ON "XP" IN HEAVY XP SHIFT*

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1. Introduction

In this paper, I examine the properties of "XP" that appears at the right-edge of a sentence mainly in German. My central claim is that the interaction of general prosodic and syntactic properties (such as weight and verb-finality) of a language determines what constitutes legitimate "XPs" in the language. I further argue that the interaction of different types of conditions is not random, but rather is governed by processing efficiency.

2. Post-verbal XPs in German

Although German is canonically verb-final (V-final), an argument (XP) may appear post-verbally at the right-edge of a sentence. The alleged generalization is that German exhibits the categorical restriction on the XP: finite clauses (CPs) must appear post-verbally as is shown in (1), whereas noun phrases (NPs) must appear pre-verbally in the canonical position as is shown in (2) (and IPs and PPs may appear in either position, as we will see in 3.3.1).

(1)   XP=CP

    a. *Er hatte [CP dass er nicht longe leben würde] gewusst.

        he had   that he not   long live   would   known

        'He had known that he would not live long'

    b. Er hatte _ gewusst, [CP dass er nicht longe leben wurde].

                                        (Hawkins 1986:145)

(2)   XP=NP

    a. Er hatte [NP die Tatsache dass er nicht longe leben würde]

        He had   the fact   that he not long live   would

        gewusst.

        known

        'He had known the fact that he would not live long'

    b. *Er hatte _ gewusst [NP die Tatsache dass er nicht longe leben würde].

However, NPs are not totally prohibited in the sentence-final position, and certain NPs such as lists do appear post-verbally as is shown in (3):

(3)　　XP＝NP

　　　a.　An der Haltestelle Lothringer Strasse sind eben eingestiegen in die 4 [NP vier Leute, zwei ältliche Frauen, ein bekümmerter einfacher Mann and ein Junge mit einer Mütze und Ohrenklappe].

　　　　'At the stop *Lothringer Street*, four people entered the tram on Line 4: two elderly women, a worried simple man, and a boy with a cap and ear muffs.'

　　　　　　　(Alfred Döblin, *Berlin Alexanderplatz* p. 42, as cited in Bury 2003:194)

　　　b.　Am 25. September verschied plötzlich an einem Herzschlag [NP mein inniggeliebter Mann, unser lieber Vater, Sohn, Bruder, Schwager und Onkel Max Rust im noch nicht vollendeten Alter von 55 Jahren].

　　　　'On September 25, passed away suddenly with a heart attack at less than 55 years of age, Max Rust, my beloved husband, our dear father, son, brother, brother-in-law, and uncle.' (ibid.)

Free relatives, whatever their category is, may also appear in sentence-final position.

(4)　　XP＝free relative

　　　Der　Hans　hat _　zurückgegeben　[XP　was　er　gestohlen　hat].

　　　the　Hans　has　returned　　　　　　what　he　yesterday　has

　　　'Hans has returned what he has stolen'　　(Groos and van Riemsdijk 1981:185)

Thus, the observation so far is that in German, CPs must appear post-verbally, some NPs such as lists and free relatives may appear post-verbally, and other NPs may not appear post-verbally.

3．An Analysis

3.1. A Prosodic Condition

A common property of XPs that may appear post-verbally, i.e. CPs, list NPs, and free relatives, is that they constitute their own Intonational Phrases (IntPs)[1]. A clause in general corresponds to an IntP in German (Truckenbrodt 1995), as in other Germanic languages such as English (Chomsky and Halle 1968, Nespor and Vogel 1986) and Dutch (Hirst and Di Cristo 1998), and lists are also known to constitute IntPs on their own (Nespor and Vogel 1986). Free relatives are in fact clauses (CPs/S's) under some analyses (Groos and van Riemsdijk 1981, Grosu 1996).

In the literature, the order in (1b), (3) and (4) is sometimes referred to as the shifted order derived via "heavy XP shift." The shifted XPs in (1b), (3) and (4) can be regarded

as prosodically "heavy" in the sense that they form their own IntPs.   Given this, I postulate the prosodic condition in (5):

(5)   Prosodic Condition on German XP-shift

XP must form an Intonational Phrase on its own.

This may be an instance of the general prosodic weight effect, which is independently observed in English heavy NP shift (Zec and Inkelas 1990, Zubizarreta 1998, Shiobara 2000, 2001, 2004).   For example, in (6a) the NP is not heavy enough to be shifted and hence the sentence results in degraded acceptability.   In contrast, in (6b) and (6c), the sentence-final NP constructs its own IntP and hence prosodically heavy: in (6b), the NP is a list, and in (6c), the NP carries extra prosodic prominence, e.g. heavy stress.

