Adequacy Conditions on Grammars
Conditions on Grammars

(1) Metatheoretical conditions theories in general must meet
   a. Consistency (No contradictions.)
   b. Economy (Parsimony: the smaller, the better.)
   c. Exhaustiveness (“Complete.”)
   d. Explicitness

(2) Adequacy conditions a grammar of a language must meet
   a. Observational adequacy
   b. Descriptive adequacy
   c. Explanatory adequacy

   (Adequate: ‘as good as necessary for some requirement or purpose; fully sufficient, suitable or fit’.)

(3) Hierarchy of adequacy conditions
   Explanatory adequacy > Descriptive adequacy > Observational adequacy
   “>” = ‘presupposes / entails’
Observational Adequacy

(1) *Observational adequacy*
A grammar of a language L is observationally adequate iff it generates all and only the sentences of L.

(2) a. Mary says John wants to shave himself. (generated)
b. *Mary says John wants to shave herself. (not generated)

A grammar of English must generate (2a) and it must not generate (2b). Therefore, a grammar (= theory) of English must be constructed so that it can generate (2a) but not (2b). The rules and principles of the grammar must be able to generate only (2a) and be prevented somehow from being able to generate (2b).
Descriptive Adequacy

(1) Descriptive adequacy
A grammar $G$ of a language $L$ is descriptively adequate iff it is an appropriate representation of the linguistic knowledge/intuition of speakers of $L$. Take the linguistic knowledge of speakers of $L$ to be their mental grammar $MG$ of $L$. Then, $G$ of $L$ is descriptively adequate iff it is a theory of $MG$.

In principle, an infinite number of otherwise different grammars (= theories of $L$) may satisfy the condition of observational adequacy (as in the natural sciences). These alternative theories are each other’s rivals.
Of competing observationally adequate grammars, the winner is the one that is descriptively adequate.

An observationally adequate grammar may be inadequate descriptively. A descriptively adequate grammar cannot be observationally inadequate.

Descriptive adequacy entails observational adequacy.

Descriptive adequacy presupposes observational adequacy.
Descriptive Adequacy—Example: Structural Ambiguity

(2)  
  a. Fido is ready to eat.
  b. ‘Fido is ready to eat his lunch’ (→ ‘Fido eats.’)
  c. ‘Fido is ready to be eaten’ (→ ‘Somebody eats Fido.’)

What does an English speaker know about (2a)?

- A. Knows how to construct the sentence. (← observational adequacy)
- B. Knows that the sentence is ambiguous. (← descriptive adequacy)

(2a) is **systematically** ambiguous between the two readings (2b) and (2c).

A grammar that accounts for A. is *observationally adequate*.
A grammar that accounts for B. is *observationally and descriptively adequate*. 
How does a grammar account for the ambiguity of (2a)?

The ambiguity of (2a) is **structural**: *Fido* is **subject** in (2b) but **object** in (2c).

→ A descriptively adequate grammar will provide for **two different structures** underlying (2a).

The two different (partial) structures underlying (2a):

- a.

```
NP       VP
|        |
Fido     V      NP
|        |
eats     ...
```

- b.

```
NP       VP
|        |
...      V      NP
|        |
to eat   Fido
```
Descriptive Adequacy—Example: Structural Difference
Underlying Superficial Similarity

(3) John is eager to please. (‘John will do anything to please other people’)
(4) John is hard to please. (‘It is hard for other people to please John’)

What does an English speaker know about (3) and (4)?

- A. Knows how to construct the sentences. (← observational adequacy)
  Knows the syntactic rules → can assign syntactic structures to the sentences.
- B. Knows that (3) and (4) have different meanings and different structures.
  And knows that (3) and (4) have different meanings because their structure
  is different. (← descriptive adequacy)

A speaker not only knows how to construct (3) and (4) but they also know to
construct (3) and (4) differently. (This is because the difference in meaning
between (3) and (4) is a consequence of a difference in structure.)

If a grammar of English applied the same procedure to generate (3) and (4) it
would be observationally adequate but descriptively inadequate.
How does a grammar account for the semantic and structural difference between (3) and (4)?

(3) and (4) have different meanings because their structure is different. John is the subject of please in (3), but the object of please in (4).

→ A descriptively adequate grammar must provide for two different structures underlying (3) and (4).

The two different (partial) structures underlying (3) and (4):

a. 
```
  NP  VP
   |    |
John V NP
  to please ...
```

b. 
```
  NP  VP
   |    |
... V NP
  to please John
```
Descriptive Adequacy–Example: Structural Similarity
Underlying Superficial Differences

(5)  a.  To teach Elizabeth is a pleasure.
b.  It is a pleasure to teach Elizabeth.
c.  Elizabeth is a pleasure to teach.

What does an English speaker know about (5a–c)?
• A. Knows how to construct the sentences. (⇐ observational adequacy)
• B. Knows that (5a–c) mean essentially the same, in spite of obvious differences in form. (⇐ descriptive adequacy)

If a grammar of English used three different procedures to generate (5a–c) and assigned three different and unrelated structures to (5a–c) it would be observationally but not descriptively adequate. (This is because the regular similarity in meaning must be assumed to be a consequence of a similarity in structure, otherwise the semantic similarity is misrepresented as sheer coincidence.)
How does a grammar account for the semantic and structural similarity in (5a–c)?

