

# The P-structure C-structure Grammar (PCG) for the contrastive study of two or more languages—Parts II & III

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## PART II

### LANGUAGE AND THE DISSECTION OF THE EXTERNAL WORLD BY THE INDIVIDUAL- AND COLLECTIVE-MIND OF A COMMUNITY

#### 2.0. The individual asocial, animal-like man in an action-reaction or stimulus-response situation

In spite of the fact that man is the most social among the social animals, he is, in his innermost, incommunicable being, a lonely, caged, asocial animal, capable only of acting and reacting in a stimulus-response situation.

However, being physically the weakest among the wild animals, but endowed (by chance or providence or through some causal connection to this weakness) with a mental equipment for symbolic communication, he has stumbled upon language to be able to call his fellow beings to come together for a collective defence against other wild animals.

The self-protective 'instinct' of all animals is present in man too all the time. It is possibly the individual man's protective instinct and the instinctive realisation of his own weakness in relation to all other wild animals that has brought him and his fellowmen together into a group or society.

However, it is not other wild animals alone that are wild. Man, the individual inner-man, is also wild.

A group of men is wild to other groups of men. All other groups of men are wild to any particular group. And, by extension every man is wild to all other men and all other men are wild to every man within a group.

The individual man is weak when pitted against a group. His self-protective instinct, which has made him member of an intercommunicating group of men to protect him from wild animals and from other groups of men, has also given him a symbolic system for protecting himself from all other members of his own group.

He has realised the danger to his own safety in *reacting* to external stimuli without *communicating* with others of the group in the first place and with *himself* in the second.

**2.1. *Man as an innately double personality—a polarized entity: being an individual wild being innermost and at the same time a rational social being projected outwards***

Each man, as an individual, asocial, wild being, therefore, has to communicate with his social counterpart within himself (this social counterpart being a member of the group), in order to decide at each moment about the chances of his survival in his action-reaction role in any stimulus-response situation.

Every man's mind, the instrument that controls communication, has been consequently polarized into the part of the mind that represents the individual, asocial wild-being in man and the part that represents the same man as a member of the group which ensures his protection against all other wild groups.

All social men in the group collectively ensure that no individual wild man among them disrupts the group and therefore causes its individual and collective destruction. Law, social customs and culture have their origin here, as the common property of all men in the group. The instrument of communication, the symbolic system that we call language, is also a common property. It is needed only for the social counterpart within the individual and the inner, asocial wild man has no use for language.

The group member character of the externalised social man and the individual character of the inner asocial wild man, in the interests of their collective protection as a single physical being, have also stumbled upon a law that subjugates the wild man to the social man in the individual.

It is the social man in the individual that is externalised personality. It is this part of him that interacts with other man, acting as the spokesman for the whole of himself, and brings in 'news from the outer world of other men'. He has taken thus complete control over the entire communication system with the outer world—language and the sensory and motor systems of his physical self.

The motive force for any action or reaction perhaps resides in the inner wild-man. Between the two of them within the individual there is a map of the external world on which all actions and reactions and their consequences are enacted. They together accept or reject such actions and reactions as would ensure or endanger the continued existence of the physical self.

This is perhaps what is called the second signal system reported by Vygotsky and attributed to Pavlov<sup>7</sup>.

The second signal system may be looked upon as a 'controlling, censoring and translating system'. It translates the actions and decisions enacted on the inner map into externally communicable linguistic form. The inner wild-man's language is emotional, that of the externalised man is comparatively more rational and linguistic.

### 2.2. *Psychological and linguistic interpretations of the external world on the inner map of the second signal system*

The inner wild man who acts and reacts within the inner map of the external world constructs the map in his own emotional way and redraws it at every stage.

The externalised social man, who is a member of the external world, rationally checks and redraws this map in his turn at every stage.

The two agree to match their maps and make them one as far as possible. But there could be areas of conflict. Under these conditions of conflict, two things could happen

- (1) The inner wild man is completely subdued and the verdict of the inner social man is accepted unquestioned or
- (2) The inner wild man 'goes wild' and pays no heed to the inner social man and has his own ways.

There could be a third alternative :

- (3) The two inner personalities, the internalised wild-man and the externalised social man, are always in struggle advancing and retreating, but ever agreeing to ensure the protection of the whole man from the external world.

Most normal human beings seem to fall into the third category, some nearer the first category and others nearer the second, but all of them ranged in infinite variety between the two extremes.

Either extreme is abnormal. What is normal is not one set pattern, but *the principle that 'the balance is dynamic'*.

By 'normal' we could then understand a range of action-reaction patterns in dynamic equilibrium, rather than one single set norm, prescribed by some arbitrary rule or code.

### 2.3. *Benjamin Lee Whorf and the world view of a whole linguistic community*

Perhaps in the primitive stages of development of the system of communication called language, the strongest wild man in the group and his dissection of the world set the stage for the grammatical categorization of his symbolic system.

Once this system had been externalized by him and had become a common property of the whole group, the process of internalizing this symbolic system penetrated into every member of the group. Consequently all members of the group began to deal with the external world in terms of this world view.

The system itself was perhaps involved in a dynamic interaction between the world-view and language and between the language and world view and ultimately a balance was reached when the language attained a stage of development that made its grammatical system almost rigid, giving rise to the situation known as the 'Sapir Whorf hypothesis'<sup>3</sup>.

This could account for the linguistically warped minds of men and even for the different philosophical systems that are conditioned by the language used for their exposition.

As long as the linguistic categorization matched the phenomena of the external world, there was no serious defect in the system.

But the symbolic language system is defective in so far as it cannot reflect:

- (1) the inner wild-man's internalized reactions, not accessible even to the inner social man residing within the same physical personality and having now become almost a slave to his own tool: language, or
- (2) the objective phenomena of the external world, that are independent of man and his mind. (The conceptual discovery of the *quantum* of electromagnetic radiation, viewing a phenomenon like light as being both a particle-like and a wave-like entity at the same time, is at once a discovery about the phenomena of the external world and a liberation of man's mind from his own linguistic shackles.)

#### 2.4. *The psychological and logical categorization of the world through language*

In the light of what has been said so far, we could say that the primary dissection of the world is the inner wild-man's dissection (a psychological dissection) and the secondary dissection is the inner social man's dissection (a more rational and logical one—restricted, however, by the original categorizations of the linguistic community and the resulting world view held by it).

#### 2.5. *Linguistic 'Universals'*

However, it is conceivable that the external world and experiences of man in it couldn't possibly be far different, from group to group, except in relation to abstract concepts, the earliest abstract concept being possibly the idea of *time*.

