

QUEST FOR TRUTH- NEW LINGUISTIC RESEARCH METHODOLOGIES

Prof. Alaa Eddin Hussain¹ and Dr. Ahmad Khuddro²

¹Semantics and translation studies, St. Andrews University, formerly professor of linguistics and translation in MMU, Huddersfield University, and a number of several Middle East universities, currently postgraduate translation studies at Effat University.

²Translation & interpreting studies, formerly visiting professor at Bologna University, Italy and currently postgraduate translation studies at Effat University.

ABSTRACT: *This current research aims to investigate current linguistics theories in an attempt to probe the research methodology employed in achieving their own hypotheses. It deals with the problem of handling linguistic research data within these theories. Hence, it discusses well known macro paradigms in linguistic metatheory: the inductivist, deductivist and hypodeductivist approaches as being employed by structuralism and functionalism. It concludes that a single approach is not entirely justified, therefore other approaches would be necessary in decision making of an outstanding problem in research methodology.*

KEYWORDS: Research Methodology, Deductivism, Inductivism, Hypotheticodeductivism, Linguistic Semantics, Axiomatic Functional Linguistics.

“The whole of science is nothing more than a refinement of everyday thinking.” Einstein

“The solution of a problem raises a new unsolved problem: the more so the deeper the original problem and the bolder its solution”. Karl Popper

INTRODUCTION

In the construction of a theory or criticizing an existing one, several arbitrary though theoretically appropriate motivated choices are involved. These choices can be either purely epistemological or extremely particular. We are more or less forced to accept and regard as scientific what historically has come to be regarded as being worthy of the epithet ‘scientific’. Nowadays, for instance, methodology employed in religion or politics cannot be labelled as scientific. As to theology there used to be a time called Dark Ages when all sciences used speculative reasoning and when dogmatic was as respectable in science as it is still in politics. But these days have gone away forever. Therefore, any speculative investigation is deprived of and does not worth the epithet ‘scientific’. Scientific disciplines such as medicine, media and linguistics should reject anything that is speculative. Speculative approach, however, is denied validity as a source of gaining knowledge. Such knowledge cannot be scientific and should be abandoned once a scientific knowledge is obtained. There are objects and topics that cannot be tackled in a purely scientific way. One of those imponderable problems is the very existence of the universe. Philosophers are fully justified in speculating about its existence, and certain areas in psychology as well as investigating the complexities of human mind. Here, we are totally justified to take refuge in speculation. However, our obtained results can in no way be considered as scientific.

RESEARCH METHODOLOGIES

There are at least two mainstream scientific researches: inductive and deductive. According to Crowther and Lancaster (2009) the deductive research approach is based on a general idea in order to reach the specific situation, and is to come up with a hypothesis using a certain theory, and is linked with the positivist paradigm, whereas inductive research approach moves from the specific to the general, i.e. from a particular idea from which one can generalize the situation. Saunders *et al.* (2007) maintains that when both approaches are used it is easy to estimate a logical and correct result. Ridenour, Benz and Newman (2008) state that inductive approach allows the researcher to put forward subjective reasoning based on the use of a number of real life examples. Deductive research approach is linked to the positivist philosophy, which includes the introduction of a hypothesis in order to prove certain assumptions.

Inductivist Approach

Inductive inference is a prediction based on sampling. If the sampling technique is good, the prediction will probably be verified. Inductive inference is used in linguistics: for instance, if you are told that almost all Arabic nouns ending in *haa* or *ta marbuta* are feminine then you can inductively infer that the next Arabic noun you encounter that ends in *haa* or *ta marbuta* will most probably be feminine. Induction uncovers tendencies, but not certainties, and so is open to disagreement. Furthermore, the inductive method assumes that there is a natural order which can be discovered through rational means by inspecting natural phenomena. If this underlying assumption were correct, the inductivist model would be the only model possible because it is determined by natural order and natural laws; it is a reflection of nature.

The inductive approach is the direct opposite of deductive reasoning. Inductive research reasoning is based on particular observations in order to eventually reach conclusions that lead to generalizations. But the conclusion at times might be invalid and therefore false. To reuse the above example but reverse it, 'Susan is a young girl. Susan is beautiful. Therefore, all young girls are beautiful.' This inductive reasoning allows for the conclusion to be untrue, even when all premises used in the argument are true. So this type of reasoning needs to be handled with extreme care in order not to reach false conclusions, since inductive reasoning when it is logically valid and true both in its premises or statements and its conclusions ultimately helps to form theories or at least hypotheses.

Deductivist Approach

Research is based on deductive, and inductive approaches. The first type, the deductive approach, starts with a general statement or hypothesis and then examines probabilities in order to reach at the end of the research a particular logical conclusion. The scientific method of research uses deduction reasoning which attempts to test certain hypothesis derived from certain theories; that is moving from the general (theories) to the specific (observations). For deductive reasoning to be sound, the hypothesis must be correct. This reasoning relies on the idea that if the premise is correct then the conclusion must be true and logical, as in the statement "all men are of flesh and blood. John is a man. Therefore, he must be made of flesh and blood.' Conclusions based on deductivism are definite so long as their premises are correct and true. But one can reach a logical conclusion even though the generalization or premise is not true as in the argument "All young girls are beautiful, Susan is a young girl. Therefore,

Susan is beautiful.’ This argument is valid but it is still untrue. The reason is that the opening statement is untrue.

