Word Order Variation: Competition or Co-Operation?

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The interplay of different factors in word order variation seems to call for a description in terms of a competition model. Still, a general assessment of competition models shows certain drawbacks in explanatory power. I argue that an approach in terms of a detailed description of the interacting factors of co-operating subsystems may result in a deeper understanding of central facts of word order variation. Using well-known data from German, this is exemplified by a semantic and pragmatic analysis of the referential power of definite and indefinite noun phrases in the background and the focus respectively. Such an analysis in terms of a choice function approach not only provides a deeper insight into the relevant mechanisms, but it also, I hope, opens the door for further research in a number of areas not connected with the study of word order variation.

1 The State of the Art

Word order variation is a phenomenon of many languages which seems to be situated at the crossroads of syntax, prosodic structure, semantics, and discourse pragmatics. Many relevant factors of each of these determining systems have been described in some detail in the literature of the last two decades. In syntax, there has been some debate about the adequate approach in terms of flat vs. branching structure, base generation or scrambling, and obligatory or optional movement, to name but the most important issues. For some literature concerning the state of affairs in German, cf., amongst others, Haider (1993), Fanselow (1997), Haider & Rosengren (1998), Müller (1998) and the literature cited there. As far as prosodic structure is concerned, its interaction with (discourse related) focus-assignment in syntax and its realisation as prosodic prominence has also been dealt with in a number of works. Here, the questions of focus-projection (or: F-percolation), the rise-fall-contour, etc. have been investigated in some detail by Selkirk...
candidate set are supposed to be synonymous. Is identity of sentence mood required, i.e., are questions, assertions, imperatives, etc. in the same candidate set? What about the position of adverbials and their varying influence on meaning? What about quantifier placement and corresponding scope relations? When faced with these problems and related ones, it seems very difficult to decide what a proper definition of "candidate set" should be in order to make a competition analysis work for a given case.

As regards Optimality Theory (OT) as the currently most prominent version of a competition model, there seems to be a division of labour between an underlying definition of competing structures by the function GEN (generate!) and the filtering device of constraints which are put in a specific hierarchy. The more specific GEN is, the less work will be left for the constraints. (As example will be discussed below; cf. Choi 1996.) Thus, all these particular objections taken together, there appears to be the danger of a lack of descriptive adequacy as long as competition models deal with observational generalizations instead of detailed and precise definitions of the relevant properties of well-formed sentences, preferably based on a small number of underlying general axiomatic principles.

In the following, I will try to show that a (more traditional) derivational approach to some of the factors determining word order variation in German may lead to a better understanding of the relevant forces and their interaction. This can be achieved, I believe, in a model which assumes that the systems which determine word order variation and its constraints all co-operate in precise and predictable ways in defining the relevant properties of individual sentences. If successful, such an approach will ideally define for any given "numeration" with a specific meaning a candidate set containing exactly one element, thus making a subsequent competition obsolete.

2 The Analysis

2.1 The Idea

In the following, I will try to demonstrate how a modular derivational analysis of some well-known phenomena of word order variation in German is able to provide a deeper and more adequate understanding of the relevant principles co-operating in defining a sentence in its structure and its specific meaning. In order to be able to do so, I will first present a traditional account in 2.2; in 2.3, I will develop a proper structural distinction of sentences of
German in a B-part (background) and an F-part (focus and focus-affiliated elements). This bi-partition will then be shown to correspond with a semantic distinction in background-determined vs. immediate sentence constituent (isc)-dependent interpretation of constituents. The proper referential interpretation of NPs will be derived on the basis of a choice function approach in 2.4, following a recent proposal by von Heusinger (1997). This analysis will then be used in 2.5-2.8 to explain some well-known constraints on word order variation in German. My proposal, which is summarized in 3., requires a distinction between a referential and a non-referential part of the meaning of NPs. Independent evidence for this distinction will be given in 4., indicating its usefulness for further research in hitherto unrelated areas of syntax.

2.2 The Facts

The phenomena I will deal with were first described in some detail in Lenerz (1977a) and have been discussed under various aspects in subsequent work. Recent attempts to describe them in terms of an OT-account can be found in Choi (1996), Büring (1996) and Müller (1958), with some discussion of the relevant literature.

In German, the order of the indirect object (IO, dative) and the direct object (DO, accusative) depends on a large degree on the particular verb, probably basically being due to considerations of animateness (cf. Vogel & Steinbach 1998). There has been a considerable amount of debate about the proper syntactic analysis, concerning the basic order of arguments, binding relations, etc. (cf., amongst others, Ruesgen 1993, Fanselow 1993, 1997, Haider & Rosengren 1998, and Müller 1998). I won’t take up this discussion. For the present purposes, the following may suffice: it has generally been agreed that for a large part of German verbs the unmarked order is IO > DO, as the evidence in (2) shows. The order IO > DC in (2) is not subject to the constraints obtaining for the reverse order in (3) and (4). A reasonable explanation for naming IO > DO the unmarked order may be given along the lines of Höhle (1982) and some subsequent work (cf. Büring 1997): The unmarked order may be used in more discourse contexts since it allows more focus interpretations (via F-projection). I won’t go into this matter, however, in the present paper. More discussion may be found in Reinhart (1995, 1997), Eckardt (1996), Truckenbrodt (1996), Zubizarreta (1993) and related work; cf. also Uehmann (1991).

The following generalizations have been observed (cf. Lenerz 1977a, Büring 1956):

(1): a. \[\text{[\pm def IO]} > \text{[\pm def DO]} : \text{"unmarked order", regardless of focus position (cf. (2-a), (3-a), (4-a))}\]
b. \[\text{[\pm def DC]} > \text{[\pm def DO]} : \text{scrambling of [+def, -F] is o.k. (cf. (2-b))}\]
c. \[\text{*[\pm def DC]} > \text{IO = don't scramble focus! (cf. (3))}\]
d. \[\text{*[-def DO]} > \text{[\pm def DO]} : \text{don't scramble (existential) indefinites! (cf. (4))}\]

The questions of (2)–(4) are supposed to give an adequate context for the respective answers in which the focus is given prominence by intonation, as indicated by capital letters. The questioned constituent is indicated (Q: DO or Q: IO).