Seeing that even *time* concepts are often expressed by words denoting spatial relations, it is perhaps possible even to bridge the gulf between the world view reflected in the Hopi language (as reported by Whorf) and that reflected in the Indo-European or any other family of languages.

Such a process is actually taking place in certain developing languages that are changing their functional behaviour in dealing with the new symbolism of mathematical and logical relations imported from the West (or from the Western languages) into them [5a, b].

We could therefore think of linguistic 'universals' as forming the major set, of which the categories tapped by individual language systems could form subsets. The system of linguistic 'universals' could itself be thought of as a growing system, changing its complexion in accordance with the changing shapes of the categorizations in the individual language systems.

We could therefore consider that the basic approach to any linguistic system should be a combination of psychological and logical categorizations representing a dynamic system in equilibrium.

We are unable to present here anything more than a rudimentary discussion of some of the problems connected with linguistic theory in the light of the background given here.

We restrict ourselves further to the examination of the practical problem of translation between languages, where the question of linguistic universals makes itself felt repeatedly in different ways.

A complete, theoretically sound and aesthetically satisfying treatment is beyond the scope of the present attempt.

## 2.6. *Suggestions towards a psychological and logical structure*

In this chapter, an approach to linguistics is presented that borders on psychology, logic and the different schools of linguistics.

The question of *linguistic universals* is viewed in terms of a basic set of equations.

The elements of this basic set of equations and their different aspects are discussed in different chapters.

We start with the idea of a universal set of symbolic 'reactions' and 'expressions' and the stages and degrees of its formalization.

The constraints imposed by formalization of expression leading to individual language peculiarities in different ways are dealt with from different angles in different places.

Our equations, though not fully discussed here in all their different aspects, are of relevance to the following fields:

- (1) The relation between logical propositions and natural language expressions.
- (2) The relation between psychological and formal categories of semantics.
- (3) The formal relation between object language and metalanguage.
- (4) Language specificity and translation.
- (5) Interrelationship of the lexicon and grammar, and
- (6) The linear left to right development of a sentence as against a hierarchical tree-structure.

These questions have not been fully dealt with here. But the different parts give indications and pointers towards such a treatment.

### 2.7. *Proposition and linguistic expression*

We assume that all languages (articulated, formalised, verbalised and unarticulated, non-formalised, non-verbalised) could be represented by the following two equations:

$$S' \rightarrow ' * ' S ' ' \quad (1)$$

$$S \rightarrow ( ' \langle P \rangle ' ' V ' ) \quad (2)$$

where  $S'$  is the linguistic expression at the surface level in any 'language',

$S$  is the underlying primitive logical 'proposition',

$*$  is the component in the equation that may be called the main 'semantic determinant',

$V$  is the 'predicate' of a proposition,

$P$  is the 'argument' of the predicate, and the notation

' ' indicates optional elements, and

$\langle \rangle$  indicates the non-verbal components.

### 2.8. *The Semantic Determinant ' \* ' and its components*

The 'semantic determinant' has two main components given by the expression:

$$* \rightarrow + ' + ' \quad (3)$$

where  $+$  may be called the 'modalities component' of the semantic determinant and  $+$  the extended 'Fillmore case-role component' of the semantic determinant.

### 2.9. The 'modalities component' +'

This component determines the attitude, selection and presentation adopted by a 'potential speaker' in formulating his spontaneous utterance or expressing his reaction to his surroundings.

The modalities component '+' has therefore its own inner components reflecting the above aspects in any possible linguistic behaviour of the potential speaker.

This could be represented in the following form:

$$+' \rightarrow (\text{PTN}(\text{ASC}(\text{SPC}))) \quad (4)$$

where SPC is the component of 'specification',

ASC is that of 'association' and

PTN is that of 'presentation'.

### 2.10. The 'Specification' component SPC

SPC, named the component of 'specification', reflects the 'attitude' of the potential speaker, the way he dissects the external world of events and things or of representations of these events and things already forming a symbolic world of abstractions.

Thus the 'specification component' SPC would represent any or all of the following, psychological (emotional-intellectual) or philosophical (formal, theoretical) components of the attitude of the potential speaker

$$\text{SPC} \rightarrow \left. \begin{array}{l} \text{Spatial, temporal, \dots,} \\ \text{thing, action \dots,} \\ \text{living, non-living, animal,} \\ \text{plant, human, god, ghost, \dots} \\ \text{belief, indifference, \dots} \\ \text{directness, objectivity, \dots} \\ \text{fear, joy, anger, awe,} \\ \text{satisfaction, disgust,} \\ \text{surprise, shock, concern, \dots} \\ \text{etc., \dots} \end{array} \right\} \quad (5)$$

A potential speaker may formulate an utterance with one or more of the above components of his psychological and logical 'specification' (revealing his 'attitude' to the world of his discourse).

If there are more than one such component, he could combine them in different ways. All these different ways of combining the SPC components could further be 'associated' in different ways, represented by the ASC component of '+'.  
(6)

### 2.11. The 'Association' component ASC

The components of ASC, representing the different ways of 'associating' the SPC components, are taken to be the 'logical operations' of conjunction, disjunction, negation, etc. This could be represented in the following form :

$$ASC \rightarrow \{ \wedge, \vee, -, \dots \text{ etc.}, \}$$

### 2.12. The 'Presentation' component PTN

The potential speaker, having associated his attitudes in different ways could 'present' his 'reaction' or 'utterance' in a number of different ways. These could be what in ordinary grammatical terms are called 'indicative', 'interrogative', 'exclamatory', 'imperative', as well as the 'suggestive pause', 'stress', 'voice', etc.

They are thus the components, in their turn, of the 'presentation component' PTN of '+'.  
(7)

PTN could therefore be represented in the form :

$$PTN \rightarrow \left\{ \begin{array}{l} \cdot, ?, !, !', \dots, Pv, Str \\ \text{etc.} \end{array} \right\}$$

### 2.13. Possible combinations of the components and subcomponents of '+'

If the human mind were capable of 'communicating' any 'message' without having absolutely any basic psychological or philosophical 'attitude' towards it, the SPC component chosen would be *nil*.

Thus this choice would be a null subset of SPC. If any *one* 'attitude' is taken, then we would have different alternative subsets of one component each. If two or more components of 'attitude' are simultaneously present then we have many alternative subsets of SPC made of *two, three, etc.*, components.

