

#10 – What is a ‘Processing Explanation’?

Typology of Explanations of Subjacency

- a. Violation of specific constraint of declarative or procedural grammar (Ross 1967, Chomsky 1973 and countless subsequent analyses)
- b. Insufficient computational resources/memory etc. (Kluender 1998)
- c. Violation of specific procedural algorithm, an aspect of a ‘parser’ (Pritchett 1991)
- d. Specific grammatical constraint required because of how the grammar is implemented (Berwick & Weinberg 1984)

Avoidability of Processing Problems, Inevitability of Grammatical Violations

Suggestions on handout #9: Garden paths are typically caused by lack of relevant semantic knowledge that is required to justify a more complex structure. Appeal to the same mechanisms in syntax involves merely saying that in situations in which there is *no* semantic knowledge that would justify a more complex structure for a given string, the more complex structure cannot be built. Garden paths can be avoided when additional information is provided to the comprehender.

Pritchett’s approach involves specifying the steps of a structure-building algorithm. The system can be set up so as to stop island violations from being overcome, by making the operations mandatory; but then there’s a problem in making the same problems avoidable in the case of garden path sentences, when appropriate supporting semantic information is provided.

Kluender’s approach is based on the idea that certain resources are over-taxed at certain points in constructing a representation. He draws a connection with center-embedding difficulty rather than with garden path difficulties. By stating that island violations are ‘conventionalized’ processing difficulties, he sidesteps the problem of explaining why concentrating very hard rescues center embeddings but fails to take away the intuition of unacceptability from islands.

Kluender 1998: On the Difference between Strong and Weak Islands

Logic of the argument: if the same factors that can move a center-embedded structure from acceptable to unacceptable can also rescue or significantly improve a wh-island or CNPC violation, then the unacceptability must be of the same kind in both instances.

This logic is valid provided that:

- The empirical generalization is correct
- The factors in question have equally general effects in both domains
- Unacceptability is a composite measure, which either *ignores* or is *independent* of ‘grammatical’ violations.

Suppose that unacceptability is a composite of ‘grammatical’ and ‘processing’ deviance, and that, for the sake of illustration, 5 deviance points or above amounts to ‘unacceptability’.

(1)	Best double center embeddings	3 processing deviance points	acceptable
	Best wh-island violations	3 grammatical deviance points	acceptable
	... add 3 processing deviance points to each		
	Bad double center embedding	$3P + 3P = 6$ points	unacceptable
	Bad wh-island violation	$3G + 3P = 6$ points	unacceptable

In this example, although the same factors push the different classes of sentences over the threshold of acceptability, this does not mean that they are unacceptable 'for the same reason'.

We can clearly distinguish two dimensions of acceptability for sentences: there are clear cases of easy to comprehend sentences which nevertheless straightforwardly violate some grammatical rule (e.g. agreement), and there are cases of sentences which do not obviously violate any grammatical constraint, but are impossible to comprehend. The first kind of acceptability is generally assigned to the 'grammar' and the second kind of unacceptability to the 'processor'. These two kinds of unacceptability do not by any means imply that there is a grammar/processor distinction, except in a very weak sense. However, we do still need to distinguish between at least unacceptability due to the lack of sufficient computational resources, and unacceptability due to violation of specific constraints on structural representations or processes.

There are main effects on acceptability of

- (i) clause boundary type (that, if, what)
- (ii) presence or absence of wh-filler

plus an interaction of the two effects

The interaction could be due to the way in which the two main effects combine, or due to some independent property, such as the wh-island constraint. Kluender & Kutas' findings don't provide us with any reason to distinguish between these two alternatives, as far as I can tell.

In asking subjects for acceptability ratings, an effect of extraction length was found. Presumably this effect would become even larger as extraction length was increased to span additional clauses. It is this kind of effect that linguists typically attempt to abstract away from, as it seems to be merely bounded by computational resources, and not by the availability of specific computations.