(2): "Wer hast du das Buch gegeben? (Q: IO)"
‘Whom did you give the book?’

a. Ich habe [dem/einem StuDENten] das/ein Buch gegeben. I have the/a student the/a book given [\pm def IO] > [\pm def DO] ("unmarked order")

b. Ich habe das Buch [dem/einem StuDENten] gegeben. I have the book the/a student given [\pm def DO] > [\pm def IO] (scrambled [+def DO, -F] is o.k.)

(3): "Was hast du dem Studenten gegeben? (Q: DO)"
‘What did you give to the student?’

a. Ich habe dem Studenten das BUCH gegeben. I have the student the book given [\pm def IO] > [\pm def DO] ("unmarked order")

b. Ich habe das BUCH dem Studenten gegeben. I have the book the student given [\pm def IO] > [\pm def DO] ("scrambled focus")

(4): "Wem hast du ein Buch gegeben? (Q: IO)"
‘Whom did you give a book?’

a. Ich habe [dem/einem StuDENten] ein Buch gegeben. I have the/a student a book given [\pm def IO] > [\pm def DO] ("unmarked order")

b. Ich habe ein Buch [dem StuDENten] gegeben. I have a book the student given [\pm def DO] > [\pm def IO] ("scrambled indefinite NP")

c. Ich habe ein Buch [dem StuDENten] gegeben. I have a book a student given [\pm def DO] > [\pm def IO] ("scrambled indefinite NP")
In the unmarked order IO > DO, every conceivable distribution of definiteness (±def) and focus (F) is possible; cf. (2-a), (3-a), and (4-a): \( \text{[±def IO]} > \text{[±def DO]} \) and \( \text{[±def IO]} > \text{[±def DO]} \). A re-arrangement of both objects is possible only if the DO is definite and the IO is focus; cf. (1-b) and (2-b). Without any discussion of the differing assumptions in the relevant literature, I will simply assume the re-arrangement to be due to scrambling (cf. Haider & Rosengren 1998, Müller 1998). The main reason for doing so is that there has to be a structural difference between IO > DO and DO > IO for a proper compositional analysis of their different semantic interpretations; cf. below. Base generation, especially in a flat structure, generally does not provide the means for a structural distinction. In other respects, the details of the proper syntactic analysis are not relevant for the following discussion.

The constraints to be dealt with in any analysis of word order variation in German are given in (1-c) and (1-d): Focus must not be scrambled (cf. (3-b)) and, even if the last NP carries focus, the scrambled NP must not be indefinite (cf. (4-b,c)). This last condition, basically taken from Lenert (1977a), requires a further specification (cf. (5) below): The proper condition is that existential indefinites should not be scrambled. The examples (3) and (4) show the effect of violations of these constraints: In the preceding question context the respective answers are only well formed if the DO in DO > IO is not the focus and not indefinite (with an existential reading) (cf. (2-a,b) and (4-a)). If the indefinite EO, however, receives a generic interpretation, as in (5), scrambling is allowed (cf. Büring 1996: 10):

5. Wem erzählt: Peter einen obszönen Witz?
   ‘Whom does Peter tell an obscene joke?’

   Peter erzählt einen obszönen Witz immer einem Schulfreund.
   ‘Peter tells an obscene joke always a-DAT schoolmate (generic)
   ‘Peter tells an obscene joke always to a schoolmate.’

It thus turns out that existential indefinites may only occur in a restricted environment. Büring covers this case by a so-called "existential axiom":

6. The Existential Axiom:
   Existential indefinites can occur in the background only if they are c-commanded by the focus. (Büring 1996: 6)

So far, the relevant conditions are given. They have been used as basic in many studies on word order variation in German. Notice, however, that (1-a-d) and (6) are only observational generalizations, lacking any explanatory power in themselves. In particular, (6) is not an axiom in the proper sense, as Büring (1996: 6) himself admits: A condition of such a complex structure, referring to several subconditions of different sorts is itself in need of an explanation. Even worse, (6) offers an observation which is paradoxical in a sense: It is hard to understand why an indefinite in the background should be c-commanded by the focus in order to receive an existential interpretation.

In the following, I will try to show how the conditions (1) and (6) may be derived from more general principles.

2.3 Split Tree = BF-Structure

In order to be able to derive the effects of (1) and (6), I will first have to define some terminology. This is necessary in order to be able to establish an adequate correlation between syntactic structure and background-focus structure (BF-structure). This, again, is necessary because the semantic interpretation of NPs depends on the BF-structure of the sentence. Assuming that semantic interpretation is compositional, the relation of NPs to BF-structure has to be visible in syntactic structure.

Many proposals have been made concerning the (referential) semantics of indefinite NPs. It is well known that indefinite NPs may have a generic reading and an existential reading. (In addition, other aspects have to be distinguished; there is also an (un)specific, a referential, and an attributive reading; for some discussion and exemplification, cf. von Heusinger 1997.) Many recent proposals refer to the distinction between a generic and an existential reading, as exemplified in (7):

7. a. weil ein Feuerwehrmann immer [v ׀ for t, beREIT] ist.
   because a fireman always is ready
   ‘because a fireman is always ready’

   b. weil immer [v ה for ein Feuerwehrmann beREIT] ist.
   because always a fireman is ready
   ‘because there is always a fireman ready’

