Speech Errors as Evidence for Language Processing: A Descriptive Linguistic Study

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Abstract

Speech production is a process by which the thoughts are translated into speech. However, during the process errors can be seen to occur. Speech errors provide an abundance of information about the cognitive processes involved in language creation and processing; they are not just random mistakes. Thus, the aim of the current study was to understand – a) Does the concept of 'speech error' exists in ancient Indian knowledge system, b) What are the different types of Speech errors and c) Do errors differ at different levels of processing. Using the secondary sources of information from books and articles, that were reviewed from IIAS, digital depositary, information related to the above objectives of the study was collected. Review on ancient Indian knowledge system, showed that Paninian Grammar described the enormous rules for sound, word and sentence formations. While, 'Sivasutras', described the sequencing of phonemes (speech sounds) that are arranged for production and in 'Manusrmuti', description on how the sounds were being represented from oral tradition to written scripts and the possibility of being misprounced or misarticulated. However, the concept of 'Speech Errors' was not described. The different types of speech errors seen were Substitution, Addition, Omission and Transposition of sounds. The findings also revealed different errors at different levels of production. In conclusion, it was noted that Descriptive Linguistic Approaches do take into account the Language Processing accounts. Speech errors also showed that Language is not modular or static but dynamic interactive process. The findings could have both clinical and theoretical implications.

1. Introduction

With more than 1,600 languages and dialects in India, errors in the pronunciation of terms from different regional languages can create confusion. Linguists and cognitive scientists have frequently studied speech errors as a window into how the human language production system functions. The brains coordinate a wide range of complex processes when speech production occurs, such as choosing the right words, arranging them into grammatical structures, and producing sounds. Due to the speed and automaticity of these processes, errors occur and they could offer important information about the underlying cognitive processes at operation.

1.1. The Process of Speech Production

Duffy (2000) noted that Speech production has been characterized as one of the most complex motor skills, functioning as multiple subsystems that must effectively coordinate together. Whereas, Speech perception relies on the auditory system in which acoustic signals are transformed into meaningful representation of spoken language (Gandour & Krishnan, 2016). Baghai-Ravary & Beet (2013) noted that even with the advent of technology, the neural processing required for speech production and perception is still only partially understood. However, the scope of the current article is limited to the production process only.

Garrett (2001) noted that the speech production process can be divided into four stages: (a) Activation of lexical concepts, (b) selection of lemmas needed, (c) morphologically and phonologically encoding the speech, and (d) finally, the phonetically encoded word is spoken. The following figure represents the different stages.

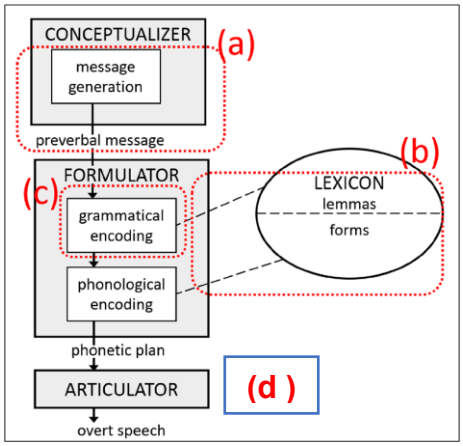

Fig 1. Stages of Speech Production (Levelt, 2001)

1.2. Contexts of Speech Production

Speech production, thus can happen spontaneously such as in a conversation (both formal and informal), reactive speech such as naming a picture or reading aloud a written word, or imitative, such as in speech repetition. During these productions, speech errors can be seen to occur.

1.3. Defining a Speech Error

Many authors have defined Speech Errors but, in this study, the definition given by Fromlin for his seminal work on speech errors is being considered as a reference. Fromkin explores the nature of speech errors, categorizing them and discussing their relevance to theories of language processing.

Fromkin (1971) defined speech errors as mistakes made during the process of speaking, where a speaker unintentionally produces incorrect sounds, words, or phrases, often leading to an unintended or non-grammatical outcome. These errors can involve various aspects of speech production, including phonological, lexical, syntactic, or semantic components.

1.4. Causes of Speech Errors

Speech Errors can be caused due to various factors like

a) Structural Factors: Errors can be caused due to structural deformities of the speech production mechanism. For eg. Cleft Palate or Tongue Tie children
b) Cognitive Processing: The process of retrieving words, assembling them into sentences, and articulating them is complex. Errors can occur at any stage of this process, often due to distractions, stress, or fatigue.

c) Neurological Issues: Neurological conditions like aphasia (caused by brain injury or stroke) or Parkinson's disease can lead to speech errors.
d) Developmental Stages: Children often make speech errors as part of language development.
e) Psychological Factors: Anxiety, stress, or pressure can interfere with speech production, causing errors. For instance, in public speaking or fast-paced conversations, people are more prone to errors.
f) Bi or Multilingualism: The influence of L1 on L2 can result in Speech Errors.
g) Freudian Slips: Speech errors in Freudian slips are often seen as revealing unconscious thoughts, desires, or repressed emotions.
h) Contextual Errors: Usually, these errors occur where the source is inside the utterance. These include anticipations, where the error intrudes from the future ('cup of coffee' → 'cuff of coffee'), perseverations, where the error intrudes from the past ('Chomsky and Halle' → 'Chomsky and Challe'), and exchanges (also known as metathesis or spoonerisms), where two elements swap places ('the zipper is narrow' → 'the nipper is zarrow').

