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The Psychological Basis of Grammaticality

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Abstract
The existence of indispensable grammatical rules implies that within the scope of human language, novel combinations must be based on past or existing grammatical experiences. Though these associative rules are argued to be arbitrary as long as human language is concerned, we sought a natural or psychological base of this linguistic tendency. We found that humans have a natural imitative bias towards conforming to past linguistic experiences when describing novel situations—children and adults alike. From this finding we conclude that the notion of linguistic creativity is illusive.

Keywords: Gammaticality; Psychological; Combinational; Intuition; Naming

1. Introduction

Human language is a complex combinatorial system. Within the scope of grammar, these combinatorial processes operate in three levels of representation, namely phonology, morphology and syntax. The rules of how the elements of different linguistic levels would combine to form the higher levels are fixed prior to an utterance is actually taking place. The nature of linguistic sign, the association between the signifier and the signified, is arbitrary, that is, the signifier "actually has no natural connection with the signified." (Saussure, 1959: 69). Moreover, the rules of language are retained

"not only by the weight of the collectivity, but also by time" (p. 74). This 'collective inertia' prevents language from 'innovation' and makes it impossible for any revolution (p. 73). As long as the combinational possibilities of language are concerned, it is observed that "solidarity with the past checks freedom of choice." (p. 74). By the same principle, even in phonology, arbitrary linguistic conventions play decisive role in preferring certain kinds of 'articulatory shortcuts' to others (Pinker & Jackendoff, 2005: 211).

In reality, it seems it has been taken for granted across different linguistic tenets that past or existing grammatical experiences determine the new combinations. For this reason, it is assumed that a generative grammar should give "a general explanation for the notion "grammatical sentence" in terms of "observed sentence..." (Chomsky, 1957: 14, 49), and "...a grammar mirrors the behavior of the speaker who, on the basis of a finite and accidental experience with language, can produce or understand and indefinite number of new sentences." (1957: 15).

Chomsky attributed the sole right to determine the accuracy of a grammar to the linguistic intuition of the speaker-hearer of the language concerned (Chomsky, 1965: 21). The question is: what lies behind this intuition? It may be the result of a certain way of functioning of human brain like primacy effect, or the long-held notion of inherent instinct for imitation in human being (Aristotle, 1965: 35). In any case, it is obvious throughout the whole universe of language that novel linguistic combinations are unfailingly based on existing grammatical experiences. This is a tendency apparently so dominating in human linguistic behaviour that the sentences produced by an actual speaker often may not have to fulfill the conditions expected from a so-called ideal speaker (for an example see Nagata, 2003). This tendency of the process of grammatical combining put the notion of linguistic creativity into question. In this study, we have sought a natural or psychological basis of this imitative bias of grammaticality.

2. Method

We conducted naming tests to explore the psychological basis of constructing novel linguistic combinations. Since the study was conducted in a Bangla-speaking setting, and the respondants spoke only Bangla, the stimuli, i.e., the combined morphemes we used, were all connected to Bangla. It should be mentioned that the word *naming* has not been used here in any nomenclaturist way (Harris, 1988: 7) that both Wittgenstein, (2001: 11e) and Saussure (1959: 69) have considered faulty. Naming was only used as a tool as part of the method designed to find the underlying psychological basis of linguistic combination. Though this method sought some technical advantage using word combinations in the study of grammaticality which has its realm more vastly in the area of syntax than in that of phonology and morphology, we kept in mind that in this case sound sequences could very well substitute for word sequences. We considered Bauer (2014) right in accepting the proposition of Aronoff (1976: 17–18) that morphology is "the enumeration of the class of possible words of a language", and in arguing that "the notion of 'enumeration' is not obviously different from the Chomskyan use of 'generation'. It also aligns morphology (perhaps, more specifically, word-formation) with syntax in implicitly claiming that just as we cannot list the actual sentences of a language, so we cannot list the actual words, but we can provide a statement by which we can determine whether a given form can be expected to be admissible as a word of the language provided that it is pragmatically adequate."

We assumed that grammar is mechanical. In our consideration, this mechanicality of grammar is reflected in the real active language use of humans in the way that humans describe any novel object or situation on the basis of their existing grammatical experiences. We attempted to elicit and analyze empirical data in order to examine the underlying psychological basis of this reality.