Here, ein Feuerwehrmann has a generic interpretation in (7-a): The sentence states that it is a general property of every fireman (= any arbitrary fireman) to be ready. In (7-b), however, it is stated that at all times there will be some fireman ready, at least one fireman at each particular point in time. This is the so-called existential reading. (Normally, it is unspecific, i.e., we do not know
who the fireman is. If ein Feuerwehrmann has a specific reading, speaker or hearer: have to assume that the fireman is somehow identifiable, e.g., as Hans Feuer.) The distinction between a generic and an existential reading of an indefinite NP seems to correlate to some degree either with syntactic structure (split tree hypothesis; cf. Heim 1982 and Diesing 1990, amongst others) or with BF-structure (Kroka 1984, Eckardt 1996, Büring 1996, Yeom 1998). Common to most treatments, however, is the assumption that the semantic analysis in terms of a quantifier logic distinguishes between two domains (cf. Heim 1982 and von Heusinger 1997 for some discussion). A common assumption is that a sentence may be translated into a logical structure of the form given in (8):

(8) quantifier [restrictor: scope]

An equally common assumption is the so-called split tree hypothesis:

(9)  

\[ \text{SpecIP} \quad \text{I} \quad \text{VP} \quad \text{NP} \quad \text{Sadv} \quad \text{VP} \quad \text{NP} \quad \text{V} \]

(...weil) ein Feuerwehrmann, immer t_i bereit ist

\begin{align*}
\text{indefNP:} & \quad \text{generic (GEN)} \\
\text{existential(∃)} &
\end{align*}

If the indefinite NP ein Feuerwehrmann is moved out of its original base position (as VP-internal subject) to SpecIP, it receives a generic interpretation. If it stays within the VP, the indefinite NP has an existential reading. (For some more discussion and additional observations, cf. Eckardt 1996.)

In the following, I will assume a particular version of the split tree hypothesis such that a structural bi-partition of each sentence in German correlates with a specific understanding of background-focus structure. The referential interpretation of indefinite (and definite) NPs in my analysis will not be in terms of a quantificational logic as in (8), but in terms of a choice function approach along the lines of von Heusinger (1997). On this basis, generic and existential readings of indefinite NPs will then be explained.

I take it for granted that BF-structure is relevant for the proper semantic interpretation of a sentence, especially as far as the referential interpretation of NPs is concerned. Assuming the principle of compositionality of semantic interpretation, BF-structure should be visible in syntactic structure in some way or other. In German, I claim that we find a BF-bi-partition of every sentence: Constituents inside the VP (i.e., non-moved, VP-dominated constituents) are somehow focus-affiliated. The focus itself and all focus-affiliated constituents, even if they are not (part of) the focus in a narrow sense, belong to the F-part of the sentence. All other constituents (maybe except the topicalized constituent in SpecCP and the finite verb in C0) belong to the B-part of the sentence. The relevant BF-bi-partition is brought about by movement: A-movement of the subjects to SpecIP or scrambling (cf. Haider & Rosengren 1998 for some psycholinguistic evidence, cf. Clahsen & Feuster 1998; for different solutions in other languages, cf. Vikner (this volume) on object shift in Icelandic and Williams (1999) on English; cf. also Zubizarreta 1998 for Germanic and Romance; for some general discussion, cf. Abraham 1995, ch. 14). A functional explanation for the specific conditions in German may run as follows: The VP can be viewed as the syntactic realisation of a predicate. A predicate refers to a property (of an individual or of several individuals, e.g., a relation of these individuals). If the whole predicate is new information, all relevant constituents will ideally remain inside the VP; cf. there-sentences in English, es-sentences in German, etc. If an individual is known, the respective NP will be moved out of the VP if possible. Normally, this applies to the subject. So, we get the typical distinction “subject-predicate” by movement of the subject to SpecIP. In German, other NPs may also be moved out of the VP if they represent background information, in this case by scrambling. Thus, in German, BF-structure may be formally represented by a syntactic bi-partition in surface structure:
 Clearly, (10) does not cover the whole range of problems which are connected with the correlation between prosodic prominence, (syntactic) focus structure and information structure. For a recent approach in the framework of the minimalist program, cf. Zubizarreta (1998). It is impossible here to give a detailed justification of my view by comparing it with the many proposals in the literature. It may be useful, however, for a proper understanding of my specific proposal to compare it with some similar approaches, noticing the small but important differences. So, the terminological distinction into background and focus, as shown in the bottom line in (10), is somewhat vague in several respects: The term focus normally refers to prosodically prominent constituents which are either themselves new information (minimal focus) or part of the new information, in which case the focussed constituent serves as a focus exponent for a derived focus comprising additional constituents (F-projection or F-percolation; cf. Eckardt 1996; for the distinction between a conception of absolute focus or relative focus, cf. Höhle 1982, Jacobs 1984, 1991). Other elements within the VP which are not proper parts of the focus are generally not covered by this terminology (except, maybe, in Büring 1997, whose idea of background vs. focus is very similar to my distinction between B-part vs. F-part). So, in order to refer to both focus proper and focus affiliated constituents, I propose talking about the F-part of the sentence. The so-called background normally refers to old information, but the term background normally does not relate to prosodically prominent constituents belonging to old information. If both have to be addressed together, a new terminology is necessary: I call it the B-part of the sentence.

A distinction very similar to mine is in fact developed in Choi (1996) in some detail: Based on earlier work by Valldurvi (1992), Choi distinguishes between old (given) information (–NEW) and new (added) information (+NEW). In addition, she adds the finer distinction between prominent (+PROM) and non-prominent (–PROM) parts of old or new information. This gives a cross classification which allows for a number of necessary distinctions, e.g., rise-fall-intonation, etc. I basically agree with Choi’s analysis except for the fact that she distributes the features [± NEW, ± PROM] in a random way on the constituents of a sentence. Thus, a subsequent battery of ranked constraints in an OT approach has to filter out improper assignments of [± NEW, ± PROM] to particular constituents. I hope to show that there are rules for a proper assignment of constituents to the particular parts of the information structure such that no subsequent filtering mechanism will be needed.

Finally, I should add some remarks on the relation between a BF-structure and a split tree. Büring (1996) tries to show that a BF-analysis is superior to a split tree analysis on empirical grounds. In particular, he claims that there are sentences in German with a generic indefinite NP inside the VP. Büring’s example is (11). He claims that *einem Italiener* (‘a-DAT Italian’, 10) may receive a generic interpretation (as well as an existential one, to be sure). I doubt that (11-b) can have a generic interpretation, but let’s assume this for the sake of Büring’s argument.

