

Syntaxkolloquium: Prof. Dr. Fanselow

A Processing Account of Syntactic Islands and the Issue of Grammaticalness

Towards a Reduction of Grammar

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1 The Grammar of Islands

1.1 A over A Principle

- (1) **A-over-A Principle (AOAP)** What it asserts is that if the phrase Y of category A is embedded within a larger phrase ZXW which is also of category A, then no rule applying to the category A applies to X (but only to ZXW). (Chomsky, 1964b, 931)

But the AOAP is too weak (2) and too strong (3).

- (2) Who_i would you approve of [_{NP} my seeing t_i]? (Chomsky, 1964a, 46, footnote 10)
- (3) Nicolas saved banks and lost the election.
a. *What_i did Nicolas [save banks] and [lose t_i]?

1.2 Islands

Ross (1967) proposed several restrictions on transformations:

- (4) **The Complex NP Constraint (CNPC)** No element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of that noun phrase by a transformation. (Ross, 1967, 127)

- (5) Phineas knows a girl who is jealous of Maxime.
 a. *Maxime_i who Phineas knows a girl who is jealous of t_i is drunk.
 b. *Who_i does Phineas know a girl who is jealous of t_i?
 (cf. Ross, 1967, 124, ex. 4.14 and 4.15)
- (6) I believed the claim that Otto was wearing this hat.
 a. *The hat_i which I believed the claim that Otto was wearing t_i is red.
 b. *What_i did I believe the claim that Otto was wearing t_i?
 (cf. Ross, 1967, 126, ex. 4.17 and 4.18)
- (7) **The Coordinate Structure Constraint** In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct. (Ross, 1967, 161)
- (8) Henry plays the lute and sings madrigals.
 a. *The lute_i which Henry plays t_i and sings madrigals is warped.
 b. *What_i does Henry play the lute and sing t_i?
 (cf. Ross, 1967, 160)

1.3 Subjacency

After defining successive cyclic movement, Chomsky (1973) presented a general account, *Subjacency*.

- (9) **The Subjacency Condition**
 A cyclic rule cannot move a phrase from position Y to position X or conversely in:
 $\dots X \dots [\alpha \dots [\beta \dots Y \dots] \dots] \dots X \dots$
 where α and β are cyclic nodes. (cf. Chomsky, 1977, 73)

Cyclic nodes were supposed to be NP and \bar{S} .
 CNPC-violations were correctly ruled out (10).

- (10) NP- \bar{S} (CNPC) *What_i did you hear [_{NP} the rumor [_{\bar{S}} that John stole t_i]]?

But Subjacency could not account for the argument/adjunct asymmetry in (11).

- (11) a. What_i did John read [a book about t_i] in the backyard of his house?
 b. *What_i did John read a book in the [_{NP} backyard of t_i]?

As a consequence of the cyclic movement through COMP positions *Wh*-Islands (12) were predicted (13-a):

- (12) **Wh-Islands** No element contained in an embedded interrogative clause may be moved out of that interrogative clause.
- (13) Andy wonders whether his neighbour smokes cigarettes.
 a. *What_i does Andy wonder whether his neighbour smokes t_i?

1.4 Barriers

- (14) γ is a BC [blocking category] for β iff γ is not L-marked and γ dominates β .
 (Chomsky, 1986, 14)
- (15) γ is a barrier for β iff (a) or (b):
 a. γ immediately dominates δ , δ a BC for β ;
 b. γ is a BC for β , $\gamma \neq IP$
 (Chomsky, 1986, 14)
- (16) In a chain $(\alpha_1, \dots, \alpha_n)$, every link (α_i, α_{i+1}) must be, that α_{i+1} is (1-
)subjacent to α_i .
 (cf. Chomsky, 1986, 30)
- (17) β is n -subjacent to α iff there are fewer than $n + 1$ barriers for β that exclude α .
 (Chomsky, 1986, 30)

1.5 Condition on Extraction Domain

To account for adjunct/object asymmetries (11) (20-b) and subject/object asymmetries (20-a) Huang (1982) stated the *Condition on Extraction Domain* (18).

- (18) **Condition on Extraction Domain (CED)** A Phrase A may be extracted out of a domain B only if B is properly governed. (Huang, 1982, 505)
- (19) **Proper Government** α properly governs β iff α θ -governs, Case-marks, or antecedent-governs β . (Chomsky, 1986, 22)

In essence the CED states that one cannot extract out of subjects (20-a) and adjuncts (20-b).

- (20) a. *the songwriter_i who [_{+IP} [_{#NP} songs of t_i] are played in the radio]
 b. *which Song_i did [_{+IP} they leave [_{#PP} after listening to t_i]]

1.6 ECP and Minimalism

There are several other accounts as the *Empty Category Principle* (21) (Chomsky, 1981; Lasnik & Saito, 1984), the *Minimal Link Condition* (22) (Chomsky, 1995), the *Relativized Minimality* (23) (Rizzi, 1990, 2001).

(21) **The Empty Category Principle (ECP)**

A nonpronominal empty category must be properly governed.
(Lasnik & Saito, 1984, 240)

(22) **Minimal Link Condition**

K attracts α only if there is no β , β closer to K than α , such that K attracts β .

(Chomsky, 1995, 311)

(23) **Minimal Configuration (MC)**

Y is in a Minimal Configuration (MC) with X iff there is no Z such that

- a. Z is of the same structural type as X , and
- b. Z intervenes between X and Y

(Rizzi, 2001, 90)

1.7 Problems

In sum, all accounts that rely on configurations of phrase structure categories cannot cover the data in (24) and (25):

- (24) In welche Länder_{*i*} hat Frau Müller die Absicht geäußert, dass sie t_i in which countries has Ms Müller the intention expressed that she reisen möchte?

travel want

‘Which countries_{*i*} did Ms Müller express the intention that she wanted to travel t_i ?’

