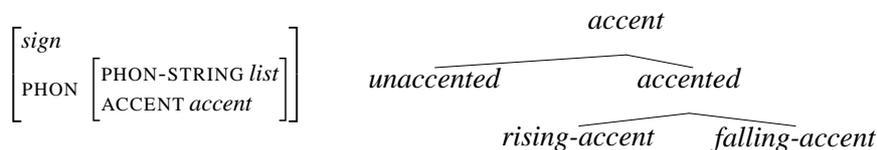
$$
\begin{bmatrix}
sign \\
\text{PHON } \begin{bmatrix} \text{PHON-STRING } list \\ \text{ACCENT } accent \end{bmatrix}
\end{bmatrix}
$$

accent

unaccented   accented

rising-accent   falling-accent

Figure 2: Representing pitch accents

The information structure of words is defined through the principle shown in

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[6] The ACCENT attribute is sufficient for the present context; a more developed representation of intonation is left for future research.

figure 3 which assigns the semantic contribution of the word to the focus or topic specification in the information structure representation of that word, depending on the type of accent the word receives.

$$word \rightarrow \begin{bmatrix} \text{PHON|ACCENT} & \textit{falling-accent} \\ \text{SS|LOC|CONT|LF} & \boxed{1} \\ \text{INFO-STRUC} & \begin{bmatrix} \text{FOCUS} & \langle\boxed{1}\rangle \\ \text{TOPIC} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

$$\vee \begin{bmatrix} \text{PHON|ACCENT} & \textit{unaccented} \\ \text{INFO-STRUC} & \begin{bmatrix} \text{FOCUS} & \langle\rangle \\ \text{TOPIC} & \langle\rangle \end{bmatrix} \end{bmatrix}$$

$$\vee \ldots$$

Figure 3: Relating intonation and information structure

The final component of the theory is a principle specifying the information structure representation of a phrase based on that of its daughters.[7] Figure 4 shows the focus projection principle of De Kuthy (2002), which covers the case in which focus is not projected and focus projection in the nominal domain.[8]

$$phrase \rightarrow \begin{bmatrix} \text{INFO-STR|FOCUS} \ \boxed{1} \oplus \textit{collect-focus}(\boxed{2}) \\ \text{HEAD-DTR|INFO-STR|FOCUS} \ \boxed{1} \\ \text{NON-HEAD-DTRS} \ \boxed{2} \end{bmatrix}$$

$$\vee \begin{bmatrix} \text{PHON|PHON-STR} \ \boxed{1} \oplus \boxed{2} \\ \text{SS|LOC} \begin{bmatrix} \text{CAT|HEAD} & \textit{noun} \vee \textit{prep} \\ \text{CONT|LF} & \boxed{3} \end{bmatrix} \\ \text{INFO-STR|FOCUS} \ \langle\boxed{3}\rangle \\ \textit{any-dtr}\left(\begin{bmatrix} \text{PHON|PHON-STR} & \boxed{2} \\ \text{SS|L|CONT|LF} & \boxed{4} \\ \text{INFO-STR|FOCUS} & \langle\boxed{4}\rangle \end{bmatrix} \right) \end{bmatrix}$$

$$\vee \ldots$$

Figure 4: Focus projection in the nominal domain

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[7]We assume that information structure is interpreted only for unembedded signs; the value of the INFO-STRUC attribute on subconstituents only serves a local bookkeeping function, similar to features like SLASH or REL in traditional HPSG (Pollard and Sag 1994).

[8]The presentation differs from that in De Kuthy (2002). Definitions of the auxiliary relations:

$$\textit{any-dtr}(\boxed{1}) := \begin{bmatrix} \text{HEAD-DTR} \ \boxed{1} \end{bmatrix}.$$
$$\textit{any-dtr}(\boxed{1}) := \begin{bmatrix} \text{NON-HEAD-DTRS} \ \textit{element}(\boxed{1}) \end{bmatrix}.$$

$$\textit{collect-focus}(\langle\rangle) := \langle\rangle.$$
$$\textit{collect-focus}\left(\langle \begin{bmatrix} \text{INFO-STRUC|FOCUS} \ \langle\boxed{1}\rangle \end{bmatrix} | \boxed{2} \rangle \right) := \langle \boxed{1} | \textit{collect-focus}(\boxed{2}) \rangle.$$

The first disjunct in the consequent of the principle covers the base case in which the focus does not project further—the mother of the phrase just collects the focus values of all her daughters. The second disjunct covers focus projection in the nominal domain, where focus always projects from the rightmost daughter of a phrase. Note how focus is encoded: If a constituent is part of the focus then its logical form is token identical to an element of its FOCUS value.[9]

