Foundations of syntax

LING 200B · Ethan Poole · 27 September 2021

1 Goals of syntactic theory

- SYNTAX studies the rules and principles governing the way in which phrases and sentences are formed.

✳ ***Central questions of syntax***[1]

1. **Discrete-infinity problem** *Humboldt's problem*
   What is it that native speakers know about their language which enables them to comprehend a potentially infinite number of novel sentences?
2. **Acquisition problem** *Plato's problem*
   How do children acquire a language?
3. **Evolution problem** *Darwin's problem*
   How did language emerge in the human species?

[1] These questions have been laid out over a large body of work, but see in particular Chomsky (1965, 1986b, 1995, 2004, 2005); Hauser et al. (2002).

- ***Related big questions***
  1. **Descartes's problem**[2]
     How is knowledge of language put to use?
  2. **Broca's problem**[3]
     How is knowledge of language implemented in the brain?

[2] e.g. Chomsky (1966)

[3] e.g. Berwick et al. (2013)

- In studying syntax (and language more generally), we are studying a specific kind of cognition and its properties. This is different from traditional (i.e. philological) approaches to language, which are primarily concerned with developing taxonomies.

✳ **Universal Grammar (UG)**

- "The theory of human [languages] … that identifies the [languages] that are humanly accessible under normal conditions." (Chomsky 1986b)
- Universal Grammar is a theory of the human ability to acquire language.
- UG posits the FACULTY OF LANGUAGE (FL): a "cognitive organ" specific to language that is innate and part of our biological endowment.
- GB, LFG, HPSG, Minimalism, OT, etc. are all (in principle) theories about what UG/FL is and how it works.

- ***Generativism and functionalism***
  - GENERATIVISM: grammar as a system of rules, UG, autonomy of syntax, the study of the rules without looking at how the system is employed; in practice: Chomskyan and formal.
  - FUNCTIONALISM: language as a communication tool, role of use and function; in practice: anti-Chomskyan and resists formalisms
  - A nice analogy from Sam Epstein: It is possible to study the anatomy of the human eye without considering what the human decides to look at.

- Functionalism and generativism largely ask different questions and thus are not mutually exclusive (despite portrayals to the contrary).
- In syntax, functionalism has never really caught on because it lacks well-defined theoretical concepts and has not produced interesting results and insights.
- ***Rationalism vs. empiricism***[4]
  - RATIONALISM claims that there are significant ways in which our concepts and knowledge are gained independently of sense experience.
  - EMPIRICISM claims that sense experience is the ultimate source of all our concepts and knowledge.

  ⇒ Generative Grammar is very much in the Rationalist tradition.
  - Empiricism rears its ugly head a lot: behaviorism, associationism, neural networks, "Big Data", "Artificial Intelligence"

[4] See Norbert Hornstein's blog for some interesting posts about this philosophical debate.

2 Discrete infinity

- ***Infinite use of finite means***
  Language is a system that combines members of a *finite* set of discrete units to produce an *infinite* range of potentially meaningful expressions.

  (1) a. Rose ate a cheesecake.
  b. Blanche said that Rose ate a cheesecake.
  c. Dorothy thought that Blanche said that Rose ate a cheesecake.
  d. Sophia said Dorothy thought that Blanche said that Rose ate a cheesecake.

✳ ***Autonomy of syntax (Chomsky 1957, 1965)***
Syntax is not reducible to the interfaces or function.[5]

[5] Interfaces = externalization (sound/sign) and meaning

(2) a. Colorless green ideas sleep furiously.
b. *Furiously sleep ideas green colorless. [Chomsky 1957]

- Empirically, syntax is concerned with those phenomena that cannot be reduced to externalization and meaning (i.e. the interfaces). This also includes how externalization and meaning are paired up.

✳ ***Primacy of syntax (Chomsky 1957, 1965)***
Syntax is where all generativity lives. The interfaces are interpretive.

- ***Implicit knowledge***
  Linguistic knowledge is more than meaning and memorization. It consists of things that we are not consciously aware of.
  - To illustrate, consider polar questions:

    (3) a. Rose has eaten a cheesecake.
    b. Has Rose eaten a cheesecake?

    (4) a. Blanche will go to the party.
    b. Will Blanche go to the party?

- English speakers subconsciously know that *Rule 3* is the correct rule:

  (5) a. **Rule 1**
  Switch the first two words around.

  b. **Rule 2**
  Move the first auxiliary verb to the beginning of the sentence.

  c. **Rule 3**
  Swap the "subject" and the verbal element after it.

- ***Competence vs. performance (Chomsky 1965)***
  Generative syntax is concerned with competence.
  - COMPETENCE: the speaker's knowledge of their language
  - PERFORMANCE: the actual use of language in concrete situations

3 Acquisition problem

- ***Plato's Problem***
  How can we know as much as we do given that we have had so little evidence for it?

- ***Rough acquisition timeline***
  - By month 12: first recognizable word
  - Months 12–18: single-word utterances, little grammatical development
  - Around month 18: two/three-word utterances obeying headedness[6]
  - By month 30: acquired most of their language's grammar

[6] That is, OV vs. VO.