- (25) a. Then you look at what happens in languages_{*i*} that you know t_i and [languages_{*j*} [that you have [a friend [who knows t_j]]]]. >

(Deane, 1991, 29)

- b. Then you look at what happens in languages that you have a friend who knows and languages that you know.

Crosslinguistic tendencies are observable for Island violations:

- Topicalization and relativization are more acceptable than *wh*-extraction.
- Extracted elements are preferred to be specific.

- Intervening element are preferred to be non-specific (see (26)).

(26) SWEDISH

Johan_i känner jag ingen > ?en flicka > *flickan som tycker om t_i/
 John know I no one a girl girl:DEF that likes
 *honom_i.
 him

‘John_i I know no one > ?a girl > *the girl that likes t_i/ *him_i.’ (Engdahl, 1980, 95)

2 A Processing Perspective

2.1 Multifactorial Description of Distance Dependencies

In a processing based account language processing can be described as the establishment of linguistic relations between linguistic entities. Distance dependencies are mainly defined by three aspects:

1. the type of relation
2. the type of the partaking entities
3. the distance between these entities

So in an abstract configuration as in (27) the processing of the structure is dependent on the types of A and B , on the type of relation that holds between A and B and on the distance between A and B , which is represented by XYZ . The distance XYZ is defined at least by the *length* and the properties of the entities of which XYZ is constructed.

(27) A_i XYZ B_i

2.2 Processing accounts of Islands

In the past 20 years a lot of studies came up that claimed that the unacceptability of island configurations were rather due to processing factors than to the mere phrase structure alone. Some studies also showed the influence of processing factors on other syntactic configurations

2.3 Filler: Properties of Dislocated Elements

Several studies investigated the contrast between bare *wh*-elements (*who*) and *which*-NP fillers (*which convict*). *Which*-NP fillers facilitate pronoun resolution (Frazier & Clifton, 2002), speed up reading times in retrieval regions of Island configurations, and increase acceptability for the whole Island sentence (Hofmeister, 2008; Hofmeister & Sag, 2010).

- (28) a. {Rick knew *who_i/which sister_i* Josh sang a song to} {before she_i went to sleep.}
- (29) a. I saw *who_i/which convict_i* Emma doubted the report that we had captured *t_i* in the nationwide FBI manhunt.
b. *Who_i/Which employee_i* did Albert learn whether they dismissed *t_i* after the annual performance review?
(cf. Hofmeister, 2008, 65/76)

To capture these results Hofmeister (2008) stated the Memory Facilitation Hypothesis, given in (30).

- (30) **Memory Facilitation Hypothesis (MFH)** Given two linguistic expressions that can each be felicitously used to describe some discourse entity *e*, the expression that encodes more syntactic and semantic information will facilitate the retrieval process initiated at all subsequent (overt or covert) mentions of *e*, all else being equal.
(Hofmeister, 2008, 4)
- (31) **Relative Informativity**
An expression x_1 is more informative than an expression x_2 if the semantic and syntactic information encoded by x_2 is a proper subset of the information encoded by x_1 .
(Hofmeister, 2008, 5)

2.4 Gaps versus Resumptives

The example in (32) shows that resumptive pronouns may rescue Island violations (Haegeman, 1994).

- (32) a. the man *who_i* [_{IP} they think [_{CP} that [_{IP} [_{CP} when [_{IP} Mary marries him_i]]] then everyone will be happy]]]
b. *the man *who_i* they think that when [_{IP} [_{CP} Mary marries *t_i*]] then everyone will be happy
(Haegeman, 1994, 410)

Controlled acceptability judgements by Alexopoulou & Keller (2007) and Hofmeis-

ter & Norcliffe (submitted) instead revealed that resumptives do not cause higher acceptability judgements than gap containing sentences although they become more acceptable with increasing embedding. A self-paced reading study by Hofmeister & Norcliffe (submitted) showed however, that resumptives cause a processing facilitation, which leads to faster reading times on the subsequent word, at least in the long distance condition (33-a).

- (33) a. Mary confirmed that there was a prisoner_i who the prison officials had acknowledged that the guard helped *t_i/him_i* to make a daring escape.
b. The prison officials had acknowledged that there was a prisoner_i that the guard helped *t_i/him_i* to make a daring escape.
(cf. Hofmeister & Norcliffe, submitted)

2.5 Distance and Interveners

As claimed above distance of a filler gap dependency is dependent on two aspects, the *length* of the distance and the type of interveners.

Concerning the mere *length*, Kluender (2004) argues that subject relative clauses and subject *wh*-questions are preferred over object relative clauses and object *wh*-questions. This is due to the longer distance between the filler and the corresponding gap, exemplified in (34).

- (34) a. Who_i do you think *t_i* has made millions of dollars?
b. Who_i do you think that Peter invited *t_i*.

That is supported by findings of German subject/object asymmetries in reading times (Fanselow et al., 1999) and ERPs (Fiebach et al., 2001). This effect is also apparent in the Accessibility Hierarchy (Keenan & Comrie, 1977; Keenan & Hawkins, 1987; Hawkins, 2004).

Warren & Gibson (2002) showed in a series of experiments that the referential type of NPs influence sentence processing especially in presence of distance dependencies. Pronouns caused slower reading times in the underlined regions than the definite description in (35-a) and (35-b) and slower reading times than the indefinite description in (36).