Four related tests were conducted under two headings:

1. Morphological Naming Test (MNT)

2. Phonological Naming Test (PNT)

Each heading consisted of two tests conducted among adults and children following the same method.

2.1 Morphological naming test

We used 33 figures in conducting the morphological naming test each of which combined two familiar figures. This kind of combination does not appear in real life; therefore we reasonably called these figures novel.

Each figure was given 3 alternative names, one of which had little or no connection with the primary figures that combined to the form the novel figures. Another had partial resemblance and the rest bore closest resemblance with the combined figure. Two examples of the constructed figures and their alternative names are presented here.

1. macokh 2. cošmach 3. dhamumu

1. Mogach 2. Morogach 3. Gachikuru

Figure 1 Examples of the figures used in the morphological naming test

In this test, 39 MA students from the department of English at Jagannath University participated. Sampling was done randomly. The participants, both males and females, were aged between 23 to 25 years. The participants were provided with the figures and were asked to choose the most appropriate name for the figure concerned. The names of the figures were arranged differently in every case in order to avoid any bias caused by a routine serial. Twenty minutes time was allotted to answer. There was complete silence in the test venue, and the

participants were not allowed to discuss with one another. The answers of the participants about every figure were calculated.

43 grade 1 students from Azimpur Girls' School were chosen randomly as child participants of the same test. The same method like in case of the adults was followed in the case of the children.

2.2 Phonological naming test

Phonological naming tests had been conducted immediately after the morphological tests on the same participants. The same figures had been used in this test. The test environment and time were exactly like the previous test. Every figure, like in the previous test, had three alternative names, one of which was phonologically nearest to the object concerned, one had partial resemblance, and the third one was far from being resemblant. The names had been constructed using the sounds that are in the names of the primary objects combined to form the test objects, although other sounds also had been used in some cases. The difference between the alternative names had been created in the following ways:

1. Using the initial sound of the name of one of the objects that had been combined as the initial sound of the name of the test object. As example, 'mogaru' is one of the names of the object that had been formed using 'morog' (মোরগ=cock) and 'gach' (গাছ=tree). The other names were 'garumo' and 'rugamo'.

2. Using different numbers of sounds forming the objects that have been combined in the given names. The more the sounds used, the more resemblance created. For example, 'šomach' combined 'cošma' (চশমা=spectacles) and 'mach' (মাছ=fish). The other names of the same object are 'makuc' and 'mamaš'. A maximum of four sounds from 'cošma' and 'mach' had been used to form the name 'šomach', where the other names had lesser number of such sounds.

3. Placing the sounds of the names of the primary objects in different orders in the names of the novel objects in order to create varying

importance of the given names. For example, 'kanupu' had been presumed to be the most chosen name for the object that combined 'kap' (কাপ বা পেয়ালা=cup) and 'nouka' (নৌকা=boat). The other names were 'napuku' and 'pakunu'. The initials of 'kap' and 'nouka' came one after another in 'kanupu'. The initial of 'nouka' came in 'napuku' but it had not been followed by the initial of 'kap'. The sound arrangement of 'pakunu' was most far from having such importance, because its initial /p/ is not the initial of either 'kap' or 'nouka'.

Two examples of the objects used in the tests are given bellow:

1. makuc 2. šomach 3. mamaš

1. garumo 2. mogaru 3. Rugamo

Figure 2 Examples of the figures used in the phonological naming test

3. Results

3.1 Results of the Morphological naming tests

Comparative analysis of the morphological test for adults revealed that the number of the participants who chose the novel objects' names that morphologically resembled the concerned objects most was significantly higher than the number of the participants who chose the names resembling moderately and the least. Even the number of the participants choosing the moderately fitting names was clearly higher than the number of the participants choosing the least fitting names. (Figure 3)

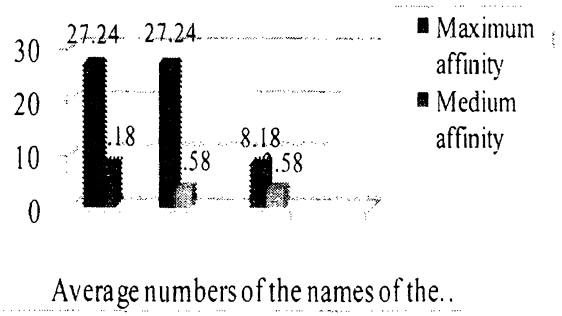

Figure 3 MNT 1: Adults. Comparison between average numbers of the names of the objects chosen by the participants according to the degree of affinity of the names with the objects

