Meaning From a Logical Perspective

By

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Abstract

This paper is intended to focus on the existing relation between *'logic'* and *'meaning'*, and how *'meaning'* is looked at through logical perspective. Besides, this paper adopts simple logical symbols to represent some aspects of meaning.

Since meaning is still regarded as a thorny area that needs further study to determine its nature and borderline, this paper proposes to resort to logic and logical rules. This paper points out how logical rules are used and how they clarify some oblique sentences. The paper also sheds light on how meaningful sentences are logically symbolized and how logic can define the borderline of meaning in an adequate manner. This paper hypothesizes that logic, logical rules, and logical symbolization can play a major role in solving problems related to meaning.

This paper consists of two sections; section One is centered on *'meaning'* as an aspect, and as a problematic concept. Section One is a preliminary exhibition of meaning designed for the sake of clarification. Whereas, Section Two is more inclusive in covering how logic deals with meaning and its analysis via logical rules. Section Two touches upon *'logic'*, which provides a means for determining *'meaning'*. Some types of logic are dealt with in order to provide some insight in dealing with the thorny area of meaning and its analysis.

The paper has reached some beneficial conclusions which have much to do with adopting thriving use of logical rules in explaining vague sentences.

يركز هذا البحث على العلاقة ما بين المنطق و المعنى، و كيف ينظر إلى المعنى عبر منظور منطقي. يستخدم هذا البحث رموزاً منطقية لتمثيل بعض أوجه المعنى.

نظراً لان المعنى مازال أحد حقول الدراسةِ التي تكتنفها المشاكل والتي تحتاج إلى نوعٍ فريد من الدراسة لتحديد طبيعة المعنى وحدوده، يقترح هذا البحث اللجوء إلى المنطق و قوانينه لحل مثل هذه المشاكل و غيرها. تلقي هذه الدراسة الضوء على كيفية استخدام قوانين المنطق و إمكانية هذه القوانين في توضيح المعاني الغامضة للجمل. تسلط هذه الدراسة الضوء أيضاً على كيفية تمثيل الجمل ذات المعنى على نحوٍ منطقي. كما تفترض هذه الدراسة إمكانية المنطق وقوانينه و تمثيله الذي يلعب دور أساسي في حل المشاكل المتعلقة بالمعنى.

يتألف هذا البحث من قسمين، يركز القسم الأول منه على المعنى كمفهوم تكتنفه بعض المشاكل. يعرض القسم الأول من هذا البحث توضيحاً أولياً للمعنى، فيما يعتبر القسم الثاني أكثر شمولية من حيث تغطيته لكيفية التعامل مع المعنى وتحليله عبر المنطق وقوانينه. يعنى القسم الثاني من هذا البحث أيضاً بالمنطق كونه طريقة يمكنها تحديد كنه المعنى. علاوة على ذلك، يتناول هذا القسم بعض أنواع المنطق من اجل توضيح معضلة المعنى و تحليله.

لقد توصلت هذه الدراسة إلى بعض الاستنتاجات المفيدة والتي تتعلق باعتماد القوانين المنطقية الناجعة لتفسير معاني الجمل التي يشوبها الغموض.

Introduction

Studying meaning falls within the domain of semantics, the scientific study of meaning or the philosophy of meaning. Although semantics is labeled as the science of the future, the study of meaning in general and philosophical semantics in particular dates back to the writings of the ancient Greeks in particular, namely Plato and Aristotle, i.e., to more than 2500 years ago. Studying meaning was launched by scholars in ancient cities like Athens, Alexandria, Ashur and other ancient cities.

Not only linguists have made serious attempts to define or determine meaning, but also philosophers, logicians, psychologists, sociologists, and the like. The domain of both meaning and logic is very wide, and could not be confined within certain limits. Meaning has come to the fore as a crucial element in deciphering linguistic problems in world languages, while logic is a way to enhance the efforts exerted to give certain features to define the concept of meaning adequately.

0.1 . The Problem

Meaning is considered to be an area of studying which poses real controversial issues of language. This paper tries to solve the following:

1- How does logic deal with the relation between sentences?
2- How relations between sentences are expressed via logical rules?
3- How does logic define its terms?
4- How can one understand self-embedding sentences?

0. 2. The Hypotheses

The study is based on the hypotheses that:

1- Meaningful units should have reference to logical laws.

2- Logical symbolization show the relation between sentences and their truth conditions.

3- Logic deals with propositions.

4- Self-embedding sentences could be clarified through logic.

0.3. Value of the study

The present study provides general guidelines of the precise usage of logical symbols used to explicate the particulars of the aspects of meaning. Thus, it would be of value for researchers dealing with semantics in general and philosophical semantics and logical (pure) semantics in particular.

