SUBJACENCY AND LEARNABILITY A PSYCHOLINGUISTIC PROCESSING APPROACH[*]

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RESUMO

A suposição de que evidências negativas não são essenciais ao processo de aquisição da linguagem pela criança conduz à pergunta de como essa criança é capaz de aprender restrições sobre regras. Na gramática gerativa afirma-se que crianças tem acesso a um conhecimento lingüístico parametrizado inato (UG = universal grammar). Um fenômeno lingüístico onde essas coersões sobre regras desempenham um papel importante é a "extração". As condisões de "extração" podem ser incluídas numa restrição geral denominada de "subjacência" que, por natureza, é abstrata. Comentarei um experimento realizado com falantes do holandês, nativos uns, aprendizes de segunda língua outros. O experimento foi idealizado para testar a hipótese de que falantes nativos e aprendizes de segunda língua aprendem as restrições sobre "extração" na língua holandesa, baseados exclusivamente em evidências positivas.

ABSTRACT

The assumption that negative evidence is not essential to the process of child language acquisition has given rise to constraints on rules. In Generative Grammar it is assumed that children must have access to innate parameterized linguistic knowledge (UG). One linguistic phenomenon where constraints on rules play an important role is extraction. The conditions on extraction can be subsumed under one general constraint, called "Subjacency", which is abstract in nature. I will discuss an experiment carried out whith native speakers and second language learners of Duch. This experiment was designed to test the hypothesis that native speakers and second language learners will learn restrictions on extration in Duch on the basis of positive evidence only.

1 – INTRODUCTION

The primary objective of linguistics is to find out what makes children capable of learning their mother tongues. In particular language acquisition research has to explain how it is possible for the child to learn his mother tongue given the nature of the linguistic input. Typically for language acquisition is that children are able to acquire their mother tongue by means of positive evidence only, i.e. solely by means of the speech used

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to communicate with them. Negative evidence, i e. corrections provided by adult speakers, is assumed not to be necessary for children to adapt their grammar to the target system.

The assumption that negative evidence is not essential to the process of acquisition gives rise to the question as to how children are capable of learning constraints on rules. One linguistic phenomenon where constraints on rules play an important role is *extraction*. An example of extraction is given in (1). The *wh*question in (1) has 'What' extracted from the embedded clause and placed in sentence-initial position.

(1)   *What$_i$* does John believe that Bill had bought t_i?
      What$_i$ does [$_{IP}$ John believe [$_{CP}$ t_i that [$_{IP}$ Bill had bought t_i]]?

However, it is not always possible to employ this kind of extraction. In (2), for example, extraction by means of the interrogative 'What' results in an ungrammatical sentence.

(2)   * *What$_i$* do you wonder who bought t_i?
      * *What$_i$* do [$_{IP}$ you wonder [$_{CP}$ who$_j$ [$_{IP}$ t$_j$ bought t_i]]?

It appears, therefore, that there are constraints on the extractability of question words from embedded sentences. Sentences (1) and (2) illustrate the fact that extraction from embedded sentences is impossible if the sentence begins with a subordinate interrogative. Dependent interrogative sentences are, consequently, called *Wh-islands*. It is impossible to subject a *Wh-island* as in (2) to extraction. This constraint on extraction can be found in many languages.

The 'Wh-island constraint' is not the only condition on extraction (see Table 1). Sentences with extraction from CP within NP are also ungrammatical. This condition is called the 'Complex NP constraint'. The Complex NP constraint holds for NP-complements with NPs such as *claim, evidence, news,* and for restrictive relative clauses. Extraction of one element from a coordination is prohibited by the 'Coordinate Structure constraint'. The 'NP constraint' specifies that sentences with extraction from an NP are ungrammatical. Rightward movement is also constrained. The 'Right Roof constraint' (Ritchie, 1978) entails that a CP cannot be moved to the right of a CP that it is embedded in.

TABLE 1:
Constraints on Extraction

'Wh-island constraint'

* *What$_i$* do you wonder who bought t_i?
* *What$_i$* do [$_{IP}$ you wonder [CP who$_j$ [$_{IP}$ t$_j$ tj bought t_i]]?