(6)   NP-shift in English

a.   ??/*Ken ate _ in five minutes [NP ten California rolls].

b.   Ken ate _ in five minutes, [NP two Alaska rolls, five B.C. rolls, and ten California rolls].

c.   Ken ate _ in five minutes, [NP TEN CALIFORNIA rolls].

I will come back to English XP-shift in 3.2.

3.2. Syntactic Conditions

While the prosodic condition in (5) captures the well-formedness of (1b), (3), and (4), it does not explain the ill-formedness of (1a) and (2b).   I argue that these examples are ruled out by syntactic conditions.   Firstly, the syntactic condition (7), which requires a CP to appear post-verbally in German, rules out (1a):

(7)   Syntactic Condition on German XP-shift

When XP=CP, XP-shift is obligatory.

One might ask why there is such a syntactic condition at all.   My guess is the following: because CPs in German are IntPs by default and hence always prosodically "heavy", the syntactic condition in (7) can be regarded as an instance of grammaticalization of the prosodic weight effect in German XP-shift.   (I will come back to this in 3.3.1.)

Secondly, I argue that (2b) is blocked by an alternative XP-shift, so called "extraposition from NP," which shifts only the CP modifier and leaves the head N in situ, as in (8) below:

(8)   Er hatte [NP die Tatsache _] gewusst, [CP dass er nicht longe leben würde].

The sentence in (8) has a CP in the post-verbal position, and is as acceptable as (1b), (3), and (4), satisfying the prosodic condition in (5).   Given the contrast in acceptability between (2b) and (8), I argue that the V-finality of German chooses extraposition over NP-

shift when possible, because only the former maintains the NP-V order.

(9)   V-finality in German[2]

German VP is head-final.

Therefore, an NP, even when it has its own intonation contour and gets prosodically heavy, cannot be shifted as long as it contains a CP.   In such a case, only the embedded CP (and not the whole NP) may be shifted.   In other words, CP-shift, or more precisely, extraposition of CP from NP, wins over NP-shift in German.

The effects of the prosodic condition in (5) and the syntactic conditions in (7) and (9) I have just proposed are observed not only in German.   Rather, some observations on English XP-shift seem to support them.   First, a shifted XP forms its own IntP in English as well as we saw in (6).   Secondly, a clause appears at the right-edge, following other internal argument(s) (e.g. NPs) as is seen in (10a) and (10b).   Thirdly, NP-shift is observed in English more often than in German (Hawkins 1986, 1994, Bury 2003), presumably because English is V-initial, to which the choice between NP-shift and extraposition is irrelevant (Shiobara 2004).   For example, extraposition of CP from NP in (10c) is not much better than NP-shift in (10b) in English.

(10)   a.   I asked [NP the man who worked in the library] [IP to go].

         b.   *I asked _ [IP to go](,) [NP the man who worked in the library].

         c.   ??/*I asked [NP the man _] [IP to go] [CP who worked in the library].

Next, I will examine *how* the prosodic and syntactic conditions interact to determine which XP is legitimate in German XP-shift.

3.3. Interaction of Prosodic and Syntactic Conditions

3.3.1. The Weight Effect in XP-shift

In 3.1, I introduced the prosodic condition on German XP-shift in (5) and in 3.2, I introduced the syntactic condition on German XP-shift in (7).   Both are repeated below for ease of reference.

(5)   Prosodic Condition on German XP-shift

XP must form an Intonational Phrase on its own.

(7)   Syntactic Condition on German XP-shift

When XP=CP, XP-shift is obligatory.

Although the condition in (5) is stated in prosodic terms and the condition in (7) is stated in syntactic terms, I argue that both are grounded in the same and general weight effect (following the spirit of Hawkins 1994).   The difference is that the prosodic condition is the most relevant to prosodically "light" XPs and captures the gradient weight effect, whereas

the syntactic condition is the most relevant to prosodically "heavy" XPs and captures the categorical weight effect.   Look at the table below:

(11)　　　The categorical and gradient weight effects in German

XP=	heavy　←　　　　　　→　light		
	CP	IP, PP	NP
XP-shift	obligatory (=(7))	optional　←　→　limited (see (5))	

(Note: the shaded area indicates that the weight effect is gradient.)