- (35) a. The woman who *you/the boy* had accidentally pushed off the sidewalk got upset and decided to report the incident to the policeman standing nearby.
b. The woman knew that *you/the boy* had accidentally pushed the girl but gave him/you a long lecture anyway.
(cf. Warren & Gibson, 2002, 95)

- (36) The consultant who *we/Donald Trump/the chairman/a chairman* called advised wealthy companies about tax laws.
(cf. Warren & Gibson, 2002, 101)

These referentiality effects caused by the DP type may be rather small, even though they possibly interact with other processing effects.

Such an interaction between the type of an intervening DP and a surrounding filler gap dependency is reported by Hofmeister (2008) and Hofmeister & Sag (2010). In the self-paced reading study involving CNPC violations they manipulated the type of the Island inducing DP as shown in (37).

- (37) I saw *who/which convict* Emma doubted *the report/a report/reports* that we had captured in the nationwide FBI manhunt.

Both regions exhibited significantly longer reading times with the definite *the report* and plural DP *reports* in contrast to the indefinite DP *a report*. This effect in turn is much more prominent in the condition with a bare *wh*-filler. At first glance this seems like a contradiction to the findings of Warren & Gibson (2002) where indefinites were read slowest. But this may be an instance of two competing processing preferences. Whereas definite noun phrases are easier to integrate at the verb in (36) because of their greater specificity, they also constitute stronger interveners for crossing Filler Gap Dependencies in (37) because of interference effects (Vasishth & Lewis, 2006).

More direct and compelling results come from Kluender & Kutas (1993). They compared acceptability ratings and ERP data for different complementizers (*that*, *if* and *who/what*) within different sentence types: yes/no-questions with subject or object questions (see (38-a), (38-b) and (38-c)) and multiple constituent questions with embedded subject or object Filler Gap Dependencies (see (38-d) and (38-e)).

- (38) a. Can you believe *that* his coach clocked him at under four minutes a mile at his last training session?
 b. Couldn't you decide *if you/who* should sing something for grandma at the family reunion?
 c. Do you wonder *if they caught him/who_k they caught t_k* at it by accident?
 d. Who_i did you decide *that you/?if you/*who* should sing something for t_i at the family reunion?
 e. What_i do you suppose *that caught him/?if they caught him/*who_k they caught t_k* at t_i by accident?

Lower judgments of acceptability (*who/what*<*if*<*that*) corresponded to higher N400 amplitude responses to complementizers (*who/what*>*if*>*that*). They also

report a consistent effect of left anterior negativity from filler to gap site, which indicates the processing load necessary to hold a filler in working memory. These findings were accompanied by lower acceptability ratings for long Filler Gap Dependencies that were interpreted as higher processing costs. As expected, these two factors interacted in both methods. Thus the study provided evidence for the differential processing of the complementizer due to their semantic content, a processing difference of holding a filler in working memory, and an interaction of these both effects.

3 The Issue of Grammaticalness

The main reason why Island structures are assumed to be ruled out by grammar is their low acceptability. The notions of *grammaticality* and *acceptability* are often used synonymously.

3.1 Grammaticality

In the tradition of generative grammar possible sentence can be divided in two sets, *grammatical* and *ungrammatical* sentences.

“The fundamental aim in the linguistic analysis of a language L is to separate the *grammatical* sequences which are the sentences of L from the *ungrammatical* sequences which are not sentences of L and to study the structure of the grammatical sentences. The grammar of L will thus be a device that generates all of the grammatical sequences of L and none of the ungrammatical ones. One way to test the adequacy of a grammar proposed for L is to determine *whether or not the sequences that it generates are actually grammatical, i. e. acceptable to a native speaker, etc.* [emphasis C.F.]” (Chomsky, 1957, 13)

Three problems arise from a binary distinction.

1. The issue of adequate mapping: If we assume, according to the quote above, that a sequence is either grammatical or ungrammatical, we end up with a set G that consists of two exclusive subsets G_{in} and G_{out} . This separation is assumed on grounds of a (rule based) grammar. If we further assume that acceptability is gradual, i.e. that we can say a sequence B is more acceptable than a sequence C which is in turn more acceptable than a Sentence D, we end up with a proset A that consists of preordered subsets A_1, \dots, A_n , where $1 < r < n$ and $A_1 \geq^* A_r \geq^* A_n$. Wherein $\alpha \geq^* \beta$ means that α is equally or more acceptable than β . If we want to test the adequacy of the distinction between

grammatical and ungrammatical sentences we have to choose a rather arbitrary division of the preordered subset of A , as in (39).

- (39) a. $A_1, \dots, A_r \mapsto G_{in}$
 b. $A_{r+1}, \dots, A_n \mapsto G_{out}$

This problem of mapping subsets of A onto G cannot be avoided by introducing further subsets of grammaticality.

Differentiation of acceptability can be observed for acceptability judgments of constructions that are traditionally considered grammatical (Kluender & Kutas, 1993) and of structures that are traditionally considered to be ungrammatical (Featherston, 2008). This makes clear that there is a strong discrepancy between acceptability judgments and a concept of grammaticality as defined above. If grammaticality models acceptability we expect only variation between two groups of sequences, but neither variation within grammatical sentences nor within ungrammatical sentences. Therefore acceptability judgements cannot adequately be modeled by grammaticality.

2. The disregard of semantics: With reference to his famous examples in (40) Chomsky (1957) concludes that grammar and meaning are independent.