'Complex NP constraint'
- NP-complements

* *Who$_i$* does John believe the claim that Bill met t_i?
* *Who$_i$* does [$_{IP}$ Johm believe [$_{NP}$ the claim [$_{CP}$ t_i that [$_{IP}$ Bill met t_i]]]]?

- Restrictive Relative Clauses

* *What$_j$* did Susam visit the store that had t_j in stock?
* *What$_j$* did [$_{IP}$ Susan visit [$_{NP}$ the store [$_{CP}$ that$_i$ [$_{IP}$ t$_i$ had t_J in stock]]]]?

'Coordinate Structure constraint'

* *Who$_i$* did John meet Mary and t_i?
* *Who$_i$* did [$_{IP}$ Johm meet [$_{NP}$ Mary and $_{ti}$]]?

'NP constraint'

* *What$_i$* did Mary hear Bill's stories about t_i?
* *What$_i$* did [$_{IP}$ Mary hear [$_{NP}$ Bill's stories [$_{PP}$ about t_i]]]?

'Right Roof constraint'

* That a boat $_{ti}$ had sunk was disturbing [that John had built]$_i$
* [$_{IP}$ [$_{CP}$ That [$_{NP}$ a boat t_i] had sunk] was disturbing] [$_{CP}$ *that John had built*]$_i$

The conditions on extraction that are mentioned above can be subsumed under one general constraint. This general constraint, called 'Subjacency', makes use of the notion 'Bounding Node'. Being part of UG, subjacency is a constraint on movement such that movement across more than one bounding node leads to an ungrammatical sentence.

It has been observed that languages may differ regarding the types of sentence in which movement is allowed. This variability can be accounted for by the assumption that what constitutes a bounding node may differ from one language to another. The constraints on extraction in Dutch and English are captured assuming that in these languages IP and NP function as bounding nodes. This accounts for the conditions on extraction as they are exemplified in Table 1.

In Italian, however, CP and NP are supposed to function as bounding nodes. This explains why in Italian (3) and (4) are correct and (5) incorrect (see Rizzi, 1982).

(3) Tuo fratello a *cui*$_j$ [$_{IP}$ mi domando [$_{CP}$ che storie$_i$ [$_{IP}$ abbiano raccontato t_j t_i]]] era molto preoccupato
('Your brother to whom$_j$ I wonder which stories$_i$ they have told t_i t_j was very concerned')

(4) L' incarico *che*$_i$ [$_{IP}$ non sapevo [$_{CP}$ a chi$_j$ [$_{IP}$ avrebbero affidato t_i t_j]]]
('The task which$_i$; I didn't know to whom they would entrust t_i')

(5) * Tuo fratello a *cui*$_i$ [$_{IP}$ temo [$_{NP}$ la possibilita [$_{CP}$ che [$_{IP}$ abbiano raccontato tutto t_i]]]] era molto preoccupato
('Your brother whom$_i$ I fear the possibility that they have told t_i everything was very concerned')

If we take this analysis to be correct, we are confronted with a learnability problem. Extraction is apparently subject to constraints that are abstract in nature. How is it possible then for children to discover these constraints in their native language, given the fact that negative evidence is irrelevant for language acquisition? In Generative Grammar it is assumed that children must have access to innate linguistic knowledge (UG). With regard to subjacency this linguistic knowledge is assumed to be parameterized in the sense that what counts as a bounding node may vary from one language to another. For English and Dutch the parameter value of what constitutes a bounding node is set as IP and NP and for Italian and French it is set as CP and NP. On the basis of language input the child is supposed to be able to decide what particular parameter value holds for the language that he is acquiring.

What is striking, however, is that sentence types which lend themselves to extraction are far fewer in number than those which do not. In order to become aware of this, one only has to look at the types of sentence that are subject to the Wh-island constraint, the Complex NP constraint, the Coordinate structure constraint, the NP constraint and the Right Roof constraint, on the one hand, and sentences such as (1), on the other. Given the criteria of learnability, it would not be unlogical to consider whether subjacency phenomena might be described using as a frame of reference the majority of the kinds of sentences which do *not* lend themselves to extraction. From this point of view it would make sense to pursue the idea that languages usually do *not* allow extraction. If we were to assume that extraction was impossible in principle, then only a certain type of sentence, such as (1), would be an exception to this principle. This assumption would make it possible to explain how extraction phenomena can be learned on the basis of positive evidence.