3.1 Poverty of the stimulus

∗ ***Poverty of the stimulus (PoS)***[7]
Children are not exposed to enough data to acquire every feature of their language.

[7] This term was introduced later, but the ideas were developed in Chomsky (1959, 1965).

- ***Basic logic of PoS***
  1. A child's linguistic experience is consistent with numerous possible grammars.
  2. It is possible to define data that would distinguish the target grammar from the other possible grammars.
  3. These data are missing from a child's linguistic experience.
  4. Children nonetheless acquire the target grammar.

- ***Illustration: Polar questions***
  - ***Question***
    Children *never* postulate something like Rule 2 in (5b), despite the fact that they have little to no evidence that it is incorrect. Why?
  - ***Strong hypothesis***
    Syntactic structures do not encode linear order. If so, it follows that syntactic rules cannot, as a matter of principle, refer to linear order.

⇒ ***Consequence***
The child never even considers a linearity-based rule, only a structure-based one.

✎ ***Other examples of poverty of the stimulus***

(6) a. Alex expected to surprise him.

b. I wonder who Alex expected to surprise him.

(7) a. Alex is eager to please.

b. Alex is easy to please.

(8) a. I { expected / persuaded } Alex to leave.

b. I { expected / persuaded } the doctor to examine Alex.

c. I { expected / persuaded } Alex to be examined by the doctor.

✳ ***UG and innateness***

- FL provides a genetically transmitted algorithm (i.e. set of procedures) for developing a grammar on the basis of linguistic experience.[8]
- FL must incorporate UG, thereby enabling the child to develop a grammar of any natural language on the basis of suitable input.
- We are genetically predisposed to analyze utterances (however ungrammatical) as having specific grammatical properties.[9]

[8] In Chomsky (1965), this is called the LANGUAGE ACQUISITION DEVICE (LAD).

[9] Another analogy from Sam Epstein: Tadpoles develop into frogs even though their input is not frogness. Acorns develop into oak trees even though their input is dirt, water, light, etc. and not oak trees.

- ***Other evidence for innate FL***
  - Acquisition is subconscious, involuntary, and unguided
  - No connection with general intelligence
  - Critical period of syntax
  - Degenerate input

3.2 Principles and Parameters

- Clearly, not all aspects of grammar are universal. Otherwise, all languages would have the same grammar. Rather, there are language-particular aspects of grammar, which children have to acquire:
  - PRINCIPLES OF UG: Invariant and universal properties of natural language
  - PARAMETERS OF UG: Constrained dimensions of grammar subject to language-particular variation[10]

[10] Only three parameters were ever widely agreed upon: *wh*-movement, headedness, and *pro*-drop.

- ***Example of a parameter: Wh-movement***
  In some languages, *wh*-elements have to front to the beginning of the sentence; in others, they do not:

(9) a. **English**
What did Mary eat?

b. **Hindi-Urdu**
Mary-ne kyaa khaayaa?
Mary-ERG what ate

4 Evolution problem

- "UG must meet the condition of evolvability, and the more complex its assumed character, the greater the burden on some future account of how it might have evolved." (Berwick and Chomsky 2016:93)

⇒ Methodologically, this drives syntactic theory towards REDUCTIONISM, which in turn fits well within the goals of the Minimalist Program (Chomsky 1995).

- ***Beautiful example of reductionism: Chomsky (1977)***
  - Ross (1967) documented a list of domains opaque to movement, i.e. ISLANDS.
  - Chomsky (1977) sought to explain island constraints in terms of general computational properties of formal grammar, namely subjacency.
  - Rather than having a list of opaque domains, which would be hard to envision being part of UG/FL, Chomsky showed that (i) they can be unified and (ii) under this unification, there is a plausible and reasonable explanation of their nature.

5 Methodology

- ***General methodology***
  1. Look at data
  2. Identify pattern
  3. Form hypothesis about underlying rules
  4. Look at more data
  5. Refine/reject hypothesis
- ***Evaluating our hypotheses***
  - DESCRIPTIVE ADEQUACY: "A grammar can be regarded as a theory of a language; it is descriptively adequate to the extent that it correctly describes the intrinsic competence of the idealized native speaker." (Chomsky 1965:24)
  - EXPLANATORY ADEQUACY: "To the extent that a linguistic theory succeeds in selecting a descriptively adequate grammar on the basis of primary linguistic data, we can say that it meets the condition of explanatory adequacy. That is, to this extent, it offers an explanation for the intuition of the native speaker on the basis of an empirical hypothesis …" (Chomsky 1965:25–26)

⇒ **Merely capturing data is not enough, though it is a crucial step along the way. We also need a theory that explains it!**

- ***Acceptability judgements***
  The primary source of empirical evidence in syntax are ACCEPTABILITY JUDGEMENTS: judgements about whether or not a given string of words is a possible sentence of the language on a given meaning.

