**ADDIS ABEBA UNIVERSITY**

**SCHOOL OF GRADUATE STUDIES**

**DEPARTMENT OF PHILOSOPHY**

# The Nature of Meaning in Logical Atomism and Holism: and some of its implications in Philosophy of Science

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To:
My mother Haregua Hailu
My sister Serkalem Ketema and her lovely daughter Medi Mesfin

**Content** **Pages**

Abbreviations

| | |
|---|---|
| T | *Tractatus Logico-Philosophicus* |
| PI | *Philosophical Investigations* |
| C | *On Certainty* |
| SSR | *The Structure of Scientific Revolutions* |
| TDE | *Two Dogmas of Empiricism* |

# Introduction

The paper shows how two different schemes of thought arise from two different conceptions of meaning: logical atomism and holism. The first leads to the view that we have one worldview and science is one unified whole whereas the second establishes that there are different conceptual schemes which could be incommensurable with each other.

Wittgenstein is the major figure as his philosophical reflections transpire in both logical atomism and holism. Wittgenstein's intellectual life is divided mainly into two distinct major periods – the early and the later represented by his two books: *Tractatus Logico-Philosophicus (Tractatus or T* hereafter*),* and *Philosophical Investigations (Investigations or PI* hereafter*).* Both his books gave rise to two distinct philosophical movements. Logical positivism arose from the *Tractaus* while his ordinary language philosophy is an offshoot of *Investigations.*

There is a controversy among philosophers, Putnam (2001, p. 9) notes, regarding Wittgenstein. On the one hand, there are those who claim Wittgenstein is very likely the greatest philosopher of the century, which include Putnam himself and on the other hand those who claim that he is the most overrated philosopher of the century. Wittgenstein's position in the 20$^{th}$ century philosophy could be controversial, but most will agree that he is an original thinker and his works are very difficult. Wittgenstein is one of the most difficult philosophers. The subject matter that he discusses is difficult but it is also supplemented by his way of writing. Wittgenstein's writings are aphoristic and cryptic. His work is not just difficult but extremely opaque and vague. In *Brown Book*, Wittgenstein himself pointed out that they are sometimes meant to be vague (cited in Fann, 1969, p. 97).

As Grayling notes Wittgenstein did not have a formal education in philosophy and he is not a product of typical education. This may explain, he says, the unusual character of his mind and interests (Grayling, 1988, p. 10). But this also makes him difficult to relate his philosophy to other works and give it strong basis either as a justification or a critique.

In this paper I have used arguments from philosophy of science, both to make Wittgenstein's works more intelligible and to interpret those writings in philosophy of science from Wittgenstein's standpoint. My reading of Kuhn's *The Structures of Scientific Revolutions* has shown me that there is a relationship and influence of Wittgenstein in his writings, though there is no explicit mention of these relations. Therefore, in the first part of the paper I have related Wittgenstein's work in the *Tractatus* with the logical positivists' conception of science while in the second I have related Wittgenstein's later works especially the *Investigations* and *On Certainty* with the works of Kuhn. In both parts what is taken as a center is the nature of meaning. In the first part it is logical atomism while in the second part it is holism. The primary focus of the paper is to expose these two interpretations of meanings and then draw their implications more clearly by showing their implications in philosophy of science.

In the first part I will expose Wittgenstein's conception of meaning in his first work *Tractatus* and then I will show how his atomism is related to logical positivists' conception of science. Wittgenstein claims in the *Tractatus* that every complex statement can be analyzed to its constituent parts of elementary propositions and that elementary propositions are true or false by their correspondence to atomic facts which are independent of each other. It is also asserted that the meaning of a name is the object it stands for.

The second part of this paper deals with holism. Holism is the antitheses of logical atomism and the positivist model of science. Holism roughly claims that a statement does not have meaning in isolation but by its relation to the larger whole. For analyzing holism I will first expose Wittgenstein's later work *Philosophical Investigations* and some of his important claims *On Certainty* together with Quine's holism in *Two Dogmas of Empiricism* and then pass to establishing my hypothesis that this holistic view gets its expression in Kuhn's *The Structure of Scientific Revolutions* when it comes to philosophy of science.

The last chapter discusses relativism as one the logical outcomes of a strong form of holism. This deadlock – against which I will argue at the end of the Thesis – gets expression in Wittgenstein's different 'forms of life', Quine's underdetermination of theories under any evidence, and Kuhn's incommensurability thesis.

# Part I

# Logical Atomism and the Logical Positivists

The first part of this paper is divided in to two chapters. The first chapter discusses in detail the logical atomism of Wittgenstein in the *Tractatus*. Chapter two picks up how his work is related to the logical positivist conception of science.

