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Psycholinguistics - A Study on how it affects effective communication

Sandipan Das

Arkaprovo Dutta

Sayantani Biswas

Kashyap Majumdar

Institute of Engineering and Management, Kolkata

Abstract

Coined by Jacob Robert Kantor in 1936, the term Psycholinguistics is a vast topic to analyze. It may be termed as a plethora of cognitive processes that make it possible to generate a grammatical and meaningful sentence out of grammatical structures and vocabulary as well as the series of steps that makes it possible to understand words, texts, articulation, etc. Essentially a branch of study that combines psychology and linguistics, psycholinguistics is basically concerned with the relationship between the human mind and the concerned language. Communication is a two-way process, not just involves two groups on both ends of the transmission line, but also a number of factors in general. The most important thing among them is the human mind. How it encodes and decodes the message signal en route to effective communication. Here, human psychology plays a vital role. If broken up, a number of areas crop up including Phonetics, Morphology, Syntax, Pragmatics, etc. Therefore, this paper is more or less a study on how the extreme extravaganza of Psycholinguistics affect effective communication in general and in the process chalk up a camaraderie with subtopics like the aforementioned.

Keywords: Psycholinguistics, language, communication, linguistics

PSYCHOLINGUISTICS - A STUDY ON HOW IT AFFECTS EFFECTIVE

COMMUNICATION

HOW COMMUNICATION IS DEFINED?

Communication is a two-way process involving two or more entities or groups that concerns the exchange of a piece of information through the use of mutually accepted signs, directions, symbols, and roles.

Communication involves certain steps. The process of smooth communication involves the following steps: Firstly, the process of thought generation. This will lead to the formation of a message in mind (elaboration on what needs to be expressed). Next, the encoding of the message (the person would be referred to as the encoder). This step is going to be followed by the sending of the message through the use of expressions, gestures and most importantly, speech. Then the transmission of the already encoded message takes place using a particular medium (sometimes also known as interface). Then, crops up the issue of the interference of the signal when being transmitted owing to certain factors including both human activity (unintentional and deliberate, both) as well as natural forces (mainly various kinds of noises). This leads to the partial loss of the transmitted signal (usually 1-2%). Reception of the remaining (98-99%) of the original signal by the receiver forms the next step. It is followed by the decoding of the received message (the person would be referred to as decoder). The decoded message is interpreted and necessary use is made of it. The generation of thoughts in the decoder's mind forms the next block of the communication process. The feedback is sent from the receiver back to the sender. The feedback is accepted by the sender. The communication process comes to an end.

TYPES OF COMMUNICATION

Non-verbal communication (that involves the conveying of a message in terms of non-

linguistic expressions). Examples of non-verbal communication include :

Body language ;

Grooming (The dressing sense: how someone dresses)

Facial expressions;

Haptic communication(The communication carried on by touch)

Chronemic communication("CHRONEMICS" coined by Thomas J. Bruneau of Redford

University towards the end of the 1970s refers to the communication that involves the role

oftime)

Not only that, but the non-verbal communication also tends to throw light on the real

intention of a delivered message. These may be again classified as-

[a]voluntary, deliberate movements, for example shaking a leg, winking, breaking

knuckles of the hand, etc. and

[b] involuntary movements, for example sweating.

Paralanguage in the forms of rhythm, stress, etc is non-verbal elements. It influences

communication. Written text including the factors like handwriting style, the spacing of

words, and expression of a situation all leads to the establishment of an impression.

Verbal communication (that involves the conveyance of a message either in written or

spoken form). From the very childhood, a child is taught a language (at least one, usually

the mother tongue or the colloquial one or both). This leads to the beginning of "Language

Learning". And when the child grows up, he learns to nurture this thought that his language

is the best in the world and there begins the first essence of ethnocentrism.

BARRIERS OF COMMUNICATION

Effective communication can be hampered due to a number of reasons. The following enlists some of them:

Physical barriers: The major factor responsible for this hurdle is the surrounding environment. Narrowing our view of our country, India is not a cashless economy. There exist a plethora of castes, classes, and divisions. This leads to a serious communication gap between the members of two separate classes of people.

Cultural barriers: This is by far the most important hurdle faced in the path of effective communication, as concerned to our point of discussion. There are thousands of cultures followed across the globe: between religious outfits and in organizations; where different people have different opinions, ideas, and expectations. For example, it may seem weird but in some countries, nodding the head up and down signifies NO while shaking the head sideways signifies YES (The reverse being followed by almost every other part of the world).

Physiological barriers: This is a minor case, but nevertheless contributes as an obstacle in the path of clear communication. This is the case, where ill health, weak eye power, hearing discomfort weighs in.