Therefore, in general, if the SPC modality is made up of  $p$  components of 'specification (= 'attitude')', the ASC modality of  $q$  components of 'association' and



the PTN component of  $r$  components of 'presentation', we would have respectively the following subsets :

Type of subset	No. of subsets of SPC with $p$ components	No. of subsets of ASC with $q$ components	No. of subsets of PTN with $r$ components
Full set	1	1	1
Subset with 1 component	$\frac{p!}{1 \times (p-1)!}$	$\frac{q!}{1 \times (q-1)!}$	$\frac{r!}{1 \times (r-1)!}$
Subset with 2 components	$\frac{p!}{2! \times (p-2)!}$	$\frac{q!}{2! \times (q-2)!}$	$\frac{r!}{2! \times (r-2)!}$
.....	.....	.....	.....
Subset with $n$ components	$\frac{p!}{n! \times (p-n)!}$	$\frac{q!}{n! \times (q-n)!}$	$\frac{r!}{n! \times (r-n)!}$
.....	.....	.....	.....
Subset with all components	1	1	1

14. *The non-verbal constituents of speech*

We could imagine a situation in which we have :

$$\begin{aligned}
 S &\rightarrow * 'S' \\
 &\rightarrow * (' \langle P \rangle ' 'V') \\
 &\rightarrow *
 \end{aligned}$$

where the optional elements ' $\langle P \rangle$ ' and ' $V$ ' are not chosen. The potential 'speaker' thus would make use of only the 'semantic determinant', without using any 'verbal language'.

Now, since we have :

$$* \rightarrow + ' + '$$

the '+' component is obligatory. The '+' component is chosen only when ' $\langle P \rangle$ ' or ' $V$ ' is chosen, since in their absence there would be nothing whose 'role' and 'case' has to be specified.

Therefore, in this special case :

$$S' \rightarrow +'$$

and since

$$+' \rightarrow (\text{PTN} (\text{ASC} (\text{SPC})))$$

we could further imagine the situation described below.

### 2.15. *The non-verbal sentence*

If there are, let us say, a 'universe' of 3 'specifications' forming a set, it could include subsets of 1, 2, 3 or none of the elements in it, forming 1 null set, 3 sets of 1 element each, 3 sets of 2 elements each and 1 set of 3 elements, making in all 8 subsets of SPC.

ASC now determines how one or more of these are 'associated'. Assuming again an ASC 'universe' of, say, 3 elements, we have the set:

$$\text{ASC} \rightarrow \{\wedge, \vee, -\}$$

giving us eight subsets:

$$\{\phi\}; \{\wedge\}, \{\vee\}, \{-\}; \{\vee, \wedge\}, \{\vee, -\}, \{\wedge, -\}; \text{ and } \{\wedge, \vee, -\}.$$

Any of these now could be chosen to operate on any of the chosen subsets of SPC and 'presented', let us say, in one of the following five modes, or a combination of two or more of them, where:

$$\text{PTN} \rightarrow \{., ?, !, !', \dots\}$$

Now PTN itself is a 'universal' set of 5 elements. It has thus the following subsets, one of which could ultimately be chosen:

$$\begin{aligned} &\{\phi\}; \{.\}, \{?\}, \{!\}, \{!'\}, \{\dots\}; \{., ?\}, \{., !\}, \\ &\{., !'\}, \{., \dots\}, \{?, !\}, \{?, !'\}, \{?, \dots\}, \\ &\{!, !'\}, \{!, \dots\}, \{!', \dots\}; \{., ?, !\}, \\ &\{., ?, !'\}, \{., ?, \dots\}, \{?, !, !'\}, \{?, !, \dots\}, \\ &\{!, !', \dots\}, \{., !, !'\}, \{., !, \dots\}, \{., !', \dots\}, \\ &\{!, !', \dots\}; \{., ?, !, !'\}, \{., ?, !, \dots\}, \\ &\{., !, !', \dots\}, \{., ?, !', \dots\}, \{?, !, !', \dots\} \end{aligned}$$

and  $\{., ?, !, !', \dots\}$ ; making in all 32 subsets of 'presentation'.

A 'presentation' of the (APC (SPC)) components already chosen could thus be made in any one of these 32 modes, psychologically, if not linguistically.

### 2.16. *Non-verbal 'Presentation'*

Assuming the syllable '*hm*' to be a non-language specific phonetic carrier of the 'modality' components (in the absence of a language-specific choice of ⟨*P*⟩ or ⟨*V*⟩), we could think of the following psychological reaction or communication situations :

- $\phi$  (that is, '*hm*' not articulated, no communication is attempted or no reaction is forthcoming, perhaps 'sulking.')
- hm.* (Mere assertion of a reaction.)
- hm?* (Questioning what has been observed, felt or stated, or asking for information.)
- hm!* (Expressing surprise at what has been observed, felt or stated.)
- hm!*' (Making it evident that something must be done as felt, desired or stated.)
- hm...* (Making it evident that something has been noted, felt, etc., but more specific reaction, conclusion, etc., is left to be guessed.)
- hm.?* (Something like: "Okay, what next, what of it?" etc.)
- hm?!* (Expression of a question and surprise.)
- hm?!'* (A question with an implied imperative.)

and so on.

This leads to the inescapable conclusion that 'potential speech' even when not put into 'conventional' *words* or groups of sounds (like *good!*, *ah!*, *oh?*, *hm?*, *hm...*, etc.) could still be highly expressive at the non-language specific psychological level: witness, for example, all the grunts, groans, shrieks, cries, laughs, sobs, etc., in (perhaps not) all the 32 modes of 'presenting' any of the 8 modes of 'association' of any of the 8 groups of 'specifications' for a limited 'universal set' of just 3 specifications!

For a set of *n* 'specifications' the possibilities and subtleties increase in alarming proportions.

### 2.17. *Individual spontaneous reaction vs. agreed codes*

This psychological freedom of 'spontaneous reaction' is thwarted, to a considerable extent, as soon as one is constrained to communicate through agreed codes of verbalised or non-verbalised signs and symbols.

As soon as any 'conventionalised' mode of non-verbal behaviour (like shrugging of the shoulders, shaking of the head from side to side, winking, low whistling, etc. is resorted to by the 'potential speaker', he has already restricted his spontaneity of response, and the available choice of SPC, ASC and PTN subsets is considerably

reduced. (The *rules*, that determine what combinations of these are conventionally possible, form the basis of its *grammar*.)

Introduce now the semi-verbalized and already language-specific interjections like *ah, oh, tut-tut, hm-hm, pshaw*, etc. (of the English speakers), *uvy, tfy*, etc. (of the Russian speakers), *ayyayyoo, atxatxee, oohoo*, etc., (1) (of the Tamil speakers), and the spontaneous reaction of the 'potential speaker' in using these is no longer absolutely spontaneous and individual. The speaker then already *belongs* to his community (a group that communicates within itself through one set of conventional modes of behaviour, verbal and non-verbal)!

