The Psychological Reality of Phrase Structure Rules

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Abstract

The aim of this work is to shed light on the concept 'Psychological Reality of Phrase-Structure Rules' as a theory which aims at the correct explanation of psychological data. An account of different views towards grammar and its evolution will be presented. This concept will be dealt with in two ways: linguistically and psychologically. A brief view towards reality will be the vital part of this work which aims at deciding whether phrase-structure rules are psychologically or linguistically real. As competence is a basic component of language acquisition, it will be tackled regarding to different views concerning it. It is suggested that learning a language is a psychological process, and so phrase-structure rules are psychologically real.

Keywords: Psychological Reality, Phrase-Structure Rules, Linguistics, Competence, Acquisition.

1. Introduction

The concept of grammar is viewed differently by various linguistic schools. Traditionally; it is a collection of rules and principles. Structuralisms believe that it is the study of how sentences are arranged and formed. Grammar is the rules that generate an infinite number of sentences and allow speakers to understand utterances they have never heard of according transformational rules. All these views suggest that any language cannot be learned without its grammar. It is an essential part in the body of language. It is grammar that remains the internal organization of any language without it a language cannot be learned because of its function to make meaning when using a certain language (Kilani and Muqattash, 1995). Grammar in teaching, according to structuralisms, was paid much in giving us detailed account for analyzing the surface features of a language but little was given to the explanation of deep structure. The later is being thought of it as of a great necessity to account for creativity in a language (Brown, 1987).

The main concern of generative grammar is to provide clear formal systems which deal with the most important naturally qualities of language; creativity and generation. In this sense, two questions arise when talking about the psychological reality of grammar. First, are the sentences with similar meanings (i.e. passive and active) processed and stored in the same way? Second, does the number of transformations of deriving a particular surface structure correlates with the complexity of the sentence when compared with the sentences (i.e. negative and affirmative). The production of language occurs at two levels lexically and grammatically; that is, it is possible to generate an infinite number of words from a finite set of phonemes, and also an infinite number of sentences from a finite set of words. According to grammarians grammar can be evaluated following certain criteria. It must specify what is considered to be acceptable or not, indicate the relation between sentences in some manner e.g. passive and active, show that language acquisition is based on universal problems. Finally, show how it is represented (i.e. its psychological reality).

In general there are certain stages by which we can follow the development of grammar. Firstly, the Behaviorism (Skinner,1957). According to this theory speakers learn "standard patterns" or "skeletal frames" as a basis for sentence composition. That is, each sentence serves as a stimulus for next word and that there is a sequential model (left to right) formation of sentences where the acquisition is based on reinforcement. This theory suffered from many deficiencies. First, the formation of new sentences means the absence of reinforcement. Second, it lacks the ability to distinguish grammatical sentences from
ungrammatical sentences. Third, it can not explain sentences with multiple interpretations (e.g. they are visiting fireman). Finally, it can not explain embedded in clauses. The second stage is the Phrase Structure Grammars. Here, sentences are grouped into constituents that are organized hierarchically not sequentially, and consist of rules for rewriting a constituent into a set of one or more constituents. Studying them enable us to see that every label on the left generates a label on the right, there are optional rules, and finally there are more lexical rules which give examples of different parts of speech. By following the rules we can generate or derive a sentence and a structural description of that sentence which expresses the speaker’s intuitions about sentences.

The third stage is the Transformational Grammar. Chomsky assumes the existence of two levels in grammar, the deep grammar and the surface structure. The deep structure of a sentence is mostly related to its meaning. It is based on phrase structure rules. The surface structure is the actual arrangement of constituent when written or spoken. It is derived from deep structure (Chomsky, 1965). The fourth is the Extended Standard Theory (1965-1973). Its main features (i) are syntactic constrains (ii) general phrase structures (X-bar) theory. The fifth is the Revised Extended Standard Theory is (1973-1976). It contains restrictions upon X-bar theory assumption of the complementizer position, and finally movement. The sixth is the Relational Grammar (1975-1990). An alternative model of syntax based on the idea that notions like subject, direct object and indirect object play a primary role in grammar. The seventh is Government and Binding (principles and parameters) theory. (1981-1990). It shows that the head of a phrase governs the complement (governor and governee). Finally, the Minimalist Program (Chomsky, 1995). Its main assumption is that grammar should be described in terms of the theoretical and descriptive apparatus necessary.

2. Literature Review

Phrase-structure rules is a set of rules that represents information about sentence structure which gives some instructions for manipulating the kinds of symbols used in describing the structure of sentences. Manipulating the symbols in the manner stated by the rules means that we can generate many other sentences which are always grammatical. By following the rules we will also generate a phrase marker that shows the relations amongst the symbols in the sentence. This leads to a sentence and a structural description of the sentence. Despite being abstract, and do not appear in the sentence, these rules are used to generate the structure which expresses speakers' intuitions about sentences (Chomsky, 1975). Since we can always generate a new sentence, the problem of the openness of the language can be overcome by the modification of certain rules. Chomsky (1977) has proposed different goals for generative grammar. (i) to discover the basic principles of language. Psychologically, to discover the nature of intuitive, unconscious knowledge which permits the speaker to use his language (Newmeyer,1983) (ii) to construct an explanatory theory that explains the behavior of certain elements of sentences (iii) to consider the general principles of language as the properties of a biologically given system that underlies the acquisition of language. In this sense, generative grammar tries to find answers for two questions: What is the system of linguistic knowledge that has been internally represented by a person who knows some language? And how can we account for the growth and attainment of knowledge?