Taking this line of thought as a research perspective, the main interest is on the types of sentence in which extraction is allowed. It turns out that it is primarily with 'opinion verbs', such as *find, think* and *believe* that extraction from embedded clauses as in (6a) is permitted. A syntactic property of these 'opinion verbs' is that they do not permit regular embedded *wh*-clauses as in (6b).

(6)   I think that he should invite you.
(6a) Who$_i$ do you think that he should invite t_i?
(6b) * I think who he should invite.

On the other hand, there are verbs which do lend themselves to embedded *wh*-clauses as in (7). These verbs can be characterized semantically as verbs with an inherent question. Examples are: *wonder, consider, discover, find out,* and *ask.* They do not permit a *that*-complement as in (7a) nor do they permit extraction.

(7)   I wonder for whom I will buy flowers.
(7a) * I wonder that I will buy flowers for her.
(7b) * What$_i$ do you wonder for whom I will buy t_i?

Assuming, as I do, that there is a general constraint on extraction from embedded clauses, the *Wh*-island constraint should be looked at from a different perspective. From this perspective it is for this general CP-constraint and not because of the *wh*-type of embedding that extraction is not allowed.

It would seem therefore, that matrix verbs which permit extraction from a *that*-complement are semantically and syntactically distinguishable from matrix verbs with *wh*-complements. On the one hand, extraction is permitted with 'opinion verbs', such as *find, think* and *believe*, which allow *that*-complements and on the other hand, extraction is prohibited with 'inherent question verbs', such as *wonder, consider* and *ask,* which occur with *wh*-complements.

Given the facts, according to which in the majority of cases extraction is prohibited, and given that extraction is only possible with a particular class of matrix verb, it may be a question of lexical knowledge as to when extraction is allowed. Why it is that extraction only occurs with 'opinion verbs' is a matter of further investigation. However, if extraction is indeed a property of particular verbs that constitute an exception to the rule that languages in principle do not allow extraction, it means that the child has to learn when movement is permissible rather than learn the restrictions on movement.

If extraction is seen as a lexical property of particular verbs there is a problem with respect to an apparent subject-object asymmetry with regard

to extraction in English. Object extraction as in (8) is possible while subject extraction as in *(9) is not.

(8) What$_i$ do you think that Mary saw t$_i$?
(9) * Who$_i$ do you think that ti saw Mary?

The situation in Dutch is somewhat different though. In Dutch *dat*-sentences with subject extraction as in (11) are correct:

(10) Wat$_i$ denk je dat Marie t$_i$ zal doen?
     ('What$_i$ do you think that Mary will do t$_i$?')
(11) Wie denk je dat t$_i$ het glas gebroken heeft?
     ('Who$_i$ do you think that t$_i$ broke the glass?')

For both English and Dutch, I assume that it is a lexical property of opinion verbs that the complementizer *that / dat* does not constitute a CP-barrier. Therefore, *Wat* in (10) is a topicalized object and *Wie* in (11) is the subject occurring in regular sentence-initial position. The ungrammaticality of *(9) can be explained by the particular function of opinion verb embeddings (*do you think that* etc.) in English. Assuming, as I do, that they constitute a topicalization device (see Jordens, forthcoming), it can be explained why (8) is grammatical and *(9) is ungrammatical. That is, objects in English, as in (8), can be topicalized, subjects as in *(9) cannot.

Contrary to the CP-constraint on extraction, it seems that object extraction is allowed in sentences such as (12), im which the matrix predicate is a factive verb. However, I would argue that these sentences should not be interpreted as embeddings with *that* being the complementizer, as in (12), but as a kind of relative clause embedding with *that* functioning as a relative pronoun, as in (12a). Evidence for this is the fact that objects in sentence-initial position, as in (12), prefer a theta-role relation to the matrix verb. Therefore, the relation between *Wat$_i$* and the gap of t$_i$ cannot be a relation of extraction, because as an extracted element *Wat$_i$* cannot occur in argument position.