### 2.18. *Individual psychological expression vs. conventionalised communication*

The need for (social) security and the desire for absolute freedom from all kinds of bondage are two things that have to strike a balance somewhere in the human social and communication system.

It is not enough—if the process of communication is to be effective—for individuals purely and simply to go on psychologically *reacting* to one another. In a community, individuals have to strive at *understanding* instead of, or in addition to, reacting. It is not also enough for one merely to understand what is happening around him. One has to *make* someone else understand.

Thus *super-interjectional verbalization* is essential for communication through verbal behaviour.

The modern linguistic 'Noun-Phrase vs. Verb-Phrase' description is a reflection of such a process taking place in two directions: one, in the *naming* of things and actions and the other, in *giving directions* for dealing with these things, through further ramifications into *describing* what *things do*. (The realisation that things do something, that is the 'subject-verb-object' relation, is verbally reflected interpersonally in different language communities in different ways, using elements that could go under the classification of V and ⟨P⟩.).

### 2.19. *Fillmorean case-role characteristics*

The awareness of 'things or persons doing things' leads to further awareness of 'where', 'how', 'in what direction', 'from which direction', and still further to that of 'when,' 'under what circumstances', etc., ultimately resulting in linguistic specifications of these in different ways.

(1) The letter *X* is used here in place of a diacritical mark (in a proposed spelling system for Indian languages for computer processing) to indicate the retroflex sounds of the consonants represented by the preceding letter.

Thus there is an *action* described, namely V, and *how, when, where, etc.*, the action takes place, and *who or what* does it *to whom or what*, representing all the *arguments*  $P_1, P_2, P_3, \dots$ , etc., of V.

Fillmore<sup>1-4</sup> tells us what the features *characterizing* any  $P_i$  ( $i = 1, 2, 3, \dots$ ) or *differentiating* any  $P_i$  from any  $P_j$  ( $j = 1, 2, 3, \dots$ ) are.

We extend the case-role characteristics, unlike Fillmore, to include all features represented by the + component of the semantic determinant \* (and call them the extended 'Fillmore markers' or 'Fillmore components' of \*).

### 2.20. The 'Fillmore Component' + of the 'Semantic Determinant' \*

Unlike Fillmore again, we consider the 'Fillmore marker (or component)' as being attached to the *whole* proposition S, given by :

$$\begin{aligned} S' &\rightarrow * 'S' \\ &\rightarrow +' '+ 'S' \end{aligned}$$

where

$$S \rightarrow (\langle P \rangle 'V').$$

So that,

$$+ S \rightarrow + (\langle P \rangle 'V').$$

If P and V are both selected in a potential utterance, then

$$\begin{aligned} + S &\rightarrow + (\langle P \rangle V) \\ &\rightarrow (\langle +P \rangle + V). \end{aligned}$$

In general, we have the equation, when both P and V are chosen :

$$* S \rightarrow * (\langle P \rangle V)$$

That is,

$$* S \rightarrow (\langle *P \rangle * V).$$

Any marker of S is distributed to all its components, and, in general, to any component of a component.

### 2.21. Components of the 'Fillmore Component' +

There are many features of specification of a noun, verb, adjective, pronoun, adverb, participle, etc., that form a universal set of 'Fillmore features'.

We give here merely an illustrative list :

Noun →	animate/inanimate, rational/ non-rational, singular/plural, neutre/non-neutre, masculine/ non-masculine, agent/non-agent, patient/non-patient, source/ goal, instrument/non-instrument, location/direction, from a direction/ to a direction, temporal/ non-temporal, concrete/abstract, countable/non-countable, etc.
Verb →	active/passive, reflexive/non-reflexive, perfective/imperfective, transitive/intransitive, link-verb/ non-link verb, causative/non-causative, past/non-past, present/non-present, singular/plural, continuous/ non-continuous, habitual/non-habitual, directional/non-directional, change of state/no change of state, modal/non-modal, participant/ non-participant, speaker/listener, neutre/non-neutre, masculine/ non-masculine, lower station/ higher station, etc.,
Adjective →	quantitative/qualitative, numerical/non-numerical, definite/indefinite, demonstrative/ non-demonstrative, relative/non-relative, interrogative/non-interrogative, possessive/non-possessive, neutre/non-neutre, masculine/non-masculine, animate/inanimate, singular/ plural, etc.,

These are tentative indications and we leave this discussion here, for the time being, at that stage.

A discussion of this aspect or view of natural language is to be presented in a separate paper in a more complete form, integrated into the system of analysing language as a left-to-right process that groups and regroups elements and groups of

lements as a sentence is being formulated or as a sentence, already formulated, is taken in 'linearly, element after element or group after group.

The restrictive rules of combination of the components and components of components of the 'semantic determinant' together form what we understand by *Grammar*.

In our view therefore *Grammar* refers to the interrelationships of the lexicon, morphology and syntax through such restrictive rules.

A unilingual approach to the analysis and description of language does not make this evident. However, a multilingual approach with problems of translation in mind brings this view-point to the fore for any further study.

## PART III

### A PRACTICAL THEORY OF SYNTAX FOR TRANSLATION

#### 3.0. Introduction

The entire theory of syntax depends on the *Verb* being taken as a primitive concept, considered to be a self-evident entity on an intuitive basis.

The *Verb* then is the *predicate* in a *proposition*, all other associated elements like the 'subject', 'object', 'complements' of sorts, etc., are *arguments* to the *predicate*.

What the verb actually is in a given language could be defined either through a morphological description, or through a listing of the characteristics of the verb, or through a listing of the verbs themselves, or through a combination of these.

In whatever way a verb has been conceived of, all syntactic structures are defined in terms of it.

For purposes of translation, the levels of *syntax*, *morphology* and *lexicon* are mutually matched between any two languages that form the source and target languages of translation, in order to relate the language specificity characteristics.

It is assumed further that the underlying 'universal' *amorphous* syntax is the same for both the languages.

#### 3.1. Definitions

1. Morphological and syntactic constructions can occur as telescopic structures one within the other in an almost endless chain, limited only by practical necessity. The outermost structure is taken to be the 'macrostructure' or 'sentence'. We shall call it the *S-structure* here.
2. Such an S-structure is one that contains, as its *immediate* inner members, one (and only one) *Verb* (simple or complex, to be described under a suitable grammar of verb morphology<sup>(3)</sup>) and one or more *structures*, which are the 'arguments' of the Verb that represents the 'predicate' in a 'proposition'.

(2) This is a slightly modified version of (5 c).

(3) See Part IV, Section 2 (of the present paper to follow in the JILSc.), for a description of the English verbs at a level intermediate between morphology and syntax.