## Chapter One

## Logical Atomism in Wittgenstein's Tractatus

During the early 20th century, a new movement in philosophy begun. This was the view that most of the problems of traditional philosophy arise from the misunderstanding and misuse of our language. In order to remove the ambiguities that were created in philosophy (especially in the then dominant idealism), philosophy therefore turned to the analysis of language. Hence the expression the 'linguistic turn'. Wittgenstein's *Tractatus* was one of the major works in this movement. Since most problems in philosophy were thought to arise from the misuse of language, the analysis of language, i.e. the distinction between meaningful and meaningless talk was central to analytic philosophy. G.E. Moore and Bertrand Russell were also prominent figures in the development of analytic philosophy.

The early Wittgenstein claims that ordinary language is often vague and misleading, especially when we use philosophical matters. But he also argues that the vagueness of ordinary language can be revealed by analysis. Wittgenstein in the *Tractatus* made his task to reveal the nature of language and its relation to the world, which in effect amounts to explaining how meaning attaches to the propositions we assert. The analysis of language to its simple parts and dissolving the problem has been used extensively by the early Wittgenstein.

It will be clearer to see how this analysis was initiated by Frege and then developed by Russell. Later we will see its implications extended by Wittgenstein, and then to the logical positivists and how they apply this to portraying the sciences.

The general claim in the analysis of language was that a name stands for an object. Hence, all our use of language can be analyzed to such a structure. If such an analysis is shown then it will be simple to identify meaningful and meaningless sentences. This was made by the development of logic. Gottlob Frege is the one who revolutionized modern Logic. As Kenny describes (1973, p. 24), Frege used the model of the language of arithmetic to formalize ordinary language. He regarded sentences as names for objects that can be designated as true and false. The word 'Socrates' stands for the man Socrates. One of the problems in Frege's symbolic system was that he has failed to make a distinction between name and description. He used the same kind of symbol for the descriptive phrase 'the teacher of Plato' and 'Socrates', since both point out to the same referent. Russell disagreed with this distinction because the descriptive phrase 'the teacher of Plato' is not a name like 'Socrates' which refers to the man Socrates. The descriptive phrase 'the teacher of Plato' is constituted of different parts ('the' 'teacher' 'Plato') which have their own reference (Kenny, 1973, p. 35).

Russell used his method to solve many paradoxical statements. For example, Russell says that the proposition 'the round square does not exist' is a meaningful proposition. It is also a true proposition. But the problem is that for this statement to be true the word 'the round square' must be meaningful. And if it is meaningful then it has to mean something, i.e. it has to exist. The paradox is created because we think the descriptive phrase 'the round square' is a name that stands for something (Kenny, 1973, p. 36). Russell solves this and such kinds of problems by substituting it with its analyzed form 'It is false that there is an object which is both round and square'. This analyzed form removes the ambiguity.

Other famous application of Russell's analysis is to propositions like 'the present king of France is wise', 'the author of Hamlet was genius,' etc. For example, the proposition 'the present king of France is wise' is false because at present there is no king in France. But when we normally give truth values to statements, we say it is 'true' if that certain thing

exists and 'false' if it does not. However, in this case, since the subject does not exist, how can the statement be false if there is nothing that it refers to? Russell argues that 'descriptive phrases occupying grammatical subject place in sentences are not proper names', and gives the logical structure of the propositions they express. Thus 'The present king of France is wise' is a conjunction of three propositions.

For some x, 1) x is king of France
And 2) for all y, if y is the king of France, Y is identical with x (since the definite article 'the' implies uniqueness)
And 3) x is wise

Russell called the language of predicate calculus a 'perfect language' and symbolically represented as $(\exists x)((Kx \ \& \ (Y)\ (Ky \rightarrow Y=X)) \ \& \ Wx)$. K=king of France and W= wise

In ordinary language the three analyzed propositions are: 1) There is a king in France 2) there is only one king of France, and 3) whatever is king of France is wise (Grayling, 1988). Now that we can see that the first proposition is false the whole conjunction becomes false. The analyzed form of the proposition brings out its logical structure, in which case we are able to know what the problematic proposition exactly says. Hence, the ambiguity is removed. Wittgenstein has been highly influenced by this logic developed by Frege, Russell and Whitehead. In the *Tractatus* Wittgenstein took the method of analysis developed by Russell in a radical way. He claimed that this analysis of language can be made complete to all propositions and we can solve the problems of philosophy from such analysis.