Section One: Meaning

1.1. What is Meaning?

Fromkin and Rodman (2003: 173) define semantics as the study of meaning. However one should be acquainted with the term *'meaning'* first. Linguists and semanticists have long been trying to propose a unanimously agreed upon definition of meaning. Ogden and Richards (1923), have given twenty two definitions for the word '*meaning*'. Yet, the noun *'meaning'* and the verb *'to mean*'

themselves have many distinguishable variable meanings. The range of the meanings of meaning is illustrated through the following examples cited from Lyons (1977: 131):

1- *What is the meaning of sesquipedalian?*

2- *I did not mean to hurt you.*

3- *Life without faith has no meaning.*

4- *Fame and riches mean nothing to the true scholar.*

The word 'mean' in the second example suggests the meaning *'intend'* which can be substituted for *'mean'*. In the third and fourth examples, the word *'mean'* suggests *'value'* or *'significance'*. Thus, the words *'intention'* and *'value'* are not similar to the word *'mean'* in the first example. Furthermore, Hall and Robert (1960: 121) point out that meaning could be defined "by speaking of the situations in respect to which we use linguistic signals… [and that] meaning is determined by usage"

1.2. Some Difficulties in Meaning

According to Wardhaugh (1977: 158), the problem of meaning has long puzzled philosophers over what a word means or suggests, in other words how they relate themselves to reality concerning the real world around us. Thus, Wardhaugh (ibid) poses some problematic questions such as "in what ways do words refer to the things they name? Do they actually substitute in some way for those things?" Wardhaugh (ibid: 159) discusses the problematic areas related to how to define or determine meaning, is it conceptual, individual or contextual? For example, the word *'table'* could cause all kinds of problems, for it has different distinct meanings in *'water table, dining table, etc*." Hence the word *'table'* has no essential meaning, but it does have multiple meaning.

The problem is how to define meaning? And in which terms? Ullmann (1977: 118) states: "it would seem, then, that the vagueness of our words is a handicap in some situations and an advantage in others" He suggests that the vagueness of words, i.e., their meanings, stems from a variety of causes which are related to the nature of language and to special circumstances. Then, he ascribes the causes to the following:

I. The generic character of words, in which one should distinguish between *'the non-distinctive features'* such as the *size*, *shape*, or *color* of an object like an *'apple'*. And the *'distinctive features'* which are common to all the objects of which one uses the word *'apple'*.

II. The lack of homogeneity of words depending on context and situation in which they are used, and the personality of the speaker using them. For example, if one takes an ordinary common noun with a concrete meaning such as *'book'*, its significance will vary according to its users; it will not mean the same thing for an author, publisher, a printer, a librarian, a pupil, etc.

III. The lack of clear-cut boundaries in the linguistic world. For instance, the spectrum of colors is a continuous band, and it may vary from one language to another and from a period to another. In this respect, Leech (1977: 28-29) provides relevant examples:" English has a range of eleven primary terms (black, white, red, green, yellow, blue, brown, purple, pink, orange, and grey. Whereas, the Philippine language makes do with four…"

IV. The lack of familiarity of the things they stand for. Indeed, this lack of familiarity depends on knowledge of the person and his physical interests. For example, many urban people have little knowledge of the meaning of animal and plant names or agricultural terms which are, on the other hand, quite known by any farmer. Actually, a radio questionnaire made in England in the year 2006 showed that a great deal of cities' children thought that cows are laying eggs.

1.3. Meaningfulness

Lyons (1977: 84) believes that meaningfulness is essential to all languages and a language without meaning is logically incoherent. Meaningfulness is a basic element to be found in many social sciences and does not bind itself to any single one of them. Thus, to know a language means to understand all words, sentences, compositions, essays, etc., but these must be meaningful, i.e., convey certain meaning. Hall and Roberts (1960: 121) stress the fact that "meaning is what gives language its usefulness, and is its very reason for existence…"

1.4. Two-Valued Orientation Towards Meaning

Hayakawa (1978: 84) states that the assumption towards meaning claims that every question has two sides only, it contains no mixture, e.g., *what is not good must be bad, and what is not bad must be good*. Thus, on this basis, the existence of any middle ground is ignored. This approach towards meaning is associated with disorder in people's semantic reaction.

1.5. Theories of Meaning

Generally speaking, many attempts were put forward to determine what meaning is, none of which seems fully adequate. Therefore, according to Lyons (1981: 173), many theories of meaning were formulated by different scholars, among which are the following:

1- *The Referential Theory*: [which is introduced by Bertrand Russell] "the meaning of an expression is what it refers to, or stands for", e.g., 'dog' means either the class of dogs or the property they all share.

2- *The Mentalistic (Conceptual) Theory*: the meaning of an expression is the idea, or concern, associated with it in the mind of any one who knows it.

3- *The Behaviouristic Theory*: the meaning of an expression is either the stimulus that invokes it or the purpose that it invokes, or a combination of both.

4- *The Meaning-is-use Theory*: the meaning of an expression is its contribution in the language according to its use.

5- *The Verificationist Theory*: the meaning of an expression is determined by the verifiability of the sentences, or propositions containing it.

6- *The Truth Conditional Theory*: the meaning of an expression is its contribution to the truth conditions of the sentences containing it.

1.6. Types of Meaning

The core of communication is meaning, but the difficulty lies in the distinction between the various senses of the meaning of a word. The erroneous selection of the sense of a word can lead to ambiguity, unnaturalness, or misinterpretation. To produce a meaningful text, distinction must be made between types of meaning. Bellow are some of the major types of meaning thoroughly and concisely mentioned by El-Samir (1999: 139-141):

1- Lexical meaning: expresses the semantic core content.