- (40) a. furiously sleep ideas green colorless
 b. colorless green ideas sleep furiously
 (Chomsky, 1975, 95)

Hill (1961) argues that the assignment of (un)grammaticality presupposes the proper recognition of the underlying structure. Hence an utterance can only be ungrammatical with respect to a specific structural analysis.

To which degree is the ambiguous trace position in (41) dependent on the resulting meaning?

- (41) How_{*i*/**j*} did John announce t_i [a plan [to fix the car t_j]] (cf. Chomsky, 1986, 35)

On (42) there is not even a structural ambiguity. The utterance is ruled out solely on grounds of (co-)reference.

- (42) *He_{*i*} said that Mary kissed John_{*i*}. (cf. Chomsky, 1981, 227, fn.45)

3. The matter of performance: Whereas acceptability is assumed to reflect grammaticality it has been accepted that acceptability can sometimes be influenced by performance. A prime example are center embeddings. Because recursion is a desired property of phrase structure grammar, center embedding are in principle unrestricted. Structures that exhibit three or more levels of embeddings, like in (43) are considered (*grammatical*) *acceptable* but (*psychological*)

unacceptable (cf. Miller & Isard, 1964, 294).

- (43) a. The man [who said [that a cat [that the dog chased] killed the rat]] is a liar. (cf. Miller & Isard, 1964, 293)
b. The salmon [that the man [that the dog chased] smoked] fell]. (cf. Lewis, 1996, 94)

The *missing VP effect* of Gibson & Thomas (1999) provides further evidence for the influence of performance on center embeddings.

Accepting the fact that acceptability is at least in some cases independent of the grammaticality of a structure is simply stating a problem: How can we decide in which cases acceptability is a criterion for grammaticality and in which cases it is independent? To be more concrete, how can we know that the low acceptability of English Island configurations is a matter of competence and not a matter of performance, e. g. working memory limitations? Without a proper set of criteria to distinguish the influence of performance and competence on acceptability, argumentation in favour of one or the other remains rather stipulative.

An additional aspect is, that it is impossible to judge the acceptability of a linguistic structure without processing it. No judgement can be given for a meta-description as in (44-b).

- (44) a. John said that the girl will leave.
b. A matrix clause consisting of a proper name *John* as subject, a verb *said* and a complement clause introduced by *that*. The complement clause consists of a definite noun phrase *the girl* as subject and an intransitive verb in future tense which is composed of the auxiliary *will*, followed by the lexical verb *leave*.

3.2 Acceptability

It is known that acceptability judgements are dependent on many factors some of which are listed below:

- Acceptability judgements reflect the individual intuition and are therefore subjective. This may lead to
 - the assumption that the intuition of one person is more reliable than that of another person (*arguments from authority*) (Sampson, 2007).
 - the problem that intuitions are not falsifiable (Featherston, 2007; Jurka, 2010) (*my idiolect gambit*)
- Linguists differ sometimes from naive speakers (*linguist bias*) (Spencer, 1973; Bradac et al., 1980; Dąbrowska, 2010). This is maybe due to
 - extensive exposure (satiation effect) (Snyder, 2000; Goodall, 2011; Sprouse, 2007)

- the expectation of finding an effect (*observer bias*) (Dąbrowska, 2010).
- Formal acceptability judgements are dependent on two groups of factors (Schütze, 1996)
 - task related factors (order of presentation, number and type of fillers, method of judgment, etc.)
 - subject related factors (literacy, age, language experience, etc.)

3.3 Definitions

In order to separate *acceptability* and *grammaticality* both concepts need to be defined.

First I will define a cover term α -*Grammaticalness*, in (45).

- (45) **α -Grammaticalness**
 α -Grammaticalness is the property of any given linguistic entity to belong to a given language.

α -*Grammaticality*, as defined in (46), is solely dependent on rules of grammar and therefore a categorial distinction.

- (46) **α -Grammaticality**
 α -Grammaticality is a property of a linguistic entity (e.g. a sentence). It is defined as the possibility of describing the relations that hold between the elements of the given entity based on the rules of a grammar theory. A linguistic entity is α -grammatical to the degree to which the relations between the elements can be described by a grammar theory.

α -*Acceptability*, on the other hand, is only dependent on the speakers' intuition. It is a gradual distinction and the impact of grammar depends on the judging subject.

- (47) **α -Acceptability**
 α -Acceptability is a property of a linguistic entity (e.g. a sentence). It is defined as the possibility of recognizing relations that hold between the elements of the given entity, based on intuition of native speakers. It can only be assigned relative to another (possibly implicit) linguistic entity.

4 Experiments

4.1 Acceptability Judgment

The acceptability judgement was conducted in a thermometer judgement paradigm (Featherston, 2008). In this paradigm people judge stimuli on a two side open end linear scale, relative to two reference items.

12 Conditions, 36 items + 64 filler items from other experiments. 48 participants, via the online tool *OnExp*.

Conditions:

- 4 Sentence types
 - BASELINE: *wh*-extraction of a verbal complement clause
 - WH: *wh*-extraction of an embedded interrogative clause (*wh*-Island)
 - CNPCCOMP: CNPC violation with a *wh*-extraction out of a complement clause of a noun
 - CNPCREL: CNPC violation with a *wh*-extraction out of a relative clause
- 3 Types of Filler
 - BARE: bare *wh*-pronoun
 - WHICH: *which*-NP filler
 - ADJ: *which*-NP filler with two additional modifiers

4.1.1 Material

(48) BASELINE-BARE/WHICH/ADJ:

- a. Nils wird verraten, dass Jana den Betrüger gedeckt hat, der auf Nils will betray that Jana the beguiler backed has, who on der Flucht war und hinreichend bekannt ist.
the escape was and acceptably known is
'Nils will betray that Jana has backed the beguiler who was on the run and is acceptably known.'
- b. *Wen_i / Welchen Betrüger_i / Welchen hinreichend bekannten*
who which beguiler which acceptably known
Betrüger_i wird Nils verraten, dass Jana t_i gedeckt hat?
beguiler will Nils betray that Jana backed has
'*Who / Which beguiler / Which acceptably known beguiler* will Nils betray that Jana has backed?'