(12) *Wat$_i$* ben je gewend, dat hij t$_i$ voor je doet?
     ('What$_i$ are you accustomed, that he does t$_i$ for you?')
(12a) *Wat$_i$* ben je gewend t$_i$, *dat$_i$* hij t$_i$ voor je doet?
     ('What$_i$ are you accustomed t$_i$, that$_i$ he does t$_i$ for you?')

To summarize, according to the current view on the acquisition of subjacency, children should have access to innate linguistic knowledge with regard to what may count as a bounding node in order to be able to learn constraints on movement. As I have pointed out however, there is an alternative which accounts for the acquisition of the same phenomena in terms of a lexical learning process. This alternative implies that movement rules can be learned solely on tbe basis of positive evidence.

First, I assume that children are able to infer from the input that there is a general constraint according to which a CP-structure constitutes a boundary to extraction.

Second, I assume that Dutch children will find out lexically, i.e. on a word by word basis, that with particular matrix verbs, which can be semantically identified as 'opinion verbs', the complementizer *dat* may *not* constitute a CP-boundary, i.e. these matrix verbs are processed without subordination.

Third, factive matrix predicates such as *betreuren* ('regret'), *ontschoten zijn* ('have slipped one's memory'), *blij zijn* ('be glad'), *bedroefd zijn* ('be sad'), *gewend zijn* ('be accustomed'), *verheugd zijn* ('be glad'), *ontgaan zijn* ('have slipped one's memory') are always processed with embedding, meaning that with these matrix verbs the complementizer is a CP-boundary. However, sentences with factive matrix predicates allow relative clause embeddings with object coreference. Sentences with object coreference are accepted only to the degree to which the object in sentence-initial position can appropriately be interpreted as an object of the matrix predicate.

2 – EXPERIMENT WITH NATIVE SPEAKERS AND SECOND-LANGUAGE LEARNERS OF DUTCH

2.1 – Predictions

Opinion verbs

Since it is a matter of lexical acquisition whether or not an opinion verb is processed with or without embedding, I assume that, on the one hand, there is a common core of opinion verbs such as *denken* ('think'), *vinden* ('think'), *menen* ('think'), *zeggen* ('say'), *verwachten* ('expect'), *hopen* ('hope') that is processed by most native speakers of Dutch as not embedding, whereas, on the other hand, there is variability with respect to particular opinion verbs that for some speakers belong to the common core, while for others they do not. Hence, for both native speakers and second-language learners it is to a certain degree an empirical question whether or not a particular opinion verb belongs to those verbs that are processed without subordination. For these lexical reasons, I assume that opinion verbs such as *van mening zijn* ('be of the opinion'), *niet zo zeker zijn* ('be not so sure'), *van opvatting zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced'), op het standpunt staan ('take up a position') may not be processed as the core type opinion verbs *denken* ('think'), *vinden* ('think'), *menen* ('think') etc., i.e. they are more likely to be processed as sentences *with* embedding. If this is so, this type of opinion verb is proc-

essed with a CP-boundary and hence, it can be predicted that it does not allow an NP in sentence-initial position to be interpreted as the subject of the predicate of the embedded clause. I would, furthermore, predict that sentences with these non-core opinion verbs do not allow coreference between the objects of the matrix and the embedded clause either. As I argued before, object coreference in sentences with a CP-boundary is possible provided the object in sentence-initial position occurs in argument position of the matrix predicate. Since opinion verbs usually do not subcategorize for object NPs, object coreference is not a possible interpretation.

Assuming that it is acquired on a word by word basis whether or not a particular opinion verb is processed with a CP-boundary, differences between native speakers and second-language learners are expected to occur. Second-language learners who rely on positive evidence as well, may be able to induce from the input that predicates such as *denken* ('think'), *vinden* ('think'), *menen* ('think') etc. are processed without embedding. However, with respect to opinion verbs such as *van mening zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced'), which are less frequent in the input, they may not be certain if these verbs should be processed with or without embedding. Hence, I expect that second-language learners differ from native speakers to the effect that they will process opinion verbs such as *van mening zijn* ('be of the opinion') without embedding more often than native speakers do.