2- Grammatical meaning: signals grammatical relationships and creates the tone of text.

3- Denotative meaning: expresses the conceptual (logical) meaning of a word.

4- Connotative meaning: carries the communicative value of meaning according to the reference.

5- Referential meaning: shows the relation between the signifier and the signified. It involves extralinguistic knowledge. It relates to the information provided. It is the encyclopedic meaning as opposed to the linguistic meaning.

6- Stylistic meaning: expresses different dimensions, e.g., levels of formality, social class, geographical origin, historical period, individuality, originality, etc.

7- Collocative meaning: expresses the idiosyncratic property of associated words.

8- Thematic meaning: shows the way the addresser chooses to communicate his message in terms of ordering, focus and emphasis to produce a communicative effect of information.

9- Contextual meaning: focuses on meaning according to context.

10- Figurative meaning: deals with figures of speech and their uses.

11- Associative meaning: expresses referential associations, which are unstable and variant from one person to another.

12- Textual meaning: derives from the rest of the text, the significance of which depends on what was mentioned before.

13- Metalinguistic meaning: expresses the overtones of words within a context of situation and the special senses.

14- Expressive meaning: relates to everything within the scope of self-expression. It is controlled by socially imposed and socially recognized norms of behavior and categorization. One of its components is the emotive meaning.

15- Emotive meaning: It is expressed through intonation and stress.

16- Pragmatic meaning: pluralistic as is suitable to a context, relativistic in its beliefs about truth and value systems, devoid of the metaphysical concerns, except when they have

practical consequences. It places a high premium upon conduct and ethical concerns as it may serve the intended meaning.

17- Intended meaning: it is expressed and meant by the addresser. It falls within the domain of pragmatics.

18- Semiotic meaning: forms of discourse in terms of the relative dominance of the signs revealed by analysis.

19- Socio-cultural meaning: it varies according to societies and cultures.

It is worth mentioning that types (1-12) are linguistic, i.e., semantic while (13-19) fall within the domain of extralinguistics, i.e., pragmatic

1.7. Meaning and Truth-Conditions

In analyzing meaning, it is quite interesting to take the meaning contained in sentences into consideration. One of the best ways to understand meaning of sentences is to imagine what the word would have to be like for the sentences to be true. Hayakawa (1978:201) presents the following relevant examples:

5*- John Pulled himself out of the water by lifting himself by the hair.*

Example (5) is difficult to understand. The reason behind this difficulty is that it is hard to imagine what the word would have to be like for it to be true. The concept of truth, thus, forms a fine instrument for determining the relation between sentences and what they are about. One can characterize an important part of the meaning of a sentence by formulating the conditions the word must meet for the sentence to be true. These conditions are called *the truth conditions* of the sentences. In logic, the meaning of a sentence is equated with its truth conditions. This, of course, means that some important aspects of meaning are disregarded, but an analysis of this type is satisfactory for the purpose of logic since this research paper is concerned with those aspects of meaning that play a considerable role in logical truth and inference.

1.8. Meaning Postulate

Meaning postulate is considered to be of significance in perceiving how words are used. According to Lyons (1977: 84) a meaning postulate in general is a rule or statement that regulates the interpretations of the terms in a language in a certain way, very often in the form of postulated equivalence or consequence relations between certain expressions of the language. The word *'bachelor'* and *'married'* could be naturally related through meaning postulate without knowing anything about their meaning, thus *(x) (B x→ ~M x)* it is sufficient to establish a relation between the predicate B and M and it is not logically dependent upon some prior or alternative specification of what each of them means. Relevantly, Lyons et al, (1987: 169-70) observe that:

> Many of the relations of sense that hold between lexemes-
>
> synonymy, antonymy, hyponymy, etc._ are determined in that,

if they ceased to hold, we would say that there had been a change

for meaning, and therefore a change in the lexical structure of the

language system in question.

Lyons et al. (ibid) exemplify that the word *'bachelor'* is not clear whether it can be used to describe a divorced man, a priest or even a sixteen year old boy? In addition they support that "the following meaning postulates is surely valid: for all x, if x is bachelor, then x is not married". They elaborate that meaning postulate can guarantee "the analyticity of an infinite number of propositions formulated in English, without requiring the semanticist to make [further] implausible assumptions…"

Crystal (1997:278) states that: "…several 'sets of postulates' have been proposed, in attempts to systemize ideas about language, the most well-known being…the American Linguist Bloomfield in 1926 and Bernard Bloch 1948".

1.9. Propositional Meaning

According to Lyons (1981: 123), it is a commonly acknowledged fact that languages are capable of being used for making descriptive statements, and these statements could be true or false with close regard to propositional or (descriptive) meaning. This fact is prominently reflected in the truth conditional theory of semantics. Whereas, non-propositional meaning, according to many philosophers and linguists, is more changeable and less important. It includes what is referred to as 'expressive component', which is the kind of meaning by which a speaker expresses meaning through his attitudes, beliefs, feelings, etc. Expressive meaning is also correlated with descriptive meaning in many nouns, verbs and adjectives.