- (49) a. WH-BARE/WHICH/ADJ:
 Nils hat erraten, ob Jana den Betrüger gedeckt hat, der auf der Flucht war und hinreichend bekannt ist.
Wen/Welchen Betrüger/Welchen hinreichend bekannten Betrüger
 hat Nils erraten, ob Jana gedeckt hat?
- b. CNPCCOMP-BARE/WHICH/ADJ:
 Nils hat die Tatsache erraten, dass Jana den Betrüger gedeckt hat, der auf der Flucht war und hinreichend bekannt ist.
Wen/Welchen Betrüger/Welchen hinreichend bekannten Betrüger
 hat Nils die Tatsache erraten, dass Jana gedeckt hat?
- c. CNPCREL-BARE/WHICH/ADJ:
 Nils hat die Identität erraten, die den Betrüger gedeckt hat, der auf der Flucht war und hinreichend bekannt ist.
Wen/Welchen Betrüger/Welchen hinreichend bekannten Betrüger
 hat Nils die Identität erraten, die gedeckt hat?

4.1.2 Results

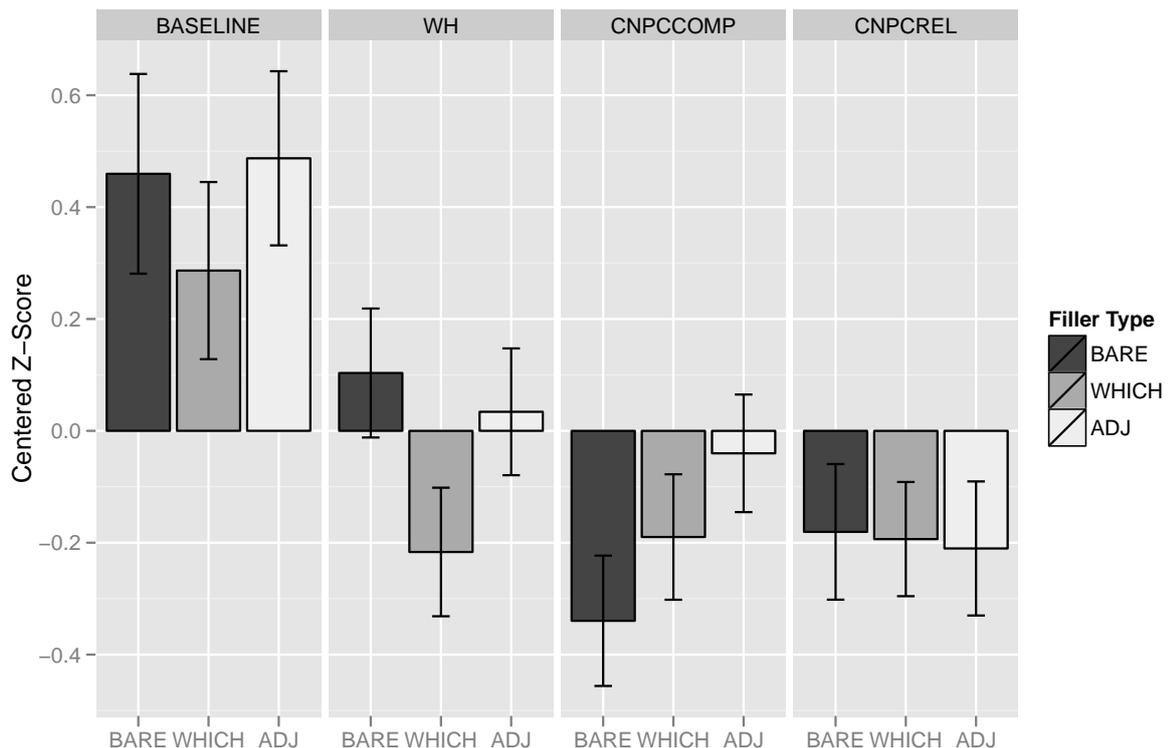


Figure 1: Mean centered Z-scores of the acceptability judgements. Errorbars show 95% confidence intervals.

