1 Preliminaries

1.1 The complexity of adult native languages

Language...

- Adults have a very sophisticated knowledge of their native language.

- This is knowledge that we *don't* have conscious access to, but that we *have* nevertheless.

- Children become adults. Children wind up with this sophisticated knowledge. How does this happen?

- Adults can learn a second language. What is the nature of their knowledge? How does *this* happen?

Judgments, ambiguity

Some things are English. Some things are not. Adult native speakers know which is which, and agree.

(1)   Three cats chased a dog.

(2)   * Dogs three cat a chased.

(3)   Cheddar, I like, but brie, I can't stand.

(4)   You cannot stop a philosopher with a thesis.

(5)   Mary saw her in the mirror.

(6)   Mary saw her duck in the mirror.

Judgments on novel sentences

This even works for sentences we've never seen before.

(7)   The submerged capybara warily protects his hoops.

(8)   The submerged capybara protects his hoops warily.

(9)   Warily the submerged capybara protects his hoops.

(10)   * Warily the submerged capybara protect his hoops.

(11)   * Submerged capybara the protects his hoops warily.

(12)   ? The capybara submerged his hoops warily protects.

There is a grammar

Conclusion: There must be a grammar

There must be an algorithm for computing whether something is English.

- Adult native speakers uniformly and overwhelmingly agree.

- To know English is to have knowledge of (at least) which sentences are possible in English and which are not.

- That is, to know English is to know the grammar.

The question for this course

How do people acquire the grammar?

1.2   On becoming adults

Imitation?

Isn't this obvious?

What's the big deal? Kids hear what their parents do and imitate that. Why do we need 15 weeks to learn that? And besides, English is easy. Not like Chinese. Or Hungarian.

No, it's not really obvious.

Which ones are good? The ones you hear?

(13)   The first platypus to eat twenty-five yellow gummi bears will win a prize.

Right, whatever. You generalize.

So maybe kids hear what parents say and recognize the patterns, and come up with general rules. That's not so hard, is it?

(14)   Pat should borrow my guitar.

(15)   Should Pat borrow my guitar?

(16)   Robin will cook a sausage.

(17)   Will Robin cook a sausage?

Easy.
To form a yes-no question, take the second word and put it in the front.

See? Simple.

Question formation
To form a yes-no question, take the second word and put it in the front.

(18)   My roommate should borrow my guitar.

(19)   Roommate my should borrow my guitar?

(20)   The hungry Linguistics student will cook a sausage.

(21)   Hungry the Linguistics student will cook a sausage?

Structure dependence

The *actual* procedure for forming a yes-no question in English does not refer to the second *word*, but rather the auxiliary that follows the entire subject *constituent*. All syntactic operations have this property—they refer to the *structure* and not the *linear sequencing*.

Question formation
To form a yes-no question, move the auxiliary to before the subject.

The "poverty of the stimulus"

The grammatical properties that the children are acquiring are *underdetermined* by the evidence available to them. Yet, children always acquire the same rules.

(22)   1, 2, 3, —, — , —

        a. 4, 5, 6

        b. 5, 7, 11

c. 5, 8, 13

        d. 3, 2, 1

This is generally taken to mean that children *bring* something to the acquisition process. The system children learn is not derived only from what they hear, but from how their brains are made. Something about language is *innate*. Whatever that is, that's *universal grammar*.

2   Constraints

2.1   Wanna-contraction

What do you wanna say?

At least part of our language knowledge comes in the form of *constraints* on meaning or possible sentence structures. One example: *wanna*-contraction.

(23)   I want to invite John.

        a.   Who do you want to invite?

        b.   Who do you wanna invite?

(24)   I want John to dance.

        a.   Who do you want to dance?

        b.   * Who do you wanna dance?

Explaining *wanna* contraction

The syntax we assume here for questions is that *who* starts out where *John* does in the statement, and then we **move** *who* to the front (and invert the auxiliary, insert *do*, pronounce like a question). The ability to contract *want to* depends on whether *who* started between them. It's as if it leaves a silent "trace" of its original location, which can block the contraction process.

(25)   a.   you want to invite John.

        b.   — you want to invite who?

(26)   a.   I want John to dance.

        b.   — you want who to dance?

How can you learn that?

If the child is basing his/her language knowledge on what s/he hears, and generalizing—which we would need to assume due to the ability to handle novel sentences—it would seem to be dangerously easy to conclude that any time you have *want to*, you can contract it to *wanna*. But children don't. And it's not the way it works in adults' language knowledge either.

How could a child come to know this?

The child never hears it? But how can a child conclude that s/he's waited long enough—that the fact that it hasn't occurred means that it actually *can't* occur?

2.2   Other constraints

Constraints on coreference

There are many other similar constraints as well. One is that in certain circumstances, the pronoun *her* can't refer to the same person as the subject. But it *can* do so in other very similar sentences.

(27)   Mary saw her duck on the porch.

(28)   Mary felt the duck bite her.

(29)   Mary saw her in the mirror.

(30)   Mary saw herself in the mirror.

The "*that*-trace" constraint

Most of the time, the word *that* is optional with embedded sentences. But very occasionally, it's impossible.

(31)   a.   Sue said Mary kissed Pat.

      b.   Sue said that Mary kissed Pat.

(32)   a.   Who did Sue say Mary kissed?

      b.   Who did Sue say that Mary kissed?

(33)   a.   Who did Sue say kissed Pat?

      b.   * Who did Sue say that kissed Pat?