Factive verbs

With regard to factive matrix predicates such as *betreuren* ('regret'), *ontschoten zijn* ('has slipped one's memory'), *blij zijn* ('be glad'), *bedroefd zijn* ('be sad'), *gewend zijn* ('be accustomed'), *verheugd zijn* ('be glad'), *ontgaan zijn* ('has slipped one's memory') I argued that what is referred to as 'object extraction' is in fact a relation of coreference between the objects of the matrix and the embedded clause. If this is account is correct, subjects will accept sentences such as *Wat ben ie gewend dat hij voor je doet* ('What are you accustomed that he will do for you') because *Wat* ('What') is interpreted as the object of *gewend zijn* ('be accustomed'). They should reject, however, a sentence such as *Wie betreur je dat de mededeling gedaan heeft* ('Who do you regret that has made the announcement') because here *Wie* ('Who') cannot be interpreted as the object of the matrix predicate *betreuren* ('regret'). It can be predicted, therefore, that sentences with object coreference are accepted only to the degree to which the object in sentence-initial position can appropriately be interpreted as an object of the matrix predicate.

For native speakers, I assume that it is part of their lexical knowledge whether or not a particular matrix verb allows a particular object. For second-language learners this kind of lexical knowledge may constitute a

learning problem. Second-language learners may or may not be certain about the particular kinds of object that predicates such as *blij zijn* ('be sad'), *bedroefd zijn* ('be sad') etc. subcategorize for.

2.2 – Method

In the present experiment, subjects were asked to judge the stimulus sentences item by item without there being any time constraints. Therefore, the responses of the subjects will reflect the degree to which the test sentences are judged as grammatical.

The sentences were presented within one session. The test items were given on 6 forms presented in random order. The subjects, all university students, were asked to indicate whether they judged the test sentences as correct or incorrect. 41 native speakers of Dutch and 21 learners of Dutch as a second language who were native speakers of Farsi, took part in experiment.

The subjects were presented with two types of matrix verb: opinion verbs (= Type 1: 10 items) and factive verbs (= Type 2: 8 items). The opinion verbs were divided into two categories: core opinion verbs such as *denken* ('think'), *vinden* ('think'), *menen* ('think'), *zeggen* ('say'), *verwachten* ('expect'), *hopen* ('hope') (= Type 1a: 5 items) and non-core opinion verbs such as *van mening zijn* ('be of the opinion'), *niet zo zeker zijn* ('be not so sure'), *van opvatting zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced'), *op het standpunt staan* ('take up a position') (= Type 1b: 5 items).

For the test sentences with opinion verbs, i.e. Type 1a and 1b, subjects had to judge 2 sentences with *Wie* ('Who') in sentence-initial position such as *Wie denk je dat het boek gelezen heeft?* ('Who do you think that has read the book?') (= Type 1a) and *Wie ben je van mening dat de misdaad begaan heeft?* ('Who are you of the opinion that has committed the crime?') (= Type 1b) and 3 sentences with *Wat* ('What') in sentence-initial position such as *Wat verwacht je dat hij voor je zal kopen?* ('What do you expect that he will buy for you?') (= Type 1a) and *Wat ben je van opvatting dat hij voor je moet doen?* ('What are you of the opinion that he should do for you?') (= Type 1b).

For the test sentences with factive verbs (= Type 2) subjects had to judge 5 sentences with animate *Wie* ('Who') in sentence-initial position as in *Wie betreur je dat de mededeling gedaan heeft?* ('Who dou you regret that has made the announcement?') and 3 sentences with inanimate *What* in sentence-initial position as in *Wat ben je verheugd dat hij bereikt heeft?* ('What are you glad that he has achieved?').

2.3 – Results

2.3.1 – Native speakers of Dutch

The test sentences and the results (grammaticality judgments) from 41 native speakers of Dutch (university students) are given in Table 2. In Table 3 the data presented in Table 2 are averaged according to Type of matrix verb (Type 1a, 1b and 2) and Type of movement (*wie*-initial and *wat*-initial).