- No influence of filler type in the BASELINE and the CNPCREL condition

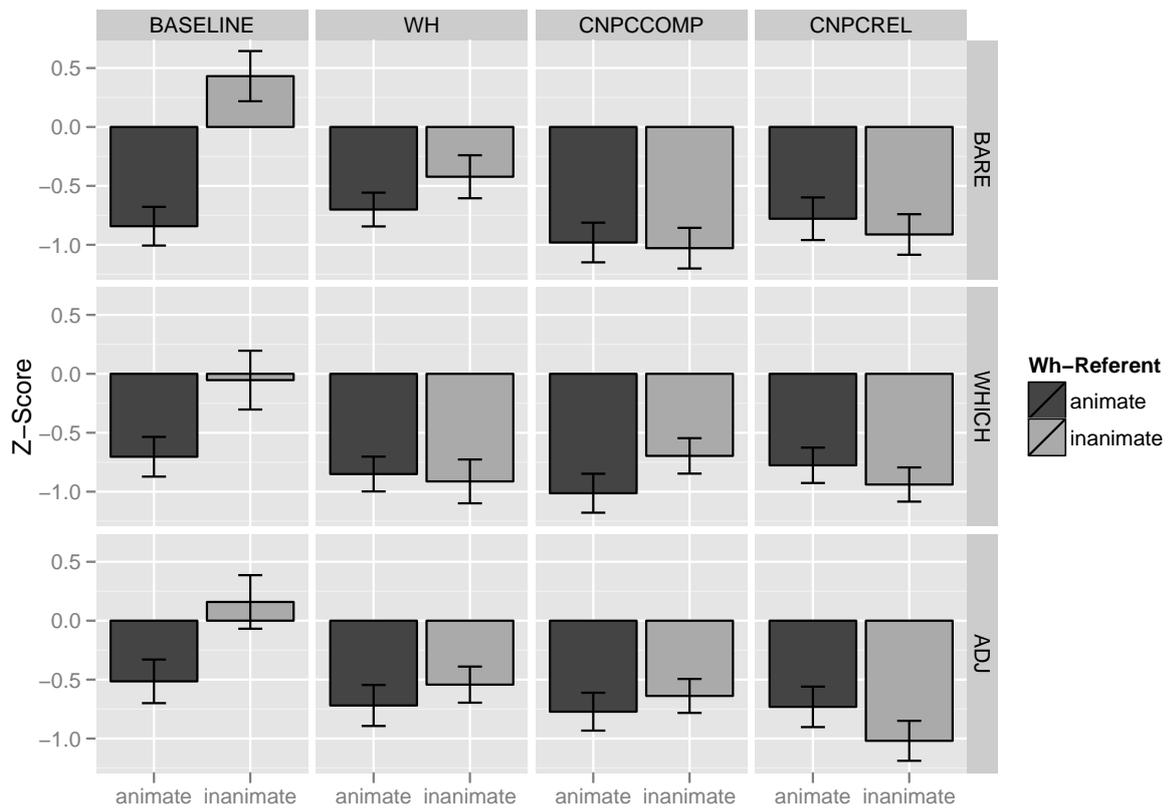


Figure 2: Mean z-scores contrasted with animacy of the wh-referent. Errorbars show 95% confidence intervals.

- low acceptability for WH-WHICH
- ameliorating effect of filler informativity in CNPCCOMP
- significant effects of animacy of the *wh*-referents (*who* vs. *what*)

4.2 Self-Paced Reading Study

We conducted a self-paced reading study with a proper subset of the acceptability judgement items, two sentence types (BASELINE and CNPCCOMP) and three filler types (BARE, WHICH and ADJ).

We used the software *Presentation* and a stationary window paradigm. Participants read a context sentence followed by an interrogative sentence and chose one of three answer possibilities. In the study participated 48 students. All native German speakers right handed.

4.2.1 Material

(50) BASELINE-BARE/WHICH/ADJ:

- a. Nils wird verraten, dass Jana den Betrüger gedeckt hat, der auf Nils will betray that Jana the beguiler backed has, who on der Flucht war und hinreichend bekannt ist.
the escape was and acceptably known is
'Nils will betray that Jana has backed the beguiler who was on the run and is acceptably known.'
- b. *Wen_i/ Welchen Betrüger_i/ Welchen hinreichend bekannten*
who which beguiler which acceptably known
Betrüger_i wird Nils verraten, dass Jana t_i gedeckt hat?
beguiler will Nils betray that Jana backed has
'*Who/ Which beguiler/ Which acceptably known beguiler* will Nils betray that Jana has backed?'

(51) CNPCCOMP-BARE/WHICH/ADJ:

- a. Nils wird die Tatsache verraten, dass Jana den Betrüger gedeckt
Nils will the fact betray that Jana the beguiler backed
hat, der auf der Flucht war und hinreichend bekannt ist.
has, who on the escape was and acceptably known is
'Nils will betray the fact that Jana has backed the beguiler who was on the run and is acceptably known.'
- b. *Wen_i/ Welchen Betrüger_i/ Welchen hinreichend bekannten*
who which beguiler which acceptably known
Betrüger_i wird Nils die Tatsache verraten, dass Jana t_i gedeckt
beguiler will Nils the fact betray that Jana backed
hat?
has
'*Who/ Which beguiler/ Which acceptably known beguiler* will Nils betray the fact that Jana has backed?'

(52) Sample of answer possibilities of the self-paced reading task

CORRECT	RELATED	DISTRACTOR
a.) <i>den flüchtigen Betrüger</i>	b.) <i>den müden Betrüger</i>	c.) <i>den großen Dieb</i>
‘the fugitive beguiler’	‘the tired beguiler’	‘the tall thief’

