More on Long Distance Dependencies

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Subject Gaps

- The ARP revision only allowed missing complements.
- But gaps occur in subject position, too:
  This problem, everyone thought ___ was tricky.
- We handle these via a lexical rule that, in effect, moves the contents of the SPR list into the GAP list

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The Subject Extraction Lexical Rule

$$\begin{bmatrix} \textit{pi-rule} & \\ \text{INPUT} & \left\langle \text{X} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{FORM} & \text{fin} \end{bmatrix} \\ \text{VAL} & [\text{SPR} \quad \langle \text{Z} \rangle] \end{bmatrix} \\ \text{ARG-ST} & \boxed{\text{A}} \end{bmatrix} \right\rangle \\ \text{OUTPUT} & \left\langle \text{Y} , \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & [\text{SPR} \quad \langle \ \rangle] \\ \text{GAP} & \langle \boxed{1} \rangle \end{bmatrix} \\ \text{ARG-ST} & \boxed{\text{A}} \langle \boxed{1} , \ldots \rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

- The new ARP still holds, that is, the non-SPR arguments are still distributed between COMPS and GAP.
- This says nothing about the phonology, because the default for *pi-rule*s is to leave the phonology unchanged.

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A Lexical Sequence This Licenses

$$\left\langle \text{likes}\ ,\ \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{FORM} & \text{fin} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \boxed{2}\ \rangle \end{bmatrix} \\ \text{GAP} & \left\langle \boxed{1}\begin{bmatrix} \text{CASE} & \text{nom} \\ \text{AGR} & \textit{3sing} \end{bmatrix} \right\rangle \\ \text{STOP-GAP} & \langle\ \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle\ \boxed{1}\ ,\ \boxed{2}\text{NP[acc]}\ \rangle \end{bmatrix} \right\rangle$$

- Note that the ARP is satisfied

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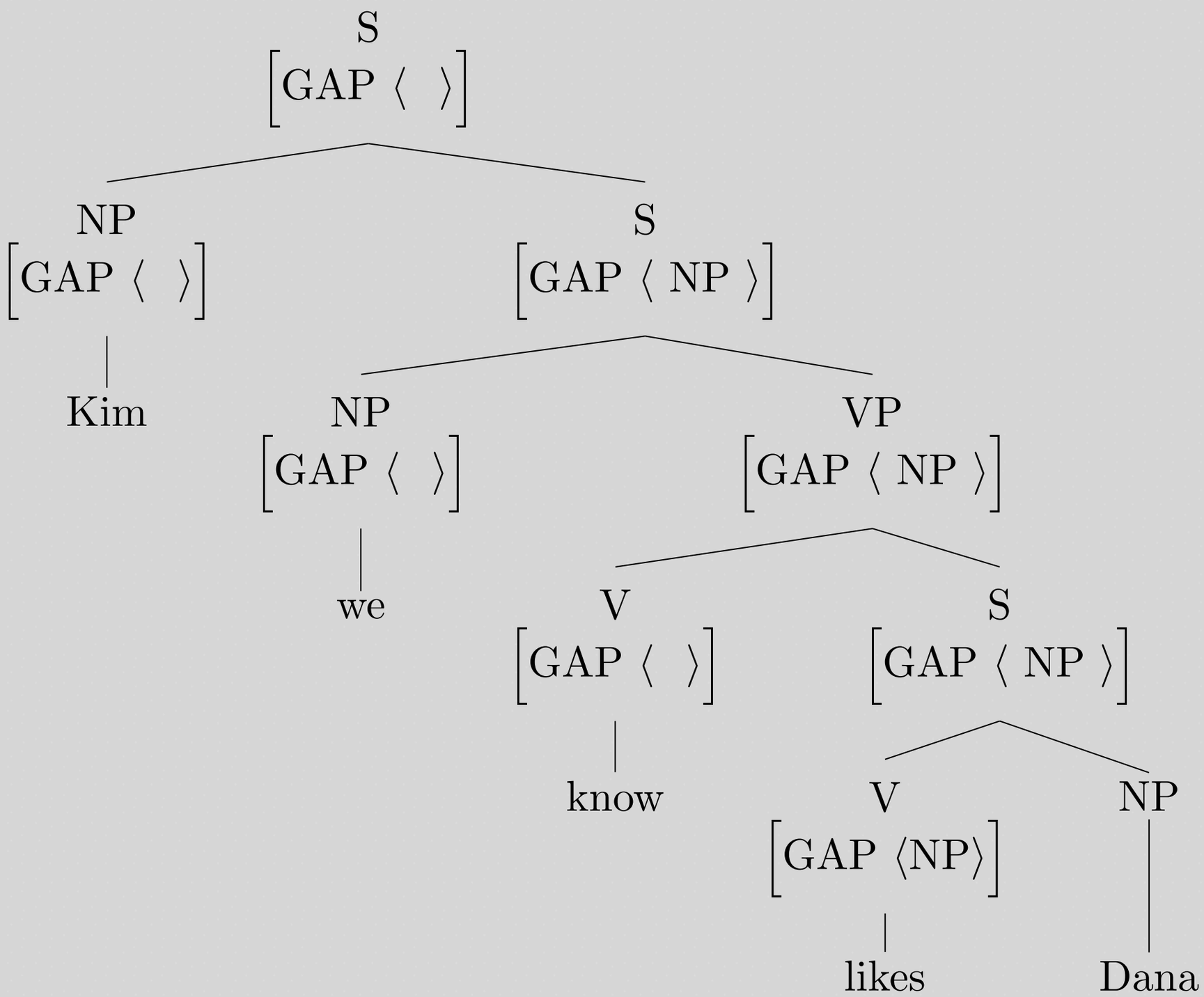
A Tree with a Subject Gap