(11) a. *Wen hast Du *einem Italiener* vorgestellt? who have you a-DAT Italian introduced?
   ‘Who did you introduce to an Italian?’
Büring assumes that the IO *einem Italiener* in (11-b) is in the VP rather than scrambled out of the VP. The possibility of a string-vacuous scrambling of the IO (as in: IO₁ [VP₁ t₁ DO₁]) should be ruled out, as Büring claims, because then it would be unclear why the IO in (12) cannot have a generic reading, i.e., why string-vacuous scrambling (as in DO₂ IO₁ [VP₁ t₁ t₂]) would not be allowed there:

(12) Ich habe [NP MARion₈] in einem Italiener tₓ vorgestellt.
    I have Marion a-DAT Italian introduced
    (IO = existential, not generic)

I must admit that I do not find Büring’s argumentation conclusive: As far as I can see, scrambling the focus-DO as in (12) should result in a deviant sentence; cf. (1-c) and (3-b). This follows naturally if we assume that scrambling may apply to background elements only, moving them to the B-part of the sentence. Thus, if (12) is not considered deviant, [DO₁] > [IO₁] should be base generated inside the VP. This may be possible for verbs taking an an-

(13) a. Wie hat Blondine bedient?
    whom has a blonde served

b. (Ich glaubte, daß) meinen BruDer [f] eine Blondine bedient hat.
    (I believe) that my brother a blonde served has

Here, if the sentence is judged correct at all, some sort of VP-internal DO₁ > SU sequence has to be assumed. Notice, however, that sentences like (13-b) should be deviant, assuming Lenerz’ (1977a: cf. 4; 1977b) condition of agenticity, which is relevant for DO > SU sequences. So, (12) and (13) do not provide counterevidence against string-vacuous scrambling. Accordingly, a sentence like (14) may indeed have a generic reading if we assume (even string-vacuous) scrambling of the IO *einem Italiener*, as indicated by the parenthesised Adverb *immer* (‘always’), which presumably marks the left VP-boundary:

(14) Ich würde einem Italiener (immer) [VP | MARion | f vorstellen]
    I would a-DAT Italian (always) introduce
    (IO = generic)
    ‘I would always introduce Marion to an Italian.’

Thus, I conclude that, contrary to Büring’s claim, a split tree analysis for a German sentence as in (10) may indeed properly represent a BF-bi-partition. So far, the main reason for assuming a BF-bi-partition, as represented in a split tree analysis, has not been made clear. As the top line in (13) states, the different readings of NPs in the B-part and the F-part, respectively, are due to a distinction between a (back)ground-determined vs. an immediate sentence context (isc)-dependent interpretation: The reference of elements in the background is b-determined: It is either given by the preceding linguistic context or by general knowledge. In contrast, the reference of elements in the F-par-, being newly introduced or somehow affiliated to newly introduced elements, has to be chosen in a context adequate manner, i.e., as isc-dependent reference. Take (15) as an example:

(15) Peter bought a book at a science fiction book store.

Without any particular context given, we may safely assume that the reference of Peter (being a proper name) is somehow b-determined. Assuming that the VP (bought a book at a science fiction book store) is the F-part of (15), the reference of a book is isc-dependent: In order to give the sentence a proper interpretation, we have to assume that a book refers to a book whose reference is determined by the immediate sentence context, i.e., a book which is available at a certain book store at the time in the past at which Peter bought it. So, a book cannot refer to the Book of Kells (which is not for sale), to the Bible or to Chomsky & Halle, The Sound Pattern of English (both are not available at science fiction book stores), nor to next year’s best selling fiction novel by John Irving (which cannot have been for sale in the past). Similar reasoning applies to an isc-dependent referential interpretation of the PP at a science fiction book store.

2.4 The Semantics of Definite and Indefinite NPs

Al. we need to complete the set of tools for my analysis is a proper way of distinguishing between the identification of the referents of definite and indefinite NPs, on the one hand, and the assertion expressed in the sentence, on the other hand. A semantics with choice functions, developed by von Heusinger
(1997, to appear), seems to be the appropriate tool to capture this distinction. It also allows us to capture the distinction between \(b\)-determined and \(isc\)-dependent reference. The basic idea of this semantics is that indefinite and definite NPs are not quantifier phrases, but terms that pick out one of the elements that are described by the descriptive material of the phrase. Thus the referent of a book in (15) is chosen out of the set of books. This basic idea is reconstructed by the so-called epsilon-operator, which was introduced into mathematics by Hilbert & Bernays (1977) in order to replace the existential and universal quantifiers. The epsilon-operator takes a predicate as its argument and yields a term. The most natural interpretation of the epsilon operator is a choice function that arbitrarily assigns to each set one of its elements. Thus we can represent sentence (16) as (16-a), where the indefinite NP is represented by the epsilon term "\(\varepsilon x Mx\). The predicate \(S\) (\(snores\)) applies to an individual \(x\) which is chosen by the choice function \(\phi\) from the set of individuals which have the property of being men (Mx); "S" is the predicate, "\(\varepsilon x Mx\)" is an individual, "M" is the attribute defining the set of individuals "Mx". The epsilon term is interpreted by the choice function \(\phi\) applied to the extension of the predicate man, i.e., as the operation of assigning one element to the set of men. In other words, the indefinite NP refers to a particular man, even though we may not determine which one. The sentence is true if this man is in the extension of the predicate \(snores\), as in (16-b).

(16) A man snores

a. \(S(\varepsilon x Mx)\)

b. \(\|S(\varepsilon x Mx)\| = 1 \iff \phi(\|\varepsilon x \text{man}(x)\|) \in \|\text{snores}\|\)

Since the choice of the particular man is arbitrary given the definition of the choice function so far, the sentence is true if any (arbitrarily chosen) man snores, which corresponds to the generic character of the sentence.