Herein lies the barrier of psychology and mind.

Attitudinal barriers: Weak management, individual conflicts at a personal level, dictatorship instead of democratic approach, lack of motivation, dissatisfaction to work all result in Attitudinal Barriers.

So to put it in a nutshell, psychology interferes a lot in the process of effective communication. The linguistics of effective communication when mingles with the psychology of the human mind, it gives rise to psycholinguistics.

METHODOLOGIES

Behavioral Methods
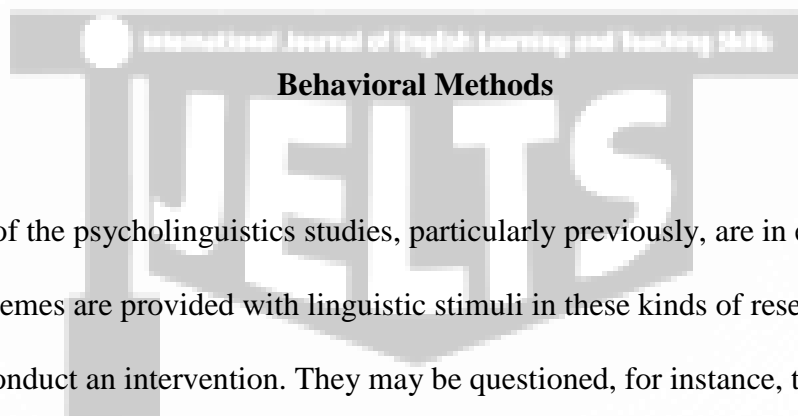
Many of the psycholinguistics studies, particularly previously, are in essence behavioral. Themes are provided with linguistic stimuli in these kinds of research and requested to conduct an intervention. They may be questioned, for instance, to create a judgment on a word (lexical decision), to replicate the stimulus, or to name a word displayed visually aloud. The most commonly used performance measures in cognitive tasks are reaction times to react to stimuli and the percentage of right answers. Such tests often take benefit of priming impacts, whereby an experiment's "priming" word or sentence can accelerate the lexical choice for an associated "target" word later on.

Common Assumptions Underlying Behavioral Methods

While there are a broad variety of psycholinguistic behavioral techniques, most rely on the same fundamental assumptions. One significant hypothesis is how time

measurements to perform a job are related to inferences about processing complexity. Whether the timed reaction is an eye movement or the moment to answer a query' yes' or' no,' the complexity of the mental process is presumed to be reflected in the latency of the reaction.

The trade-off between velocity to react and the precision of that reaction is investigated by a more advanced timing technique. This is called a speed- accuracy trade-off (SAT) method. SAT requires respondents to respond to a linguistic stimulus as quickly as they hear a tone that is displayed at distinct intervals after the stimulus is presented. When the interval is brief, respondents tend to create a lot of mistakes, and they become totally precise when they are long enough. Therefore, plotting reaction latency and precision across the spectrum of tone intervals provides an unbiased measurement of the speed at which the task can be performed.SAT methods were used to evaluate the frequency of occurrence of distinct types of lexical, syntactic and semantic processing.

Although it is deemed to be a particularly sophisticated method for setting processing rates, it has the disadvantage that many thousands of tests have to be conducted to generate a clear SAT profile, and this will mean that many instances of each type of material will have to be used. There are therefore only a restricted amount of problems that can be explored readily with SAT.

The understanding of priming impacts is another significant hypothesis underlying many behavioral techniques. Priming methods assess the impact on the subsequent processing of a target item by having earlier processed a prime item. The prime may be a term with a specific shape or significance, or it may even be a whole phrase with a specific syntactic structure. The rationale behind priming methods is that any impact of prime on later target processing must reflect some connection between prime and target object mental depictions.

Typically, when a prime stimulates target interpretation, this is taken as proof that there is something in common between target and prime representation. On the other hand, if it interferes with the interpretation of the target–this is called negative priming as opposed to positive priming–this is taken to reflect some conflict between the primary and target representations. Priming techniques are particularly useful to establish the relationship between different linguistic representations used during processing and are widely used in conjunction with a number of behavioral or neurophysiological measures.

For Spoken Language Comprehension

Cross-modal Priming: A popular method of priming used to tap into the understanding of the spoken language is what is called cross-modal priming. Usually, in cross-modal priming, the prime element is a term inserted in a spoken phrase or text used to prime a written target object, which is why it is called cross-modal.