The results of this experiment show that there is a significant relationship between the type of matrix predicate and the use of *Wie* ('Who') or *Wat* ('What') in sentence-initial position. With one type of matrix verb (i.e. factive verbs) *wat*-initial is accepted much more often than *wie*-initial, whereas with the other types of matrix verb (i.e. opinion verbs) there is only a small difference to be observed between *wie*-initial and *wat*-initial. Furthermore, the use of both *wie*- and *wat*-initial with non-core opinion verbs (Type 1b) is much less accepted than with core opinion verbs (Type 1a).

Explanation

Under the hypothesis that it is a lexical property of the matrix verb whether *that* constitutes a CP-barrier or not, the data of the Type 1a items can be explained as follows. In sentences with core opinion verbs such as *denken* ('think'), *hopen* ('hope'), *verwachten* ('expect'), *dat* does not function as a CP-boundary. For the parser the sentence has no embedding. Hence, what is usually called 'subject extraction' in sentences such as *Wie denk je dat het boek gelezen heeft?* ('Who do you think that has read the book?') and 'object extraction' in sentences such as *Wat verwacht je dat hij voor je zal kopen?* ('What do you expect that he will buy for you?') really is movement to sentence-initial position. Therefore, for native speakers both types of movement are judged grammatical

In sentences with non-core opinion verbs such as *van mening zijn* ('be of the opinion'), *niet zo zeker zijn* ('be not so sure'), *van opvatting zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced'), *op het standpunt staan* ('take up a position') and factive verbs such as *betreuren* ('regret'), *ontschoten zijn* ('has slipped one's memory'), *blij zijn* ('be glad'), *bedroefd zijn* ('be sad'), *gewend zijn* ('be accustomed'), *verheugd zijn* ('be glad'), *ontgaan zijn* ('has slipped one's memory') the complementizer *dat* functions as a CP-boundary. Hence, it does not allow an NP in sentence-initial position to be interpreted as the subject of the predicate of the embedded clause. Furthermore, sentences with these non-core opinion verbs do not allow coreference between the objects of the matrix and the embed-ded clause either. Since opinion verbs usually do not subcategorize for object NPs, object coreference is not a possible interpretation.

In the items with factive matrix predicates *wie*-initial is judged ungrammatical. The average acceptance score for *Wie* ('Who') in sentence-initial position is 4.4% with factive verbs. As with non-core opinion verbs factive verbs are processed with embedding and therefore *Wie* ('Who') in sentence-initial position violates the CP-constraint on movement. Sentences that have *Wat* ('What) in sentence-initial position as in *Wat ben je van opvatting dat hij voor je moet doen?* ('What are you of the opinion that he should do for you?') and *Wat ben je verheugd dat hij bereikt heeft?* ('What are you glad that he has achieved?'), are subject to another constraint. *Wat* ('What') in sentence-initial position appears to be subject to government relations with respect to the matrix predicate. If *Wat* ('What') cannot possibly occur in an object relation to the matrix verb as in *Wat sta je op het standpunt dat hij moet zeggen?* ('What are you of the opinion that he should say?') and *Wat ben je verheugd dat hij bereikt heeft?* ('What are you glad that he has achieved?'), sentences are judged incorrect. On the other hand, sentences such as *Wat ben je van opvatting dat hij voor je moet doen?* ('What are you of the opinion that he should do for you?'), *Wat ben je niet gewend dat hij voor je doet?* ('What are you not accustomed that he will do for you?') are often judged grammatical because here *Wat* ('What') can function as an argument of the matrix predicate.

To summarize, the results of this experiment show that properties of matrix verb categories appear to determine whether or not movement or a relation of coreference is possible. Movement of a subject or an object NP from the *dat*-clause into sentence-initial position is allowed if the matrix verb belongs to the category of core opinion verbs. Furthermore, a relation of coreference between the object of the matrix and the embedded clause is possible if the object in sentence-initial position can be interpreted as an argument of the matrix predicate.

TABLE 2
Grammaticality judgments of 41 native speakers of Dutch.
Acceptance scores %.