Linguistics is mainly concerned with the study of meaning conveyed via various linguistics components. As part of a general linguistic theory this field aims to study meaning scientifically. Previously, scholars believed that semantics was not amenable to scientific evaluation. Today, there are several attempts to study semantics scientifically. For semantics to be scientific, it must be empirical. In other words, it must operate with publicly verifiable data obtained by means of observation or experiment. This is considered by many scholars to be the hallmark of scientific enquiry. Moreover, scientific methodology relies on the exhaustive study of all data, coherent analysis, objectivity and predictions that can be falsifiable.

It is not sufficient to collect data to prove the validity of a theory because very often such data may prove to falsify such data for some independent reason. As such, Popper has emphasized that a theory can only be tested by attempts to falsify it. Popper’s approach to scientific enquiry is not concerned with evidence which seems to show a theory to be correct but with evidence which shows a theory to be false. If evidence refutes the theory an alternative theory must be adopted which is compatible with the facts.

Criterion for Language Adequacy

Any scientific approach to the study of language must be consistent, economical and adequate. For a semantic theory to be adequate it must fulfill at least four conditions:

First, it must characterize the nature of word meaning and sentence meaning of a language and explain the relation between words and sentence meaning. Words have meaning that can be arranged into sentences, e.g. cats chase dogs and dogs chose cats. Although the words have the same meaning in both sentences, the word-order changes the meaning. Thus, there is interdependence between syntactic structure of a sentence and its meaning, in other words, the meaning of a sentence is structure – dependent. The relation between semantics and syntax is a very hotly debated issue in linguistics.

Second, a semantic theory must be able to predict the ambiguity of language, both lexical (e.g. I went to the bank) and structural (e.g. American history teacher).

Third, a semantic theory must be able to explain the systematic relations between words and sentences of a language. For example, the use of synonyms (e.g. happy and glad), words related in meaning (e.g. man and woman), contradiction (e.g. I live in Saudi Arabia and I don’t live in Saudi Arabia) and entailment (e.g. John killed Mary which entails Mary died.)

Fourth, a semantic theory must account for the non-finite nature of sentence meaning in the form of a finite set of rules. This is a property of language that has been emphasized by Chomsky.

Any theory that fails to capture these relations or makes wrong predictions is inadequate. As such, there is no one semantic theory which enjoys widespread acceptance.

Criterion of Scientific Theory

Science is about method, not about substance. For this reason, any discipline or investigation that applies the method of science to its enterprise is fit to be described as scientific. As others have noted, “the subject-matter being studied does not determine whether or not the process is called scientific. It makes no difference whether the investigation is in the fields traditionally held to be sciences, such as Chemistry or Physics, or is in the various areas of human relations, including ... social sciences. The activity of an investigator is scientific if he/she correctly uses the scientific method, and the investigator is a scientist if he/she uses the scientific method in his thinking and searching for information”.

Therefore, there is an important methodological decision a researcher and a theory builder has to make. This is the justifiable choice between an inductive and hypothetico-deductive methodology. An inductivist would arrive at an accurate description of the quested model by discovering essential recurring patterns in the facts. This can be achieved by close and accurate observation of the cases under investigation. The resultant descriptive observation is a hypothesis that an inductivist would use as a tool in analysing future cases.

To sum up, the basic idea of inductivism is that “science starts with observations, and moves on from them to generalizations (laws and theories), and predictions” (Gillies, p.5). Inductivists think that scientific discovery “proceeds by first collecting observations or data... and then inferring laws and predictions from this data by induction” (Gillies, p.26).

Science, however, begins with empirical observations; we cannot simply observe without a theoretical background; instead, “[o]bservation is always selective[, and] it needs a chosen object, a definite task, an interest, a point of view, a problem” (Popper, p.26). In other words, it is impossible to have theory-neutral observations, and any observations that are devoid of theoretical background are simply meaningless. Therefore, inductivism that embraces random observations as the beginning of scientific discovery is naïve and counter-intuitive.

Inductivists do not distinguish between the context of discovery and the context of justification, because for the inductivists discovery must be based upon the principle of induction, which is also what justifies the discovery. However, the question is what justifies the principle of induction is unsolved. At first glimpse, there seem to be two alternatives. On the one hand, one could argue that the principle of induction is precisely justified inductively by experience or blind faith; however, this way of thinking will obviously lead to a vicious circle.

Following the inductivists’ failure to distinguish between the context of discovery and the context of justification the hypothetico-deductive model or method has been suggested. It is a scientific inquiry proceeds by formulating a hypothesis in a form that could conceivably be falsified by a test on observable data. A test that could and does run contrary to predictions of the hypothesis is taken as a falsification of the hypothesis. A test that could but does not run contrary to the hypothesis corroborates the theory. It is then proposed to compare the explanatory value of competing hypotheses by testing how stringently they are corroborated by their predictions.