3. A P-structure is one that *does not* contain a verb as an *immediate* inner member. It may, however, contain, as its immediate inner members, lexical elements, other P-structures or a *C-structure*.
4. A C-structure is one that contains a verb as one of its *immediate* inner constituents along with one or more P-structures.  
Unlike the S-structure, in which the verb may occasionally be elided or absent, a verb is obligatory as an immediate inner member in a C-structure.
5. A *Marker* is a structural constituent that helps to indicate the relationship between the structure to which it is attached and the immediate *outer* structure that contains it. A marker is (implicitly or explicitly) attached to every immediate inner member of a *outer* structure.
6. Every structure is (actually or potentially) an immediate inner member of some outer structure and, likewise, every structure is itself an outer structure consisting of its own immediate inner members (unless it is an ultimate lexical or morphological element, considered as 'indivisible' any further).

Thus every structure has a *dual character*. That is, it is an inner component in relation to an immediate outer structure and *at the same time* it is an outer structure in relation to its own inner constituents.

### 3.2. *An amorphous (Non-language specific, 'Universal') formula for the abstract syntactic structure of a sentence*

Let us use the symbols :

- S' — for the S-structure (or 'amorphous' sentence) of a natural language,  
 S — for the S-structure or proposition (in a more or less logical sense),  
 P — for the P-structure (a natural language representative of which could be a Noun Phrase but not necessarily only a Noun Phrase),  
 V — for the Verb (intuitively understood, lexically listed, morphologically described or logically characterised as a predicate),  
 C — for the C-structure (one representative of which could be a Clause, or a Phrase containing a verb),

and  $\rightarrow$  — for the expression : 'can be analysed as'.

Then, the basic syntactic formula (in its amorphous, non-language specific form) is given by the following two expressions :

$$(1) S' \rightarrow *S$$

and

$$(2) S \rightarrow ('(P)' ' V')$$



where, using brackets with the meanings indicated below,

⟨ ⟩ contains a P-structure

( ) contains a C-structure

{ } indicates alternatives

' ' indicates optional elements,

we have :

- |       |     |   |   |      |            |
|-------|-----|---|---|------|------------|
| (3 a) |     |   |   |      |            |
| (3 b) |     |   | {   | ⟨Z'⟩ |            |
|       | ⟨P⟩ | → |   |      | ⟨C⟩        |
|       |     |   |   |      | ⟨NO '⟨Z'⟩⟩ |
| (3 c) |     |   |   |      | ⟨AO '⟨Z'⟩⟩ |
| (3 d) |     |   | ⟨DO '⟨Z'⟩⟩                                    |      |            |
| (4)   | C   | → | ('⟨P'⟩ V)                                     |      |            |
| (5)   | Z   | → | P   |      |            |
| (6)   | Z'  | → | P   |      |            |
| (7)   | NO  | → | 'T' 'DO' 'AO' N                               |      |            |
| (8)   | AO  | → | 'Y' A   |      |            |
| (9)   | Y   | → | AO  |      |            |
| (10)  | DO  | → | 'X' D   |      |            |
| (11)  | X   | → | DO  |      |            |
| (12)  | N   | → | lexico-morphological 'noun' or 'pronoun'      |      |            |
| (13)  | A   | → | lexico-morphological 'adjective'              |      |            |
| (14)  | D   | → | lexico-morphological 'adverb'                 |      |            |
| (15)  | T   | → | lexico-morphological 'determiner'             |      |            |
| (16)  | *   | → | '+' ' + '                                     |      |            |
| (17)  | +   | → | lexico-morphological-cum-semantic case marker |      |            |
| (18)  | +'  | → | logical or grammatical transformation marker. |      |            |

(For a more complete revision, see Part V)

### 3.3. Some types of operations that could be performed on S

(a) Logical operations :

(1) Negation

— S

(2) Conjunction  $S_1 \wedge S_2$

(3) Disjunction  $S_1 \vee S_2$

(b) Grammatical operations :

(1) Interrogation  $S?$

(2) Exclamation  $S!$

(3) 'Imperation'  $S!$

(c) Combined logical and grammatical operation :

(1) Negation and Interrogation —  $S?$

In short, we have the basic formula (1) :

$$S' \rightarrow *S$$

where

$$* \rightarrow ' + ' ' + '$$

and

$$+' \rightarrow -, \wedge, \vee, ?, ! \text{ or } !' \text{ (logic/Chomsky)}$$

and

$$+ \rightarrow \text{Fillmore case and role markers.}$$

The abstract S-structure therefore is considered to be a more inclusive concept of a *proposition*, in which some constituent components could be C-structures. The C-structures themselves are propositions or combinations of propositions, in their turn.

The amorphous natural language structure or '*potential*' sentence  $S'$  is therefore not in the primitive assertive form (as restricted and used in logic) but is the result of a few operations performed on propositions represented by the formula for  $S$  (namely, the basic formula (2) above). A few such operations have already been listed above and described as logical, grammatical, etc., by way of illustration.

The Marker thus is conceived of as including information on the grammatical and logical operations performed on the structures to which they are attached and at the same time showing the relationship of those structures to the immediate outer structures.

The S-structure formula given in this paper is only tentative (in that the \* component has not been developed into a formal system and that the V and NO morphology has not been fully developed) but is indicative of the general process of the S-structure formation. The recursive elements indicated within \* are recursive only conditionally. When these conditions (represented by \*) are explicitly stated, the tentative formula could be further developed in greater detail.

### 3.4. *Language specificity of the S-structure*

The S-structure formula given here is not language specific, and therefore could be considered as being 'universal'. It is amorphous until the specific conditions of a given language are incorporated by rules into the modifications to be made on the tentative formula.

The 'cases' and 'roles' of the different P-structures (that is, the expansions of \* associated with them), to be determined on the basis of a formalized 'semantic' system (in the Fillmorean sense), will determine for any given language the arrangement of the P-structures with respect to the verb.

For example, if we should account for the fact that in English we have the syntactical order of Subject-Verb-Object (and other complements), that is, the Sb-V-Ob order, then this language specificity is to be incorporated into the formula as follows.

$$S \rightarrow \langle\langle P \rangle V\rangle$$

$$\langle P \rangle V \rightarrow \langle P_1 \rangle \langle P_2 \rangle$$

Formalized rules of 'case' and 'role' categories are invoked to determine the structures that go into  $\langle P_1 \rangle$ ,  $\langle P_2 \rangle$ , etc.