2. Methodology

Information pertaining to the aforementioned study objectives was gathered through the use of secondary sources, including books and articles that have been reviewed at IIAS digital depositary. A total of 36 articles were reviewed, out of which, 12 articles were selected that matched to the inclusion criteria. Three books pertaining to Indian Knowledge system were reviewed.

3. Findings

Natural speech is full of mismatches between intention and output. Slips of the tongue are errors involving the sounds or words of the language, and provide a window onto the processes of speech production. The findings are discussed in relation to the three objectives taken for the current study. The information pertaining to the first objective was collected from the three books reviewed on the Indian Knowledge System. While the information pertaining to the second and third objective were collected from the 12 articles reviewed for the said purpose.

3.1. The concept of 'Speech and Speech Errors' in Indian Knowledge System

Spoken language is the basic nature of human existence, which has been transmitted through oral traditions in the Ancient India.

Sen (1970) notes that Panini's grammar sutras in 8 chapters was the greatest force in the formation of classical Sanskrit language. He also noted that there is no mention of Language in general or a Language in particular in any of the sutras. The only reference to the phenomenon of 'Speech' was in Sutra 1.3.48 as /vyakta vacam samuccaraNe/ - to utter a well-articulated speech. Here /vac/ - denoted only the faculty of 'Speech' or the phenomenon of speaking. It was also personified as the supreme spirit that binds all the being together and guides even the highest of the gods (RV 10.125). In the later Vedic tradition, the stature of /vac/ was considerably reduced. Speech is inherent to the faculty of man and has been from the beginning of his creation or evolution. He also noted that as per Paninian grammar 'Language'

was ‘Speech’ whatever may be its composition and texture. The matter of speech described or analysed by Panini was mainly literary. Panini also makes reference to Vedic literary and non-Vedic literary works. There was no distinction made between written and spoken language or between learned vs ordinary speech. However, reference was made to badly pronounced or mispronounced words which he referred to as /mlecchita/.

Sen (1970) also noted that /bhaSh/ does not occur in Rig Veda but is an old extended root form having Indo-European origin which was attested in Balto-Salvic and Germanic branches. The root /*bhel-/ got changed into /*bhel-no-/ to /*bhel-s-/ - meaning to utter continuous sound , bark, roar. While /*bhel-s/ into /bhaSh - to bark/ probably which later changed to / bhes - to argue/ in Hindi. Another form /bhaaSh/ – to tell, address, announce/ probably which later changed to / bhaasha/ in Hindi. The distinction between literate (Arya) and illiterate (apabhraShta) speech was done a few centuries later by Patanjali. It was noted that, ‘Sivasutras’, described the sequencing of phonemes (speech sounds) that are arranged for production. The Siva Sutras provide a profound connection between phonemes and spiritual realization. The correct use of sound, particularly through mantras and syllabic combinations, is viewed as a powerful tool for transforming one's consciousness and attaining union with the divine.

While ‘Manusmriti’ (Mittal), essentially promotes speech that is sincere, unambiguous, and intentional while subtly cautioning against mistakes that skew communication or injure others. This is consistent with the larger Hindu notion that sound, or ‘Vak’, has the ability to influence both individual and societal reality. The possibility of being misprounced or misarticulated sounds when being represented from oral tradition to written scripts can also be noted. Thus, it can be noted that there was no reference to ‘Speech errors’, as considered in the current context.

3.2. Classification of Speech errors

Works related to speech errors can be seen to be documented in literature as early as late 19th century.

Mayer and Meringer(1890) played a significant role in the study of speech errors, which laid the foundation for modern theories of language production errors. They were also among the first to systematically document such errors. They described the two main categories of speech errors - ‘Versprechen’ (slips of the tongue) and ‘Verlesen’ (slips of reading) in German speakers. They also proposed three distinct sources of error: (i) interference from intended elements of the utterance (Plan Internal Errors); (ii) interference from an alternative formulation of the intended thought (Alternative Plan Errors); (iii) interference from an unintended thought (Competing Plan Errors). Thus, their research laid an important groundwork for later studies in psycholinguistics and cognitive science.