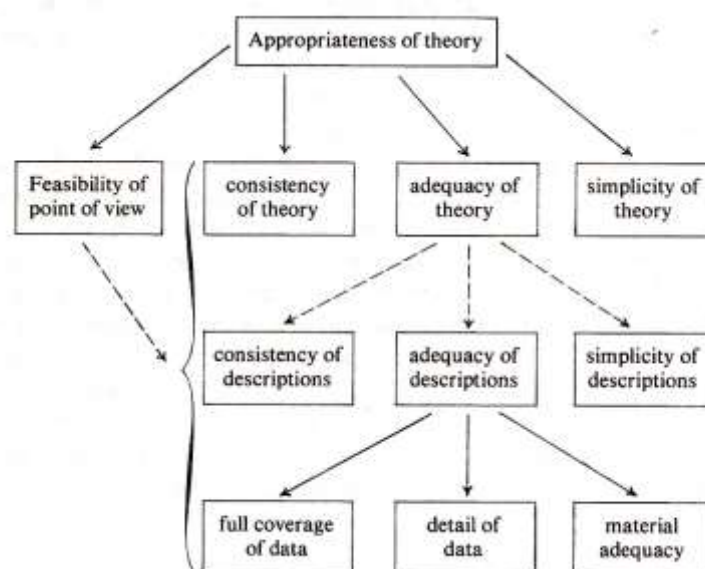
According to Popper, falsificationism is an ideal instrument for conducting a strong and valid research method as “[t]he work of the scientist consists in *putting forward* and *testing theories*”, and he adds, “Every discovery contains ‘an irrational element’, or ‘a creative intuition’,” this entails that there is no logic of scientific discovery, but rather irrational conjectures (p. 30).

There is, however, a logic of scientific testing. Inductivists use verificationism as a methodology of testing. According to Popper, verification and falsification are asymmetrical. Therefore, adequate testing of theories and statements require attempted criticisms and refutations rather than verifications.

Both approaches, however, did not distinguish between a description and theory and unless the philosophy of science fails to overcome this confusion, people will continue to fight out this problem as they did for centuries. Therefore, a researcher has to make a distinction between description and theory. A structural description of any set of data presupposes a theory as an instrument without such a theory a description would not even be meaningful in a formal sense. The theory which is arbitrary and appropriate has got to be axiomatic – deductively organized. It contains statements and definitions which lead to theorems and as terms it contains primitive and defined terms. The theory may also contain models which can be derived from its statements. The task of definition is to explain, clarify the terms and introduce notions of the theory. Some definitions introduce models. The theory does not contain hypotheses. A description, on the other hand, does not contain axioms nor does definition we found in the theory; but it merely contains hypotheses. It also can contain statement or quasi definition for purely descriptive purposes. Obviously a hypothesis is refuted and abandoned if it conflicts with the gathered data. Every descriptive statement carries with it a metahypothesis.

Having rejected inductivities–speculative approach in favour of a scientific hypothetic deductive approach the researcher has to select the point of view that is adopted in the theory he is going to employ. There is a partial overlap between the adopted point of view and the theory itself though a theory can contain more than one point of view. We can summarize what has been said so far in the following diagram in which the arrows indicate implies and broken arrows means implies potentially. Material adequacy means the consistency of descriptive statements with the observed data. Consistency entails refutation of the descriptive statements in question. It has the last and final decision in this approach.

This whole discussion so far can be schematized in the following diagram (Mulder & Hervey's *The Strategy of linguistics*, 1980):



Application

In this research it has already been emphasized by and by that throughout the history of linguistics research methodologies there are three philosophical approaches. These are: inductivism, deductivism and hypothetico-deductivism.

Inductivism is rooted in all American schools of thought, such as Bloomfieldianism, and is adhered to by many notable scholars e.g. Harris, Hockett, Pyke and Chomsky. Inductivists arrive at a description of data by discovering general patterns in the data. This approach is deeply rooted in speech phenomena and is based on observing a particular speech community. This methodology is based on the researchers' own experience of analyzing systematic and regular patterns from field word study that is extracted by using a tape-recorder. There is a need for exhaustive coverage of the data so as to establish a model or theory by a process of trial and error. There may be a need to revise the analysis or the analysis may prove to be satisfactory. The aim is to describe a linguistic theory or to uncover patterns or generalizations uncovered from the corpus. The pattern must be a true representation of the linguistic phenomena. The truth of the phenomena is inherent within the pattern or descriptive of the pattern (Essentialism). This approach assumes no preconceived point of view and accordingly no adherence to any previous linguistic theory. Linguistic descriptions produced by this approach, systemizes and embodies the principles of individual languages.

Inductivism has been criticized on several grounds. Observation implies selective attention. There is no such thing as theory – neutral and hypothesis – free observation and data collection. Popper maintains that observation is theory-laden, i.e. depends on the researchers' experience and point of view. Thus by its very nature observation is subjective, even though the observer fails to make explicitly clear his/her point of view it does not make his/her observation objective but still introduces a subjective element in a vacuum created by an implicit point of view. It is difficult to establish a necessary cut-off point and to determine relevant and irrelevant evidence. Similarly, it is difficult to determine when to stop observing and when to start generalizing.

Interpretation of results will depend on the researcher's value-judgments and experience, and as such, different researchers will obtain different results. Inductiveness requires a large amount of data to ensure generalizations that are true representations of linguistic data, however, very often the corpus is limited to a finite sample of data. Therefore, generalizations may not apply to the whole speech community. These generalizations are descriptive statements about one particular language and have no universal implications. Thus, this approach is totally ad-hoc and as such there is no guarantee that the data observed are homogenous, consistent and exhaustive.