### 3.5. *Object language and metalanguage*

If we now put in (1)

$$(19 a) S' \rightarrow S'_a$$

so that

$$(19 b) S'_a \rightarrow * S_a,$$

where

$$S_a \rightarrow \langle\langle P \rangle V_a\rangle$$

$$\rightarrow \langle\langle C_a \rangle \langle P_a \rangle V_a\rangle, \text{ by (3 a),}$$

and if we put

$$(20 a) C_a \rightarrow S'_b,$$

then, by (1) we shall have again :

$$(20 b) S'_b \rightarrow * S_b$$

where, by (3 a),

$$S_b \rightarrow \langle\langle C_b \rangle \langle P_b \rangle V_b\rangle.$$

If we put again

$$(21) C_b \rightarrow S'_c$$

so that once again we have by (1)

$$(22) S'_c \rightarrow * S_c$$

where, by (3 a), we have :

$$S_c \rightarrow (\langle C_c \rangle \langle P_c \rangle V_c),$$

and so on.

Under these circumstances  $S'_a$  represents a sentence of the metalanguage and  $S_c$  a sentence in its object language and in its turn  $S'_b$  is a sentence in a metalanguage with its own object language sentence  $S'_c$  and so on ad infinitum.

The difference between :

(23) *When he explained it I could understand the clause*  
and

(24) '*When he explained it*' *I could understand as a clause* is the following:

(23) is :

$$(23') * S_a \rightarrow (\langle *_{1'} (C_a) \rangle \langle *_{a'} P_a \rangle * V_a)$$

where  $*_{1'} \rightarrow$  *when*

and (24) is :

$$(24') * S_a \rightarrow (\langle *_{1'} (S'_b) \rangle \langle *_{b'} P_a \rangle * V_a)$$

where  $S'_b$  is a sentence in the object language.

Expanding (24') further, we have :

$$\begin{aligned} * S_a &\rightarrow (\langle *_{1'} (*_{2'} S_b) \rangle \langle *_{b'} P_a \rangle * V_a) \\ &\rightarrow (\langle *_{1'} (*_{2'} \langle *_{3'} (C_b) \rangle) \rangle \langle *_{b'} P_a \rangle * V_a) \end{aligned}$$

where

$*_{3'} \rightarrow$  *when*

$*_{2'}$   $\rightarrow$  zero logical/grammatical transformation indicating a 'primitive' proposition.

$*_{1'}$   $\rightarrow$  'objectivization' in a metalanguage (that is, 'quotation').

Thus, at the surface level,  $*_{1'}$  would stand for the quotation marks in writing:

'*When he explained it*'.

Similarly  $*_{2'}$  would stand for a grammatical/logical operation performed on a primitive proposition.

For example, when A says :

(25) 'When he came' is a noun,

and B asks :

(26) 'When he came'?

(meaning : What? Is 'when he came' a noun?),

the primitive  $S'_b$  of (25) is subjected to the grammatical interrogative transformation in (26). That is, if in (25)  $*_2$  represents a zero transformation, in (26)  $*_2$  represents an 'interrogative' transformation.

Finally,  $*_1$  represents the 'imbedding' transformation of an  $S'_b$  into an  $S'_a$ , where  $S'_b$  is a sentence (either full or elliptical) and  $S'_a$  is a primitive proposition in the metalanguage.

### 3.6. Examples

#### (i) Linguistic universals and language specificity

Let S be a primitive proposition whose predicate is V and whose argument are collectively represented by  $\langle P \rangle$ .

Then

(27)  $S \rightarrow (\langle P \rangle V)$

Let the different arguments be  $P_1, P_2, P_3, \dots$  etc.

Then,

$\langle P \rangle \rightarrow (\langle P_1 \rangle \langle P_2 \rangle \langle P_3 \rangle \dots)$

Now, if  $S'$  is a sentence in any language, then

(27')  $S' \rightarrow * S$

$\rightarrow * (\langle P_1 \rangle \langle P_2 \rangle \langle P_3 \rangle \dots) V$

$\rightarrow (* \langle P_1 \rangle \langle P_2 \rangle \langle P_3 \rangle \dots) * V$

$\rightarrow (\langle * P_1 \rangle \langle * P_2 \rangle \langle * P_3 \rangle \dots) * V$

where  $*$  is the *totality of all possible markers*, definite subsets of which could be attached to different  $\langle P \rangle$  and to the V. The markers that could be attached to a V form one set of this totality. Those that could be attached to any  $\langle P \rangle$  form other subsets. All these subsets are *overlapping* with one another to different degrees. But in order to differentiate the different  $\langle P \rangle$ 's and the V from one another there would at least be one marker feature for each that could be distinct. For example, the Fillmore case characteristic 'nominative' could belong to more than one  $\langle P \rangle$ , while the 'role' characteristic of 'agent' could belong to only one of them in a given proposition.

In addition to the case and role characteristics there could also be the morphological and lexical features of 'masculine', 'singular', 'third person', etc., which could be called their 'grammatical or lexical' *address*. Such features of grammatical or lexical address, in some languages, and therefore in the linguistic universal proposition, are also features of the verb. Therefore, in the Universal Proposition many of these features of 'grammatical or lexical address' could be found attached to the V and at least one ⟨P⟩.

When we select a given language, however, some features that are attached to any V or any ⟨P⟩ could be morphologically or syntactically left *unmanifested in form*. The difference between different languages (apart from their lexical stock) is that different sets of features remain 'unmanifested' under different conditions in different languages.

Now, if we consider two languages L1 and L2, we have to perform one of the language specificity transformations at the propositional level itself. This is represented by splitting ⟨P⟩ into two parts to deal with the particular situation in which in some languages some arguments precede the verb ('predicate') some others follow it.

Thus, in English, German or French :

$$(28) S \rightarrow (\langle P_1 \rangle V \langle P_2 \rangle)$$

whereas in Tamil, Hindi or Japanese :

$$(29) S \rightarrow (\langle P_1 \rangle \langle P_2 \rangle V).$$

Since the verb ('predicate') is the basic element in our theory of the *proposition* and hence of the surface level *sentence*, we have first to choose the type of verb peculiar to propositions underlying particular language structures. We could think of three such types (there could be more) for L1 :

$$(30) V \rightarrow \left\{ \begin{array}{l} V_a \\ V_b \\ V_c \end{array} \right\}$$

where  $V_a$  may be link verb,  $V_b$  an intransitive verb and  $V_c$  a transitive verb.

If  $V \rightarrow V_a$  then

$$(31) V \rightarrow V_0$$

and, if  $V \rightarrow \left\{ \begin{array}{l} V_b \\ V_c \end{array} \right\}$ , then

$$(32) V \rightarrow V'_0 V_0.$$

Now, in language L1, we will have for  $V \rightarrow V_0$

$$(33) S_{L1} \rightarrow ((P_1) V_0 (P_2))$$

and for  $V \rightarrow \begin{Bmatrix} V_b \\ V_c \end{Bmatrix}$

$$(34) S_{L1} \rightarrow ((P_1) V_0' V_0 (P_2)).$$

A sentence  $S'_{L1}$  will be the result of a certain operation (logical or grammatical) being performed on  $S_{L1}$ .