If the wh-island effect is just due to the interaction of length-of-dependency effects and referential-processing-at-boundary effects, then wh-island acceptability should continue to fall off precipitously as extraction-length increases. On the other hand, if the effect of crossing a wh-island is due to a specific additional factor, then the cost of a wh-island should stay constant or even decrease as extraction-length increases.

- (2) a. What do you know that John likes ___?
b. What do you know whether John likes ___?
- (3) a. What do you think that Bill expects to know that John likes ___?
b. What do you think that Bill expects to know whether John likes ___?

Factors discussed

- D-linking (etc.) of extractee improves acceptability
- D-linking (etc.) of intervener(s) reduces acceptability
- Lack of independent tense in path of extraction improves acceptability

Strong Islands

Basically, the examples below confirm Kluender's claim that the 'referential properties' of the extracted argument, the most embedded tense, and at least certain intervening elements has an effect on the acceptability of sentences.

Relative Clause islands

- (4) a. * What did you meet the man who ___ was reading ___?

- b. * What did you meet someone who __ was reading __?
 - c. * What do you hope to find someone who __ was reading __?
- Improvement due to D-linking of extractee
- (5)
- a. ?? That's the article that we need to find someone who __ can understand __?
 - b. ?* Which of the articles do we need to find someone who __ can understand __?
 - c. ?* What do we need to find someone who __ can understand __?
- Improvement due to properties of head of relative clause
- (6)
- a. ?? What do we need to find someone PRO to read __?
 - b. ?* What do we need to find a semanticist PRO to read __?
 - c. * What do we need to find the best reviewer PRO to read __?
- Difference in status for tensed and tenseless relative clauses
- (7)
- a. * What do we need to find someone who'll read __? >
 - b. * What do we need to find a semanticist who'll read __?
 - c. * What do we need to find the best reviewer who'll read __?
- Not clear that modifying the referential properties of any other intervening NPs has any effect on acceptability
- (8)
- a. ?? What do we need to find someone PRO to read __?
 - b. ?? What does anybody need to find someone PRO to read __?
 - c. ?? What does that man need to find someone PRO to read __?
 - d. ?? What do all of those people who just walked in need to find someone PRO to read __?

Complex NP islands

- (9)
- a. ?? That's the article that we believe the report that John read __?
 - b. ?? Which of the articles do we believe the report that John read __?
 - c. ?? What do we believe the report that John read __?

Subject islands

- Effect of referential properties of extractee on acceptability (mild effect in predicted direction)
- (10)
- a. ?* That's the book that we think a good review of __ will boost sales greatly.
 - b. * Which of the books do we think that a good review of __ will boost sales greatly?
 - c. * What do we think that a good review of __ will boost sales greatly?
- (11)
- a. ?* That's the book that a good review of __ will boost sales greatly.
 - b. * Which of the books will a good review of __ boost sales greatly?
 - c. * What will a good review of __ boost sales greatly?
- Effect of referential properties of head of subject NP on acceptability (mild effect in predicted direction)
- (12)
- a. ?* Which of the books will a damaging review of __ hurt sales?
 - b. * Which of the books will the damaging review of __ hurt sales?
 - c. * Which of the books will Susan's damaging review of __ hurt sales?

Adjunct islands

- Referential properties of extractee don't seem to make much difference to the acceptability of these

- (13) a. * That's the book that John did the laundry while he was reading __.
 b. * Which of the books did John do the laundry while he was reading __?
 c. * What did John do the laundry while he was reading __?
- (14) a. ?* That's the book that John did the laundry while PRO reading __?
 b. ?* Which of the books did John do the laundry while PRO reading __?
 c. ?* What did John do the laundry while PRO reading __?

Weak Islands

Wh-islands

- (15) a. * What did you ask which man __ was reading __?
 b. ?* What did you ask who __ was reading __?

- Does modifying the definiteness/accessibility of the embedded subject affect the status of a potential wh-island? I don't think so.

- (16) a. ?? What did you wonder whether the reviewer from the *Times* had read __?
 b. ?? What did you wonder whether the reviewer had read __?
 c. ?? What did you wonder whether a reviewer had read __?
 d. ?? What did you wonder whether someone had read __?
 e. ?? What did you wonder whether he had read __?