4.2.2 Results

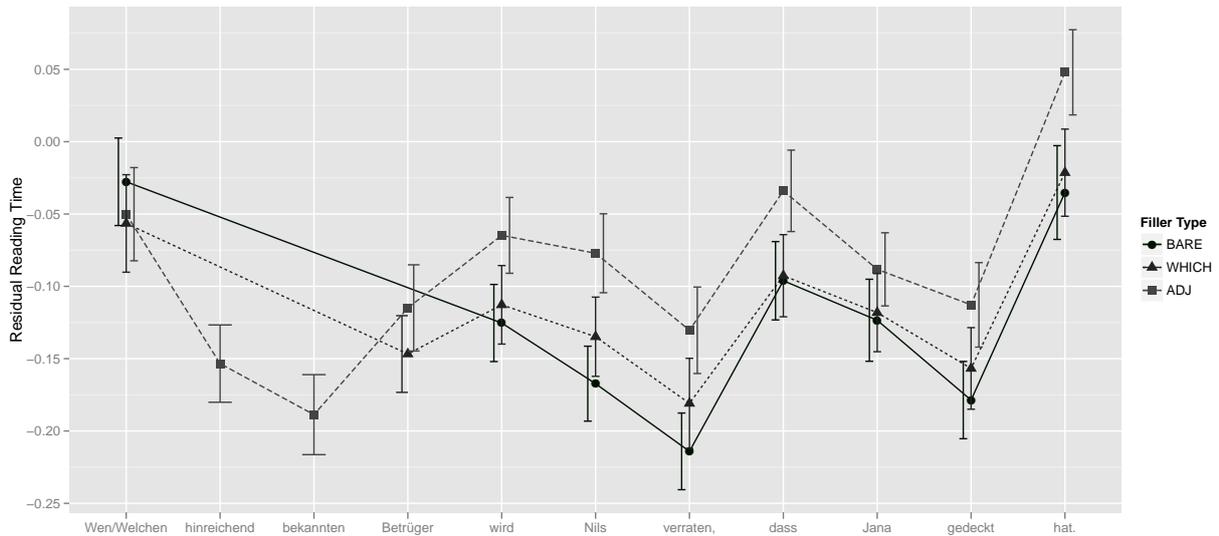


Figure 3: Time curve of the mean residual reading times in the BASELINE-configuration. Errorbars show 95% confidence intervals.

BASELINE:

- Reading times for BARE and WHICH are at no segment significantly different.
- Reading times for ADJ are significantly longer than for BARE (and WHICH):
 - from the main clause auxiliary (*wird*) until the complementizer (*dass*)
 - and again at the supposed retrieval region, the embedded verb (*gedeckt*) and the embedded auxiliary (*hat*).
- No significant difference between all three conditions at the embedded clause subject (*Jana*)
- Inanimate *wh*-referents caused faster reading times at the embedded auxiliary.

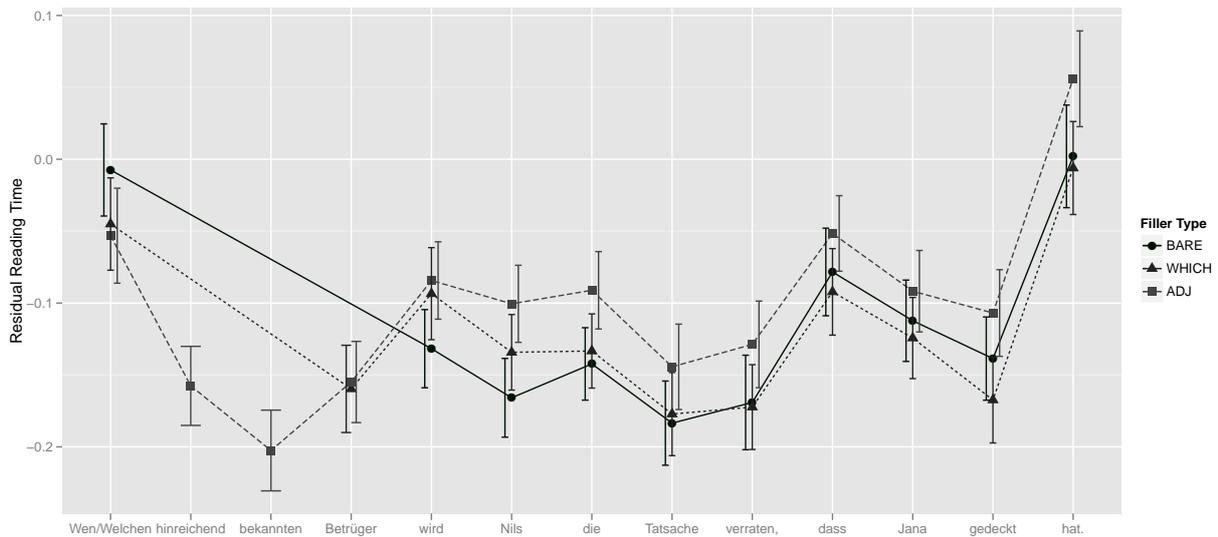


Figure 4: Time curve of the mean residual reading times in the CNPCCOMP-configuration. Errorbars show 95% confidence intervals.

CNPCCOMP:

- reading times for BARE and WHICH are at no segment significantly different
- reading times for ADJ are significantly longer than for BARE (and WHICH) on the main clause subject (*Nils*) and on the island inducing determiner (*die*).
- No significant difference between all three conditions from the main clause island inducing NP (*Tatsache*) until the embedded clause subject (*Jana*)
- reading times for ADJ are slower than for WHICH (and BARE) at the supposed retrieval region, the embedded verb (*gedeckt*) and the embedded auxiliary (*hat*).
- Animated *wh*-referent caused faster reading times for the region Island inducing NP (*Tatsache*), matrix verb (*verraten*), and complementizer (*dass*).