The Gating Technique: Another technique is gating when listeners interpret data-related sentences in the speech flow. The gating procedure involves gradually long fragments of speech and measurement when listeners are able to interpret the speech correctly. This method can be used to predict the earliest point at which the listener could identify a word and thus make it possible to check whether the identification time for the spoken word is predicted.

The Visual World Paradigm: Eye Tracking is one of the most efficient online interventions. Because visual attention is heavily regulated by where an individual is

presently looking, eye tracking can be used to imply at any stage during understanding what an individual is attending to and how long they are attending to it. Either the method can be used for reading studies, in which case the focus of attention corresponds to the phrases being examined at any moment, or it can be used to assess which portion of a scene a participant attends as they interpret spoken statements about that scene. Usually, this latter method is called the visual world paradigm.

For Written Language Comprehension

Self-paced Reading: Self-paced reading is one method category. The reader determines the frequency of presentation of written content and the experimenter records the frequency of presentation. This type of method was used to study syntactic analysis, discourse understanding procedures and specific resolution of anaphors. It provides a useful indication of when a reader encounters the difficulty of understanding but is limited by the size of the presented linguistic unit.

Rapid Serial Visual Presentation (RSVP): Using what is called rapid serial visual presentation (RSVP), a slightly different technique for presenting written language use. With RSVP, readers see sequences of phrases presented at a specified rapid pace in the middle of a computer screen. The experimenter then has the reader perform an extra job, such as recognizing a word in the sequence or attempting to recall the sequence of phrases, which shows how the frequency of presentation limits understanding. Using this method, lexical, semantic, and syntactic processing was investigated. RSVP may interfere with normal language processing like word-by-word self-paced reading.

Eye Tracking During Reading: Eye tracking is the least interfering online behavioral method for understanding written language. The eye moves systematically during reading. There are short fixations in which the gaze remains on the same object interspersed with rapid movements called saccades during which the gaze moves to another text letter or word. The fixation duration and the length and direction of the saccades directly represent the reading process's ease or difficulty. In addition, they show the accurate word in the text that causes difficulty reading because only the term presently fixed is given attention.

A broad variety of linguistic procedures including lexical access, lexical solution, syntactic analysis, and multiple aspects of the discourse process, such as anaphora resolution, were explored using eye-tracking methods. It is especially efficient in determining exactly when, during phrase or discourse processing, the reader makes a choice on some aspect of the linguistic input.

Eye tracking is especially effective as it does not interfere with the normal reading process. Some neurophysiological techniques, such as ERP, described later, are similarly claimed.

For Spoken Language Production

Analysis of Speech Errors: Speech error information were used to draw many interesting conclusions concerning the nature of the manufacturing of languages. It was noted, for instance, that substitution mistakes are always syntactic to the same. Furthermore, lexical replacement is not always a syntactic replacement. These results demonstrate that words are selected in manufacturing for utterances prior to being strung together and that this is done prior to the syntactic situation being labeled for words.

Speech errors were utilized in the argument of distinct message planning, lexical and grammatical assembly and phonological elements for the general organization of speech manufacturing. Some attempts were also made to create methods to experimentally generate voice mistakes by priming mistakes comparable to the ones used in tongue twisters. Many of the findings from the evaluation of speech mistakes were backed by the latest technology, such as picture naming.

Picture Naming: A particularly important online method for studying the development of languages is to evaluate the time it takes for respondents to name photos of objects or occurrences. This can also be combined with other techniques such as eye tracking for an exact indication of how words are used during the production of languages.

Priming Techniques in Language Production: A significant question in linguistic manufacturing is to how gradually one unit is formulated according to distinct levels of representation (semantic, syntactic and phonological). To tackle these and other associated issues, priming methods were used. For instance, words can either be assembled as full packages or gradually as a series of separate phonological units for articulation at the phonological stage. In order to test this, a so-called implicit priming process was created. There are also methods for the syntactic study of priming in the development that uses a variation of the process of picture naming.

For the Study of Dialogue

Just lately, as with language manufacturing, psycholinguists began to study language

processing experimentally in dialogues. Again, the problem of exuberant responses has sometimes been called. Since the dialog is inherently spontaneous, it is difficult for the experimenter to regulate a sound test. One way to tackle this issue is to create a job that checks how people speak. The referential communication task is one such job. Recently, scientists began to record patterns of eye movement of interlocutors while performing some version of the referential communication task. Thus, aspects of the visual world paradigm can be combined with those of the interactive referential communication task.