For the verbal domain, the regularities are known to be influenced by a variety of factors, such as the word order and lexical properties of the verbal head (cf., e.g., Stechow and Uhmann 1986). Since verbs need to be able to lexically mark which of their arguments can project focus when they are accented, we introduce the boolean-valued feature FOCUS-PROJECTION-POTENTIAL (FPP) for objects of type *synsem*. Figure 5 shows the relevant part of the lexical entry of the verb *lieben* (love) which allows projection from the object but not the subject:

$$
\begin{bmatrix}
\text{PHON|PHON-STR } \langle lieben \rangle \\[4pt]
\text{ARG-S } \left\langle
\begin{bmatrix}
\text{LOC|CAT|HEAD } \begin{bmatrix} noun \\ \text{CASE } nom \end{bmatrix} \\[8pt]
\text{FPP } minus
\end{bmatrix},
\begin{bmatrix}
\text{LOC|CAT|HEAD } \begin{bmatrix} noun \\ \text{CASE } acc \end{bmatrix} \\[8pt]
\text{FPP } plus
\end{bmatrix}
\right\rangle
\end{bmatrix}
$$

Figure 5: The focus projection potential of *lieben*

The extended focus projection principle is shown in figure 6. The new, third

$$
phrase \rightarrow
\begin{bmatrix}
\text{INFO-STR|FOCUS } \boxed{1} \oplus collect\text{-}focus(\boxed{2}) \\
\text{HEAD-DTR|INFO-STR|FOCUS } \boxed{1} \\
\text{NON-HEAD-DTRS } \boxed{2}
\end{bmatrix}
$$

$$
\vee
\begin{bmatrix}
\text{PHON|PHON-STR } \boxed{1} \oplus \boxed{2} \\
\text{SS|LOC } \begin{bmatrix} \text{CAT|HEAD } noun \vee prep \\ \text{CONT|LF } \boxed{3} \end{bmatrix} \\
\text{INFO-STR|FOCUS } \langle \boxed{3} \rangle \\
any\text{-}dtr \left(\begin{bmatrix} \text{PHON|PHON-STR } \boxed{2} \\ \text{SS|L|CONT|LF } \boxed{4} \\ \text{INFO-STR|FOCUS } \langle \boxed{4} \rangle \end{bmatrix} \right)
\end{bmatrix}
$$

$$
\vee
\begin{bmatrix}
\text{SYNSEM|LOC } \begin{bmatrix} \text{CAT|HEAD } verb \\ \text{CONT|LF } \boxed{3} \end{bmatrix} \\
\text{INFO-STR|FOCUS } \langle \boxed{3} \rangle \\
\text{NON-HEAD-DTRS } \langle .., \begin{bmatrix} \text{SYNSEM } \begin{bmatrix} \text{FPP } plus \\ \text{LOC|CONT|LF } \boxed{4} \end{bmatrix} \\ \text{INFO-STR|FOCUS } \langle \boxed{4} \rangle \end{bmatrix} ,.. \rangle
\end{bmatrix}
$$

$$
\vee \ldots
$$

Figure 6: Extended focus projection principle

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[9]The value of FOCUS is a list to account for multiple foci, cf. De Kuthy (2002, p. 164).

disjunct specifies under which circumstances focus can project in the verbal domain: a phrase headed by a verb can only be in the focus (i.e., its entire logical form is token identical to an element of its focus value) if the daughter that has the focus projection potential (FPP *plus*) is entirely focused itself.

Finally, in order to account for the particular construction under discussion in this paper, the partial fronting of a non-finite constituent, the specific information structure properties of such fronted constituents need to be expressed in a principle expressing what we referred to as Webelhuth's generalization: In an utterance in which a verb phrase occurs as a fronted constituent (i.e., the filler of a head-filler phrase) this entire verb phrase must be in the focus of the utterance (i.e., the FOCUS value of the fronted constituent must be identical to its semantic representation). Figure 7 shows the formalization of this principle.

$$
\begin{bmatrix} \textit{head-filler-phrase} \\ \text{NON-HEAD-DTR} | \text{SYNSEM} | \text{LOC} | \text{CAT} | \text{HEAD } \textit{verb} \end{bmatrix} \rightarrow
$$

$$
\begin{bmatrix} \text{INFO-STRUC} | \text{FOCUS } \big\langle \boxed{1} \big\rangle \\ \text{NON-HEAD-DTR} \begin{bmatrix} \text{INFO-STRUC} | \text{FOCUS} & \big\langle \boxed{1} \big\rangle \\ \text{SYNSEM} | \text{LOC} | \text{CONT} | \text{LF} & \boxed{1} \end{bmatrix} \end{bmatrix}
$$

Figure 7: Webelhuth's generalization

Combining the new lexical specifications, the focus projection rule for the verbal domain, and the partial fronting focus requirement with the basic setup of De Kuthy (2002) one obtains a theory which predicts that subjects can only be part of a fronted verbal projection if they can be the focus exponent.