Sentence Types:

- Significant effects of sentence types only at the matrix verb and the embedded verb.
- additional intervener, Island inducing NP, seems to slow down retrieval/integration processes at the verbs
- more informative filler seem to cause longer reading times but are more stable with respect to interveners

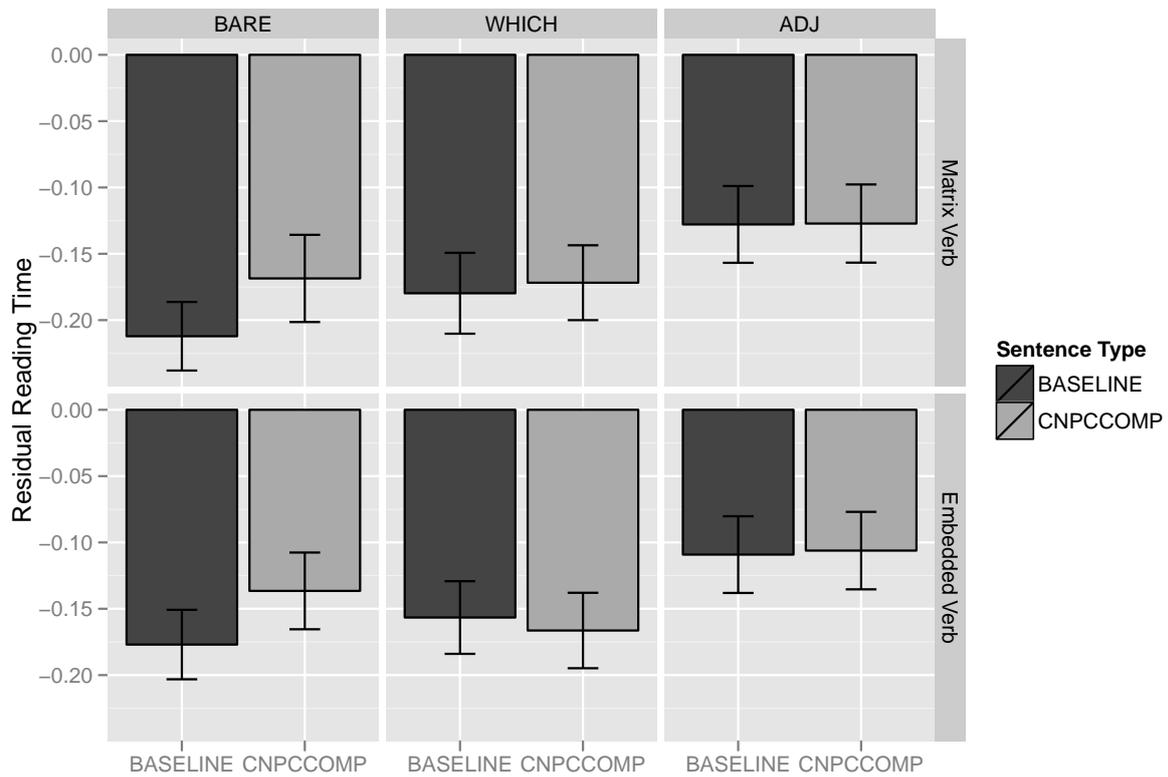


Figure 5: Contrast of residual reading times of the matrix verb and the embedded verb in the different sentence types. Error bars show 95% confidence intervals.

Answer times:

- ADJ received shorter answer times than WHICH and significantly shorter answer times than BARE.
- BASELINE received shorter answer times than CNPCCOMP.

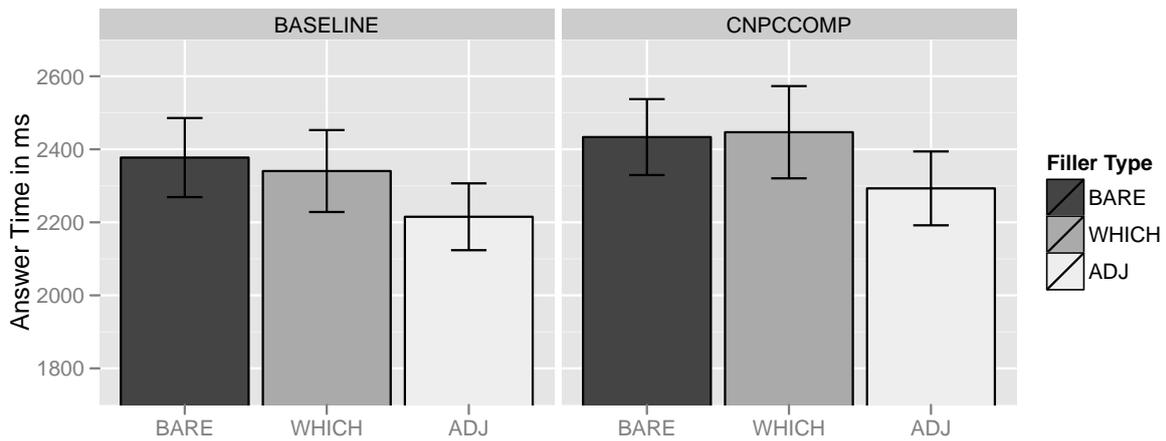


Figure 6: Answer times of the self-paced reading study. Error bars show 95% confidence intervals.

4.3 Discussion

- For German Island violations the Memory Facilitation Hypothesis (30) cannot be confirmed.
- No simple correspondence between reading times and α -acceptability judgments
- Filler type has influence on α -acceptability of strong Islands (CNPCCOMP), contradicting Alexopoulou & Keller (2007).
- Filler informativity rather than D-linking seems to influence α -acceptability
- Formal *weight* seems to impede on-line processing but to facilitate sentence final wrap-up processes (Kluender & Kutas, 1993, cf.)
- *Formless* cues, such as animacy of the *wh*-referent influence both, on-line processing and off-line judgments

5 Conclusion

- Islands are not categorical excluded phrase structure configurations
- There is need for refined definitions of theoretical primitives concerning *Grammaticalness*
- The judgment of linguistic structures is influenced by processing factors

- The influence of processing factors on linguistic structures and resulting judgements is highly interdependent and nontrivial

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