1. opinion verbs

Type 1a: *core opinion verbs*: *denken* ('think'), *verwachten* ('expect') etc.

wie-initial

Wie denk je dat het boek gelezen heeft?	98
Wie meen je dat de tafel moet dekken?	73

('Who do you think ..?')

wat-initial

Wat verwacht je dat hij voor je zal kopen?	100
Wat vind je dat hij zal moeten proberen?	93
Wat hoop je dat hij zal beloven?	93

('What do you expect ../.. think .. /.. hope ..?')

Type 1b: **non-core opinion verbs**: *van mening zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced') etc.

wie-initial

Wie ben je niet zo zeker dat de brief schrijft?	2
Wie ben je van mening dat de misdaad begaan heeft?	44

('Who are you not so sure ../.. of the opinion ..?')

wat-initial

Wat sta je op het standpunt dat hij moet zeggen?	2
Wat ben je overtuigd dat hij zal bereiken?	22
Wat ben je van opvatting dat hij moet doen?	56

('What are you of the opinion ../.. convinced ../.. of the opinion ..?')

2. factive verbs

Type 2: *gewend zijn* ('be accustomed'), *blij zijn* ('be glad') etc.

wie initial

Wie betreur je dat de mededeling gedaan heeft?	0
Wie is je ontschoten dat het boek geleend heeft?	0
Wie ben je blij dat de zaak heeft afgehandeld?	0
Wie ben je bedroefd dat het geheim verraden heeft?	2
Wie ben je gewend dat de rommel opruimt?	20

('Who do you regret /.. has slipped your memory ../.. are you glad ../.. sad ../.. are you accustomed .. ?')

wat initial

Wat ben je verheugd dat hij bereikt heeft?	7
Wat is je ontgaan dat hij gezegd heeft?	54
Wat ben je niet gewend dat hij voor je doet?	85

('What are you pleased ../..has slipped your memory ../.. are you not accusto-med ..?')

TABLE 3
Embedding with 3 types of matrix verb. 41 native speakers of Dutch.
Acceptance scores %.

	Type 1a	Type 1b	Type 2
	opinion		**factive**
	core	**non-core**	
wie-initial	85.4	23.2	4.4
wat-initial	95.1	26.8	49.2

2.3.2 – Second-language learners of Dutch

The test sentences and the results (grammaticality judgments) from 21 second-language learners of Dutch (university students) are given in Table 4. In Table 5 the data presented in Table 4 are averaged according to Type of matrix verb (Type 1a, 1b and 2) and Type of movement (*wie*-initial and *wat*-initial).

The results of this experiment show that there is a significant relationship between the type of matrix predicate and the use of *Wie* ('Who') or *Wat* ('What) in sentence-initial position. With one type of matrix verb (i.e. core opinion verbs) there is only a small difference to be observed between *wie*-initial and *wat*-imtial, whereas with the other types of matrix-verb (i.e. non-core opinion verbs and factive verbs) *wat*-initial is accepted more often than *wie*-initial.

Explanation

The L2 learners appear to discriminate between two types of verbs: core-opinion verbs and other types of matrix verb. As learners of L2 Dutch they have discovered that this distinction is relevant with respect to embedding. While the default assumption of L2 learners is that elements cannot be moved out of CP-structure, they have learned that with the most frequent core-opinion verbs, such as *denken* ('think'), *hopen* ('hope'), *verwachten* ('expect'), the complementizer *dat* may not function as a CP-barrier. For learners who have been able to find out that core opinion verbs are processed without embedding, movement of subject and object NPs into sentence-initial position can be judged as equally grammatical.

Sentences with non-core opinion verbs such as *van mening zijn* ('be of the opinion') are less frequent in the input. Therefore, non-native speakers simply may not know whether or not they have to be processed with or without an embedded CP-structure. Overgeneralization from core opinion verbs explains why subjects judge both *wie*- and *wat*-initial in sentences with non-core opinion verbs more often as grammatical than native speakers.

