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# What is hierarchical structure?

Hierarchical structure involves the nesting of phrases inside phrases. For example, in our lecture on phrases we saw that there is a Verb Phrase, consisting of the verb and postverbal arguments, and a Noun Phrase, consisting of the noun and associated words (e.g. the determiner). We can “prove” that these structures exist using tests for phrasehood, e.g. **coordination**:

1. John ate the fish and the chips : COORDINATION OF NOUN PHRASES
2. John scoffed the fish and polished off the chips : COORDINATION OF VERB PHRASES

Our tests for phrasehood tell us that there is one phrase (an NP) nested inside another (a VP). This is what we mean by hierarhical structure. Hierarchical structure can be represented using **syntactic trees** (see examples in the lecture)

Words as well as sentences can have hierarchical structures, e.g.

Touch -> touch-able -> Un-touch-able.

# Embedding

When a phrase comes inside another phrase, we say that it is “embedded” in that phrase (NB this use of the term “embedded” is slightly different to the use of the term to describe certain types of dependent clauses). What this means is that when we move the container phrase, the lower-level phrase is also moved, e.g.

1. It was [ the documentary [ on penguins ] ] that the man watched t

Here the NP “the documentary on penguins” is moved to the front of the sentence from the position marked by t (trace). Note that the lower-level prepositional phrase moves with it.

# Hierarchical structure and syntactic ambiguity

We can use phrases to demonstrate how a single surface form may correspond to two different structures, e.g.

1. I’m a big dog man = *I am keen on dogs* (*big* = enthusiastic)
2. I’m a big dog man = *I like big dogs* (*big* = large)
3. I saw the woman with the binoculars = *I used the binocular to see the woman*
4. I saw the woman with the binoculars = *I saw the woman who was carrying some binoculars*

(SEE LECTURE SLIDES FOR ACTUAL SYNTACTIC TREES)

# Hierarchical structure and movement

Syntactic movement can be easily depicted using syntactic trees. We merely cut the tree at a particular point, and all of the branches at the tree below that point can be moved as a single unit! (SEE LECTURE SLIDES)

# Hierarchical structure and recursion

Recursion describes the process whereby a phrase is nested inside a phrase of the same type, e.g.

1. Your glasses are under the clock in the living room (PREPOSITIONAL PHRASE INSIDE ANOTHE PREPOSITIONAL PHRASE)
2. John believes Mary is pregnant (SENTENCE INSIDE A SENTENCE, OR “CLAUSE” INSIDE A “CLAUSE”)

Recursion is potentially infinite (e.g. \*John said that Peter said that Ali said that Chen said that Martha said that…). It is useful for communicative purposes, as it increases the efficiency of language, e.g.

1. John belives that Mary was pregnant (EXAMPLE WITH RECURSION)
2. John believes something. The following is his belief. Mary is pregnant (EXAMPLE WITHOUT RECURSION)

Noam Chomsky argues that recursion is an essential property of language, though Daniel Everett has argued that there is a tribe in the Amazon jungle (the Pirahā) who don’t do recursion, so it is not a universal feature of language.

# Recap on the advantages of trees

1. They can represent hierarchical structure
2. They can represent syntactic ambiguity
3. They can represent movement processes, and how these embed phrases
4. They can represent recursion

# Trees and Chomsky’s Universal Grammar

Noam Chomsky argues that we are born with innate knowledge of language. He bases this argument on the observation that we learn language very rapdily with little explicit correction. This argument is called **the argument from the poverty of the stimulus**. Quite literally, the language input we receive is too poor to explain our knowledge of language. Chomsky argues that our innate knowledge of language looks a bit like a tree.