3.1 An example analysis

Now that we have introduced the basic principles governing the interaction of intonational marking, syntactic structure, and information structure, let us take a look at how an example in which a subject has been fronted as part of a fronted verbal projection is licensed by our theory. Example (19) is an instance of such a construction; the analysis of this example is shown in figure 8.

(19) [[Ein AUSSENSEITER gewonnen]]$_F$ hat hier noch nie.
　　　an　outsider　　　 won　　　 has here still　never
　　'An outsider has never won here yet.'

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{Ein Außenseiter gewonnen hat hier noch nie} \right\rangle \\ \text{IS|FOCUS} \left\langle \boxed{1}\exists x[\textit{aussenseiter}'(x) \wedge \textit{gewinnen}'(x)]\right\rangle \end{bmatrix}$$

F

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{Ein Außenseiter gewonnen} \right\rangle \\ \text{S|L} \boxed{2}\left[\text{CONT|LF} \boxed{1}\right] \\ \text{IS|FOCUS} \left\langle \boxed{1}\right\rangle \end{bmatrix}$$

H

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{hat hier noch nie} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix}$$

C

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{Ein Außenseiter} \right\rangle \\ \text{S}\begin{bmatrix} \text{L|CO|LF} \boxed{3}\lambda Q\exists x[\textit{aussenseiter}'(x) \wedge Q(x)] \\ \text{FPP } \textit{plus} \end{bmatrix} \\ \text{IS|FOCUS} \left\langle \boxed{3}\right\rangle \end{bmatrix}$$

H

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{gewonnen} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{Ein} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix} \begin{bmatrix} \text{P}\begin{bmatrix}\text{PS} \left\langle \textit{Außenseiter} \right\rangle \\ \text{ACCENT } \textit{falling}\end{bmatrix} \\ \text{S|L|CO|LF} \boxed{4}\lambda x \textit{ aussenseiter}'(x) \\ \text{IS|FOCUS} \left\langle \boxed{4}\right\rangle \end{bmatrix}$$

H

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{hat} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix}$$

C

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{hier} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix}$$

C

$$\begin{bmatrix} \text{P|PS} \left\langle \textit{noch nie} \right\rangle \\ \text{IS|FOCUS} \left\langle\right\rangle \end{bmatrix}$$

C

$$\begin{bmatrix} \text{P|PS} \left\langle\right\rangle \\ \text{S}\begin{bmatrix} \text{L} & \boxed{2} \\ \text{N|I|SLASH} \left\{\boxed{2}\right\} \end{bmatrix} \end{bmatrix}$$
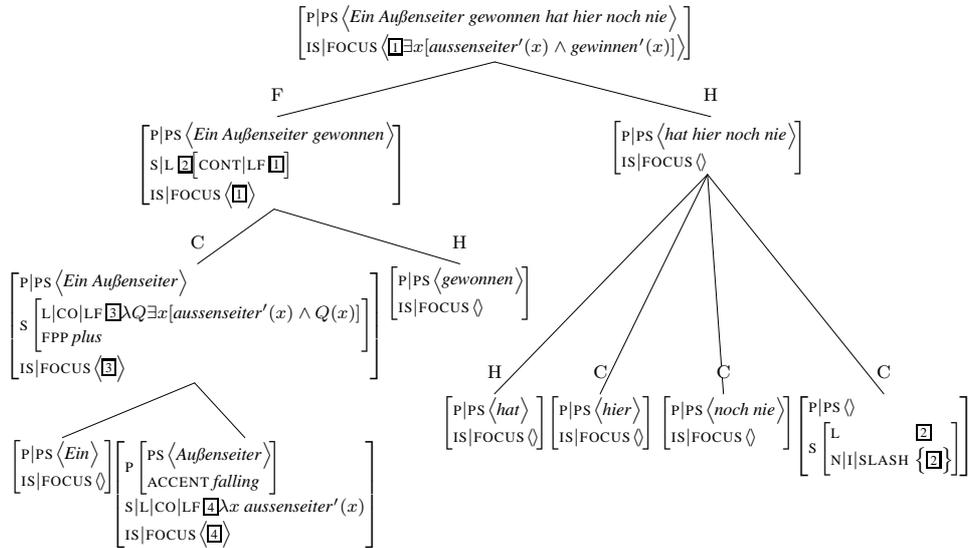
Figure 8: A sketch of an analysis