However, in order to analyse non-generic sentences, von Heusinger (1997) introduces indexed epsilon-operators that are interpreted by different choice functions. This makes it possible to choose the reference of an NP in a context-adequate manner, i.e., in my words as \(isc\)-dependent. Thus the representation for the indefinite NP a man in (17) is the indexed epsilon term "\(\varepsilon i Mx\)" with the free index or parameter \(i\) for the choice of a choice function. Thus (17) is true if there is a choice function \(\phi\) such that the object assigned to the set of men (i.e., a particular man) is in the extension of the predicate is snoring, as in (17-b):

(17) (What's that noise?) A man is snoring.
2.5 Indefinite NPs in the B-Part: Generic Interpretation

I will now try to show how the puzzling aspects of word order variation in German can be explained. In order to do so, I will first derive the generic and existential reading of indefinite NPs. This will then be applied to explain the constraints in (1).

Let us first turn to a derivation of the generic vs. existential reading of indefinite NPs, as exemplified in (7), repeated here for convenience:

(7) a. weil ein Feuerwehrmann immer |vp t beREIT ] ist.
   because a fireman. always ready is
   'because a fireman is always ready' generic reading

   b. weil immer |vp ein Feuerwehrmann beREIT ] ist.
   because always a fireman. ready is
   'because there is always a fireman ready' existential reading

Both readings will be derived as pragmatically induced interpretations of a vague referential semantics. (For similar approaches in other areas of semantics, cf. the concept of conventional implicature (Grice 1975) and, more precisely, the concept of conceptual shift (Bierwisch 1983).) In (7-a), the NP *ein Feuerwehrmann* ('a fireman') is in SpecIP hence not VP-dominated, i.e., in the B-part of the sentence. Thus, its reference should be *b-determined*, i.e., given (i) by preceding context, or (ii) by deixis, or (iii) by common knowledge; cf. (19). Neither is obviously the case since *ein Feuerwehrmann* is indefinite, hence it does not refer to a given or known individual. This is the point where the pure semantic interpretation stops without providing a proper result. Assuming the principle of co-operation (Grice 1975), however, pragmatic inference may help us, possibly in terms of a conventional implicature along the following lines: There is no given or known individual to which *ein Feuerwehrmann* refers. However, the set of firemen is in the background knowledge, as is indeed the knowledge about every predicate! So, the indefinite NP *ein Feuerwehrmann* may choose any (arbitrary) individual from that set, and this is indeed the generic reading! Note especially that the choice function is not *isc-dependent*. Hence, the generic reading of an indefinite NP in the singular is nothing but an unspecified reading which is not *isc-dependent*. In terms of a choice functional approach, *ein Feuerwehrmann* in the B-part of a sentence is represented as "exFx". The fact that the choice function ε is not context specific (i.e., not ε; x) is due to the NP being in the B-part and the resulting pragmatic inference. (Similar derivations of other realizations of generic NPs (bare plurals, definite generic NPs) may be worked out.)

The existential reading of an indefinite NP can be derived in a similar way: *Eins Feuerwehrmann* in (7-b) is in the F-part of the sentence. Hence, it should be interpreted in an *isc-dependent* manner. In terms of a choice function approach this means that the choice function choosing an individual from the set of firemen has to be a context adequate choice function.

(20) ∃ xFε; xFx

(20) is to be understood as has been exemplified for (17) above: There is a context i in which a particular context-adequate choice function ε; applies, choosing an individual from the set of firemen.2 (19) then states that this fireman has the property of being ready. Thus, the existential reading of the indefinite NP *ein Feuerwehrmann* can be derived from its being in the F-part of the sentence, hence *isc-dependent* in its interpretation. The existential reading is thus explained as the result of a pragmatically induced and contextually restricted application of the choice function.

2.6 Don’t Scramble Existential Indefinites!

I have shown above how a generic reading of an indefinite NP in the B-part of a sentence may be derived. This result can now also be applied to the scrambled NP in sentences like (4-b,c) and the corresponding constraint (1-d): “Don’t scramble (existential) indefinites!” By scrambling, an NP is moved to the B-part of the sentence. An indefinite NP in the B-part is inevitably interpreted as generic, not as existential. Hence, the corresponding sentences (4-b,c) are semantically cevent since it does not make any sense to state that somebody gave a generic book to a specific student at a specific time (cf. Büring .996). A similar effect may possibly be achieved in English (even without scrambling) by lexically enforcing a generic reading (any old book) and putting the focus on the other object (*PEeter*):

(21) a. I gave a book to *P*Eter.


There is additional evidence in German that the scrambling constraint (1-d) is structure dependent. In other words: The generic reading responsible for
must be dominated by (every segment of) VP, i.e., the NP must be in the F-part! Being in the F-part results in an *isc-dependent* interpretation, hence in an unspecified existential reading, as shown above.

Things are different for (22-b), as (22-b') shows:

(22b')

Here, the indefinite NP *ein Buch* has been scrambled from its base position (IO > DO) into the B-part of the sentence, where it inevitably receives a *b-determined* sense, hence generic interpretation. The sentence is as odd as the examples (4-b,c) above, again because of semantic deviance.

So far, the constraint (1-d) and the so-called Existential Axiom (6) have been derived in my analysis. Still, there remains the obvious paradox in (6): Why should an NP “in the background” be in the F-part of a sentence? It can be shown, I believe, that the assumption that the existential indefinite NP in the crucial examples is “in the background” is wrong.

2.7 Existential Indefinites in the F-Part

The assumption that an existential indefinite NP is in the F-part of a sentence is crucial for my analysis. Hence, in order to be able to resolve the apparent paradox in the so-called Existential Axiom in (6), I will have to show that the existential NP is not in the background, as insinuated by the preceding question context in (2-a) and (4-a). Let us first look at some examples in a different context in which the preceding sentence (23-a) is not a question:

(23a) Peter hat s.ch *ein Buch* gekauft.
Peter has himself a book bought
'Peter bought himself a book.'

b. Nein, MAX hat *ein Buch*_{a/j} / *einz*_{a/j} [\(\emptyset\)] gekauft.
   "No, Max bought himself a book / one bought"

c. Fritz hat sich AUCH *ein Buch*_{a/j} / *einz*_{a/j} [\(\emptyset\)] gekauft.
   Fritz has himself also a book / one bought
   "Fritz bought himself a book / one, too."