In contrast, the deductive approach presupposes a theory as an instrument that must be tested. The hypothesis contains statements and definitions or a descriptive model of language that cannot be verified, only refuted if it is shown to conflict with the data. Deductivists begin with a theory which is formulated in terms of axioms (basic premises), and as a result a deductivist theory is an axiomatic theory which embodies a closed set of primitive propositions. The choice of axioms depends on observations and experience and therefore is intuitive and arbitrary. Axioms are chosen according to two conditions a priori and a posteriori one. An axiom is a priori if it is credible, i.e. reasonable. An axiom is a posteriori if it is appropriate. Moreover, axioms must be internally consistent. All theoretical notions within the model can be refuted because the theory clearly specifies exactly what conditions would falsify them. The

deductivist approach is manifested in European linguistics as far back as Ferdinand de Saussure. Functionalism is implicitly deductive because it embodies the statement or axiom. "Function is the criterion of linguistic reality" which can be placed at the head of the deductive hierarchy in any linguistic theory. Deductivism is also limited. Axioms are formulated according to the researchers' observations and experiences, and thus, intuitive. Moreover, predictions about speaker's language behavior are very often unreliable. This approach is still arbitrary in the sense that it is deduced from definitions that are themselves arbitrary, however, it does have the advantage of being homogenous, consistent and exhaustive.

Examples of inductivist approach: Behaviourism

In the 1940s two linguists independently advocated that meaning can be described in terms of the situation in which the utterance is said. This suggestion was made in English by Firth and in America by Bloomfield. Initially, behaviourism developed as a psychological theory which was for a long time dominant in American psychology and had considerable influence upon linguistics. Nowadays behaviourism is less widely accepted.

There are four principles that all behaviouristic theories adhere to. First, anti-mentalism, that is, a distrust of all mentalistic terms (e.g. mind, concept, idea etc.) and the rejection of introspection as a means of obtaining valid data, because the personal thoughts and experiences of individuals are unreliable. A well-known behaviourist J.B. Watson, advocated that the study of language must be based on observable and recordable utterances. Therefore, language is equated with verbal behavior.

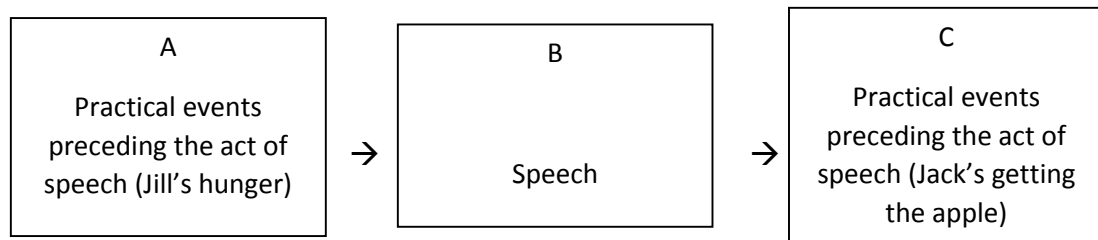
Second, there is no difference between human and animal behavior. This supports the attempts made by American philosopher Charles Morris, to construct a general theory of semiotics applicable to all languages which he outlined in his book *Signs, language and behavior*. However, it is appropriate to question whether animal behavior is meaningful in the same sense as language is to humans.

Third, behaviourists advocate empiricism, the view that experience is the principal source of knowledge. This is in direct conflict with rationalism which emphasizes the role of the mind in the acquisition of knowledge. Behaviourism stresses the importance of learning in acquiring language behavior and the significance of environment and not heredity in human behavior. Thus this theory places emphasis on nurture rather than nature.

Fourth, behaviourism is associated with determinism. One strong form of determinism is positivism which is a belief that all science should be modeled on the natural sciences (e.g. physics and chemistry), and accordingly all scientific knowledge is reducible to statements made of the physical world.

Behaviourism was first associated in linguistics with Bloomfield. Bloomfield's interest in behaviourism was to establish linguistics as a science. He was a strong believer in inductivism and maintained that a scientist has to accumulate facts without any preconceived theory so that inductive generalizations about language can be arrived at. According to this approach, data are scientific and objective if they are observable.

Bloomfield suggested that the meaning of a linguistic form must be analysed in terms of the situation which the speaker utters it and the response from the hearer. For Bloomfield meaning is essentially the situation. He maintained that the situation consists of three parts:



(Leech, 1974, p.72)

He illustrated his views in relation to his famous account of Jack and Jill. When Jill is hungry, she sees an apple (S) which produces a linguistic reaction (r) e.g. I am hungry. The sound waves on hitting Jack's ear-drums creates a linguistic stimulus for Jack (s), which results in a non-linguistic reaction (R) of getting Jill the apple. This can be schematically shown as follows:

$$S \rightarrow r \dots S \rightarrow R$$

(Where r and s stand for verbal stimulus / response and S and R for external stimulus / response)

According to Bloomfield, language behavior is stimulus – response. Significantly, the stimulus and the reaction are physical events. For Jill it is a result of light waves striking her eyes and of her stomach secreting fluids. Similarly, Jack's stimulus is a result of speech sounds registered in his ears and his response of giving the apple to Jill.

This association between stimulus and response was born out of Pavlov's work on conditions reflexes. Pavlov showed that salivation in dogs occurred naturally as an unconditioned psychological response in the prescience of food and could be evoked as a reaction to the ringing of a bell. Reinforcement can convert an instinctive response into a learned response.

Bloomfield extended the behaviouristic approach to all aspects of meaning. Therefore the meaning of the word hungry is the physical secretion of stomach fluids, which of course is nonsense. To avoid such simplistic identification, Bloomfield suggested that word meaning can be described according to a set of distinctive features that were common to the situation in which the word was spoken in. Again this approach was entirely misguided because there can never be a common element between utterances as the following illustrates:

Bring me my dress.

I need a dress.

Example (1) can be uttered with no dress in the situation and (2) when the speaker finds out that she has gained weight and the dress she wants to fit into is too small.