Section Two: Logic

2.1. Some Definitions of Logic

In the *'Oxford Advanced Learner's Dictionary'* (2005: 904), Logic is defined as "the science of thinking about or explaining the reason for something using formal methods".

Hayakawa (1978: 207) defines logic as "a set of rules governing consistency in the use of language". Whereas, Allwood et al. (1977: 16) define logic as "the study of those properties that make an inference necessarily valid or a sentence necessarily true". For Herford and Heasley (1983: 131) logic is:

[T]he science which deals with meanings in a language system,

not with actual behavior of any sort. Logic deals with propositions.

Most centrally…the terms 'logical' and 'logic' do not apply directly

to utterances which are instances of behavior.

According to Bollinger (1975: 227), logic is "the restricted language of affirmation and negation, of propositions which are true or false."

2.2. Language and Logic

Logic is of interest to many linguists since a linguist may take for granted the validity of his/her assumptions, methods, and conclusions, while a philosopher may question the whole basis on which the work is done. There are problems in understanding sentences which include self-embedding, e.g., *The boy the man the woman loved saw ran away*, or the other example which is easier to interpret *The question girl the dog bit answered was complex.*

As it is known, language contains an infinite number of words that carry different meanings that are situated within the science of linguistics. Sciences, by definition, are considered to be logical systems. Bollinger (ibid: 221) asks the question: "*is a language in itself a logical system?*" He precedes saying that language had been promoted by Aristotle to be superior to logic, and logic is the restricted language of affirmation and negation of propositions. A proposition is defined by Crystal as (1997: 288) as "…the unit of meaning which continues the subject-matter of a statement in the form of a simple declarative sentence".

Language includes not only propositions, but fantasy that could be found in poetry and fable, in which great deal of metaphor, paradox, pun, oxymoron, etc., are used, in addition to the expressions of desire.

Language is simply based to express desire to get the desired object. It is logically linked to a modicum of direct experience, it gives us our knowledge of the world, and accordingly we reweave our imagination, though our languages are "…uncommitted means for everything" (Bollinger, ibid: 221). However, if language is to serve logic as well as poetry and pragmatics, it should contain the devices used by logic. Logic always defines its terms more exactly than they are used in natural language, for example, "*a person I didn't like and I had every reason to like*" would be more logically expressed as "*a person I didn't like even though I had every reason to like him*".

Linguistic forms can be explained by a logically formed presupposition, for example, the word *'unless'* which is defined in the *'Oxford Advanced Learner's Dictionary'* as *'if not'* which is here considered an equivalent to *'unless'*, but indeed the two are not quite the same: "*Professor Sam will pass you in the linguistic course if you don't fail the final exam and if you don't make less than a C in your term paper"* is an acceptable sentence. Yet "*Professor Sam will pass you in linguistics unless you fail the final exam and unless you make less than C in your term paper"* is not acceptable. Therefore, *'unless'* implies a unique circumstance, whereas 'if not' includes the possibility of two or more. The proposition which is a logical aspect defines 'unless' as follows: "There exists a unique circumstance *Q*, such that for all circumstances *C, if C ≠ Q* then *C* implies *P*". (The symbol ≠ means *'not equal to*').

Indeed, logic derives from mathematics, for it points outward to the external world rather than inward, and it makes precise the way one deals with things.

2.3. Logic and Rational behavior

Considering Heford and Heasley's view (1983: 131), the terms *'logic'* and *'logical'* do not apply directly to utterances (which are instances of behavior). Consider the following examples:

6*- It's not logical to want to kill oneself.*

7*- The truth of the proposition that Socrates is mortal follows logically from the fact that Socrates is a man and the fact that all men are immortal.*

could be semantically examined in terms of logic and illogical. There is an important connection between *'logic'* and *'rational action'*, but it is wrong to equate the two. Logic is just one contribution factor in rational behavior which involves:

(***a***) Goals, (***b***) assumptions and knowledge about existing states of affairs, and (***c***) calculations, based on these assumptions and knowledge leading to ways of achieving the goals, for example Heford and Heasley's (ibid):

Goal*: to alleviate my hunger.*

Assumption and knowledge: hunger is alleviated by eating food. Cheese is food. There is a piece of cheese in front of me. I'm able to eat this piece of cheese.

Calculations: hunger is alleviated by eating food, and, cheese is food. Then hunger is alleviated by eating cheese. If hunger is alleviated by eating cheese, then, my own hunger would be alleviated by eating this piece of cheese in front of me, and eating this cheese would alleviate my hunger, so, eating the cheese would achieve my goal.

Rational behavior: eating the cheese.

Eating the piece of cheese in such circumstance is an example of eating performance which is entirely rational. But, the use of the word *'logic'* here restricts the logic to the *'calculations'* aspects of this behavior. The goals, assumptions, knowledge, and final action are in no way logical or illogical. In the light of this comment, if the word *'cheese'* in the abovementioned example were replaced throughout by the word *'chalk'*, then the calculations leading to the conclusion that I should eat a piece of chalk would be *'logical'*.