Exploring issues in the ways we produce and comprehend speech is known as the psychology of language or psycholinguistics. The purpose of psycholinguistics is to study how knowledge might be represented in the mind and how this information can be used in speaking and understanding. It is a trial to understand how the knowledge and thought may relate to the neural structure of our brains. So, the study of linguistics is an essential part of psychology as language is considered one of many systems that interact to form our whole complex system of cognitive structures. So, it is suggested that grammar is a kind of a scientific theory which must be treated realistically. This leads to the psychological reality of rules described by the grammar (Chomsky, 1980a).
There are two different views about grammar that should be presented. The first one is linguistical; which views grammar as a theory of representational system (Devitt, 2006b). The other one is psychological; which views grammar as a concept about linguistic competence, a mental organ that is speakers' language faculty. The concentration of the linguistics is their descriptive problems within a given framework. They hardly pay any attention to external evidence or consideration. But psychologists tend to take information about grammar as one of their starting point and see its relation with cognition functions. So phrase-structure rules as seen by psychologists "May represent a formally stated analogue of the psychological rules used for encoding language". That is the string of morphemes or words encompassed by a single phrase-structure rule may represent a psychological unit which is determined by the speakers' encoding rules "(Johnson, 1965:469). In his experiment aimed at studying the psychological reality of phrase-structures rules, Johnson shows that when speakers are presented the task of learning grammatically structured verbal material, it may be that part of the learning has already occurred. He stated that "There are items pools which consist of response sequences that have been integrated, or learned as sequences, and hence, can be sampled as relatively simply response units in new learning situations" (ibid). This leads speakers to deal with language materials in terms of pre-integrated units which are predictable from the linguistic structure of the materials which in turns means that phrase-structure rules seem to be psychologically real. Studying any theory is based on psychological data which aims at explaining those data correctly means that the theory is concerned about psychological reality. As linguistic is a science, whether it deals with abstract concepts or not, it has what is called truth. This truth is the main concern of psychologists as well as linguists. To investigate this truth (reality), a researcher may face some problems, one of them is abstractness. The biological structure of language as a study of abstract syntax or phonology cannot tell us anything about the so called 'Psychological Reality' or 'Biological Nature'. Chomsky defines psychological reality with reference to the biological nature of language as the set of genetically determined principle that provides the basis for the growth and development of these specific capacities "(Chomsky, 1983:3).

Language in this sense must be considered as any biological system in the body such as vision. As any biological system language has some things that can be considered true or real, and reality may be clear or abstract. One can, in his search for this truth, get his psychological data from many sources: such as studies of speech perception, sentence processing and introspection. Since the later counts as psychological data, the correct explanation of psychological data of grammatical theory could be considered psychologically real. Information about the psychological reality of phrase structure rules can be collected from many different sources (i.e. aphasic speech, speech errors, the way native and non-native speakers acquire language and the results of the experiments that are done in the psychology laboratory (Chomsky, 1977). The purpose of these experiments is to explore some aspects of verbal behavior. In judging any theory whether it is psychologically real or not, two things must be taken in consideration. First, it must explain the speakers' intuitions, Second, it must be compatible with the different sources of data. So any concept may be psychologically real if it plays a particular role in a particular experiment process or psychological process like remembering. And so, the introspection about the well-formedness and interpretation of sentences is a kind of psychological data.

A different view towards the introspection is made. It is declared that psychological reality as reference to the modularity of mind which may seem an easy way—out, where the main function of the mind is to produce and retrieves information synthesized in decodable structure. Nevertheless, how the mind controls these modules, and what kind of creative control there can be is still not very clear (Martin Puts, 1992, 580-1). Another concept which relates to the psychological reality is Human Behavioral Reality, "The degree to which a theory accurately accounts for actual though" (Brown, 1987:150). According to linguistics, a theory of linguistic that is psychologically real must contain rules which represent actual cognitive process through which human beings operate. This means that grammar is psychologically real if it describes or directly relates to mental processing, storage, and recall.
3. Discussion and Findings