According to Harley (2006) errors can be classified according to the units of speech (e.g., phoneme, word, or phrase) and the mechanisms (e.g., exchange, substitution, anticipation, or perseveration) involved.

Speech errors based on linguistic classification can be noted as follows -

a) Phonological errors: Mistakes in sound production, such as mispronunciations or transpositions of sounds (e.g., saying "babbit" instead of "rabbit"). In individuals with neurological language impairments (for eg. Aphasia) such errors are labelled as phonetic paraphasia. These errors occur when a person alters or replaces sounds while speaking, producing words that may sound similar to the intended term but are incorrect.
b) Lexical errors: Incorrect word choice or using a word that doesn't fit the context (e.g., saying "elephant" when you meant "giraffe").
c) Syntactic errors: Problems with sentence structure, such as missing words or incorrect word order (e.g., "I went store to" instead of "I went to the store").
d) Semantic errors: Using words that don't convey the intended meaning, often mixing up related but different concepts.

3.3. Errors at different levels of processing

Based on Garrett (2001) model of speech production process can be divided into four stages: (a) Activation of lexical concepts, (b) selection of lemmas, (c) morphologically and phonologically encoding the speech, and (d) finally, phonetic encoding of the word.

The following errors that can be noted at different levels of speech production –

(a) At the Conceptual Level, Exchange of words within syntactic categories occurs, for eg. "We completely forgot to add the ***list*** to the ***roof***" (Dell, 1986).

(b) At the lemma selection level, speech errors occur as wrong word selections, for eg. "***cat***" in place of "***dog***"

(c) At morphological level, Speech errors involving morphemes effect the lemma level or the wordform level, for eg. "… ***slicely thinned***" (Stemberger, 1985)

(d) At the final Phonetic Level, Speech errors represent the actual articulated speech, for eg. For "***tiger***" – "***giger***" / "***titer***" / "***diger***".

4. Discussion

Psycholinguistic models aim to bridge the gap between linguistic theory and cognitive science, offering insights into how humans are able to process complex linguistic input in real-time like those occurring in speech errors.

Vaidya (1993) explored the various aspects of speech errors specific to Kannada, a Dravidian language. She noted that errors may occur more frequently in certain linguistic contexts or with particular types of words, indicating that speakers mentally organize their speech in a way that is influenced by the phonological, syntactic, and semantic properties of the language. Vowel omissions, consonant substitutions, ordering of syllables and vowels, were the errors seen in Kannada, which were not found in other languages.

Berg and Abd-El-Jawad (1996) noted that speech errors by Arabic speakers were exhibited as rearrangement of the segments within a root morpheme far more frequently than speech errors by English speakers or German speakers who tended to rearrange the segments within a word.

They suggested that word-internal root consonant rearrangement errors in Arabic apply at the consonantal root level of representation, which was the level that was specific to the morphology of root-and-pattern languages. These findings provide evidence for the psychological reality of the Arabic root-and-pattern morphological structure.

Chen (2000) examined speech errors in Chinese, which has a limited phonological inventory as compared to English, which reduces the need for sub-syllabic units in the analysis of Chinese. Therefore, it's possible that Chinese speakers break down information in syllable-sized parts. The Chinese writing system likewise utilises chunks the size of syllables. Thus, syllable unit errors are likely to be more frequent in Chinese than in English. The study also found that syllable errors do occur relatively frequently in Chinese, and at a rate that is higher than predicted from analysing syllable errors as errors involving multiple sub-syllabic units.

Frisch (2006) notes that errors made during speech production, provide evidence for the use of phonological constituents as units in language processing. Speech error data support the psychological reality of many of the abstract structures proposed in phonological theory (e.g., feature, segment, onset, rime) and phonotactic constraints on their combination.

These studies highlight how speech errors give evidence for universal principles of language processing that might manifest differently across languages, depending on their specific linguistic structures.

5. Conclusion

Researchers can understand and deduce the phases of speech processing, the structure of the mental lexicon, and the interactions between the various linguistic levels (syntax, semantics, and phonology), by examining the errors. By analysing the types and patterns of errors, researchers can gain insights into the mechanisms behind language production, such as how words are chosen, ordered, and articulated. Thus, Language can be seen as an autonomous intralinguistic system of relations between different levels of processing. Analysis of speech errors shows that production occurs in stages, with content words and function words being accessed at different stages, with some interaction between levels of processing. Thus, error patterns provide insights to identify how the brain organizes language and the processes involved in speech production and comprehension. The psychological validity of many of the abstract structures (such as feature, segment, onset, and rime) laid down by phonological theory, as well as the phonotactic restrictions on their combination, are supported by speech error data. Speech errors have proven to be a rich source of data on the organization of linguistic representations in the mind/brain, as well as on the time course of language production. Certain kinds of speech errors can be experimentally induced, but these are limited and their ecological validity is questionable.

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