The whole project of Wittgenstein in the *Tractatus* was to describe how language was related to the world. Wittgenstein says that as we use language to describe the world, there must be a relationship between language and the world. That is why the main issue for Wittgenstein, in the *Tractatus*, was to show the relation between logic, language and the world (Fann, 1969, p. 6). Logic is taken by Wittgenstein and also by the positivists to be the most underlying of all our thinking and the investigation of all the nature of things (PI 89). In *Philosophical Investigations* he has said that logic is the a priori order of the world (PI 97). In the *Tractatus*

he says that logic is the mirror image of the world (T. 6.13). Influenced by the development of the new logic and Russell's theory of description, he believed that logic reveals the structure of the language and the world. The rest of this chapter shows in detail how Wittgenstein tries to relate logic, language and the world. Once this is shown, I will try to show how some of the important claims of the *Tractatus* has been used by the logical positivists' description of science.

As mentioned above, Wittgenstein has been highly influenced by the new logic developed by Frege, Russell and Whitehead. In the *Tractatus* Wittgenstein took the method of analysis developed by Russell in a radical way. He claimed that this analysis of language can be made complete to all propositions.

To the preface of the *Tractatus* Wittgenstein summarizes the book saying that

> The whole sense of the book might be summed up in the following words: what can be said at all can be said clearly and what we cannot talk about we must pass over in silence. Thus the aim of the book is to set a limit to thought or rather-not to thought, but to the expression of thoughts... It will therefore only be in language that the limit can be set, and what lies on the other side of the limit will simply be nonsense (T, p3).

The whole project of Wittgenstein in the *Tractatus* is to set a limit to thought. Wittgenstein believes that there is a logical structure that underlies our language. He has stated that if we can get to the very essence of language, if we know the logic of our language, then we can solve the problems of philosophy. He believes that to show the limits of language is to show the limits of thought. This is because thoughts find their expression in language (written or spoken).

All our thoughts, Wittgenstein says, are expressed through language. Though he says that our ordinary languages are in a perfect logical order they are often vague and misleading

especially when we use philosophical matters. But Wittgenstein says that the vagueness of ordinary language can be revealed by analysis.

## 1.1 Language and the world

How is language related to the world?

Wittgenstein asked a radical question "What makes language possible? And how is language related to the world?" Wittgenstein is convinced that language does describe the world. Therefore, he says that if language is to describe the world, there must be something common to both, or one cannot be expressed by the other. Here the method of analysis used by Wittgenstein is a priori, because the question here asked is how is it possible to make statements about the world? The analysis is made from the possibility of language to reality and not from reality to language. In his *Notebooks* he said, 'My work has extended from the foundations of logic to the nature of the world' (quoted in Fann, 1969, p. 6).

In the *Tractatus* Wittgenstein took logic as what underlies all our thinking. Logic, he says, in the *Philosophical Investigations* (PI 89) lays at the bottom of all sciences and logical investigation explores the nature of all things. He conceives logic as 'the a priori order of the world… the order of possibilities, which must be common to both the world and thought' (PI 97). Wittgenstein believes that there is a fixed structure to the world, which is an a priori order. He is convinced that if we know the structure of the logic of language we will know the structure of the world (Fann, 1969, p. 6).

In order to address these questions, Wittgenstein proposes two theories: the picture theory and the truth function theory. These two theories are designed in order to address the structure of language and its function. In order to identify what is common to both, Wittgenstein first states that both complexes in propositions and the world could be analyzed to their simple constituent parts.

In order to show this, it will be helpful to start with a diagram summarizing Wittgenstein's conception of the structure of language (left) and the analogous structure of the world (right) (Grayling, 1988, p. 29)

| Language | World |
|---|---|
| ↓ | ↓ |
| Propositions | Facts |
| ↓ | ↓ |
| Elementary propositions | Atomic facts (State of Affairs) |
| ↓ | ↓ |
| Names | Objects |

Wittgenstein says,

> 2.0201 Every statement about complexes can be analyzed into a statement about their constituent parts, and into those propositions which completely describe the complexes.
> 2.021. Objects form the substance of the world. Therefore, they cannot be compound.
> 2.0211 If the world had no substance then whether a proposition had sense would depend on whether another proposition was true.

The description that the world is constituted of simple indivisible entities has a long tradition in Western metaphysics. Leucippus and Democritus, Leibniz, Hume, and Russell have maintained this atomism. Wittgenstein's insistence of the existence of simple comes from the nature of language itself.