(5a–c) have *systematically* similar meanings *because* their structure is similar.

→ A descriptively adequate grammar must provide for the *systematic similarity in structure* in (5a–c).

The (partial) similarity in structure:

(6)

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S

“Subject”

to teach  Elizabeth

“Predicate”

is  a pleasure
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(5a–c): “variations on the same theme.” Accounted for if (5a–c) are *derived from* the same underlying structure, something like (6).
Summary

Among other things, a descriptively adequate grammar must account for

- the *structural ambiguity* of sentences,
- *structural differences underlying superficially similar* sentences, and
- *structural similarities underlying superficially different* sentences.
Explanatory Adequacy

(1) *Explanatory adequacy*

A grammar $G$ of a language $L$ meets the condition of explanatory adequacy iff it offers a principled explanation of the competence of speakers of $L$. An explanation for the competence of a speaker $Sp$ of $L$ is principled insofar as everything in $G$, a model of the mental grammar $MG$ of $Sp$, is derived from *general principles* of language represented in $UG$, assumed to be innate, a necessary condition for language acquisition. (= A grammar $G$ of a language $L$ meets the condition of explanatory adequacy iff it accounts for language acquisition.)

Assumptions about $MG$ and $UG$ are required by:

- Creativity of language.
- Poverty of stimulus. (Logical problem of language acquisition)

Accounted for if language acquisition is taken to be a process whereby the child constructs a generative $MG$ of a language $L$ with the help of an innate $UG$, a grammar of natural language.
MG and UG

MG
Assumptions about MG are required by the observed creativity of language use. Speakers of a language produce and understand an infinite number of different sentences, including sentences they have never constructed or heard before.

This requires that we assume the speakers do not merely reproduce sentences they have heard before but possess the knowledge of how to construct a sentence of L. Otherwise their ability to say or understand something they have never said or heard before remains a mystery.

Some examples of expressions children frequently use, though such expressions never occur in the speech of adults in the child’s environment:

- lót (adult Hungarian: lovát)
- pik (adult Hungarian: rajzol)
- He no bite you. (adult English: He won’t/doesn’t bite you.)
- No want food (adult English: I don’t want any food.)
Assumptions about UG are required by what is called the poverty of stimulus problem in language acquisition (LA).

**Poverty of stimulus**
The term “poverty of stimulus” describes the quality of linguistic input in the child’s environment. In plain English, the kinds of things a child hears around them in the language use of others, as well as the kinds of things they never hear. Both are equally important observations relevant for a theory of LA.
(1) Some of the “poor” or “corrupt” input an English child will hear:

- stammering (d-d-d-dinosaur, th-th-th-the problem, C-C-Crambone)
- false starts and other kinds of disfluency (I want ... I can tell you this.)
- hesitations (er, er, er; um)
- sentence fragments (Actually, I tell you, it isn’t important, ‘cause once I’m dead, what do I care, no I don’t care what many people think either now or afterwards. [His name should be on everybody’s lips.] Like Picasso’s is or Einstein’s.)
- slips of the tongue (I sent from down from my bedroom a little note.)

All of the above come under the label “speech errors.” Speech errors are systematically ignored by children as irrelevant for the grammar of L. This requires that we assume that children know to ignore them. This means that children have the innate ability to discriminate between linguistically relevant and irrelevant input.
(2) Rules and restrictions children apparently know without any evidence for them in the linguistic environment:

Coordinate Structure Constraint (CSC)
No one ever makes the following mistake:

(3) *Who did you divide the cake between John and _____?

(3) involves a coordinate NP \([\text{NP John and } \_\_\_]\). In this question, the *Wh*-word Who is moved out of the position marked “___”. This violates CSC, which says that a conjunct, in this case Who, cannot be moved out of its position in a coordinate structure.

CSC is never taught, nor presented in any other form to children, yet, this is never violated in speech. In general, no ungrammatical sentence marked as ungrammatical ever occurs in the linguistic input in the child’s environment. CSC is one of several general restrictions that children apparently know not to violate without any evidence for it in the linguistic input. It is known as the “no negative evidence problem.”

These considerations again require that we assume that general restrictions like CSC are part of UG, the child’s innate linguistic knowledge.
Important note about explanatory adequacy (EA)
EA is technical term with its meaning fixed in a theory of language. By EA, a special sort of principled explanation is meant.

In the non-technical sense, any theory may be taken to offer a principled explanation, i.e. be “explanatory” in the non-technical sense, if it is derived from a small set of general principles.

In the technical sense, EA represents the requirement that G must be derived from a special set of general principles, UG.

UG is a special set of principles in that all of them are specific to language. This represents the general idea that language is a special faculty in humans that has no counterparts in other cognitive domains. The idea is that language is like no other faculty in humans, like the number faculty, e.g.
Hierarchic structure of adequacy conditions
(repeated)

Explanatory adequacy > Descriptive adequacy > Observational adequacy

“>” = ‘presupposes / entails’