For those second-language learners who have encountered some factive verbs, there is no reason to give up the default assumption that CP constitutes a barrier to movement. This is because whenever with these matrix verbs a *wh*-words occurs in initial position, it can be interpreted as coreferent with the object of the predicate of the embedded clause. What these second-language learners do *not* seem to know, however, are the conditions under which this relation of object coreference may occur. They appear not to possess the kind of lexical knowledge which says that particular factive verbs such as *blij zijn* ('be glad'), *overtuigd zijn* ('be convinced') cannot be subcategorized for NPs in object function.

TABLE 4
Grammaticality judgments of 21 second-language learners of Dutch.
Acceptance scores %.

1. opinion verbs

Type 1a: **core opinion verbs**: *denken* ('think'), *verwachten* ('expect') etc.

wie-initial

Wie denk je dat het boek gelezen heeft?	71
Wie meen je dat de tafel moet dekken?	71

('Who do you think ..?')

wat-initial

Wat verwacht je dat hij voor je zal kopen?	95
Wat vind je dat hij zal moeten proberen?	91
Wat hoop je dat hij zal beloven?	85

('What do you expect ../.. think ../.. hope ..?')

Type 1b: **non-core opinion verbs**: *van mening zijn* ('be of the opinion'), *overtuigd zijn* ('be convinced') etc.

wie-initial

Wie ben je niet zo zeker dat de brief schrijft?	28
Wie ben je van mening dat de misdaad begaan heeft?	57

('Who are you not so sure ../.. of the opinion ..?')

wat-initial

Wat sta je op het standpunt dat hij moet zeggen?	66
Wat ben je overtuigd dat hij zal bereiken?	66
Wat ben je van opvatting dat hij moet doen?	71

('What are you of the opinion ../.. convinced ../.. of the opinion ..?')

2. factive verbs

Type 2: *gewend zijn* ('be accustomed'), *blij zijn* ('be glad') etc.

wie initial

Wie betreur je dat de mededeling gedaan heeft?	61
Wie is je ontschoten dat het boek geleend heeft?	52
Wie ben je blij dat de zaak heeft afgehandeld?	19
Wie ben je bedroefd dat het geheim verraden heeft?	42
Wie ben je gewend dat de rommel opruimt?	47

('Who do you regret /.. has slipped your memory ../.. are you glad ../.. sad ../ ..are you accustomed .. ?')

wat mitial

Wat ben je verheugd dat hij bereikt heeft?	66
Wat is je ontgaan dat hij gezegd heeft?	61
Wat ben je niet gewend dat hij voor je doet?	52

('What are you pleased ../..has slipped your memory ../.. are you not accustomed ..?')

TABLE 5
Embedding with 3 types of matrix verb. 21 second-language of Dutch.
Acceptance scores %.

	Type 1a	Type 1b	Type 2
		opinion	factive
	core	non-core	
wie-initial	71.4	42.9	44.4
wat-imtial	84.1	68.3	61.3

3 – CONCLUSION

In order to give a generalized account of the phenomena under discussion, without having to rely on the assumption that a highly specific kind of linguistic knowledge should be innate, I proposed a general constraint on movement. According to this constraint on movement, which I called the CP-constraint, all movement relations are confined to the CP-structure. Hence, it is postulated that an NP cannot function as subject or object of a predicate, if it occurs outside the CP-structure that the predicate is part of.

Furthermore, I postulated that languages may vary with respect to whether or not a complementizer is processed as an embedder. I assume that for Dutch it is a lexical property of particular matrix verbs, which can be classified semantically as 'opinion verbs', that the complementizer *dat* does not function as a CP-boundary.

With factive matrix verbs, the complementizer *dat* regularly constitutes a CP-boundary. Hence, movement to sentence-initial position is ungrammatical. However, to some extent factive verbs allow the object *Wat* to occur in sentence-initial position, if the sentence can be (re)interpreted as a relative clause embedding in which *dat* is processed as a relative pronoun.

To summarize, what is usually seen as constraints on extraction, really is the outcome of the way in which lexical properties of particular matrix verbs interact with the CP-constraint on movement. Since it is a lexical property of 'opinion verbs' in Dutch that the complementizer *dat*, may not function as a CP-barrier, native speakers and L2 learners are able to learn the possibilities of what is traditionally called 'extraction' solely on the basis of *positive evidence*.

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