

# Exploring the Interplay: Language and Science in Thoughtful Reflection

S Mohanraj

## ABSTRACT

*Often in our academics, the two major disciplines Science and Arts are kept apart from each other. There have been no attempts to integrate the two and this has resulted in developing certain prejudices. A time has come (especially with the introduction of NEP 2020 which introduces liberal education) to overcome these prejudices, and see how the two disciplines are based on similar principles. The article is an attempt to show how the two disciplines are not only closely related, but also share similar principles of analysis.*

**Key words:** coordinates, dynamic, organic, paradigm, quantum gravity, syntagmatic.

*‘So, there is no meaning to space that is independent of the relationships among real things in the world. Space is not a stage, which might be either empty or full, onto which things come and go. Space is nothing apart from the things that exist; it is only an aspect of the relationships that hold between things. Space, then, is something like a sentence. It is absurd to talk of a sentence with no words in it. Each sentence has a grammatical structure that is defined by relationships that hold between the words in it, relationships like subject-object or adjective-noun. If we take out all the words we are not left with an empty sentence, we are left with nothing. Moreover, there are many different grammatical structures, catering for different arrangements of words and the various relationships between them. There is no such thing as an absolute sentence structure that holds for all sentences independent of their particular words and meanings.*

*The geometry of a universe is very like the grammatical structure of a sentence. Just as a sentence has no structure and no existence apart from the relationships between the words, space has no existence apart from the relationships that hold between the things in the universe. If you change a sentence by taking some words out, or changing their order, its grammatical structure changes. Similarly, the geometry of space changes when the things in the universe change their relationships to one another. –*

*Lee Smolin, Three Roads to Quantum Gravity*

*Help me to understand the above passage.’*

I received this message from a friend one fine morning. He was sincere and required help in understanding the passage, especially the second paragraph of the quotation from Lee Smolin. This little write-up is in the form of a response I sent to my friend. Wonder, if this interests you people.

This is in response to your message you posted last afternoon. The two paragraphs are fundamental concepts and appeal to me immensely. Though I am not able to comment on the principles of Quantum Gravity (a concept floated by Lee Smolin), I can certainly share a

few of my thoughts on the contents of the first and second paragraphs related to language. To the best of my understanding, what Smolin says is that to understand space, (which certainly is an abstract phenomenon) you need some coordinates. It could be two points separated from each other by a distance, and the distance measures the space, but cannot capture it. Besides the distance, the arrangement of global bodies are influenced by the gravity they exert on each other. Hence rearranging these bodies may alter the structure of the universe. This argument can be substantiated with many more examples, and the analogy can be extended to the structure of a sentence in English. While discussing sentence structure, we see the relationship between words in a sentence as the gravitational pull (attachment) between and among them.

Language as an entity is described as something that is both organic and dynamic. This simply means, language has life, and like all living beings it has to undergo change constantly. We have seen this happen in our life time, and it happens across all languages. Languages change with time and space, hence we have dialects and modifications to the grammar of a language over a period of time. For example, the English Language as used by Shakespeare is not the same as what we use today. We can give examples from the languages we are aware of and show how they have changed over a period of time. This is evident in our understanding of the relationship between tense and time, loss of inflexions, change of meaning and grammar in words etc.

The change to be perceived needs a medium. The medium helps in manifesting the change in tangible terms. In simple words, the changes that happen, to be perceived, need to be expressed

and understood. Expression and comprehension are two important dimensions of language which are perceptible. The rest are all abstract.

We have all learnt in our courses on Phonetics that a Phoneme is an abstraction. This abstraction gets a definite shape or form when it is lent voice (or voicelessness), stricture (plosive, fricative, affricate, trill, etc.) and supported by one or two speech organs (bi-labial, labio-dental, alveolar, velar etc.) to facilitate articulation. This makes it possible for us to describe phonemes using three term labels (e.g. /p/ as a voiceless, bilabial plosive speech sound). This analogy can be extended to morphemes as well. For example the past morpheme [-ed] is an abstraction and gets realised because of the environment it occurs in. It acquires a different phonetic values when it is added to words ending with /t/or /d/ or voiceless consonants or voiced speech sounds. You are aware of examples for each of these for they have been drilled into us. Here are three familiar examples to illustrate these variations: talked /tɔːkt/; bag – bagged /bæɡd/; and pad – padded /pædɪd/. The three mnemonic words to remember modifications of plural morpheme [s] are cats /kæts/; dogs /dɔːgz/; and horses /hɔːsɪz/ depending on the environment in which this morpheme occurs.