The first time the term was used by Edward Sapir in 1933. He studied the phonemic analysis of American Indian Languages and proposed an abstract phonological structure which underlies the range of phonetic phenomena that he studied. His empirical justification was that if you assumed it, then you explain many of the phonetic facts. He tried to show that the phonetic facts were not something random, but in fact they reflected some single principles from which a range of phenomena follow. Sapir, in fact, did not take that as a theory of psychological reality, but he wanted to say that his informant seemed to be something that was not physically present. In his work, he found two kinds of evidences concerning the psychological data. The first one provides evidence for the correctness of the phonological analysis. The other is behavioral, which is an evidence for psychological reality of the phonological analysis, (Sapir, 1933). As time is passing, we still have the same question about psychological reality: What is the evidence for the reality of some linguistic construction: what is the evidence for the systems and principles. Chomsky says "The evidence is supposed to come from experiments and bear on psychological reality" (Chomsky, 1983: 8). When investigating psychological reality throughout history, the aim was not to find evidence but it has been that the hypothesis being proposed has some facts. This means that there is always an evidence to support facts physical or psychological and to show psychological reality one has to do an experiment involving reaction time. It is clear that starting from Sapir 1933 till now, the same question arises. It is stated that "The best way to answer this question is to transfer the debate to physical science" (Chomsky, 1983: 11). Scientists have always been talking about the interior of the sun but have they done any experiment inside the sun or have they got any kind of laboratories inside the sun that prove their theories about it? The answer is negative. As a result; applying the same methods of finding physical reality of sciences on psychological reality is a failure, but trying to find linguistic evidence for certain structures means that we try to find the truth of these structures which means the psychological reality of their constructions. Through trying to investigate the concept, many experiments have been constructed. Starting from Edward Sapir who tried to investigate whether studying the phonemic analysis of American Indian languages indicates psychological reality or not. He assumed that there is abstract phonological structure which underlies the range of phonetic phenomena he studied, and he concluded that if you assumed it, you can find facts about it. The vowel Shifting Rule (Chomsky and Halle,1968) is another example. It was declared that subjects would perform in a particular way in a particular experimental they have designed, but after discovering that subjects do not perform in that way, it was said that their theory was not psychologically real. The third example is 'Back Formation'. In this process the word formation process is reversed. For example, the suffix er (William, 1975). Certain nouns in English existed before their verbs e.g. burglar/to burgle. The noun indicates a certain profession or activity, and speakers simply assumed that the ending on the nouns was the agentive suffix (er). As speakers have made this assumption, they could subtract the final (er) to arrive at a new verb just as writer/to write. Another example is the word Television which existed earlier than the word to televise. A further example is the experiment made by Neal F Johnson (1965). His experiment was designed to determine how speakers would use their knowledge of grammar to break sentences into functional subunits as they attempt to learn them (Johnson 1955:1). His results indicated that the conditional probabilities were predictable from the linguistic structures of the sentences.

The difference between present perfect and past tense is another example. "Human beings conceptualize many items not only in chronological order, but also with the present moment as a focal point of reference". (Brown 1987: 152). The distance between the surface and deep structure measured by transformation in sentences- would be an accurate index of psychological complexity of the sentence. This view is called "The Derivational Theory of Complexity. Studies show that" negative was more difficult to comprehend than affirmative, also passive and active" (Carol, 2007: 41). For example;

\begin{itemize}
  \item \textbf{a. The sun is not shining} /  \textbf{1. The sun is shining}
\end{itemize}

The two sentences differ in meaning and transformational complexity, so this point is hardly conclusive.
b. The boy was bitten by the wolf / 2. The boy was bitten

The first is more complex regarding transformational rules, it needs a rule that deletes the phrase by the wolf and so the theory predicts it to be more difficult to comprehend which is an issue relates to competence. Competence is defined as "That knowledge internalized by a speaker of language, which once learned and possessed, unconsciously permits him to understand and produce an infinite number of sentences"(Chomsky, 1965:5). It can be realized that this concept is based on psychological data which aims at the correct explanation of the data. It is the duty of psycholinguistics to find out how language is present in the mind of the speaker and how this is used in the process of production and understanding of expressions normally, and how they acquire these abilities. Another view concerning competence is seen as "The Ability to produce and understand sentences with the sounds and meanings of that language"(Devitt, 2006b: 128). This leads us to see the linguistic competence of a person as the relation between the shape of a sentence and its true semantic content; the ability to use a sound of the language to express a thought or the ability to translate the sound of a language into mental representation. This processing will happen as a change from a process or a condition. Regarding rules and principles, competence aims at producing and understanding expressions that are governed by principles and rules; and so grammar competence tells us that competence includes something that follow the rules and principles of the grammar. Chomsky indicates that "The theory of competence deals with abstract structures postulated to account for and explain linguistic data." (Chomsky, 1986a: 91). Competence is a mental object which is considered necessary to explain the aspects in native speakers' verbal behavior which indicate the command of language. In relation with competence, psychological reality is achieved when a linguistic concept help us understand the behavior which is involved in judging grammatical theories which are presented as facts or data.

4. Conclusion

Studying the psychological reality of speakers is vital; that is to find evidences about the way or manner the speakers follow when they deal with the input / output of their competence. It does not mean that if we cannot find empirical evidence on the psychological reality of grammar it does not exist psychologically. The truth of a grammar for a language leaves the question of the psychological reality of the language open, but studying physical reality of objects along with psychological reality is the best way to prove the psychological reality of phrase-structure rules.

References

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