Logic, then, tells us nothing about goals, or assumptions, or actions in themselves. It simply provides rules for calculation which may be used to get a rational being from goals and assumptions to action. There is a close analogy between logic and arithmetic. Arithmetical facts does not mean just fact involving numbers in some way, but rather from the system of rules defining addition, subtractions, multiplication, and division. A similarity between arithmetic and logic is the unthinkability of alternatives:*'2+2=5'* is an arithmetical contradiction.*'John is here and John is not here*' is a logical contradiction.

2.4. Simplified Logic

If one takes a simple sentence such as: *'John is a man'*, one has a prediction which satisfies the individual *'John'* that he was the property of being a man.

According to Palmer (1993: 84), one can describe the aforementioned simple sentence in terms of logic, accordingly, one can symbolize it with *M (a),* where M stands for the predicate 'is a man' and (*a*) refers to the individual *'John'*. One can extend this symbolization to deal with relations where more than one individual is concerned. Thus, *'John loves Mary*' may be symbolized as *L (a, b)*, where *L* stands for the predicate *'love'* and the previous formula is that there is not one but two arguments *a* and *b*. It is relevant to add that the arguments are ordered, since *'John loves Mary'* could be symbolized as *(L (a, b))* is not the same as *'Mary loves john'* which is symbolized as *(L (b, a))*. Other predicates may take even more argument, e.g., *give* has three. Thus, *'John gave a Mary a book*' may be shown as *G (a, b, c).*

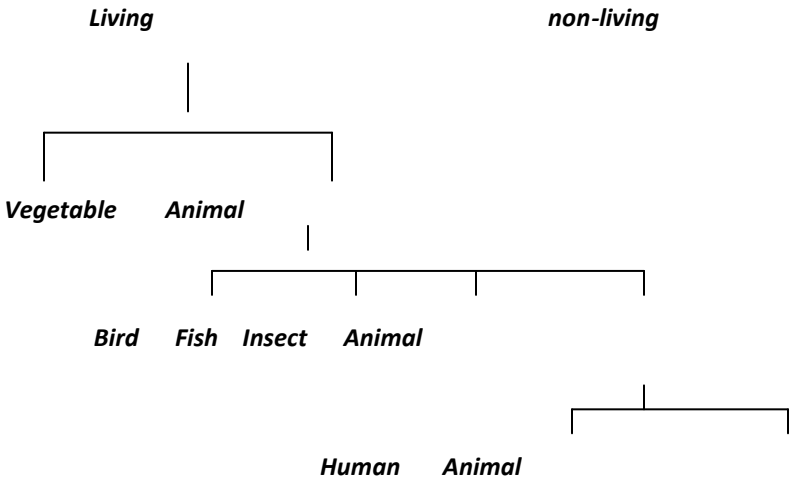
The purpose of this symbolization, however, is to show relations that hold between sentences (or proposition). Thus, one might want to say that if *'John is a bachelor'*, he is unmarried. This could be achieved by *B (a)→ U (a)* where the symbol → indicates entailment, *B* stands for *'bachelor'*, and *U* for *'unmarried'*, and the whole formula says that *'John is a bachelor'* entails *'John is unmarried'*. However, since the purpose here would be to discuss the relation between *'bachelor'* and *'unmarried'*, one concludes that for any individual, not just *'John'* being a *'bachelor'* entails being unmarried. Instead of using *a*, *b* and *c* (individual constants) which refer to specific individuals, the letters *x, y*, and *z* as individual variables are used to refer to any individual, and further introduce the universal quantifier ∀ (*for all*). One can now symbolize ∀ *x (B(x) →U(x))* which is to be read as *'for all x, if x is a bachelor, x is unmarried'.* One might further wish to treat '*unmarried'* as 'not married', and this can be symbolized by using the sign ~ for negation: ∀ *x (B(x) → ~ M (x))* where *M* stands for *'married'*. It could be read as: *for all x if x is unmarried entails x is not married.*

2.5. Logic and Sense Relations

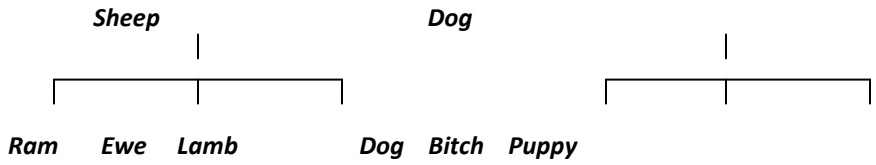
Logic can be used as a significant means to interpret sense relations like hyponymy, synonymy, and antonymy. The following subsections are illustrative.

2.5.1. Logical Hyponymy

Palmer (1993: 85-7) observes that, hyponymy involves the notion of inclusion in the sense that *'tulip'* and *'rose'* are included in 'flower', and *'lion'* in *'mammal'* or animal. *'Rose'* is included in the meaning of *'flower'*, thus, a *'flower'* is a hyponymy of a *'rose'*. Hyponymy could be described in terms of hierarchical classification of nature:



Even the subordinates could be described in the same manner.



