1. The classical problem of perception is to determine how an organism uses its knowledge, beliefs, and expectations in interpreting a sensory input. In the case of perception of language, we can formulate for separate study a particular instance of this general question, namely: how does a person bring his knowledge of his language, his intrinsic mature linguistic competence, to bear in assigning to a speech signal a structural description?

We can, in other words, pose the problem of specifying the characteristics of a "perceptual device" PD that takes as its input a signal S and gives as its output a "percept" P:

\[ S \rightarrow \text{PD} \rightarrow P \]

Approaching general problems of perception from linguistics, we may ask: what conditions does language structure place on the character and functioning of a perceptual device. This investigation breaks down into three sub-studies, namely, the study of the input signal, of the internal structure of the perceptual device, and of the percept that we can regard, quite naturally, as the result of its functioning.

2. For the purposes of this discussion, I will assume that the signal can be described with any desired accuracy – in particular, that we can assume it to be given in phonetic transcription in terms of a universal phonetic theory that contains a universal alphabet. Thus we assume fixed a denumerable set of possible language signals, common to all languages, from which the utterances of each language are chosen.

3. We can assume that the device PD contains a recursive specification of a set of pairs (S, P), where S is a signal and P is a percept (or, to
use a more technical term, a "structural description") associated with it in
the language in question, as well as a strategy for finding P given S.
About the strategy, I have nothing to say, and I believe that nothing
significant is known. About the recursive specification of pairs (S, P)
(what I will henceforth call the "grammar" of the language of the
perceiver), quite a bit is known, and it seems to me that what is known
sets non-trivial conditions on the theory of perception.

4. Consider now the structural description that is the output of the
device PD of (1). It is not, of course, directly observable. Rather we must
attempt to develop a theory of structural descriptions of sentences on the
basis of indirect evidence concerning what information is available to one
who has identified and correctly understood an utterance of his language.
From the mass of evidence of this sort, we must attempt to abstract
underlying systems that play a role in the understanding of utterances,
and that can be studied independently in some non-trivial way. It is
obvious on a moment's reflection that many factors of diverse sorts
interact to give what observable evidence we have concerning linguistic
behavior, and that failure to distinguish these (as, e.g., when language is
regarded as a mass of undifferentiated "dispositions to respond") con­
demns the entire enterprise to chaos and sterility. Of the several coherent
subsystems concerning which some information is available, I will
sketchily discuss here only two: the system of "rational (phonemic)
spelling" and the system of grammatical relations. Thus let us consider
what is involved in "identifying" a signal as a certain string of phonemes
and in assigning to it a certain network of grammatical relations.

5. A "minimal pair" is a pair of utterances that differ in only one
position, e.g., "pin"-“bin”, "bin"-“ban”, etc., but not "pin"-“ban”. It is
not difficult to convey this notion to an unsophisticated speaker. One
obvious condition on phonemic representation must be that, in general,
pairs that are perceptually minimal should differ correspondingly in
phonemic representation. Thus, for example, the minimal pairs

(2) (i) said – set (sed – set)
(ii) set – sat (set – sät)
(iii) filler – feeler (filř – filř)
(iv) racer – razor (rěsur – rězř)

might be represented, respectively, as in the parentheses in a perceptually
adequate orthography.