- Effect of changing referential properties of the intervening wh-phrase on the acceptability of wh-islands

- (17) a. * What did you wonder who __ read __?
 b. * What did you wonder which man __ read __?
 c. * What did you wonder which of the men __ read __?

- (18) a. ?* What did you ask who __ read __?
 b. * What did you ask which man __ read __?
 c. * What did you ask which of the men __ read __?

- What is the status of extractions from wh-islands with infinitival embedded clauses?

- (19) a. What did you ask whether to read __?
 b. What did you ask when [PRO to read __]?
 c. What did you ask how to read __?
 [embedded extraction from sentence-final position?]
 d. ? What do you know when to read __?

- (20) ?* What do you know when to say that the students should read __?
 [seems markedly better under the *embedded* construal of *when*]

- (21) ?* What do you know when to tell the dean that the committee read __?

- Does the improvement due to tense reduce to an effect of the discourse status of the embedded subject?

- (22) a. ? What did you ask when PROarb to read __?
 b. ?* What did you ask when John wants PROcon to read __?
 c. ?? What did you ask when it would be best PROarb to read __?

- (23) a. ? What did you ask how PROarb to read ___?
 b. ?* What did you ask how the professor prefers PROcon to read ___?
 c. ?* What did you ask how the professor thinks it's best PROarb to read ___?
- (24) a. ?? What did you ask when somebody would like PRO to read ___?
 b. ?* What did you ask when the man from Dover would like PRO to read ___?

- There does seem to be a slight ±tense contrast when extracting across an in-situ wh-phrase

- (25) a. ?? What do you expect who ___ to enjoy ___?
 b. ?? What do you want who ___ to enjoy ___?
 c. ?* What do you suspect who ___ was enjoying ___?
- (26) a. ?? What do you expect who ___ to say ___?
 b. ?? What do you want who ___ to say ___?
 c. ?* What do you suspect who ___ will say ___?

- Improvement due to D-linking of extractee

- (27) a. ? That's the article that you knew who ___ was reading ___?
 b. ?* Which of the articles did you know who ___ was reading ___?
 c. * What did you know who ___ was reading ___?

Negative islands

- (28) a. * Why don't you think that John likes Mary ___?
 b. * How don't you think that Sue fixed the computer ___?
- (29) a. These are the articles that we don't think that John likes ___?
 b. Which of these articles don't we think that John likes ___?
 c. What don't we think that John likes ___?

Factive islands

- (30) a. That's the article that it's surprising that John likes ___?
 b. ? Which of these articles is it surprising that John likes ___?
 c. ? What is it surprising that John likes ___?

Center Embeddings

[No ratings given – add your own]

- (31) a. The woman the man the host knew ___ bought ___ left.
 b. The woman that man the host knew ___ bought ___ left.
 c. The woman a man the host knew ___ bought ___ left.
 d. The woman someone the host knew ___ bought ___ left.
 e. The woman someone he knew ___ bought ___ left.

Kluender's analysis: definiteness of initial NPs, definiteness of interveners increases load. Familiarity, high accessibility, 'attenuated descriptive content' all improve acceptability.

- Inverting the order of the first and second NPs gives rise to similar improvement in acceptability. Similar reversals of definites and indefinites should not be similarly ineffective in wh-extractions. Distinctness of the clauses seems to help substantially.

- (32) a. The man the woman the host knew bought left.

- b. That man the woman the host knew bought left.
 - c. Some man the woman the host knew bought left.
 - d. Someone the woman the host knew bought left.
 - e. Someone the woman he knew bought left.
- Distinctness of the clauses is also aided by lengthening the final VP, something that should have no effect whatsoever on processes involved in holding fillers in working memory.
- (33) That man the woman the host knew bought decided to leave.
- Matching distinctness, while contrasting only definiteness.
- (34) a. The woman the man the senator knew bought decided to leave.
b. A woman a man a senator knew bought decided to leave.