As the referential index \(i\) in (23-a) shows, a (specific or unspecific) reference is determined as *isc-dependent*. A following sentence in which this reference is taken as *b-determined* would have to refer to this book by the definite NP *das Buch* ("the book") or by a pronoun *es* ("it."). In (23-b), however, the book which *Max*_{a} bought *himself*_{a} is not necessarily the same book which *Peter*_{a} bought *himself*_{a}. In a strict physical sense it even has to be a different book since, normally, the same copy cannot be sold twice. But even if we think about a book in more abstract terms as referring to any copy of a certain book identifiable by author and title, the book that Max bought in (23-b) is *not necessarily* the same one as the one Peter bought in the preceding sentence (23-a). The indices in (23) do not cover this situation correctly. A more precise version should use different choice functions: Thus, if we replace the index \(i\) by its choice function \(i\), for the context \(i\) in (23-b), we get the correct result: The *isc-dependent* choice function for the context \(j\) in (23-b) cannot be the same one as in the preceding context \(i\); hence, the reference of *a book* in (23-b) is chosen by the context adequate choice function \(i\). To be sure, this choice function may by chance pick the same book in its physical or non-physical sense, but the relevant point is that its choice is *independent* of the preceding choice of \(i\), thus not *b-determined*. (A similar argument holds for (23-c).) Thus, the reference of the NP *ein Buch* is not necessarily in the background of the following context. If anything is in the background, then it is the *property* of the NP *ein Buch*, namely that Peter was involved in some kind of book-buying. This shows that the distinction between a referential part and a non-referential (attributive or descriptive) part of the meaning of NPs is relevant for a discourse adequate semantic interpretation. This difference is in some way expressed in the choice function approach (\(i_{x,a} x\)), where "\(i_{x,a}\)" may be seen as a representation of the referential part, and "\(Bx\)" as a representation of the attributive or descriptive part of the NP meaning. (More precise ways of representation will have to be worked out.)

This assumption is also supported by the fact that the repetition of the whole NP *ein Buch* in the sentences following (23-a) does not sound normal. In normal subsequent context, the "bare determiner" *eins* ("one") will be used, deleting the noun *Buch*. This again indicates clearly that the attributive part of the NP (Buch) is *b-determined* and may hence be deleted. The referential part *eins*, however, has to be uttered since it establishes an *isc-dependent* reference independent of the preceding context. Notice, especially, that the use of a *b-determined* pronoun *es* ("it") is not possible; cf. (24):

(24) a. Peter hat sich *ein Buch*_{a} gekauft.
   Peter has himself a book bought

b. *Nein, MAX hat *es*_{a} sich gekauft.
   no, Max has it himself bought

c. *Fritz hat *es*_{a} sich AUCH gekauft.
   Fritz has it himself also bought

Correct sentences corresponding to what the intended meaning of (24-b,c) is would have to state explicitly that the same referential choice is intended:

(24)' b'. Nein, MAX hat sich *dieses Buch*_{a} gekauft.
   no, Max has this book bought

c'. Fritz hat sich *dasselbe (Buch)* AUCH gekauft.
   Fritz has this the same (book) also bought

If we apply this argument to the crucial question-answer examples in (2)-(4), we get a similar result: The answers containing the full NP *ein Buch* are unnatural parrot-like answers. In natural dialogue, a previously mentioned NP has to be replaced by a pro-form. If its reference is *b-determined*, the personal pronoun is used, as in (25):

(25) Was hast du *dein Studenten* gegeben?
   "What did you give to the student?"
   Ich habe *ihn* ein BUCH gegeben.
   I have him a book given
   'I gave him a book.'

If the reference of the NP in the answer is not *b-determined* but *isc-dependent*, then, instead of a pronoun (26-a), the bare indefinite determiner is used (26-b):

(26) a. Peter hat sich *eine Buch* gekauft.
   Peter has himself a book bought

b. *Nein, MAX hat *ein* gekauft.
   no, Max has an bought

c. *Fritz hat *ein* sich AUCH gekauft.
   Fritz has it an also bought
(26)  Wem hast du ein Buch gegeben?
   "Whom did you give a book?"

a  ??Ich habe es dem StudENten gegeben.
   I have it the student given
   'I gave it to the student,' b-determined

b  Ich habe dem StudENTen 
    \[N \notin 0\] gegeben.
   I have the student one given
   'I gave one to the student.' isc-dependent

This shows, too, that the indefinite (singular) NP \textit{ein Buch} ('a book') in the
answer (26-b) is not "in the background" (although it was mentioned before in
the question); rather, it is in the F-part of (26-b), and thus it cannot be
referentially \textit{b-determined}. Rather, it has to refer in an \textit{isc-dependent}
maner. So, its reference is chosen \textit{isc-dependently}; only its attributive part is
\textit{b-determined} (as is, indeed, every attributive part of any NP).

This resolves the apparent paradox in the description of the distribution of
existential indefinite NPs.

To conclude, indefinite NPs receive a generic reading if they appear in the
B-part of a sentence. In the F-part of a sentence, indefinite NPs are interpreted in
an \textit{isc-dependent} manner. This usually gives us an unspecific existential
reading. (There may, however, be certain contexts with a generic predicate, in
which an indefinite NP in the F-part may also receive a generic interpretation.
I will not discuss this here. I will also not discuss the distinction between a
non-specific and a specific interpretation of indefinite NPs.)