Now, the morphological test described above was conducted on the operational children who responded in a similar way like the adults did. (Figure 4)

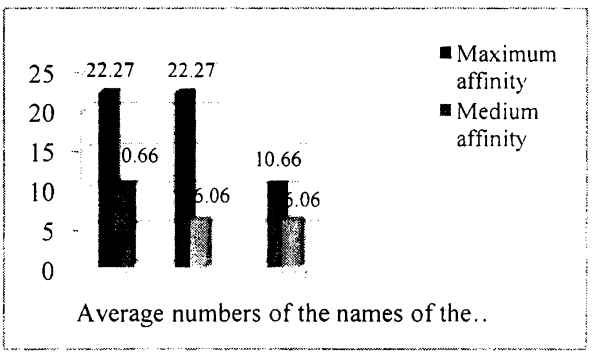

Figure 4 MNT 2: Children. Comparison between average numbers of the names of the objects chosen by the participants according to the degree of affinity of the names with the objects

3.2 Results of the Phonological Naming Test

The results of the phonological naming tests (Figures 5 and 6) were significantly similar to the results of the morphological tests.

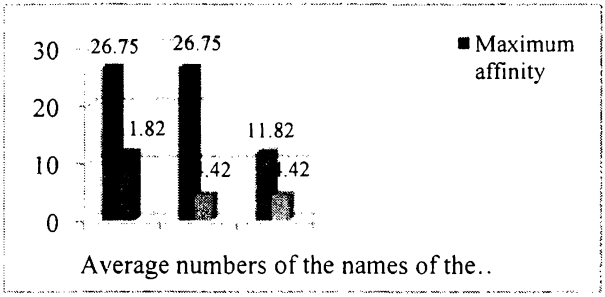

Figure 5 PNT 1: Adults. Comparison between average numbers of the names of the objects chosen by the participants according to the degree of affinity of the names with the objects

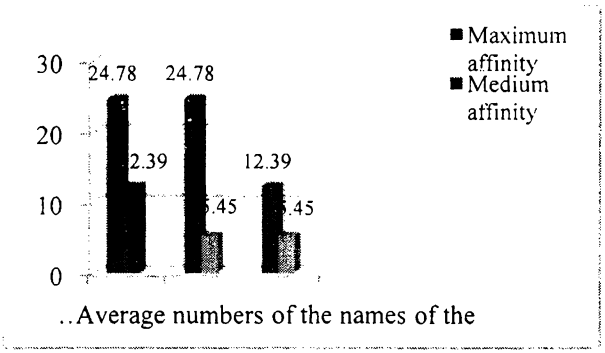

Figure 6 PNT 2: Children. Comparison between average numbers of the names of the objects chosen by the participants according to the degree of affinity of the names with the objects

4. Discussion

The results suggest that the tendency of using existing linguistic experience in constructing novel sound sequences is universal in humans. Always conforming to a limited and certain number of rules is quite typical of the process of language generation, since those rules of grammar are arbitrary by nature. Furthermore, as we found in this experiment, this conformity has its root in a deeper and inborn bias of humans towards imitating their past grammatical experiences when faced with the need of novel linguistic constructions. This

conclusion fits with the "cell assembly theory" of human brain functioning during learning (Hebb, 1949), according to which a path of interconnected neurons, which has been created by a repeated stimulus or input, "can be more easily crossed in future" (Groome et. Al., 1999, p. 8) by any similar stimulus. The conclusion also match other cognitive theories such as Gestalt theory (Wertheimer, 1912, Kohler, 1925) and schema theory (Bartlett, 1932) of learning and memory. Both theories propose the need of pre-existed models or schemata of things for the human brain to recognize and learn new ones. Even experiments with computer models of human brain (Selfridge and Neisser, 1960; Marr, 1982; McClelland and Rumelhart, 1986) have "raised the possibility that human perception could conceivably involve similar feature-detecting systems" (Groome et. Al., 1999, p. 5). This tendency of human psychology suggests that human mind lack the property of a true linguistic creativity for generating qualitatively infinite number of sentences.

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