This contextual view of meaning can be summarized as: 'meaning is ultimately reducible to observable context' (Leech, 1974, p.74). Significantly, Bloomfield maintained that semantics is the weakest point in language study. As a positivist, he believed that the meaning of words must be described scientifically e.g. salt is sodium chloride. However, Bloomfield (1976) acknowledges that the meaning of words like love or hate cannot be identified physically. Moreover, a definition in terms of scientific knowledge exchanges one set of linguistic symbols for another and is circular. Often there are competing scientific accounts of the same phenomenon. Moreover, scientific statements are sometimes provisional. Another flaw in

Bloomfield's approach is his contextualization of meaning, that is, the meaning of an utterance will depend on the stimulus and response. Accordingly, an utterance like I am hungry may produce unpredictable behavior. This theory also loses its force when we recognize that there are many unknown predisposing factors that can contribute to the observable stimulus and response.

Scholars other than Bloomfield have also tried to give a behavioural explanation of meaning. The most famous is Skinner's (1957) book of Verbal behavior. For Skinner, utterances are verbal operands, that is, 'activities which operate upon the environment' (Lyons, 1977, p.130). Operands are either verbal or non-verbal. Verbal operands are classified as either 'mends' or 'tacts'. Mends refer to the instrumental functions of language whereas facts are verbal responses reinforced by the environment. For skinner reinforcement depends upon the environment in which the stimulus occurs. For example, the meaning of fox is reinforced by seeing a fox. He is mainly interested in linguistic expressions which are associated with objects and events in the immediate situation. Chomsky has been a vocal critic of Skinner's Verbal behavior. He argues that a variety of responses are possible for any given stimulus since responses are not predictable from the stimuli. For example, on seeing a picture a variety of responses are possible, such as, Clashes with the wall paper or Remember our camping trip last summer (Palmer, 1976, p.55).

Behaviourism as a framework to describe the meaning of words, expressions and utterances is very restricted in value, because it can only deal with a very small number of utterances e.g. highly ritualized exchanges or monologues. Many words do not denote observable objects e.g. love. Moreover, the response is not very often observable e.g. if someone hears the word rain, they may not observably react. Similarly, this theory relates meaning to a disposition to respond and specifying the conditions under which a particular reaction takes place is problematic. The notion that all language-behaviour is stimulus-bound (under the control of the environmental stimulus). Some utterances are undetermined and cannot be predicted from the context.

Although behaviouristic theory is not adequate in describing semantics it can explain some aspects of language acquisition and does emphasize the importance of language as a social behavior which is controlled by the environment.

Examples of deductivism: Truth conditional semantics

This is an approach to meaning based on the notion of truth, which has grown out of the study of logic. This approach uses the tools of logic to represent sentence meaning. The beginnings of logic can be traced back to Aristotle's search for the principles of valid argument and inference. Essentially, this study is concerned with the truth of statements and whether, truth is preserved or lost by placing sentences in different patterns.

Truth can be judged as a correspondence with facts according to extralinguistic context. From this perspective, truth is said to be empirical. The truth of a statement, that is, whether it is true or false, can only be accessed by relating it to facts of the world. For instance, the truth of the following sentence: *M father is a general in the army*, depends on the speaker's father's background. If her father is a general in the army, the sentence is true; if not, it is false. The truth value of a sentence is whether it is true or false; and the conditions which make a sentence true or false are its truth conditions. This type of truth is known as a posteriori because it is based on empirical testing. Such statements are called synthetic sentences.

Negation will change the truth value of a sentence. If, I add *not* to the previous sentence, then its truth value will be reversed. Semanticists use logical forms to show relationships between sentences:

1. My watch has been stolen.
2. My watch has not been stolen.

If (1) is true then (2) is false; also if (1) is false then (2) is true. To show this relationship between these two statements a schema called logical form, where lower case letters (p, q, r, etc.) stand for statements, the symbol: \neg for negative, T represents true and F is false is exemplified below:

P \neg P

T	F
F	T

Connectives are especially important to logicians because they have predictable effect on the truth conditions of statements, such as, conjunction, disjunction and exclusion. For example, the compound sentence formed by using *and* to join the following two statements has the following truth values:

3. *The car is on fire.*
4. *The firemen are on their way.*
5. *The car is on fire and the firemen are on their way.*

P q p \wedge q

T	T	T
T	F	F
F	T	F
F	F	F

Where the symbol \wedge stands for *and*. This study of the truth effects of connectives is called propositional logic.

Philosophers and logicians have identified another truth that is a function of linguistic structure, a priori truth. Statements that are necessary true because of the wording are called analytic (i.e. 6) and similarly, statements that are necessary false because they are a contradiction are called contradictory sentences (i.e. 7).

6. A bachelor is an unmarried man.
7. A bachelor is a married man.

The truth follows from the meaning relations within the sentence.

The study of truth of sentences with quantifiers like *all*, *every*, *each*, *some*, etc. are called predicate logic. Therefore, certain words like connectors and quantifiers are called logical words.

There are fixed truth relations between sentences which hold regardless of the empirical truth of the sentences, that is, entailment e.g.