Now let us get to the syntax or sentence grammar. Sentence as it is spoken (utterance) or written (sentence) is a reality or the surface structure. Otherwise, the meaning contained in it is a concept or a theoretical construct and Chomsky calls it the deep structure. The deep structure cannot be expressed and it is abstract. An idea can occur to a person speaking any language, but when expressed the same idea derives different forms depending on the language a person uses and his/her competence in the language. The deep structure becomes a surface

structure due to a series of transformations. The surface structure (as you are reading this, each sentence of mine is a surface structure) is language specific, while the deep structure has universal qualities. (This is what Lee Smolin says in the second paragraph.)

That structures are abstract can be illustrated with another example. Let us look at it from a pedagogic point of view. In order to teach a language, one needs to develop a syllabus. There are different types of language syllabuses and most of them are based on components of grammar or the functions the language performs. Grammatical items on a syllabus are abstract – for example let us take a very common structure like SVC (Subject Verb Compliment - simple present tense). When stated as SVC, the structure remains abstract for the user (learner or teacher in this case) and finds it difficult to comprehend. Let us illustrate this structure with some real life sentences – *He is a teacher. She is a doctor* etc. These sentences can be understood because of the word order, the relationship that exists between and among them (for e.g. ‘she/he’ necessarily needs to take ‘is’ or a verb in the singular, and the complement needs to specify a position or a status that agrees with the subject. Once the word is recognised as a complement, passivisation does not become possible.) The relation that exists among the words in a sentence (horizontally) is called the Syntagmatic Relation, from which the word ‘syntax’ is derived. This gives the abstract structure meaning and makes it tangible. If words in a sentence can be replaced successfully without altering the structure, such words are said to be in paradigmatic relationship (derived from paradigm).

It can be further elaborated when we provide a context to the sentences being illustrated. Take

a look at the following paragraph:

*His name is Rao. He is a teacher. Vimala is his neighbour. She is a doctor. They both are good friends. Every morning, Rao goes to school on his scooter. Vimala’s clinic is on the way to his school. So he allows Vimala to pillion ride on his scooter.*

In this paragraph, the first five sentences belong to the pattern to be taught and makes it easy for the learners to understand them easily because of the context. Language teaching is in fact, a process of concretising the abstract notions of language for easier understanding. Depending on the level of the learners and their age, the passage can be altered to make it more complex both thematically and linguistically.

Further, languages take support of a variety of other strategies to become tangible. These are called ‘speech acts’ as proposed by Austin. The three major acts (suggested in early sixties) were illocutionary, locutionary, and perlocutionary acts. I will not explain these in detail now. But the origin of these is interesting and I will close after stating why this is interesting.

There are certain utterances in all languages that go beyond just being utterances. They perform an act – e.g. when the King of England says ‘I confer on you Knighthood’ - is the King simply uttering this sentence or also conferring the knighthood. There can be many examples of this type and these are called Performative Utterances. Here the utterance is abstract and the act is concrete. Think of an expression like – *pushpamsampayaami*(during a puja). What does this utterance convey – the literal meaning or the act? Besides speech acts, we also have pragmatics which lend a lot of support to each of the utterance and see how each utterance is unique and can be identified as performing a

specific function. (Leech has elaborated this in his book on Pragmatics.)

I like to conclude this with yet another similarity that exists between language and science – Mathematics. We define Mathematics as a science that operates with a finite set allowing for infinite possibilities. In other words nine numbers with zero can produce infinite number of possibilities. These numbers use four basic operations – addition, subtraction, multiplication and division to give rise to different types of complex calculations. Now let us turn to language.

Language is also a finite set with infinite possibilities. The twenty six letters of the alphabet (in English) following a set of rules (basic operations) can produce infinite number of words. And the words so produced using a set of other operations (rules of grammar) can

produce infinite number of utterances and sentences. So looking at language as science is perhaps the right thing to do. To learn the language, let us learn the concepts (basic operations) rather than memorise. Language needs to be an applied science and not a mechanical replication of what is heard and read.

#### References:

- Austin, J L (1962). *How to do things with words*. Cambridge (Mass): Harvard University Press.
- Chomsky N (1959). 'A Review of Skinner's Verbal Behaviour' in *Language* 35:1 (pp 26-58)
- Leech, G N (1983). *Principles of Pragmatics*. London: Routledge

**Prof. S. Mohanraj**, (Formerly) Professor of English, English & Foreign Languages University (EFLU), Hyderabad.