The demand that complex statements be analyzed to their simplest constituent parts comes from the understanding that sense must be definite. Sense must be definite means that, for example, if a person asserts a certain vague proposition we believe that the person knows what he means by it and we may ask what do you mean by this and that term and demand a future explanation. The person could define one word by using another word and that word also by another one. But the process of these analyses cannot go on indefinitely. The person cannot define one word by another or this will go on infinitely and nothing will be defined.

If what the person says about the world is actually true then the process must come to an end. The end comes where what the person means can be verified in the world. Unless, according to Wittgenstein, if the truth of one proposition (in this case that it actually means something) depends on whether another proposition is true or false, then it would be impossible to give a picture of the world either as true or false (T 2.0212).

According to Wittgenstein, 'every proposition has one and only one complete analysis' (T 3.25). In the *Tractatus* (T 4.221) he says 'it is obvious that in analyzing propositions we must arrive at elementary propositions consisting of names in immediate combination'. He says there is a one-to-one relation between a proposition and a fact. In this way it would be possible to form a picture of the world that is either true or false.

Wittgenstein now comes to explain what this one-to-one relation of proposition and fact is and how they are related with the world.

## 1.2 The picture theory

At the heart of Wittgenstein's *Tractatus* is the picture theory of propositions. Wittgenstein used the picture theory in order to describe how language is related to the world. Wittgenstein has stated that there is a structure of language and the world. Language and the world are connected by the picturing relation. Moreover, he also argues that whatever meaningful thing that can be said, hence that can be thought, is limited by these structures. Wittgenstein used the picture theory to explain why the correct use of language depicts the world correctly.

Wittgenstein has noted in the *Notebook* (cited in Kenny, 1973, p. 53) that the pictorial nature of propositions came to him while he saw a picture in a magazine showing how car accidents were represented in Paris court rooms by means of doll, toys, etc.

A picture, he says, models another fact (or possible fact) in certain time and place. The picture for example in the magazine represents a possible state of affairs. Furthermore, the picture itself is a fact because it is made up of, say, toys, dolls, lines, colors, etc.

Pictures have things in common with what they depict. A picture also, he says, has a structure. Structure is the way the elements in a picture are related to each other: for example an accurate drawing and a photography picture has the same type of structure. Besides, the two pictures have a common pictorial form or form of representation. A pictorial form is the possibility of a picture to be arranged in this way or another. The picture shows one possible state of affair.

The elements in a picture have a common relation with the object they represent. This common element between the picture and what is pictured is what Wittgenstein calls a pictorial form. What makes picturing possible is that both the picture and what is depicted share a common pictorial form (T 2.161, 2.17). Wittgenstein holds that it is not only similar pictures that have the same pictorial form but they also share it with the actual fact.

Every picture, Wittgenstein says, is a logical picture, having a logical form. Logical form is part of the pictorial form. Logical pictures can depict the world (T 2.19) or what the world could possibly be. For example, given a place with some objects inside, there are limited possible ways that we can rearrange the objects inside. In similar way a logical space consists of all the possibilities the objects could possibly have. This means that the possible states of affairs are confined within logical space. Therefore, a logical space comprises not only the actual state of affair but all the possible state of affairs. And a picture, Wittgenstein says, represent a possible situation in logical space (T 2.202), without stating its truth or falsity. He says,

> 2.22 The picture represents what it represents independently of its truth or falsity, by means of its pictorial form.
> 2.221 What the picture represents is its sense.

2.222 The agreement or disagreement of its sense with reality constitutes its truth and falsity.

2.223. In order to tell whether a picture is true or false we must compare it with reality.

2.224. It is impossible to tell from the picture alone whether it is true or false.

2.225. There are no pictures that are true a prior.

Therefore, to know the truth of a picture we cannot get its truth value merely by looking at the picture; we must compare it with reality. Thus the criterion for truth here becomes correspondence to facts.

The correspondence of propositions in Wittgenstein is with atomic facts which are facts that cannot be further analyzed nor be defined using other facts, which will be discussed below. In Hume, for example, this correspondence is between ideas and impressions. Hume advices us that if there is any suspicion that a certain term is without any meaning or idea to trace our ideas back to an impression in order to know the truth or falsity of our ideas - whether simple or complex. Because, he says, if there is no impression there is no idea (Hume, 1977, p. 13).

In Wittgenstein the correspondence is not between fragmented ideas and concepts but with complete propositions (which are the unit of meanings) and atomic facts. As Quine (1998) also noted in *The Two Dogmas of Empiricism,* it is impossible that all our statements be translated term-by-term. He notes that emending was made to the claim by Bentham, that the primary vehicle of meaning is not term but statement. The objects of verification are statements. Quine is a major critique to such verification which is discussed later (Quine, 1998, p. 293).