Neurophysiological Methods

The methodological armory of the psycholinguist has lately been improved by techniques for assessing the neurophysiological correlates of language processing. Three specific methods of measurement are used. The first is the evaluation of scalp electrical activity using **electroencephalography (EEG)** to generate what are called **event-related brain potentials (ERPs)**. The second measure changes in brain blood flow connected with a neural activity using **functional magnetic resonance imaging (fMRI)** techniques, and the third measure shifts in magnetic fields connected with brain electrical activity using **magnetoencephalography (MEG)**.

fMRI signals provide accurate data about the specific activity region of the brain so fMRI has proved helpful for neurological research. The disadvantage of this psycholinguistics technology is that it is not good to determine the neural activity time. Because the neural activity requires time to generate blood flow modifications.

In comparison, ERPs provide accurate data regarding the neural activity's duration, but the

origin of the activity is hard to identify. This is because the ERP signal is influenced by all kinds of irrelevant variables, for example, skull thickness or interactive signals from different brain regions.

Finally, the newest method, MEG, provides excellent localization, with a temporal resolution comparable to ERP. However, as with ERP, MEG signals are susceptible to activity only in neural systems with specific orientations, and neither method is easily used when contemporary motor activity occurs, such as eye movements or articulation during the speech.

ERP has been used by the most important psycholinguistic study so far because ERP tests are comparatively inexpensive, and the method provides a spatial resolution comparable to behavioral interventions like eye monitoring.

Computational Modeling

The aim of computer psycholinguistics is to build theories of human linguistic processes that take the form of computational models implemented. These models are meant to clarify how a set of primitive computational procedures accomplish some psycholinguistic function. The models conduct a psycholinguistic job and generate behavior that can be interpreted as a set of projections that can be compared with human information. As such, computational psycholinguistics is a more general paradigm of cognitive modeling. Computational psycholinguistics is distinguished by its domain (not its techniques) from other forms of cognitive modeling, and its focus on producing functioning computational mechanisms that embody an explicit process model is distinguished from other forms of psycholinguistic theorizing. Few examples of

computational modeling are the DRC model of reading and word recognition proposed

by Max Coltheart and colleagues, McClelland and Elman's TRACE model of speech

perception and Franklin Chang's Dual-Path model of sentence production.

Psycholinguistic methods vary depending on the type of measured factors and how far they

interfere in the processing of language. Behavioral measures, such as eye tracking, and

neurophysiological measures, such as ERP, are particularly efficient in the measurement of

linguistic understanding over time. Picture naming and priming methods were particularly

efficient for linguistic development research.

WHAT IS A MODEL?

A model, in simple words, is a purposeful representation of reality to provide a local

understanding of a particular phenomenon. It can be mathematical, mechanical or

physiological. A model is not to be confused with theory, even though they share

some common elements in their definitions, because while theories are used to

explain the phenomena, models describe the functionality of the theory in a concise and

localized fashion, used for the testing of the theory.

Models of Speech Production

The exact methodology in which speech is produced, in the human intellect,

is chronicled in a set of several models, collectively referred to as "models of speech

production". This is done as the various characterizations of speech production,

cannot be incorporated into a single inclusionary model.

Despite assorted contrasts amongst them, the different models of speech production have certain unifying factors, which are recurrent in all of them. The main feature of a model is the modus operandi in which the linguistic components, namely phonemes, morphemes, lexemes, syntax, and context are retrieved and assembled during spontaneous speech production. All the models are unified by the fact that the information in its entirety is represented by linguistic components in a hierarchical manner and the order in which these units are retrieved is sequential, as they are built upon one another.

The analysis of the process of speech production is majorly done by reverse- engineering the audible output. An excellent technique of analysis is the scrutiny of the speech errors occurring during the process of speech production. We can elucidate with the help of an example, how errors provide an insight into the aforementioned process.

Target- Have you seen my black cat?

Error- Have you seen my cat black?

We can infer that the words "cat" and "black" are planned at the same stage, and the similarities in the two words are subjected to further research.

These "stages" defined by the errors have led to two diametrically opposing ideologies in the process of speech production, specifically the series and parallel processing models.

Series Processing Models

Fromkin's Five-stage Model

This model was put forth by popular American linguist Victoria Fromkin. To come up with this model, she performed extensive research on the errors of speech production. As indicated by the name, it divides the process of speech production into five stages.

Stage 1- Identification of meaning

Stage 2- Creation of syntactic structures

Stage 3- Establishment of intonation contours (i.e. distinctive pattern of pitches, tones, or stresses in an utterance)

Stage 4- Formation and insertion of content words, along with the formation of affixes and function words.

Stage 5- Phonemic representations added and phonological rules applied Fromkin noticed that word exchanges occurred only within clauses and not

across them, this led her to draw the conclusion that through stage 1, the information to be conveyed is called upon, followed by the genesis of the syntactic structure (which follows a particular syntax) in Stage 2.