That is,

$$(35) S'_{L1} \rightarrow * S_{L1}$$

Now the '+' component of \* could be :

$$\left\{ \begin{array}{l} \text{'zero' } \\ \text{'negative' } \\ \text{'interrogative' } \\ \text{(logical combinations of these through } \wedge, \\ \text{V, etc.),} \\ \text{etc.,} \end{array} \right\}$$

If the (+' component of) \*  $\rightarrow$  'zero', the sentence  $S'_{L1}$  is an 'affirmative' sentence corresponding to the truly logical proposition (an 'assertion')  $S_{L1}$ ; if \*  $\rightarrow$  'negative', then too we have a truly logical proposition (negation) giving rise to a negative sentence  $S'_{L1}$ .

If \*  $\rightarrow$  'interrogative', we have a grammatically transformed 'interrogative' sentence, that is a sentence derived through a grammatical operation performed on the logical proposition  $S_{L1}$ . If \*  $\rightarrow$  'negative' and 'interrogative', we have a logical and grammatical operation performed on  $S_{L1}$ , giving us a 'negative interrogative' sentence  $S'_{L1}$ . (Our discussion here is confined to the '+' component of \*. The + component of \*, which would give us the 'extended' Fillmore marker as applied to verbs, namely, 'tense', 'aspect', etc., is not touched upon. Hence the formulae given below are applicable to any 'tense' or 'aspect' in L1).

We then have :

$$(36 a) S'_{L1} \rightarrow * S_{L1} \\ \rightarrow * ((P_1) V_0 (P_2))$$

for  $V \rightarrow V_c$ , and

$$(36 b) S'_{L1} \rightarrow * S_{L1} \\ \rightarrow * ((P_1) V_0' V_0 (P_2))$$

for  $V \rightarrow \begin{Bmatrix} V_b \\ V_c \end{Bmatrix}$ .

Let us now consider the cases when the '+' component of \*  $\rightarrow$  (a) 'affirmative', (b) 'negative', (c) 'interrogative' and (d) 'negative interrogative' (for L1 = English):

(a) For carrying out the 'affirmative' or 'zero' transformation on (36 a) and (36 b), we have the following rule :

(37) When no other operation remains :

$$V'_0 V_0 \rightarrow V_0$$

(b) In carrying out the 'negative' (or any other operation) that operation takes precedence over (37), and accordingly :

(38) The 'negative marker' is placed immediately after the first element in  $V$ , so that if  $V \rightarrow V_0$  as in (36 a), we have :

$$\begin{aligned} -S_{L1} &\rightarrow -(\langle P_1 \rangle V_0 \langle P_2 \rangle) \\ &\rightarrow \langle P_1 \rangle V_0 \text{ neg. } \langle P_2 \rangle, \end{aligned}$$

and in (36 b), where  $V \rightarrow V'_0 V_0$ , we have :

$$\begin{aligned} -S_{L1} &\rightarrow -(\langle P_1 \rangle V'_0 V_0 \langle P_2 \rangle) \\ &\rightarrow \langle P_1 \rangle V'_0 \text{ neg. } V_0 \langle P_2 \rangle. \end{aligned}$$

Taking both the '+' and the + components of \* into account, we see that in English this is reflected in such sentences as the following, as shown below :

$$(36 a.1) (+' \wedge +) (S_{L1}) \rightarrow (+' \wedge +) (\langle P_1 \rangle V_0 \langle P_2 \rangle)$$

For the 'negative transformation' we have to put  $+' \rightarrow -$ , so that we have :

$$\begin{aligned} (36 a.2) + (-S_{L1}) &\rightarrow + (\langle P_1 \rangle V_0 \text{ neg. } \langle P_2 \rangle) \\ &\rightarrow (\langle + P_1 \rangle + V_0 \text{ neg. } \langle + P_2 \rangle). \end{aligned}$$

Now, + is a Fillmore 'case' marker. When it is attached to P as in  $+ P_1$ ,  $+ P_2$  etc., it refers to the lexico-morphological-cum-syntactic *case* (that is, the lexical and morphological information about gender, number, person, etc., plus the morphological, syntactic and semantic 'case' and 'role' proper).

When + is attached to a V, as in  $+ (V'_0 V_0)$  or  $+ V_0$ , it refers to 'agreement' (that is, sharing of the same features or some of them) with a  $\langle +P \rangle$  plus morphological, lexical/semantic and syntactic information about 'tense', 'mood', 'aspect', 'nature of the verb', etc.

Accordingly, (36 a.2) would represent an English sentence like :

$$(36 a.3) (\langle +_1 I \rangle +_2 \text{ be neg. } \langle +_3 \text{ here} \rangle).$$



where  $+_1$  gives the information (from the lexicon and through Fillmore specifications) *nominative, 1st person, singular, non-neutre*, etc.

Correspondingly,  $+_2$  would include *1st person, singular, non-neutre*, etc., in addition to purely verb-based information about *tense, aspect*, etc., and  $+_3$  would give information about *location* (as opposed to *direction, time, patient, instrument*, etc.).

This would ultimately lead us, after the proper morphological substitutions and syntactic transpositions according to rules, to the following (from 36 a.3):

(36 a.4) *I am not here.*

If  $+_2$  were to include information about its being a *noun*, *be* would ultimately take the form *being* and the morphological changes in *I* would be its replacement by *my* ( $+_1$  being now an *adjective* and not a *noun*). In addition there would be the syntactic transposition requiring the interchange in position between  $+_1$ , *be* and *neg.* in (36 a.3) resulting in:

(36 a.5) *My not being here.*

When the *Verb* in a sentence or clause (that is, in the proposition underlying them) is nominalized, the sentence or clause ceases to be a sentence or clause and becomes a P-structure.