Wittgenstein says that atomic facts are thinkable, that is we can imagine them. And if they are thinkable then they are possible because we cannot think anything illogically.

In relation with his picture theory, Wittgenstein says that a thought is a picture. Through thought we picture facts or possible state of affairs. Since thoughts are pictures they are composed of elements with certain arrangement.

4.01 A proposition is a picture of reality

4.022 A proposition shows its sense

A proposition shows how things stand if it is true. And it says that they do so stand.

Therefore as pictures, they too have a form of representation or a pictorial form and they share their pictorial and logical form with what they represent.

Another fact about our language or propositions, according to Wittgenstein, is that they are in perfect logical order. They are made up of elements standing in certain relation with each other. But he claims this is not apparent because 'language disguises thought' (T. 4002).

As mentioned above with the development of modern logic, it is analysis that reveals this hidden structure.

What are these elements in structure? He says, if we completely analyze our language or propositions the only elements needed are names. And these names are in a structure. He says,

3.202 The simple signs employed in propositions are called names.

3.203. The name means the object. The object is its meaning ("A" is the same sign as "A").

3.22. In a proposition a name deputizes for an object

3.26. The name cannot be dissected any further by means of a definition: it is a primitive sign.

He also points out that the meaning of a name is the object it stands for. To understand the name is to understand its reference, i.e. the object. These objects can only be named. We can

only represent them through signs and can only say how it is but not what it is (T 3.221) because to say what it is, is to define it by another term. And names cannot be expounded by means of definitions (T 3.261).

The unit of meaning is not the name, but a sentence, because the name can only function within a proposition. Baker and Hacker explain that just like the toy car and person represent together a certain accident, but when the toys are back in the box they represent nothing. So the names represent when they are elements in a statement (Baker & Hacker, 2005, p. 170). In the same relation the world, Wittgenstein says, is the totality of facts, not of things. (T 1.1) Wittgenstein states that every proposition has one and only one complete analysis and that in a fully analyzed propositions there are as many names as there are objects (T 3.2).

4.0311 One name stands for one thing, another for another thing, and they are combined with one another. In this way the whole group- like a tableau vivant- presents a state of affairs.

4.0312 The possibility of propositions is based on the principle that objects have signs as their representatives.

These names in a structure are what constitute atomic facts which are expressed in elementary propositions. An elementary proposition is the picture of atomic fact.

The truth or falsity of an elementary proposition is determined by the corresponding atomic fact.

4.25 If an elementary proposition is true, the atomic fact exists

If an elementary proposition is false, the atomic fact does not exist

Here, truth and falsity is not an additional, extra property of an elementary proposition but it is its very sense; a proposition has meaning means that it is either true or false. A proposition must restrict reality to two alternatives, yes or no (T 4.023). Wittgenstein says ‘to determine the sense of the proposition is to determine in what circumstances it is true’ (T 4.063). This

is one of the influences for the logical positivists' principle of verification which states that the meaning of a sentence consists in its method of verification or in other words, they claim that, to know the meaning of a statement is to know how to verify it by means of observation.

## 1.3 Truth function theory

The other central thesis of the *Tractatus* is that

5. A proposition is a truth function of elementary proposition (An elementary proposition is a truth function of itself).

The truth function theory states that the truth value of a compound proposition is determined by the components, which in turn is determined with its match with the world. That is, once the truth values of the components are given, then the truth value of the compound proposition can be calculated. For example: - given the truth function of p and q: as p (TFTF) and q (TTFF) then for the following propositions their truth value (on the left) can be calculated as:

5.5101 (TTFT) (p,q) in words : if p then q ($p \supset q$)
(TTTF) (p,q) in words :p or q (pvq)
(FFTT) (p,q) in words : not q (~q)
(FFFT) (p,q) in worlds : Neither p nor q (~p. ~q or p/q)

A more familiar description of the above is to write it in truths function table.

| p | q | $p \supset q$ | p v q | ~q | (~p . ~q) |
|---|---|---|---|---|---|
| T | T | T | T | F | F |
| F | T | T | T | F | F |
| T | F | F | T | T | F |
| F | F | F | F | T | T |

But for the proposition like:-

If p then p and if q then q (p⊃p.q⊃q), p or not p (pv~p), the truth function of these proposition is always true irrespective of the truth function of its component and he calls this type of propositions Tautologies and he calls contradictions proposition of the form (p.~p.q.~q) (T 5.101) which have a false truth function irrespective of the truth possibility of their component.

Here, Wittgenstein makes a distinction between saying and showing.

4.461 propositions show what they say: tautologies and contradictions show: they say nothing.