2.8 Problems with the "Unmarked Order"

This leaves as with the cases in which each order of IO and DO is acceptable
(2-a,b). If DO is a definite NP and IO carries focus, DO may remain in situ
(\[\pm \text{def IO}\] \[\pm \text{def DO}\], unmarked order) or scramble (\[\pm \text{+ def DO}\] \[\pm \text{def IO}\]). The scrambling of a non-focus DO to the background part of
the sentence does not present a problem. There is, however, the problem of
interpreting the non-scrambled definite DO in situ, i.e., in the F-part. A similar
problem arises, of course, for Diesing's (1990) analysis, as Chci (1996:
120f.) notices. In the original split tree analysis, the definite NP, being inside
the VP, should be bound by the unselective existential quantifier which
contradicts its definite reference. Instead of discussing Diesing's and Chci's
proposals, I will present my own analysis, which is based on the principles
stated and applied above.

According to my analysis, a definite NP in the B-part should be \textit{b-determined} in reference, whereas a definite NP in the F-part should be \textit{isc-dependent} in reference. Thus, there should be a difference in meaning between (2-a) and (2-b), repeated here for convenience:

(2)  Wem hast du das Buch gegeben?
   'Whom did you give the book?'

a  Ich habe dem StudENTen \[f \text{ das Buch } \ast \text{ es gegeben.}
   I have the-DAT student the book it given
   (isc-dependent)

b  Ich habe das Buch \[f \text{ es dem StudENTen } \]
   I have the book it the-DAT student given
   (b-determined)

Such a difference in meaning is, however, hard to establish. I assume that the
difference does not reside in the final \textit{meaning} of both sentences, but rather
in the way their interpretation is brought about.

Let me start with the more natural case (2-b). Here, the information of the
F-part (\textit{dem Studenten gegeben}) is added to the B-part (\textit{ich habe das Buch} ...).
The NP \textit{das Buch} belongs to the B-part and its reference is established in a
\textit{b-determined} manner, i.e., as the most salient individual of the set of books
in the given context; cf. (18) and (19). The explicit repetition of the whole
NP \textit{das Buch} is, in fact, unnatural and would, of course, require additional
pragmatic reasoning. The most natural explicit answer replaces the NP with
a personal pronoun; cf. (2-b'). (I will disregard elliptic answers like "\textit{dem
Studenten}" for obvious reasons; they don't allow any insight into word order
relations.)

(2b') Ich habe es dem Studenten gegeben.
   I have it the-DAT student given

Sc., (2-b) or (2-b') do not present a problem to my analysis. This is, of course,different for (2-a). My proposal will have to proceed as follows.

In (2-a), the information of the F-part (\textit{dem Studenten das Buch gegeben})
is added to the B-part (\textit{ich habe}); the NP \textit{das Buch} here belongs to the F-
part and its reference is established in an \textit{isc-dependent} manner, i.e., as a
specific, aforementioned book whose reference has to be determined appro-
priately with respect to the immediate sentence context. This, of course, will
result in fixing the reference of the NP \textit{das Buch} as referring to exactly the
same individual as in the question (2), or in the related answer (2-b). (2-a)
only achieves this in a more indirect way. Notice, too, that a replacement of the NP with a personal pronoun in the F-part is not possible; cf. (2a'):

(2a') *Ich habe dem Studenten es gegeben.
         I have the-DAT student it given.

Admittedly, more research into the semantics of definite NPs, especially if they appear in the F-part, is necessary. Notice, however, that my proposal presupposes for definite NPs a distinction similar to the one required above for indefinite NPs: The interpretation of each NP is a combination of a referential part and a non-referential (attributive or descriptive) part. For the present case of definite NPs this means that the attributive part is always treated as given or known. If the definite NP is in the B-part of a sentence, then its referential part is b-determined and, by being definite, the NP chooses the most salient given/know individual of the set defined by the attributive part. If the definite NP is in the F-part of a sentence, its attributive part is b-determined (as is true for all attributes). It is only its referential part which is to be interpreted in an iae-dependent manner. Being definite, however, the appropriate context adequate choice function chooses a specific, salient giver/know individual.

My proposal thus describes two different ways of achieving the same meaning for both sentences (2-a) and (2-b). The details of a precise formal analysis will, however, still have to be worked out.

3 Conclusion

To conclude, I hope to have presented the outlines of a proper analysis for the interpretation of definite and indefinite NPs in various word orders in German. The specific interpretation is different for each possible word order, and the constraints banning certain distributions of focussed and/or indefinite NPs ((1-c,d), (6)) have thus found an explanation: The corresponding deviant sentences do not in general receive a proper semantic interpretation.

As I said, the present paper sketched only the outlines of a proper analysis. Independent evidence for the relevance of the distinction between referential and attributive parts of the meaning of NPs is, of course, required (for a short exemplification, cf. the appendix (4.-) and should receive a detailed analysis. Also, a proper formal analysis of the required distinction is still missing. In particular, a proper and detailed formal analysis of all the possible readings of definite and indefinite NPs in all relevant distributions will have to be worked out, describing in a precise way the co-operation of the different modules and their respective principles such that a true account of the interaction of syntax, prosodic structure, semantics and (discourse) pragmatics (3F-structure) can be achieved. Even if this has not been fully accomplished in the present paper, my analysis has shown that sentences with different word orders are indeed different sentences, each with a different meaning, even if they show the same lexical material ("numeration") and the same argument structure. So, in the ideal case, the candidate set (numeration + meaning) for each sentence will in fact be reduced to cardinality [1], leaving no room for a computational model. This seems to be true at least for the cases discussed. Other constraints may still exist which are not amenable to a similar approach. This may hold at least for those cases in which the factors I mentioned are not involved. The well-known case of growing length of constituents as discussed by Hawkins (1983) and Pramus (1993, 1994), amongst others, comes to mind.

Thus, my analysis has not proven that competition models are inadequate altogether. Rather, I hope to have shown that it is worthwhile to investigate the apparently competing conditions in detail and try to derive them from more basic principles before applying them in a competition model. There seems to be more co-operation than one might think at first sight.