✳ ***Grammaticality and acceptability***

- If a string is GRAMMATICAL, the grammar *can* produce it.
- If a string is UNGRAMMATICAL, the grammar *cannot* produce it.
- Grammaticality is a theoretical construct. It is a causally relevant variable in judgements of acceptability.
- Acceptability is GRADIENT, but grammaticality is CATEGORICAL.
- Crucially, factors other than grammaticality affect acceptability, e.g. length, word frequency, priming, etc.

⇒ There is no such thing as a "grammaticality judgement".

- ***Rules of elicitation***
  1. Every suspected ungrammatical sentence should be part of a MINIMAL PAIR, the other member of which is grammatical.
  2. The sentences for which you elicit an acceptability judgement should be embedded in a discourse that makes the meaning that sentence would have salient.

(10) **ANNA KARENINA PRINCIPLE**
All grammatical sentences are alike (i.e. obey all the rules); each ungrammatical sentence is ungrammatical in its own way (i.e. violate any number of rules).

6 Minimalism

- ***Progression of syntactic theory***
  - Chomsky (1957, 1965): Standard Theory
  - Chomsky (1970): Extended Standard Theory
  - Chomsky (1975): Revised Extended Standard Theory
  - Chomsky and Lasnik (1977): Y-model[11]
  - Chomsky (1981): Government and Binding Theory
  - Chomsky (1986b); Chomsky and Lasnik (1993): Principles and Parameters
  - Chomsky (1993, 1995): Minimalist Program

[11] They called it the 'T-model'.

✳ ***The Minimalist Program (MP)***

- ***Goal:***
  "Determine to what degree a more computationally generic domain-general view of FL is viable." (Hornstein 2018:54)
- Emphasizes pairing down the theory (as an ordinary part of rational inquiry).
- A reaction to the rich linguistic structures and modules proposed in GB.
- A program of inquiry, not a theory.

- ***Minimalist syntax***
  A particular set of proposals about syntax made within the MP line of thinking, which are relatively widely adopted:
  - Collapses D(eep)-structure and S(urface)-structure[12]
  - Bare Phrase Structure
  - Derivations over representations
  - Copy Theory of Movement
  - MERGE and AGREE
  - Phases

[12] In other words, structure building and movement are interspersed, like GENERALIZED TRANSFORMATIONS in early transformational grammar (Chomsky 1957).

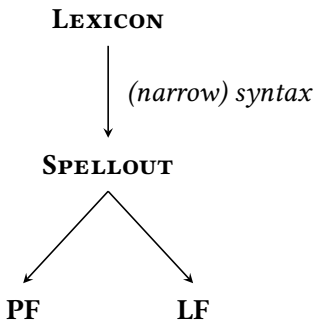
⇒ ***Hornstein's strategy***
Assume that GB (and its relatives like LFG and HPSG) are mostly correct approximations of the properties of UG/FL. Take those properties and try to simplify and reduce them.

- ***More terminology: I-language and E-language***
  Syntax is concerned with possible I-languages.
  - I-LANGUAGE: the linguistic knowledge of an individual native speaker, a mental representation comprised of "perfect" rules and representations
  - E-LANGUAGE: all outward manifestations of a speaker's I-language
  - UG is a theory of possible I-languages.
  - Ultimately, we are interested not in the grammars of individual languages, but in UG. Individual languages are just how we get there.

∗ ***General architecture of the grammar (Y-model)***
The Y-model is (essentially) a claim about ontological primacy.[13]

[13] (11) is *not* a psycholinguistic model, but rather a computational model. It makes no claims about processing or production.

(11)



  - Semantics and morphology/phonology are (i) associated with derived structures and (ii) interpretive.
  - The syntax assembles structures, which are then 'interpreted' by semantics and morphology/phonology.
  - As a result, syntax is not sensitive to semantics or phonology directly.

- ***Example: Number***
  - **Syntactic features (in English)**
    singular/plural

- **Morphology**
  [plural] feature usually realized as *-s*, but not always, e.g. *sheep*
- **Semantics**
  [plural] usually interpreted as more than one individual, but not always, e.g. *scissors*

(12) a. The sheep **are** sleeping.

b. The scissors **are**/***is** in the drawer.

What to read if you want to learn more?

- ***Works by Chomsky***[14]
  - Chomsky (1965): *Aspects*
  - Chomsky (1986a): *Knowledge of language*
  - Chomsky (1995): *The Minimalist Program*
- ***Works by others***
  - Sprouse and Almeida (2012); Sprouse et al. (2013): Experimental studies showing that 'informal' acceptability judgments are reliable, robust, and replicable
  - Hornstein (2018): Overview of the Minimalist Program
- ***From Norbert Hornstein's blog***
  - "Nativism, Rationalism and Empiricism-1"
    `https://facultyoflanguage.blogspot.com/2014/08/nativism-rationalism-and-empiricism-1.html`
  - "Rationalism, Empiricism and Nativism-2"
    `https://facultyoflanguage.blogspot.com/2014/09/rationalism-empiricism-and-nativism-2.html`
  - "Empiricism, Rationalism and Generative Grammar"
    `https://facultyoflanguage.blogspot.com/2012/10/empiricism-rationalism-and-generative.html`

[14] Jokingly, but also kinda true: The first ten pages of any Chomsky paper.

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