A proposition says that the world is like this or that, which can be stated either as true or false depending on what is the case, but a tautology which states that it is either raining or not raining does not say anything about the weather. Therefore, tautologies and contradictions are not ordinary propositions. They are not pictures of reality (T 4.462).

Another important remark Wittgenstein makes is that the totality of true thoughts is a picture of the world (T 3.01). True sentences picture facts but these facts are independent of each other. Each item, he says, can be the case or not the case while everything remains the same (T 1.21). States of affairs are independent of one another (T 2.061). For the existence or non-existence of one state of affair it is impossible to infer the existence and non-existence of another. An elementary proposition is a truth function of itself (T 5.00). The truth or falsity of one proposition does not entail the truth or falsity/the existence or non-existence of another. He claims that only necessity that exists is logical necessity and the only impossibility that exists is logical impossibility. (T 6.375)

The independence of one elementary proposition from the other is very influential to the logical positivists because with their verification principle, they claimed that every statement could be verified (given empirical content) independent of other propositions. This logical atomism, as discussed later, has been challenged by Holism.

## 1.4 The nature of propositions of logic

Wittgenstein says that the truths of logic cannot be derived from experience and hence they are *a priori* and their truth value is a tautology. He says, logic is *a priori* and because it is not derived from experience Wittgenstein says '[t]he propositions of logic are tautologies' (T 6.1).

The tautological nature of logical propositions (laws of logic) can be shown, he says, by a truth function table. We have said earlier that a proposition is a truth function of elementary proposition and an elementary proposition is a truth function of itself (T 5).

Wittgenstein states that the logical product of two elementary propositions is neither a tautology nor a contradiction (T 6.3751). It is either true or false, yes or no. But the logical product of a law of logic is a tautology. He gives the truth function of, for example, the law of non-contraction which states that something cannot be p or not p at the same time and in the same respect. Symbolically represented as P v ~P

| P | ~P | P v ~P |
|---|---|---|
| T | F | T |
| F | T | T |

Because of their *a priori* nature, the truth function of the propositions of logic can be calculated irrespective of the contents by replacing them with symbols (T 6.113). In proving logical propositions what we do is, Wittgenstein says, change one form of tautology to another.

Moreover, logical propositions as well as mathematical propositions are analytic and proof in them is a mechanical process, i.e. calculating one tautology from another. And calculation, he says, is not an experiment (T 6.2331), which means that we do not get new information out of it which was not already there. Therefore, Wittgenstein concludes that,

6.1261 In logic process and result are equivalent.

6.1251 Hence there can never be surprise in logic.

Because of their tautological nature propositions of logic do not assert anything.

6.11 The propositions of logic say nothing (they are analytic propositions)

Like the tautological statement: "Either it is raining or it is not" does not say anything about the weather, propositions of logic too do not express a state of affair. They are not pictures of reality. Logical propositions like mathematical propositions are pseudo-propositions. They say nothing about the world or a certain state of affair.

The stating of logic and mathematics as analytic proposition was influential to the logical positivist description, that the only meaningful propositions are either analytic (true by virtue of their meanings) or synthetic (whose truth depends on matters of fact). This is discussed later.

Though the propositions of logic are not pictures of reality Wittgenstein does not say that they are nonsensical but he says that they only lack sense in saying what is about the world (T 4.462). They have another importance, i.e. they set a limit to the world, to what can and cannot be said.

## 1.5 What can and cannot be said

In a letter to Russell Wittgenstein says that the main problem of philosophy is to show what can and cannot be expressed by propositions or by language, which is the same as what can be thought (quoted in Anscombe, 1967, p. 161).

In order to solve this Wittgenstein sets a limit to what can be said from the propositions of logic. He says experience shows us the actual fact but logic shows us what they might be.

We can know all the possible logical relation between propositions *a priori* and with this we can know the logical space of the world. In other words, logic shows us all the number of possibilities the facts could be configured. It pictures everything that there could possibly be in reality.

Wittgenstein now has set a limit to language - to what can be said and to what cannot be. The limit is done from inside. Thoughts find their expression in language, the essence of language is picturing. To picture is to state a possible state of affair and they can be analyzed to names in structure and by using logic we can state all the number of possibilities that it could be configured by using logical relations, for example, negating a picture will always picture another possibility. But to say beyond this is just nonsense. And thinkers, he notes, violate those limits whenever they pose and try to answer problems called philosophical.

Wittgenstein gives the whole picturing of reality to the natural sciences:

4.1 propositions represent the existence and non-existence of state of affairs.