The entry of *gewinnen* (to win) in figure 9 encodes the lexical property that the subject of this intransitive verb has focus projection potential.

$$\begin{bmatrix} \text{PHON} & \left\langle \textit{gewinnen} \right\rangle \\ \text{ARG-S} & \left\langle \begin{bmatrix} \text{FPP } \textit{plus} \\ \text{LOC|CAT|HEAD|CASE } \textit{nom} \end{bmatrix}\right\rangle \end{bmatrix}$$

Figure 9: The lexical entry of *gewinnen* (to win)

The pitch accent in example (19) is on the noun *Außenseiter* so that according to the information-structure principle for words in figure 3 it contributes its LOGICAL-FORM value to its FOCUS value. The focus projection principle of figure 4 ensures that the focus can project over the entire NP *ein Außenseiter*, i.e., its FOCUS element is identical to its LF value. Since *ein Außenseiter* as the subject of *gewonnen* in the tree in figure 8 is lexically marked as FPP *plus*, the principle governing focus projection in the verbal domain in figure 6 licenses the focus to project over the entire fronted verbal projection *ein Außenseiter gewonnen*. The fronted constituent thus contributes its LF value to its FOCUS value. In this example, the focus does not project further so that in the head-filler phrase the focus values of the two daughters are simply collected as licensed by the first disjunct of the focus principle in figure 6. As a result, the FOCUS value of the fronted verbal projection is the FOCUS value of the entire sentence. Finally, note that the example satisfies Webelhuth's generalization, which requires a fronted verbal projection to be the focus of the utterance as formalized in figure 7.

4   Summary and Outlook

In this paper we have investigated the fronting of subjects as part of a non-finite constituent in German, in particular the so-called definiteness effect excluding (many) definite subjects from this position. Based on generally ignored counter-examples to this definiteness effect, we explored the connection between focus projection and the partial fronting cases. We showed that it is the subject of those verbs which allow their subject to be the focus exponent that can be included as part of a fronted verbal constituent. In combination with the observation by Webelhuth (1990) that fronted constituents containing a verb need to be focused, this provides a natural explanation of the definiteness effect in terms of the information structure requirements in these sentences. The apparent exceptions to the definiteness effect were shown to involve definite noun phrases which can bear focus, which allows them to be part of a fronted verbal constituent. Finally, building on the information structure setup provided in De Kuthy (2002), we presented an HPSG theory which encodes the proposed analysis.

Given the complexity of focus projection in the verbal domain, there are a number of relevant issues that remain to be addressed in future work. Apart from integrating additional factors influencing focus projection, such as word order effects, Webelhuth's claim that a fronted constituent containing a verb has to be focused requires discussion on a wider empirical basis. Example (20) shows that the so-called i-topicalization (cf., Höhle 1991, Krifka 1994, Jacobs 1997 and Büring 1999) is a possible focus-background structure for sentences with a fronted verbal constituent.

(20) Hat hier je ein Außenseiter gewonnen? / Did an outsider ever win here?

    a. Nein, [[ein /AUSSENSEITER gewonnen]]$_T$ hat hier noch NIE\, aber es
        no   an outsider   won   has here still never but it
        haben schon viele Erstplazierte verloren.
        have   yet   many first placed lost

    b. Nein, [ein Außenseiter [/GEWONNEN]]$_T$] hat hier noch NIE\, aber es
        no   an outsider   won   has here still never but it
        sind schon viele auf dem zweiten Platz gelandet.
        are already many on the   second place arrived

In light of such examples, Webelhuth's generalization that the only possible focus-background structure for sentences with a fronted verbal constituent has the entire fronted constituent in focus is too restrictive. One possibility we are investigating is whether instead of requiring the fronted constituent to be focused one can require it to be a uniform information unit.

Another aspect of Webelhuth's generalization to be investigated concerns its deeper motivation. Research into the focus-background structure of partial constituents in general is needed to be able to deduce rather than stipulate the information structure requirements of fronted partial constituents.

Based on the approach developed in this paper, we think these issues can be fruitfully explored.

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