Since CPs are Intonational Phrases (IntPs) by default in German (see 3.1) and hence always prosodically heavy, the prosodic heaviness of CPs is considered as categorized and CPs are obligatorily shifted into the post-verbal position.   The syntactic condition in (7) captures this effect.   On the other hand, whether an NP constructs an IntP or not depends on its content, and an NP can be shifted only if it becomes prosodically heavy, as in cases, for example, when it contains a list, a large number of words, or heavy stress (see (6)). The prosodic condition in (5) captures this effect.   Note that the prosodic condition in (5) is always satisfied by CPs, and the syntactic condition in (7) does not apply to NPs.

　The interesting case is when XPs are IPs or PPs.   Syntactically (or categorically), IPs and PPs are regarded as less heavy than CPs in that they do not have a CP layer or a clausal layer, respectively; and heavier than NPs in that they generally embedded an NP or NPs.   The observation is that IP-shift and PP-shift are optional in German:

(12)　　　XP=IP

　　　a.　Er　hatte　[IP die　Frau　　zu　gewinnen]　gehofft.

　　　　　he　had　　　the　woman　to　win　　　　hoped

　　　　　'He had hoped to win the woman'

　　　b.　Er hatte _ gehofft, [IP die Frau zu gewinnen].　　　(Hawkins 1986:145)

(13)　　　XP=PP

　　　a.　Ich　erzähle　dir　gleich,　　　was　Ich　[PP bei　Müllers]　gehört

　　　　　I　　tell　　　you　right-away　what　I　　　　at　Mullers　heard

　　　　　habe.

　　　　　have

　　　　　'I tell you right away what I have heard at the Mullers'

　　　b.　Ich erzähle dir gleich, was Ich _ gehört habe [PP bei Müllers].　(ibid:148)

The optionality of IP-, PP-, and NP-shift is attributable to the gradient nature of

"prosodic" weight (e.g. phonetic realization of prominence, Ladd 1986:329), which in turn affects intonational phrasing. This contrasts with the obligatoriness of CP-shift.

3.3.2. Blocking and Competition among Conditions

Next, let us consider how the V-finality relates to the prosodic and syntactic conditions on XP-shift in German. First, the observation was that CP-shift obligatorily happens despite the fact it leads to a violation of V-finality. Therefore, the syntactic condition in (7) wins over the V-finality in German:

(14)　Competition between (7) and (9)

> (7) obligatory CP-shift ＞ (9) V-finality

Likewise, NPs may also appear post-verbally as long as they are prosodically heavy. This suggests that prosodic heaviness overrides the V-finality in German.

(15)　Competition between (5) and (9)

> (5) The prosodic weight effect ＞ (9) V-finality

So far, in the generalizations in (14) and (15), the V-finality exhibits no effect. Remember that the V-finality provides an explanation for the case where NP-shift is blocked by extraposition of CP from NP (see (8)). This is formalized as a blocking effect in the following way:

(16)　Blocking of one syntactic operation by another:

　　　NP-shift cannot happen when extraposition of CP from NP is possible.

This blocking effect is derived from the fact that extraposition of CP from NP does not violate any conditions whereas NP-shift violates the V-finality.

(17)　Syntactic operations and relevant conditions

Conditions / Syntactic operations	(5) Prosodic Condition on XP-shift	(7) Syntactic Condition on XP-shift	(9) V-finality
Extraposition of CP from NP	✓	✓	✓
NP-shift	✓	n.a.	*

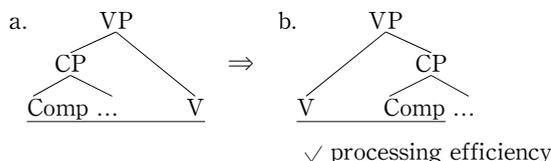(Note: the shaded area indicates that the conditions are not in effect.)

In other words, the V-finality in German is in charge of the blocking effect in (16). It is then correctly predicted that such an effect is absent in V-initial languages such as English (see (10)).

4. Toward an Explanation

In the previous section, I analyzed German XP-shift and showed how the prosodic and syntactic conditions interact in determining what constitutes legitimate XPs in German. In this section, I consider *why* these conditions interact the way they do.