It was also evident that the word exchanges took place between words serving the same grammatical function (e.g.-verbs will only get exchanged with verbs, not nouns). This implies that the syntactic structure is available quite early on in the process of speech production. The third stage proposed by Fromkin is where/when the message gains different stresses and intonations based on the meaning. The fourth stage Fromkin suggested is concerned with the selection of words from the lexicon. After the words have been selected in Stage 4, the message undergoes phonological specification.

Since the intonation contour of a phrase is maintained despite word exchange errors as seen in the following example, intonation contours must be selected before the words that fit in it.

The game of thrones-**Target**

The throne of games-**Error**

We can observe that even though the word order has been changed the stress remains at the word in the underlined position

Garret's Model

Garret's model is also a serial processing model like Fromkin's model, but its distinctive factor is that it advocates a three-level system. Level one or the message level comprises of the generation of the message which is required to be conveyed. Level two is the sentence level, wherein the actual formation of the sentence occurs. The sentence level, however, consists of two sublevels, the lexical selection, and functional assignment. Lexical selection is a process in which the person of interest selects the suitable words to convey the message, and syntactic planning is a process in which the correct order of words and grammatical construction comes into play. The third level or the articulatory level is heavily pronunciation reliant, and it is at this level, where the brain commands the speech organs to produce the necessary sounds to impart the required information.

Bock and Levelt Model

This model is composed of four levels. The first level is the message level, which is similar to as mentioned in Garret's model. The second level (the Functional Level)is subdivided into two stages. the Lexical Selection stage, where the hypothetical rendition is turned into a lexical form, and the function assignment stage, where the syntactical role of each word is assigned.

The final level is the phonological encoding of words. During phonological encoding of a

word the speaker retrieves the word's sound form. It consists of two representational tiers: an ordered set of segments and a metrical representation capturing the word's syllable structure and stress pattern.

Each level of this model is functionally unique and independent of each other as characterized by the study of errors during speech production. From here, the information stored at the final level is sent to the motor cortex where the vocal apparatus is coordinated to physically produce speech sounds.

Parallel Processing Models
The Dell model

Dell's model commonly referred to as the connectionist model of speech production uses the concept of spreading activation to account for speech production. In this model, words and rules are organized into a network with connections between units based on semantic and phonological relatedness. It represents the demarcated units of speech production (viz. phonemes, morphemes, syllables, concepts) as interconnected "nodes", which are free to commune with each other, across the levels, as explained below with the help of an example,

Semantic Level

Cabbage and spinach which are quite similar in their semantic features (Both are green, leafy vegetables which are used in cooking) would be interconnected through a node within the semantic network.

Lexical Selection Level

Yell and shout, have nearly the same meaning, despite some minor differences, and are often used interchangeability, therefore they might share a node, to which they are both connected to.

Phonological Selection Level or Sound Level

In the word fat, the node for its phoneme is connected to all the morphemes containing the same phoneme(fat, bat, mat, chat, etc.)
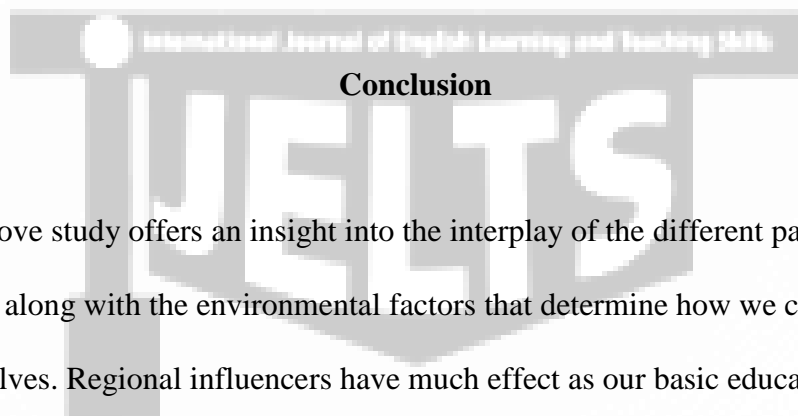
Conclusion

The above study offers an insight into the interplay of the different parts of the human psyche along with the environmental factors that determine how we communicate amongst ourselves. Regional influencers have much effect as our basic education to how we share our thoughts with each other.

Various scientific methods such as fMRI, ERPs, and MEG have thrown light on different faculties that are triggered during communication - oral or written. The different models have studied how speech is created and what factors can influence the same. Our minds are complex, the study of which has so far revealed fascinating conclusions, needless to say, that human communication has remained a very interesting subject and more studies are welcome to offer an insight therein.

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