4.11 The totality of true propositions it the whole of natural science (or the whole corpus of the natural sciences).

And when the natural sciences finish their job we have a totality of true propositions. What lies beyond this is what we cannot talk about including the propositions of ethics and aesthetics (T 6.42) though Wittgenstein talks about the metaphysical subject too. He indicates that the metaphysical subject is not the human body or the soul which psychology deals. Rather it is not part of this world; it is compared with the eye and its visual field. He says:

5.632 Wherein the world is a metaphysical subject to be found? You will say that this is exactly like the case of the eye and the visual field. But really you do not see the eye and nothing in the visual field allows you to infer that it is seen by an eye.

## 1.6 Philosophy and natural science

Wittgenstein deals with the status of philosophical propositions and their nature and then he redefines the task of philosophy. He says,

4.0031 All philosophy is a critique of language.

4.111 Philosophy is not one of the natural sciences.

(The word 'philosophy' must mean something whose place is above or below the natural science, not beside them.)

4.112 Philosophy aims at the logical clarification of thoughts. Philosophy is not a body of doctrine but an activity.

A Philosophical work consists essentially of elucidations. Philosophy does not result in philosophical propositions; but rather in the clarification of propositions. Without philosophy thoughts are, as it were, cloudy and indistinct: Its task is to make them clear and to give them sharp boundaries.

Philosophy is not a set of propositions or a theory about the world based upon empirical investigation. The stating of propositions is given to the natural sciences but philosophy is an activity that aims at the logical clarification of our thoughts and language. The picturing of reality is not given to philosophy. Its pursuit is meaning and sense and not truth.

6.53 The correct method in philosophy would really be the following: to say nothing except what can be said, i.e. proportions of natural science - i.e. something that has nothing to do with philosophy - and then, whenever someone else wanted to say something metaphysical, to demonstrate to him that he had failed to give a meaning to certain signs in his propositions. Although it would not be satisfying to the other person- he would not have the feeling that we were teaching him philosophy-this method would be the only strictly correct one.

Wittgenstein here makes a clear distinction between philosophy and science. For example, when we are faced with a certain problem we either understand the problem or we do not. If we understand the problem there is no need for any philosophy and the problem is to be solved by scientific methods. If we do not understand the problem we ask for further clarification of the problem and at the end it will be either a real problem, that will be dealt with scientific methods, or it turns out to be no problem at all but a misunderstanding in the use of our language that is made clear by further analysis or something that makes no sense.

4003 Most of the propositions and questions to be found in philosophical works are not false but nonsensical. Consequently we cannot give any answer to questions of this kind but can only establish that they are nonsensical.

Most of the propositions and questions of philosophies arise from our failure to understand the logic of our language. (They belong to the same class as the question whether the good is more or less identical than the beautiful). And it is not surprising that the deepest problems are in fact not problems at all.

6.4312 The solution to the riddle of life in space and time lies outside space and time. (It is certainly not the solution of any problems of natural science that is required.)

Kant held that there can be no solution to metaphysical problem because the things in themselves are forever hidden from us and hence not subject to science. But Wittgenstein goes further and declares that all problems which cannot be dealt with the methods of science are nonsensical (Fann, 1969). Wittgenstein says,

6.5 When the answer cannot be put into words, neither can the question be put into words. The riddle does not exist. If a question can be framed at all, it is also possible to answer it.

But even then, when all the possible scientific questions are answered the major problems about life will remain completely untouched (T 6.52) because they lie beyond the limits of language and hence, beyond the world.

And the last words of the *Tractatus* says,

7. What we cannot speak about we must consign to silence.

Wittgenstein has now made a relation between language and the world. Language and the world are connected with the picturing relation, where each particular element in the proposition is linked with the respective element in the world.

Language is constituted of propositions which are analyzed to elementary propositions, which in turn are constituted of the simple signs - names. Analogous to the structure of the language, the world is the totality of facts, which are comprised of atomic facts (state of affairs), which in turn are constituted from simple objects. Atomic facts are independent of each other.

Some additional claims of the *Tractatus* includes:

1. Every statement about complex can be analyzed completely to statements of its constituent parts or elementary proportions. (T. 20201, 3.25). Elementary propositions are constituted of 'names'. (T. 4.221). Names cannot be further divided. They are primitive signs. (T. 3.26). The meaning of a name is the object it stands for (T. 3.22). To have a meaning is to name some entity. The meaning of a name is what it represents. Russell says that 'Words all have meaning, in the simple sense that they are symbols which stand for something other than themselves' (Cited in Baker & Hacker, 2005, p. 4).
2. Elementary statements are verified by its state in the world. Knowing the meaning of the word is knowing the thing it represents.
3. The meaning of a sentence is a function of its constituent words and their mode of combination. E.g. 'aRb' describes a different circumstance than 'bRa' (Baker & Hacker, 2005, p. 14).
4. Since the constituent words could be arranged in different forms, an elementary statement is true if it correspond to a fact (Baker & Hacker, 2005, p. 12).