My central claim is that processing efficiency, which is obtained by "minimizing the Constituent Recognition Domain," induces the prosodic weight effect in XP-shift in general (Hawkins 1990, 1994, 2004, Shiobara 2000, 2004), and the processing demand is in some cases so strong that the prosodic condition overrides syntactic conditions. I illustrate how this idea works in (18):

(18)　　Minimizing the VP domain by CP-shift in German

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     a.        VP                    b.        VP
           CP        ⇒                      CP
        Comp ...   V               V    Comp ...
                                      √ processing efficiency
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First, when an argument CP precedes the verb, all the words from the Comp(lementizer) that signals the CP up to the final verb (indicated by the underline) need to be processed in order to recognize that the VP consists of a CP and the V. On the other hand, when the CP is shifted into the post-verbal position, only the verb and the adjacent Comp need to be processed. This way, the recognition of the constituents of the VP becomes faster, which leads to processing efficiency. In general, the heavier the argument XP is, the more it takes for the recognition of the VP domain and, in turn, the more likely the XP gets shifted. That is to say, the prosodic weight effect in XP-shift is motivated by processing efficiency.

A typological prediction is that in rigidly head-final languages such as Japanese, CP-shift may not be obligatory. This is because CPs are also head-final in such languages and hence CP-shift does not make the recognition of the constituents of the VP faster. On the contrary, when CP is shifted, more words need to be processed to recognize the VP domain, because V and Comp become disjoint from each other. This is illustrated in (19):

(19)　　CP-shift in rigidly head-final languages

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     a.        VP                    b.        VP
           CP            ⇒                       CP
        ... Comp    V              V      ...  Comp
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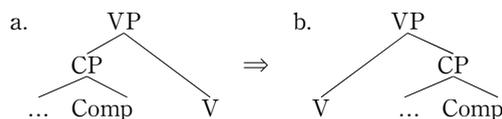
This prediction is borne out in Japanese.　CP-shift is not obligatory, but rather restricted to colloquial Japanese.　When a CP is shifted at all, as in (20b), the shifted CP is preceded by a noticeable intonational break.

(20)　a.　Ken-ga　　　Naomi-ni　[CP　inu-ga　　　kesa　　　　　sinda　to]
　　　　　Ken-Nom　Naomi-Dat　　　dog-Nom　this-morning　died　　Comp
　　　　　tutaeta　yo.
　　　　　told　　　yo
　　　　　'Ken told Naomi that the dog died this morning'
　　　b.　Ken-ga Naomi-ni _ tutaeta yo, [CP　inu-ga kesa sinda to].

Moreover, the prosodic weight effect in general seems to be absent in Japanese, and an NP, whether it is relatively heavy as in (21) or light as in (22), may be shifted as freely as CPs.

(21)　a.　Ken-ga　　　Naomi-ni　[NP　inu-ga　　　kesa　　　　　sinda　koto-o]
　　　　　Ken-Nom　Naomi-Dat　　　dog-Nom　this-morning　died　　fact-Acc
　　　　　tutaeta　yo.
　　　　　told　　　yo
　　　　　'Ken told Naomi the fact that the dog died this morning'
　　　b.　Ken-ga Naomi-ni _ tutaeta yo, [NP inu-ga kesa sinda koto-o].

(22)　a.　Ken-ga　　　Naomi-ni　[NP　inu-no　koto-o]　　tutaeta　yo.
　　　　　Ken-Nom　Naomi-Dat　　　dog-of　fact-Acc　told　　　yo
　　　　　'Ken told Naomi about the dog'
　　　b.　Ken-ga Naomi-ni _ tutaeta yo, [NP inu-no koto-o].

This suggests that the directionality of head should play an important role in determining what constitutes legitimate XPs in XP-shift, and supports the argument that the prosodic weight effect in XP-shift is grounded in processing efficiency.[3]

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（1） The operational definition of an IntP I use in this paper is that "IntP is the domain of an intonation contour, which can be naturally preceded or followed by an intonational break."

（2） To be precise, the V-finality in (9) concerns the linear order of a verb and its dependents, and not the hierarchical structure of a VP. I still call this condition "syntactic" just because it refers to a syntactic category (i.e. VP).

（3） Typologically, Farsi and Hindi seem interesting to examine at the next step: XP-shift in Farsi seems to pattern similarly to German (e.g. obligatory CP-shift, optional IP- and PP-shift, and limited NP-shift, cf. Ghomeshi 2001), and XP-shift in Hindi seems to pattern similarly to Japanese (e.g. relatively free CP- and NP-shift, cf. Mahajan 1997).