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Island Constraints

- There are configurations that block filler-gap dependencies, sometimes called “islands”
- Trying to explain them has been a central topic of syntactic research since the mid 1960s
- We’ll look at just one, Ross’s so-called “Coordinate Structure Constraint”
- Loose statement of the constraint: a constituent outside a coordinate structure cannot be the filler for a gap inside the coordinate structure.

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Coordinate Structure Constraint Examples

**This problem, nobody finished the extra credit and____*

**This problem, nobody finished____ and the extra credit.*

**This problem, nobody finished ___ and started the extra credit.*

**This problem, nobody started the extra credit and finished____*

- But notice:

  This problem, everybody started____ and nobody finished ____

- Aside: Notice that examples like the last one are surprising on a transformational account, because there are two gaps but only one filler.

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The Coordinate Structure Constraint

- In a coordinate structure,
  - no conjunct can be a gap (conjunct constraint), and
  - no gap can be contained in a conjunct if its filler is outside of that conjunct (element constraint)
  - …..unless each conjunct has a gap that is paired with the same filler (across-the-board exception)

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These observations cry out for explanation

- In our analysis, the conjunct constraint is an immediate consequence: individual conjuncts are not on the ARG-ST list of any word, so they can't be put on the GAP list
- The element constraint and ATB exception suggest that GAP is one of those features (along with VAL and FORM) that must agree across conjuncts.
- Note: There is no ATB exception to the conjunct constraint.

  **Apples, you can compare ____ and____.*

  **Chris, I didn't see ____ or even a picture of____.*

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Our Coordination Rule, so far

$$\begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{IND} & s_0 \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{IND} & s_1 \end{bmatrix} \ldots \begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{IND} & s_{n-1} \end{bmatrix} \begin{bmatrix} \text{HEAD} & \mathit{conj} \\ \text{IND} & s_0 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{ARGS} & \langle s_1 \ldots s_n \rangle \end{bmatrix} \right\rangle \end{bmatrix} \begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{IND} & s_n \end{bmatrix}$$

- Recall that we have tinkered with what must agree across conjuncts at various times.
- Now we'll add GAP to the things that conjuncts must share

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Our Final Coordination Rule

$$\begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{GAP} & \boxed{A} \\ \text{IND} & s_0 \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{GAP} & \boxed{A} \\ \text{IND} & s_1 \end{bmatrix} \ldots \begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{GAP} & \boxed{A} \\ \text{IND} & s_{n-1} \end{bmatrix} \begin{bmatrix} \text{HEAD} & conj \\ \text{IND} & s_0 \\ \text{RESTR} & \langle \left[\text{ARGS} \ \langle s_1 \ldots . s_n \rangle \right] \rangle \end{bmatrix} \begin{bmatrix} \text{FORM} & \boxed{1} \\ \text{VAL} & \boxed{0} \\ \text{GAP} & \boxed{A} \\ \text{IND} & s_n \end{bmatrix}$$

- We've just added GAP to all the conjuncts and the mother.
- This makes the conjuncts all have the same gap (if any)
- Why do we need it on the mother?

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Some Other Islands

- Complex NPs:
  I met [*the man who wrote that book*]
  **That book, I met the man who wrote* ___
- Clausal Subjects:
  [*That you insulted my mother*] *upset me*
  **My mother, that you insulted* ___ *upset me*
- Determiner Phrases:
  Pat knows [*the president of this company's*] *son*
  **This company('s), Pat knows the president of* ___ *('s) son*
- Embedded Questions:
  They wondered [*who you recommended that book to*]
  **That book, they wondered who you recommended* ___ *to*.

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The Search for General Principles

- Chomsky first noticed islands in the early 1960s
- J. R. Ross's 1967 MIT dissertation described a variety of island environments
- In a 1973 paper, Chomsky proposed a set of abstract conditions to account for a number of Ross's observations
- Since then, Chomsky has repeatedly revised his proposals, and many others have proposed alternative sets of principles
- Largely, they have been **locality** conditions -- that is, ways of keeping fillers and gaps from being separated by too much structure

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Islands & Processing

- Island constraints as locality conditions suggests that they may be motivated by processing considerations.
- Recent work by Kluender, Sag, and others has suggested that some islands arise not because of conditions on grammar, but because of processing difficulties
- Hofmeister has shown that by manipulating factors that affect parsing difficulty, he can make sentences with some island violations sound okay.

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Closing Remarks on LDDs

- We've only scratched the surface: it's a huge topic.
  - There are many more kinds of LDDs, which would require additional grammar rules
  - There are also more island constraints, which also need to be explained
- Our account of the coordinate structure constraint (based on ideas of Gazdar) is a step in the right direction, but it would be nice to explain why certain features must agree across conjuncts.

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