

The Field of Linguistics

What is Linguistics?

Linguistics is the scientific study of Language. *Linguists* (people who are specialists in Linguistics) do work on specific languages, but their primary goal is to understand the nature of Language in general : ...what distinguishes human language from other animal communication systems? ...what features are common to all human languages? ...how are the modes of linguistic communication (speech, writing, sign language of the deaf) related to each other? ...how is Language related to other types of human behavior? ...etc.

The main goal of the study of Linguistics in an academic setting, like all other intellectual disciplines, is to increase our knowledge and understanding of the world. However, since Language is universal and fundamental to all human interactions, the knowledge attained in Linguistics has many practical applications.

Linguists, with some training in other appropriate disciplines, would thus be prepared to seek answers to questions such as the following: ...how can a previously unstudied language be analyzed and written? ...how can foreign languages best be taught and learned? ...how can speech be synthesized on a computer or (far more difficult) how can a computer be programmed to understand human speech? ...how can the language problems of people with speech abnormalities be analyzed and rectified? ...how are linguistic issues in legal matters to be handled? ...etc.

The Sub-Fields of Linguistics

Language is a phenomenon with many layers, from the sounds that come out of people's mouths to the meanings that those sounds express. The field of Linguistics is composed of sub-fields, and most professional linguists become specialists in one or more of those sub-fields. The major sub-fields are the following:

Phonetics: This is the study of speech sounds themselves. *Phoneticians* study both the production of speech sounds by the human speech organs (*articulatory phonetics*) and the properties of the sounds themselves (*acoustic phonetics*).

Phoneticians are concerned with such questions as the following: ...what are the sounds, from among all those that humans could make, that actually exist in the world's languages? ...what specially defines different "accents"? ...can speakers be identified by "voiceprints"? ...what are the properties of sounds that would go into computerized speech synthesis?

Phonology: This is the study of the organization of language sounds. *Phonologists* are concerned with questions such as the following: ...what sounds *contrast* in one language but not another (answers to such questions explain why Spanish speakers have trouble with the difference between English *sh* and *ch*, or why English speakers have trouble with the different "u" sounds in French words like *rue* 'street' and *roue* 'wheel'.)? ... what sounds of a language can or cannot occur one after the other (for example, why can words begin in *st* - in English but not in Spanish)? ...how do poets or writers or song lyrics intuitively know how to match the rhythm of speech to the abstract rhythmic pattern of a poetic or musical meter?

Morphology: This is the study of the make-up of words. *Morphologists* study such questions as the following: ...to what extent are ways of forming words "productive" or not (why do we say *arrival* and *amusement* but not **arrivement* and **amusal*).

)? ...what determines when words change form (why does English have to add –
er
to adjectives when making comparisons but Hebrew does not add any equivalent)? ...how can
we get a computer to recognize the “root” of a word separated from its “affixes” (e.g. how could
a computer recognize
walk
,
walks
,
walking
, and
walked
as the “same” word)?

Syntax: This is the study of how phrases and sentences larger than the word are constructed.
Syntacticians
address such questions as the following: ...how can the number of sentences we could utter be
infinite in number even though the number of words in any language is finite? ...what is it that
makes a sentence like
visiting relatives can be boring
ambiguous? ...why would English speakers judge a sentence like
colorless green ideas sleep furiously
to be “grammatical” even though it is nonsensical? ...how can languages express the same
thoughts even though they construct their sentences in different ways (e.g. why does English
I saw them there
mean the same thing as French
je
les y
ai
vus
even though the order of elements in French is
I them there have seen
)? ...how can a computer be programmed to analyze the structure of sentences (note that
answers to this question would be crucial for machine translation because of differences in
sentence formation across languages)?

Semantics: This is the study of meaning. *Semanticists* answer such questions as the
following: ...how do we know what words mean (how do we know where
red
stops and
orange
starts)?

what

is the basis of metaphors (why is

my car is a lemon

a “good” metaphor but

my car is a cabbage

is not)? ...what makes sentences like

I'm looking for a tall student

or

the student I am looking for must be tall

have

more than one meaning? ...in a sentence like

I regret that he lied

, how do we know that, in fact, he did lie? ...How many meanings can be found in a sentence like

three students read three books

and why do just those meanings exist?

In addition to these basic sub-fields there are a number of “hyphenated” fields of Linguistics, which use the “tools” of the basic fields. Some of these “hyphenated” fields are the following:

Historical linguistics: This is the study of how languages change over time, addressing such questions as why modern English is different from Old English and Middle English or what it means to say that English and German are “more closely related” to each other than English and French.

Sociolinguistics: This is the study of how Language is used in society, addressing such questions as what makes some dialects more “prestigious” than others, where slang comes from and why it arises, or what happens when two languages come together in “bilingual” communities.

Psycholinguistics: This is the study of how language is processed in the mind, addressing such questions as how we can hear a string of language noises and make sense of them, how children can learn to speak and understand the language of their environment as quickly and effortlessly as they do, or how people with pathological language problems differ from people who have “normal” language.

Neurolinguistics: This is the study of the actual encoding of language in the brain, addressing such questions as what parts of the brain different aspects of language are stored in, how language is actually stored, what goes on physically in the brain when language is processed, or how the brain compensates when certain areas are damaged.

Computational linguistics: Learning and understanding a language involves computing the properties of language that are described in phonology, syntax, and semantics from what is heard. The challenge of describing how this is possible connects linguistics with computational issues at a very fundamental level.

How could syntactic structures be computed from spoken language, how are semantic relations recognized, and how could these computational skills be acquired?

Computational linguists attempt to answer these questions.