8. The man assassinated the president.

9. The president died.

Logically, sentence (8) entails (9). A truth based definition of entailment can be states as: ‘A sentence p entails a sentence q when the truth of the first (p) guarantees the truth of the second (q), and the falsity of the second (q) guarantees the falsity of the first (p)’ (Saeed, 2011, p.90). Therefore, an entailment relation is given by linguistic structure, we do not have to check any fact in relation to the real world. The linguistic source may be lexical (as in the previous example) or syntactic. The relationship of hyponymy is a regular source of entailment between sentences. For example, the noun *cat* is a hyponym of *animal* as the following sentences entail:

10. I bought a cat.

11. I bought an animal.

Sometimes entailment is syntactic, e.g. active and passive versions of the same sentence as (12) and (13) below demonstrate:

12. The man built the house.

13. The house was built by the man.

Presupposition is an important topic in semantics. The interest in presupposition can be seen as coinciding with the development of pragmatics for example, the sentence *Where is the salt?* Is said to presuppose that the salt is not present to the speaker, and that there is someone whom the speaker thinks might know where the salt is. Presupposition also holds between the following sentences:

14. Her brother is a fool.

15. She has a brother.

Sentence (15) presupposes (14).

In some ways, presupposition is like entailment, that is, an automatic relationship involving no reasoning. There are two approaches to presupposition: a semantic approach and a pragmatic one. The former views presupposition as a truth relation that can be schematized in terms of logical form as the following demonstrates:

16. Mary’s brother has come back from London.

17. Mary has a brother.

P		q
T	→	T
F	→	T
T or F	←	T

An important difference between entailment and presupposition, is if we negate an entailing sentence then the entailment fails; but if we negate a presupposing sentence the presuppositions survives.

Presupposition failure can occur when there exists no referent for the nominal. This can be highlighted by Bertrand Russell's classic example:

18. The King of France is bald.

19. There is a King of France.

If there is no King of France, how can we judge the truth value of these sentences? Russell's solution was to analyze definite descriptions as complex expressions:

'The King of France is bald is true if and only if:

a. at least one thing is the king

b. at most one thing is the king

c. whatever is the king is bald.'

(Saeed, 2011, p.97)

A problem for truth-based presupposition is that very often, it is sensitive to context. For example, presupposition is usually triggered by time adverbial clauses:

20. She cried before she finished her homework.

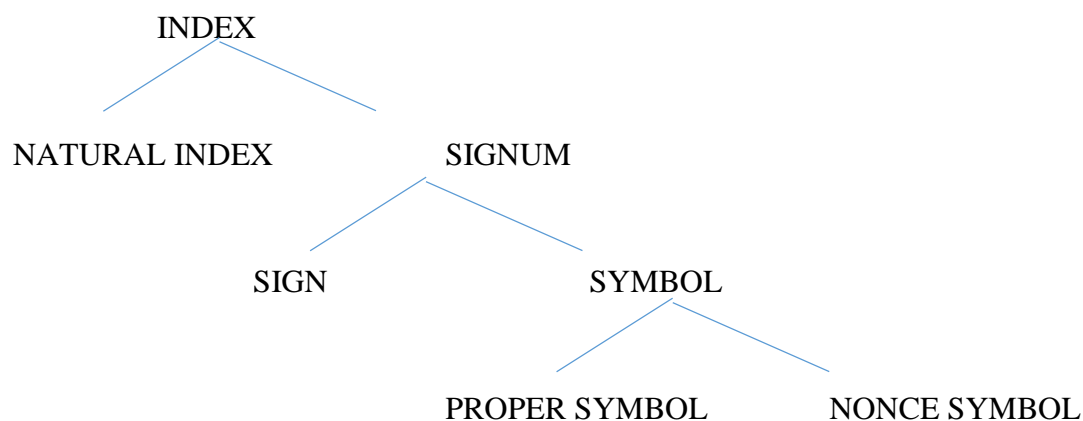
21. She finished her homework.

In conclusion, logical relations are a convenient way of restating in a precise formulaic way some of the semantic features of language. However, not all semantic features of language can be reduced to simplistic logical formulations. As a result, this theory has only dealt satisfactorily with a small part of the complexity of natural languages.

Examples of hypothetico-deductive approach: Hervey's axiomatic functional semantics

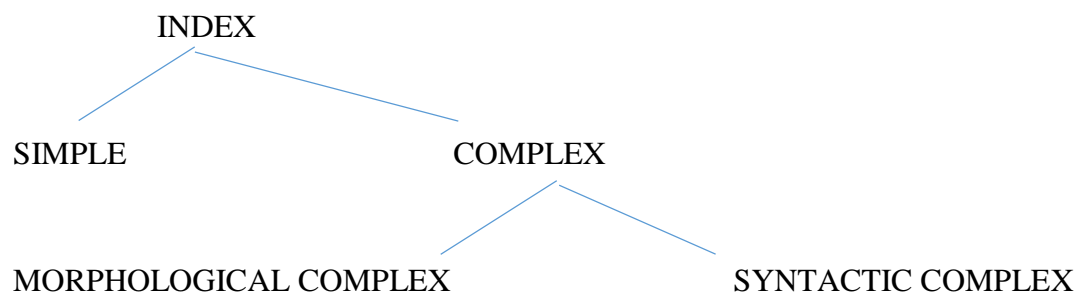
The linguistic theory of axiomatic functionalism is a deductive theory of axioms and key definitions that has developed from J. Mulder. Hervey in his pioneering book *Axiomatic semantics* (1979), acknowledges that he has borrowed many concepts and terms from Mulder's axiomatic functionalist linguistic theory.