4 Appendix

In the following appendix, I will present some independent evidence for the distinction between a referential and a non-referential/attributive part of the semantics of NP. In particular, I will show that such a distinction is reflected in syntactic behaviour.

4.1 Evidence from Prepositions

In most grammars, some forms of prepositions in German are described as amalgamations of a preposition with a following definite article; so zum is analysed as zu+dem ('to the'), ins is in+das ('into :he'), etc. The matter is complex and not well understood in its phonological, morphological, syntactic and semantic aspects. The analysis as "preposition + definite article" is, however, doubtful, as the following example shows (cf. Siebert 1999: 125):

(27) Peter geht zum Arzt, *| der ihm empfohlen wurde |.
Peter goes to (the) doctor who to-him recommended was
"Peter goes to the doctor *| who was recommended to him |."
Clearly, the noun Arzt (‘doctor’) does not refer; so, maybe the special form of the preposition (zu) is only a merger of a preposition with a dative case ending (zu + m), lacking the referential part of the determiner and relating only to the attributive meaning of the noun.

4.2 Evidence from Predicate Nouns

A similar point can be made for predicate nouns. They, too, do not seem to refer, but to consist only of an attributive reading:

(28) a. Peter wird (*der/ein) Lehrer, und Max will *er/es auch
    Peter becomes (*the/?a) teacher, and Max wants *him/it also
    werden.
    become

b. Peter wird (*der/ein) Lehrer, und Max will auch einer [N∅]
    Peter becomes (*the/?a) teacher, and Max wants also one
    werden.
    become

‘Peter will become a teacher, and Max also wants to become one.’

4.3 Evidence from Idioms

A similar distinction must be made for non-referential NPs in idioms: The idiomatic reading is only obtained if the NP stays in its VP-internal position:

    Peter has a-DAT woman the court made
    ‘Peter courted a woman.’ [idiomatic reading]

b. ??Peter hat den Hof einer FRAU gemacht.
    Peter has the court a-DAT woman made

‘Peter made the court to a woman.’ [no idiomatic reading]

In my analysis, the idiomatic interpretation in which the NP is non-referential is only possible if it is interpreted in an isc-dependent manner. Scrambling, as in (29-b), forces a b-determined reading, i.e., a referential reading of the NP, leaving no possibility for the idiomatic meaning. Other examples of non-referential idioms are given in (30):

(30) non-referential NPs in idioms:

a. jemandem den Marsch blasen
   sb. (dat.) the march blow
   = to give sb. a ticking-off

b. jemandem die Schau stehlen
   sb. (dat.) the show steal
   = to steal the show from sb.

c. jemandem die Tür weisen
   sb. (dat.) the door show
   = to turn sb. out.

Similarly, there are coined phrases which may or may not be read in an idiomatic way:

(31) (nor-)referential NPs (in idioms):

a. jemandem die Quittung (für etwas) geben
   sb. (dat.) the receipt (for sth.) give
   = to make sb. pay (for sth.)

b. jemandem die rote Karte zeigen
   sb. (dat.) the red card show
   = (in soccer): to give sb. a ticket / a (final) warning

c. jemandem nicht das Wasser reichen (können)
   sb. (dat.) not the water give (can)
   = to be inferior to sb.

d. jemandem die Luft abdrehen
   sb. (dat.) the air throttle
   = to make sb. shut up / to kill sb.

Predictably, the idiomatic reading is again only obtained with the NP in situ (32-a), whereas the scrambled NP in (32-b) only allows a non-idiomatic, i.e., referential interpretation:

(32) a. Der Schiedsrichter hat einem SPIELER die rote Karte gezeigt.
    the referee has a-DAT player the red card shown
    [idiomatic reading preferred]

b. Der Schiedsrichter hat die rote Karte einem SPIELER gezeigt.
    the referee has the red card a-DAT player shown
    [referential, non-idiomatic reading only]
4.4 Evidence from Syntax

Further: evidence for a distinction between a referential and a non-referential/attributive part of NPs may also come from syntax. Split topicalisation as in (33) and was für-split as in (34) may under some closer investigation turn out to apply to only one semantic part of the NP.

(33) Volvos_{j} haben mich ja [VP [NP viele t_{j}] überholt].
    Volvos have me yes many overtaken
    (As for) Volvos, many overtook me.

(34) Was_{i} haben dich denn [VP [NP t_{i} für Leute] angesprochen]?
    what have you-ACC then for people addressed
    'What kind of people addressed you, then?'

As has been noted before (cf. Müller & Sternefeld 1995), the source of the movement must be VP internal. Both movements may not apply after scrambling (cf. also Lenerz 1994: 163):

(33') *Volvos_{j} haben mich [NP viele t_{j}] in ja [VP t_{m} überholt].
    Volvos have me many yes overtaken

(34') *Was_{i} haben dich [NP t_{i} für Leute] denn [VP t_{k} angesprochen]?
    what have you-ACC for people then addressed

This, again, indicates a difference in referential capacity which may be reconstructed in terms of the distinction between b-determined and isc-dependent reference.

Notes

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1. In particular, (17-a) is not a covered-up version of a quantifier approach. As von Heusinger (1997: 98ff.) points out himself, the formula (17-a) is only a shorthand version of a more precise logical expression without any quantifier whatsoever:

   \( \exists \exists_1 [e_1 (\lambda M x)] \equiv S(e_1, \exists_1, \lambda M x) \lambda M x) \)

   As (i) shows, the quantification over contexts \( \exists \exists_1 \) in (17-a) can be replaced by a precise choice function "(Zeta)" ranging over contexts \( (\xi_1) \).

2. This is even clearer in the equivalent expression referred to in fn. 1:

\( \xi \) is a choice function which chooses a context \( i \). This context \( i \) is characterised by the properties in the brackets \( [B(e_1, x, F x)] \). It is a context in which a particular choice function \( e_1 \) applies, choosing an individual \( x \) from the set of firemen \( F x \) who are ready (B). The choice function \( e_{1, i} \) is thus the context adequate choice function choosing an appropriate fireman in that context.

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