Hyponymy can be described in terms of logic. To say this is a *'tulip'* entails this is a '*flower'*, and this is a *'scarlet'* entails this is red. One can formalize the relation between '*tulip'* and '*flower'* as: $\forall$ *x (T(x)* $\rightarrow$ *F(x))* though such a formula by itself will not bring out the hierarchical classification involved in hyponymy, for since a tulip and a flower are also plants, one can say $\forall$ *x (T(x)* $\rightarrow$ *P(x)) and* $\forall$ *x (F(x)* $\rightarrow$ *P(x)),* but it must not follow from this that *'tulip'* and *'flower'* are both co-hyponyms of *'plants'*. One needs further to specify that *'flower'* is an immediate hyponym of '*plants'* and that *'tulip'* is an immediate hyponym of '*flower'*.

2.5.2. Logical Synonymy

Crystal (1997: 176) defines synonymy as:

> A term used in semantics to refer to major types of sense relation between lexical items: lexical items which have the same meaning are synonymous, and the relationship between them is one of synonymy.
>
> For two items to be synonymous, it does not mean that they should be identical in meaning, i.e. interchangeable in all contexts, and with
>
> identical connotations…

Crystal (ibid) argues that context can play an impressive role in distinguishing synonymous pairs. On the other hand, Palmer (1993: 88-94) gives a detailed description of how synonyms are defined in terms of logic. Taking the words *mavis* and *thrush* into account, one can say that they are synonymous, thus, according to logical laws; they could be represented as follows: $\forall$ *x (M(x)* $\rightarrow$ *T(x)) and* $\forall$ *x (T(x)* $\rightarrow$ *M(x)),* i.e., that all mavises are thrushes, and all thrushes are mavises, though this does not solve the many practical problems that one may face.

2.5.3. Logical Antonymy

Crystal (1997: 27) defines antonymy as "one of a set of sense relations recognized in some analyses of meaning…it refers to all types of semantic oppositeness". Palmer (1993: 94-7) holds the view that languages have no real need of true synonyms, and as it has been shown, it is doubtful whether any true synonyms exist. Antonyms and complementaries do not lend themselves very

easily to the kind of logical formulation suggested earlier. For antonyms one may say that if something is *A* it is not *B* (and vice versa), while for complementaries one has to say that if it is not *A* it is *B* (and vice versa). Thus for antonyms '*wide'* and '*narrow'* one can use the following formulae: $\forall x (W(x) \rightarrow \sim N(x))$ *and* $\forall x (N(x) \rightarrow \sim W(x))$ 'Though' this follows logically ' while for the complementaries *'male'* and '*female'* the formulae are: $\forall x (M(x) \rightarrow \sim F(x))$ *and* $\forall x(\sim M(x) \rightarrow F(x))$ together with $\forall x (F(x) \rightarrow \sim M(x))$ $\forall x (\sim F(x) \rightarrow M(x))$.

2.6. Propositional Logic

Talking about propositional logic, Lyons (1981: 123) points out that "…those philosophers who accept that propositions differ, on the one hand from sentences, and on the other hand from statements, questions, commands, etc., will usually say that propositions" are:

(**1**) either true or false (**2**) may be known, believed or doubted (**3**) may be asserted, denied, or queried (**4**) are hold constant under translation from one language to another.

Palmer (1993: 180-6), supports that in view with the problems concerned with propositional logic, the sentential variables are preferable. Here, one is concerned with the relations that hold between sentences apart from the internal structure of the sentences themselves. Thus, in the example *'John is in his office*' and *'John is at home'* and the information that at least one of these is true. Given that the second is false, one can conclude that the first is true. This conclusion can be drawn irrespective of the form of the sentences themselves. One can use symbols such as *p, q* and *r* (sentential variables) to represent sentences. The aforementioned example could be symbolized as: $((p \vee q) \& \sim q) \rightarrow p$ which says *'if p-or-q and not q then p'.* It becomes clear that one needs rules of formation to form these more compound sentences, and that the logical connectives do not hold only between the simple sentences p, q, etc., but also the compound sentences, thus all parts of the logical syntax. It is assumed that every sentence is either true or false. The true value *'true'* is symbolized as *t*, whereas the *'false'* one is symbolized as *f*. Therefore, the truth table for conjunction (&) is the following

p	***q***	***p&q***
t	***t***	***t***
t	***f***	***f***
f	***t***	***f***
f	***f***	***f***

The first column shows that, if both simple sentences ***p*** and ***q*** are true, the compound sentence is true. The next three columns show that, if either ***p*** or ***q*** is false, the compound sentence is false. For negation, the truth table is simply as:

p	~ p
t	f
f	t

Thus, one needs only one sentence p, together with its negation **~ *p***. If a sentence is not true, it is false, and vice versa. The truth table for disjunction is:

p	q	p v q
t	t	t
t	f	t
f	t	t
f	f	f

Here, the first line allows for the compound to be true if both simple sentences are true. The truth table for implication is in fact as:

p	q	p → q
t	t	t
t	f	f
f	t	t
f	f	t

Therefore, any true statement will imply any other true statement. Finally, equivalence is simply the conjunction of two implifications*: p≡ q* equals *(p → q) & (q → p).* It is usually expressed in ordinary languages: *p ≡ q* equals *(p → q) & (q → p).* It is usually expressed in ordinary languages as only if (though as with implication there is usually some casual connection between the two sentences in ordinary language); the truth table is shown as follows:

p	q	p ≡ q
t	t	t
t	f	f
f	t	f
f	f	t

2.7. Predicate Logic

Predicate logic is essential in perceiving some sentences, especially those which contain a sense of philosophy. According to Palmer (1993: 186-90), one needs predicate logic to understand such examples as the following:

8- *All men are mortal***.**

9- *Socrates is a man***.**

10- *Therefore Socrates is mortal***.**

In predicate logic, one shall need to deal with relations between sentences. Predicate logic is not wholly distinct from propositional logic, but includes it. In logic, as it is mentioned earlier, this paper is concerned with sentences, not with open sentences either by substituting individual constants *w (a),* or by introducing a quantifier $\forall$ *x (w(x)).* Moreover, one can symbolize *'All men are mortal*' as: $\forall$ *x (M (x)* $\rightarrow$ *D (x)),* where *M* stands for *'man'* and *D* for '*mortal*'.

Thus, it is read as for all x, if x is a man, x is mortal. The second quantifier is the existential quantifier $\exists$, which expresses some or more strictly means, there is at least one individual for whom it is the case that *'some men are foolish'*, is then symbolized $\exists$ x (m(x) & F(x)) where $\exists$ =same.

2.8. Inference and Logical Analysis of Sentences

As it i mentioned by Allwood et al. (ibid: 98), the following example illustrates what a logical inference is:

11*- All John's friends are my friends.*

12*- All my friends are nice.*

13*- Therefore all John's friends are nice.*

(***11***) and (***12***) are called the premises and (***13***) is considered to be the conclusion. If the premises are true, then the conclusion will definitely be true. So, the argument above is logically a valid inference.

2.9. Deductive and Inductive Logic

There are two main types of inferences, according to Allwood et al. (1977: 16), those that are necessarily valid and those that are valid only with a greater or lesser degree of probability. Each type is correlated with a special type of logical study. The Study of necessarily valid inference is pursued within deductive logic, while inferences that are valid with some degree of probability are studied within inductive logic. The following two examples show the difference between deductive and inductive inferences:

Deductive Inference

Premises*: When it's snowing it's cold.*

It's snowing

***Conclusion**: It's cold.*

Inductive Inference

***Premises**: When it's snowing it's usually cold.*

It's snowing

***Conclusion**: It's cold*

One can notice that the conclusion of the inductive inference is valid only with a certain probability and is not necessarily valid as in the deductive inference. Deductive logic has so far been more completely investigated than inductive logic. Accordingly, this paper adopts the term *'logic'* to be synonymous with deductive logic.

2.10. Logical Paradox

Logical paradox, also called 'Electra Paradox' is designed to show that a simple referential account of meaning leads to absurdity, and, therefore cannot be correct (Lyons, 1977: 220). The following example from Allwood et al. (1977: 91) clarify this issue:

***14**- Orestes has returned home, Electra does not recognize him, although she knows that Orestes is her brother.*

Sentence (**14**) can be represented as follows:

*(**a**) **Premises**: Electra does not know that the man in front of her is her brother.*

*(**b**) Electra knows that Orestes is her brother.*

*(**c**) The man in front of her is identical to Orestes.*

***Conclusion**: Electra both knows and does not know that the same man is her brother.*

In other words, Electra knows that Orestes is her brother but does not know that the man in front of her is her brother.

2.11. Logical Presupposition

In a comment on Strawson's *'Introduction to Logical theology'*, Wilson (1977:24-25) observes that an adequate semantic theory must recognize not only truth conditions, but also truth value conditions or logical presuppositions. Logical presupposition could be defined as: a sentence *S* presupposes another sentence *P*. If *S* is true, *P* must be true, and if *P* is false or lacks truth-value, both *S* and *P* must lack truth value. It is said that logical presupposition is a controversial subject. Wilson (ibid) tackles Strawson's view

by saying that: "it was already suggestive that the phenomenon of logical presupposition in natural languages had by no means been established and was indeed not capable of empirical proof".

Disagreement over this topic was a matter of debate whether a given sentence *S* entails or logically presupposes another sentence *P*. Besides, Wilson (ibid) stresses that factive verbs such as (*know, regret, realize, perceive, etc.)* presuppose their complements, for example:

15*- John knows that Mark is short.*

16*- John does not know that Mark is short.*

One can conclude a third sentence which says that:

17*- Mark is short.*

One can observe that (***17***) is not part of what the speaker confirms, but part of what he presupposes. The presuppositions exist in the mind of the listener or speaker. Sentence (***17***) is also considered to be a logical presupposition of (***15***) and (***16***), so that factive verbs logically presuppose their complements. The following patterns reflect logical presupposition:

18*- Tom has stopped beating his wife.*

19*- Tom has not stopped beating his wife.*

These two sentences logically presuppose a third one which is:

20*- Tom has beaten his wife.*

Another example, from Wilson (1977:35), that carries logical presuppositions is (***21***)*:*

21*- Jane* { *Quite (did not quite)* / *Continued (did not continue)* / *Resumed (did not resume)* } *(to) speak.*

Which would be a presupposition of:

22*- Jane was speaking.*

Basically, logical presupposition occurs in various types of cleft sentences, giving the following pairs of which the first member would logically presuppose the second:

23*- It was (wasn't) in August that John quit.*

24- John quit.