The notion of linguistic sign is central to Hervey's theory and has been developed from a semantic aspect in close collaboration with Mulder. Axiomatic semantics is a 'denotation sign-semantics' theory. Signs are entities which have a paradigmatic relation in grammar and have totally fixed-conventional information values in the semiotic system under consideration. Signs are a subset of indices, that is, elements which can convey information as the following diagram illustrates:



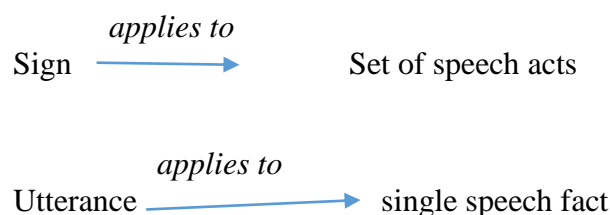
(Hervey, 1979, XXI)

A natural index is an element whose interpretation depends on experience of the natural physical world. On the other hand, a signum can only be interpreted by knowledge of arbitrary conventions. Interpretation of symbols depends on arbitrary fixed conventions (implicit or explicit) that are prevalent in the speech community. These conventions are learnt when we learn a language. Therefore, dictionary definitions describe these conventions, if the conventions change, the dictionary definition must also change. Semiotic systems contain a system of signs that have both form and information value. It is for this reason that *man* and not *John* is a linguistic sign in English. Signs can combine in paradigmatic and syntagmatic relations. In addition, they can be classified according to their degree of complexity as the following illustrates:



(Hervey, 1979, p.7)

A sign is an element in a semiotic system, that is, in a particular language. Specifically, a linguistic sign is a model used for a linguistic description of speech facts having form and meaning. Each sign is a distinct speech fact, and each speech event is a realization of that sign. It must be noted here that Hervey distinguishes between utterance and realization. An utterance is an individual member of a sign, it has a recognizable form (i.e. phonetic sound) and meaning. The following relations will hold:



(Hervey, 1979, p.11)

Every utterance has a form and reference. Reference is ‘part’ of an utterance which conveys meaning in a speech event, and as such, reference implies a particular form. Utterance, form and reference are notions that apply to a single event that has a physical identity in time and space. Every form implies a specific reference, and accordingly no two utterances can have identical references. This situation can be schematized as follows:

Form A \longleftrightarrow Reference A = Utterance A

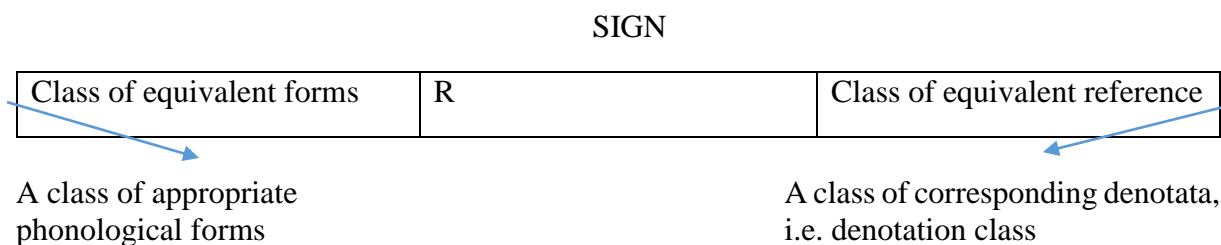
(Hervey, 1979, p.13)

Utterances can be organized into three types of ‘similarity classes’: form classes, reference classes and form–reference classes. Form class constitutes all utterances that are similar to a given utterance; a reference class constitutes all utterances that are referentially similar to a form class; and form–reference class refers to all utterances that are formally and referentially familiar to a given form class. For instance, the phonological form /per/ in English belongs to the form class /per/ which refers to a linguistic sign *pear* and form–reference class *fruit*. As such, a sign is a class of equivalent utterances. The references of all utterances belonging to the same sign, constitute a class of equivalent references. These unique relationship can be represented in the following diagrams:



Where S= linguistic sign, E=expression, C=content, U=utterance, F=form, and R=reference. The double-headed arrow stands for equivalence.

Hervey distinguishes between reference and denotatum. Reference does not refer to the object or thing meant, that is, the denotatum. For example, the *denotatum* dog is realized by the sign *dog*. For a successful utterance, there is ‘correspondence’ between the reference and the underlying denotatum so that a single denotatum ‘corresponds’ to the reference. Every class of equivalent references determines a specific class of denotata called a denotation class. Each sign has its appropriate denotation class. These relationships can be schematized as follows:



(Hervey, 1979, p.25)

The problems of existence and reality is important to denotation. He again draws a distinction between denotation and denotable. A denotation is a ‘hypothetical entity’, which can be observed through the senses, or not yet observed or not observable. A denotatum is considered

from a non-linguistic context as a denotable. In other words, an utterance denotes a denotatum which can be considered from a non-linguistic point of view as a denotable. Thus, utterances of signs 'colourless green ideas' and 'square circle' denote zero and belong to an empty denotation class.

Axiomatic functionalist semantics is summarized in the following denotational rectangle:

Formal Type	Class	Sign	<i>corresponds to</i>	Denotation Class
	To			
Formal Token	Member	Utterance-Model	<i>denotes</i>	Denotatum
Concrete Event	state, item	Speech Event		Denotable object, property, event, relationship (as a differential of experience)

This denotational rectangle implies that the task of semantic description is to establish the type of denotata that can be denotated by utterances of signs. That meaning is not a mentalistic concept but is the conventional association of signs with denotation classes resulting in categories into which speakers learn to sort their external and internal experiences. In addition, semantic description requires a form of hypothesis testing.