3 Negative evidence

3.1 Explicit teaching

Negative evidence

As linguists, the way we figure out what the rules are is to take into account both the sentences that are grammatical and those that are *not* grammatical. We state our generalizations, and build our hypotheses, on the basis of sentences that are ungrammatical.

Adults don't provide **negative evidence** (evidence a sentence is **not** grammatical) to children, at least not in any obvious way. So, children can't be basing their hypotheses on the same thing linguists are. Children are not really behaving as "little linguists," analyzing what they hear and forming their theory of grammar.

Nobody likes me

Plus, there are at least some well-known anecdotes suggesting that children are not particularly attentive to negative evidence even when it is provided.

From McNeill (1966).

(34) C: Nobody don't like me.
 A: No, say "nobody likes me."
 C: Nobody don't like me.
  (repeats 8 times)
 A: No, now listen carefully: say "nobody likes me."
 C: Oh! Nobody don't likes me.

Give me other one spoon

From Braine (1971).

(35) C: Want other one spoon, Daddy.
 A: You mean, you want the other spoon.
 C: Yes, I want other one spoon, please Daddy.
 A: Can you say "the other spoon"?
 C: Other. . . one. . . spoon
 A: Say "other."

> C: Other
>
> A: "Spoon"
>
> C: Spoon.
>
> A: "Other spoon"
>
> C: Other…spoon. Now give me other one spoon.

She holded the baby rabbits

From Cazden (1972), anecdotally observed by Jean Berko Gleason:

(36)　C: My teacher holded the baby rabbits and we patted them.

　　　A: Did you say your teacher held the baby rabbits.

　　　C: Yes.

　　　A: What did you say she did?

　　　C: She holded the baby rabbits and we patted them.

　　　A: Did you say she held them tightly?

　　　C: No, she holded them loosely.

3.2   Implicit negative evidence

Implicit negative evidence?

Brown & Hanlon (1970) looked at **approval** and **comprehension** as possible "back channels" through which implicit negative evidence could be provided. But…

Adults express **approval** to 45% of grammatical sentences and to 45% of ungrammatical sentences. (Adults seem to like true sentences, and dislike false ones, whatever the grammaticality status.)

Adults **understand** 42% of grammatical sentences and 47% of the ungrammatical ones.

Parents differ, and stop

Eve and Sarah's parents ask clarification questions after **ill-formed** *wh*-questions.

Adam's parents ask clarification questions after **well-formed** *wh*-questions, and after past tense errors.

After about age 4, Adam's and Sarah's parents stopped responding differently to ungrammatical utterances, but the children still made errors. Then what?

Statistics

Marcus (1993): Maybe the child can work with the odds, where there is a difference, even if the data is noisy.

Suppose a response happens 20% of the time to an ungrammatical sentence, and 12% of the time to a grammatical one.

The child says X. If there is a response, 63% chance that X was ungrammatical. If there is no response, 52% chance that X was grammatical.

That's not reliable enough to account for children's success. Though the odds improve if the child says X again and keeps track of the responses. To reach 99% confidence in the conclusion, X needs only to be said a mere 446 times. Hmm.

3.3   Lack of feedback opportunities

Lack of errors

Another big problem with supposing that negative evidence plays an important role: There are a lot of errors that children *just don't make*—so, there's nothing to which the feedback could be provided.

Conclusion

Children acquire language on the basis of only positive evidence.

4   Universal Grammar, Principles & Parameters

4.1   Universal Grammar

Being human

Universal Grammar

Having language = being human

Rocks, ferns, cats, apes don't soak up language when surrounded by it.

Birds have wings, people have arms.

What determines whether you're a bird is whether your parents are birds.

Language knowledge has some kind of genetically-specified template—knowledge of language can only take a certain form, limiting the number of possible variations language can have.

Universal Grammar

Universal Grammar (UG) explains how this could be possible.
Children acquire language...

- very quickly

- following the same course across languages

- under varying circumstances

- without explicit teaching

- with a uniform result

4.2   Principles and parameters

Principles and parameters

A common way to view UG is as something that imposes a system of principles on the grammars of languages, generally invariant across languages.

The dimensions of variation upon which languages can differ are expressed in terms of parameters of variation. Some languages are SVO, some are SOV. What the child is doing when acquiring a language is at least in part "figuring out" which of the two options corresponds to the language in the environment.

Determining what the principles and parameters of language are is the basic business being conducted in, e.g., Syntax class, Phonology class, etc.

4.3   Critical periods

Critical period

It also seems that there is a unique window of opportunity for acquiring a language early in life—which closes at a certain point.

If you are going to acquire language, it must happen while you are young. Evidence in support of this comes from certain cases of child abuse, e.g,. "Genie"—who was essentially locked in her room until she was 13, without language input, and wasn't ultimately successful in acquiring the syntactic structures of English. (Though caution is required here—here there is more generalized psychological trauma.)

The visual system shows critical periods as well. In experiments done on monkeys and cats, it was determined that there is a critical period for development of binocular vision (tested by monocular deprivation).

5 Second language acquisition

Second language acquisition

The question of how a *second* language is acquired brings with it a whole set of other questions.

Maybe the biggest among them—to what extent is the knowledge of a second language *like* the knowledge of the first language. Is it also constrained by UG? Are the mechanisms that allow children to acquire their first language at work in acquiring a second language?

Just from intuition, it doesn't *seem* like it is as quick, effortless, and error-free. It also seems to depend on the age at which one starts. Does this relate to the critical period?