25*- It was (wasn't) to escape the draft that John went to Canada.*

26*- John went to Canada.*

27*- It was (wasn't) because he was tired that John left.*

28*- John left.*

Some modifiers like (*again, another, even, only, too, and other*) and of restrictive and non-restrictive could be analyzed in terms of logical presupposition.

2.12. Logical System and Meaning Analysis

To shed light on this topic, it is worth providing the following examples cited from Clark et al (1977: 480):

29*-*

a*. That man is male.*

b*. My mother is adult.* *True sentences.*

c*. Our pregnant neighbor is a woman.*

which would be a presupposition of:

d*. That man is female.*

e*. My mother is not an adult.* *Self contradictory sentences*

f*. Our pregnant neighbor.*

g*. That rock is male.*

h*. My brother assembled.* *Semantically anomalous*

i*. Our pregnant neighbor is geometric.* *sentences*

The abovementioned sentences can be logically proven as follows:

Clark et al (1977:480) argue that in (*a*) man expands out into the components *male* (*x*) and *adult* (*x*), where (*x*) stands for *'man'*. The subject of the sentences is a *male* as the rest of the sentence asserts the entity of *male*. Since this is a tautology, it must be true. So that, (*a*) is necessarily true, and that (*b*) and (*c*) are also true, following the same analysis of (*a*). Self contradiction and semantic anomalies can be proven in the same way. Clark et al (ibid) argue that the self-contradictions one can find in (*b*) through (*d*), that *man* is asserted to be a *female*. But since *male* (*x*) and *female* (*x*) belong to a binary taxonomy, something cannot be both *male* and *female* simultaneously. Therefore, asserting that something that is *male* is *female* is self-contradictory. The semantic anomalies in (*g*) through (*i*) are ruled out via redundancy rules.

In (*g*) the *rock* is asserted to be *male*, but *male* (*x*) has the following redundancy rule associated with it: *Male (x) → Animate (x)*

It could be read as *male* (the man) entails *animate* (the man), so, before something can be asserted to be *male*, it has to be *animate*. Since one component of *rock* is *(~ animate (x))* (not animate (the man)), *rocks* cannot be *animate* (*x*), and therefore maleness is something that cannot be asserted of them.

2.13. Two-valued and Multi-Valued Logic

Hayakawa (1978: 207-8) states that the term multi-valued logic was originated by korzybski. It is associated with two-valued orientation towards meaning. Normally, the ordinary logic resembles arithmetic (two-valued) 'as the kinds of logic which define meaning by using a set of mathematical symbols'. A two-valued logic could be a beneficiary element in existing order out of linguistics derangement. Thus, according to traditional (Aristotelian) logic "*a thing is either a cat or not a cat*" and the Aristotelian law of identity "*a cat is a cat*" makes a great deal of sense when we understand them as means of supporting our vocabulary system. One must logically deduce about *'cats'* and *he/she* could realize that through the extensive examination of the definition of 'cat' cats are creatures that meow. *X, y*, and *z* are *Cats*. Therefore *x*, *y*, and *z* meow. But what if *x* has an ill throat and cannot meow? Hence, one should notice that intentional *cat* (by definitions) is not the extensional *cat* (referred to in the physical world). Each *cat* is different from any other *cat*. Therefore, in order to guarantee the truth of the logical deduction of the statement through logic one must rely only upon *cats-by-definition* and about *cats* in the real world. As long as meaning is concerned, logic is going to clarify the misunderstanding over meaning. Logic can only be crucial (as mathematics) when there are pre-existing, hard and fast agreements as to what words stand for. The greater the number of distinctions, the greater becomes the number of courses of action inferred. This fact enables one to react suitably to many various situations in the diligent approaches towards traditional two-valued logic which is not recommended. Depending on two-valued logic in everyday life leads to a two-valued orientation, 'I am right and everybody is wrong', and that leads to the problem of inadequacy to deal with reality. Multi-valued (or many-valued) orientation occurs in everyday life. Here, there are scales of judgment to be taken into account. Instead of saying 'good' and 'bad', one can say 'very bad', 'not bad', 'fair', 'good', 'very good'. Furthermore, there are mixed judgments to be stressed; instead of saying 'sane', and 'insane', one can say 'quite sane', 'sane enough', 'mildly neurotic', 'extremely neurotic' and 'psychotic'.

Because of the increasing interests, activities and desires of human beings, the ability to see things in terms of more than two values may be referred to as a multi-valued orientation.

Conclusions

In trying to determine meaning in terms of logic, the researcher reached the following conclusions:

1- In logic, the meaning of a sentence is equated with its truth-conditions, but in the limits of propositional logic, one cannot say anything about the truth conditions of individual simple sentences.

2- Modifiers such as (again, another, even only, too, and other) and of restrictive and non-restrictive use could be analyzed in terms of logical presupposition.

3- Inductive inference is valid only with certain probability and is not necessarily valid as in the deductive inference.

4- One can analyze meaning in terms of two-valued logic (as in arithmetics), when one is talking about two-valued orientations towards meaning.

5- One can analyze meaning in terms of infinite (or many) valued logic, when one is talking about multi-valued orientations towards meaning.

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