Axiomatic functionalist semantics is based on a body of definitions and theorems that make this a deductive theory that is consistent, adequate and exhaustive. This is an integrated approach that proposes a very original semiotic view of the linguistic sign and linguistic meaning. Hervey's approach provides a solution to problems of sign-identity i.e. the setting up of sense-relations in descriptions of meaning e.g. a synonym is a linguistic sign whose denotation class totally overlaps with or is identical to the denotation class of another linguistic sign. Axiomatic functionalist semantics also analyzes how linguistic signs relate to reality.

More notably, Hervey's linguistic semantics rejects inductivism, speculativism, and universalism. It integrates semiotic theory independently of semantics. According to Mulder, it is the first wholly consistent, scientific and purely linguistic semantic theory to be developed.

CONCLUSION

It has been concluded that inductivist and deductivist research methods of reasoning have been employed throughout the history of linguistic research methodology; also, it has been observed that both macro-paradigms of linguistics are needed in order to achieve an adequate, consistent and simple presentation of a coherent linguistic theory. The bottom-up data-gathering and preliminary classification from phenomenological inductivism, and the top-down hypothesis construction from hypothetico-deductivism cannot be related in neat temporal sequence: experience tells us that the linguistic researcher must expect to go to and fro between them,

reviewing the data to intuit hypotheses, and then checking the hypotheses against the data using the evaluative procedures discussed above. It has been noticed throughout this research that there is a clear separation between the two macro-paradigms, the reality is—of course—more complex. The next step in research is to classify data using principles which are fundamentally inductivist. The inductivist's choice of data involves a categorical process which cannot ultimately be satisfactorily distinguished from hypothetico-deductivism. The latter has been applied adequately in axiomatic functional approach.

REFERENCES:

- ALLAN, K., 1986. *Linguistic meaning* (Vols. 1 and 2). Routledge and Kegan Paul, London. (Reprint edn: World Publishing Corporation, Beijing, 1991).
- ALLAN, K., 2001. *Natural language semantics*. Blackwell, Oxford & Malden MA.
- ARIEL, M., 1988. Referring and accessibility. *Journal of Linguistics*, 24, 65–87.
- BLOOMFIELD, L. 1976 (c. 1935). *Language*. London, Allen and Unwin.
- BOAS, Franz, 1911. *Handbook of American Indian languages*. Vol. 1. Smithsonian Institution, Washington, D.C.
- BRONOWSKI, J., 1978. *The origins of knowledge and imagination*. Yale University Press, New Haven.
- CHOMSKY, N., 1957. *Syntactic structures*. The Hague, Mouton.
- CHOMSKY, N., 1964. *The logical basis of linguistic theory*. In: Lunt, H.G. (Ed.), *Proceedings of the ninth international congress of linguists 1962*. Mouton, The Hague, pp. 914–977.
- CHOMSKY, N., 1965. *Aspects of the theory of syntax*. MIT Press, Cambridge MA.
- CHOMSKY, N., 1975b. *Reflections on language*. Pantheon, New York.
- CHOMSKY, N., 1980. *Rules and representations*. Columbia University Press, New York.
- CHOMSKY, N., 1986. *Knowledge of language: Its nature, origin, and use*. Praeger, New York.
- EINSTEIN, A., 1973. *Ideas and opinions*. Laurel ed. Dell, New York. (First published 1954).
- FODOR, J.A., 1985. Some notes on what linguistics is about. In: Katz, J.J. (Ed.), *The philosophy of linguistics*. Oxford University Press, New York.
- HARRIS, Z.S., 1960. *Methods in structural linguistics*. University of Chicago Press, Chicago. (First published 1951).
- Hervey, S.G.J. 1979. *Axiomatic semantics: A theory of linguistic semantics*. Edinburgh: Scottish Academic Press.
- HOCKETT, C.F., 1947. Problems of morphemic analysis. *Language* 23, 321–343. (Reprinted in Martin Joos (Ed.) *Readings in linguistics*. American Council of Learned Societies, Washington D.C. 1957, pp. 229-442).
- KATZ, J.J., 1981. *Language and other abstract objects*. Rowman and Littlefield, Totowa.
- KATZ, J.J., 1985. *The philosophy of linguistics*. Oxford University Press, New York.
- KEMPSON, R. 1977. *Semantic theory*. Cambridge, CUP.
- KUHN, T.S., 1970. *The structure of scientific revolutions*. International Encyclopaedia of Unified Science, 2nd ed. Chicago University Press, Chicago.
- LEECH, G. 1974. *Semantics*. London: Penguin Books Ltd.
- LYONS, J. 1977. *Semantics I*. Cambridge, CUP.
- MULDER, J. and S. HERVEY. 1980. *The Strategy of linguistics*. Edinburgh: Scottish Academic Press.
- PALMER, F.R. 1976. *Semantics: A new outline*. Cambridge, CUP.

SAEED, J.I. 2001. *Semantics*. Oxford: Blackwell Publishers.

SAUSSURE, F. de. 1965. *Course in general linguistics*. Publié par Charles Bally et Albert Sechehaye avec la collaboration de Albert Riedlinger. 3 edn. (First published 1915). Paris: Payot.

<http://66.102.104/seach/AF> semantics

<http://Ling.upenn.edu/>

<http://www.mdx.ac.uk/>

<http://slic.sozo.ac.jp/web>

www.stanford.edu/group/

www.sunysuffolk.edu/