Coming back to the original discussion, corresponding to (36 a.1) for  $V \rightarrow V_0$ , we now have for  $V \rightarrow V'_0 V_0$ :

(36 b.1)  $(+' \wedge +)(S_{L1}) \rightarrow (+' \wedge +) (\langle P_1 \rangle V'_0 V_0 \langle P_2 \rangle)$

(36 b.2)  $+ (- S_{L1}) \rightarrow + (\langle P_1 \rangle V'_0 \text{ neg. } V_0 \langle P_2 \rangle)$   
 $\rightarrow (\langle + P_1 \rangle + (V'_0 \text{ neg. } V_0) \langle + P_2 \rangle).$

So that, after applying a rule like

(39)  $+ (V'_0 \text{ neg. } V_0) \rightarrow +_a V'_0 \text{ neg. } +_b V_0,$

(where  $+_a$  and  $+_b$  are non-identical but overlapping specifications), we get:

(36 b.3)  $(\langle +_1 I \rangle (+_{2a} \text{ do not } +_{2b} \text{ read}) \langle +_3 \text{ book} \rangle)$

giving ultimately a surface sentence like:

(36 b.4) *I do not read the\* book,*

(36 c) The 'interrogative' transformation for  $S_{L1}$ :

(40 a)  $(\langle P_1 \rangle V_0 \langle P_2 \rangle) \rightarrow (V_0 \langle P_1 \rangle \langle P_2 \rangle)$

\* where, the article 'the' is the result of  $+_3$  through some sort of Fillmore specification of definiteness.)

and

$$(40 b) \langle\langle P_1 \rangle V'_0 V_0 \langle P_2 \rangle\rangle \rightarrow (V'_0 \langle P_1 \rangle V_0 \langle P_2 \rangle)$$

giving us surface sentences like :

(40 a.1) *Are you here ?*

$$(V_0 \langle P_1 \rangle \langle P_2 \rangle)$$

and

(40 b.1) *Do you go there ?*

$$(V'_0 \langle P_1 \rangle V_0 \langle P_2 \rangle)$$

or *Did you read the book?*

A question like the poet's '*Breathes there the man...?*' (with an additional rule for the transposition of  $P_1$  and  $P_2$ ) and the conversational '*Have you money on you?*' could be dealt with by stipulating that (37) should apply before (40 b).

(d) The 'negative' and 'interrogative' transformations could be affected in two ways in  $S_{L1}$ :

(1) by applying first (38) and then (40 a or b)

or

(2) by applying first (40 a or b) and then (38).

In the first case we get :

(1 a)  $-(S_{L1})? \rightarrow (-S_{L1})?$

$$S_{L1} \rightarrow \langle\langle P_1 \rangle V_0 \langle P_2 \rangle\rangle$$

$$-S_{L1} \rightarrow \langle\langle P_1 \rangle V_0 \text{ neg. } \langle P_2 \rangle\rangle$$

$$(-S_{L1})? \rightarrow (V_0 \langle P_1 \rangle \text{ neg. } \langle P_2 \rangle)$$

*(Are you not there?)*

(1 b)  $S_{L1} \rightarrow \langle\langle P_1 \rangle V'_0 V_0 \langle P_2 \rangle\rangle$

$$-S_{L1} \rightarrow \langle\langle P_1 \rangle V'_0 \text{ neg. } V_0 \langle P_2 \rangle\rangle$$

$$(-S_{L1})? \rightarrow (V'_0 \langle P_1 \rangle \text{ neg. } V_0 \langle P_2 \rangle)$$

*(Did you not go there ?)*

(2 a)  $-(S_{L1})? \rightarrow -(S_{L1}?)$

$$S_{L1} \rightarrow \langle\langle P_1 \rangle V_0 \langle P_2 \rangle\rangle$$

$$S_{L1}? \rightarrow (V_0 \langle P_1 \rangle \langle P_2 \rangle)$$

$$-(S_{L1})? \rightarrow (V_0 \text{ neg. } \langle P_1 \rangle \langle P_2 \rangle).$$

If this order of application of the rules is followed, we have to state :

(41) neg.  $\rightarrow$  *n't*

giving us :

*Aren't you there ?*

(2b)  $S_{L1} \rightarrow \langle (P_1) V'_0 V_0 (P_2) \rangle$

$S_{L1} ? \rightarrow \langle (V'_0 (P_1) V_0 (P_2)) \rangle$

$-(S_{L1}) ? \rightarrow \langle (V'_0 \text{ neg. } (P_1) V_0 (P_2)) \rangle$

*(Don't you go there?).*

### 3.7. Conclusion

Our view is that no linguistic theory, to have any practical applications, would be complete unless the *lexicon* and *grammar* were taken as interacting counterparts of one another and unless a formalized *semantics* were included by rules into such an *integrated grammar*. An attempt has been made in Part II to give an indication of how 'the logic of natural language' could be considered as working.

We hope to have given an indication how, in the light of the primacy of psychological and logical associations of relations (actually existing or imagined) among the elements of the external world or events or among the elements of the world of our imagination, the descriptive mechanism of language could be structured, in its turn re-imposing its structure on the way the world (actual and imaginary) could be psychologically and logically dissected as a consequence, true to the Sapir-Whorf hypothesis. Once a psychological and/or logical dissection has been made and the relations among the dissected components imagined, Fillmore's specifications take over, even at the pre-linguistic 'deeper' level.

From this pre-linguistic 'deeper' level we arrive at the linguistic (syntactic) deep structures of Chomsky. In the Hallidayan sense logic does not play any further part from here on, for the structured syntactical, morphological, and even lexical components determine the higher deep structure levels. We hope to have shown how the dual character of each propositional component (and components of components, in their turn) determine the structure of a surface level sentence of any complexity, necessitating no rank ordering and rank shifting in the Hallidayan sense, but reflecting the same type of structure in components within components (a choice of alternatives being available as we go from the outermost structure to the inner ones).

In an *integrated grammar* of the type proposed, the psychological phenomena of 'gestalt' and 'associations', the logic of the theory of sets and of propositions, the Sapir-Whorf interaction between language structure and psychological structuring of the world, the higher level Chomskyan deep structure and the systemic structure of Hallidayan categories are not contradictory but complementary to a large extent.

Grammar is more 'universal' at the pre-linguistic 'propositional' level.

## References

1. ANDERSON, J. M. *The Grammar of Case*, Cambr. Univ. Press, 1971.
2. BACH, E. AND HARMS, R.T. (ed.) *Universals in Linguistic Theory*, New York, Holt, Rhinehart and Winston, 1968.
3. CARROLL, J. B. (ed.) *Language, Thought and Reality: Selected Writings of Benjamin Lee Whorf*, Cambr. Mass., M.I.T., Press, 1956.
4. FILLMORE, C. J. The case for Case, in (2).
5. GANESHSUNDARAM, P. C.
  - (a) Technical Terms in Regional Languages, *ISTA Bulletin*, New Delhi, 1968, 4, 11-31.
  - (b) Science, English and the Indian Languages, *ISTA Bulletin*, New Delhi, 1970, 6, 7-16.
  - (c) A practical theory of syntax for translation, *IRAL, Heidelberg*, 1976, 14, 373-382.
6. HARMS, R. T. [See (2)].
7. VYGOTSKY, L. S. *Thought and Language*. (English Translation), The M.I.T. Press, 1967.