5. Each elementary statement can be verified independently of other statements. Complex statements are just truth functions of elementary propositions.

## 1.7 Some difficulties in Wittgenstein's *Tractatus*

As any reader would wonder, Wittgenstein does not give any example of elementary propositions, names, atomic facts or simple objects. This makes the *Tractatus* very abstract. As Anscombe (1967) notes, the fact that Wittgenstein states the existence of simples is not because he can give examples but he knows this *a priori*. He has stated that the nature of analysis of proposition suggests that there be such simple entities and also the requirement of the definiteness of sense, he says, demands that there has to be simple objects, objects which are metaphysically, not just epistemologically, simple (T 2.0211).

Anscombe cites from Wittgenstein's *Notebook* where he says,

> [I]t also seems certain that we do not infer the existence of simple objects from the existence of particular simple objects, but rather know them- by description, as it where- as the end product of analysis, by means of a process leading to them. (Cited in Anscombe, 1967, p.29)

And later in *Philosophical Grammer* he says, 'At the root of all this there was a false and idealized picture of the use of language' (quoted in Malcom, 1993, p. 35).

As Anscombe notes, Wittgenstein while writing the *Tractatus* sees himself first and foremost as a logician and he believes that epistemology has nothing to do with the foundations of logic. Russell asked Wittgenstein that a thought is a fact but what is their relation to those of the picture. To this Wittgenstein replied,

> I do not know what the constituents of thought are but I know that it must have constituents which correspond to the words of language. Again the kind of relation of

> the constituents of the thought and of the pictured fact is irrelevant. It would be a matter of psychology to find out (Cited in Anscombe, 1967, p. 28).

Russell insisted and asked, 'Does a thought consists of words?' Wittgenstein replied,' No, but of psychical constituents that have the same sort of relation to reality as words. What those constituents are I don't know' (quoted in Kenny, 1973, p. 58).

In the *Tractatus* Wittgenstein was more concerned in discussing the relation of pictures than the process of picturing or relation. Later he found the process of picturing to be part of the relation, which led to a different description of the nature of language, which is discussed in the next chapter.

# Chapter Two

# Logical Positivists and Logical Atomism

The logical positivists drew the structure of their analysis from the *Tractatus*. Many claim that the *Tractatus* has been highly influential to the logical positivists, though few philosophers such as Antony Quinton (Quinton, 1982) who notes that Wittgenstein himself was influenced by his conversation and meeting with members of the Vienna Circle and his influence is overstated. Though the positivists do have other influences, much of their claims have its roots in the *Tractatus*. In this chapter, I will draw the similarities and influence of the *Tractatus* on the positivists' model of science.

## 2.1 From Logical Atomism to Logical Positivism

Wittgenstein has stated that every complex statement can be analyzed completely to statements of its constituent parts or elementary proportions (T. 20201, 3.25). Elementary propositions are constituted of 'names' (T. 4.221). Names cannot be further divided. They are primitive signs (T. 3.26). The meaning of a name is the object it stands for (T. 3.22). Wittgenstein did not give examples of what an elementary proposition was. There were wide interpretation of the *Tractatus,* but the most influential was the logical positivists. The positivists made a modification to the *Tractatus*. They gave Wittgenstein's elementary propositions an empirical basis. For example, Carnap chose "elementary experiences" as the starting point. By giving it this empirical base the "logical atomism" of *Tractatus* was transformed to logical positivism (Specht, 1969, p. 5).

While every meaningful compound statement can be analyzed to its elementary statements comprised of names, the positivists' claimed that 'names' are connected to the world directly. Moritz Schlick says that 'The meaning [of indefinables] must be given by direct acquaintance: one can learn the meaning of the word "joy" or "green" only by being joyful or by seeing green' (quoted in Baker & Hacker, 2005, p. 6).

Wittgenstein has claimed that the meaning of a name is the object it stands for and to determine the sense of the proposition is to determine in what circumstances it is true (T 4.063). This is one of the influences for the logical positivists' central claim of the principle of verification. The principle of verification states that the meaning of a sentence consists in its method of verification or in other words, they claim that, to know the meaning of a statement is to know how to verify it by means of observation. The positivists took the idea that all meaningful statements could be translated with factual meaning that refers to only sensation and the patterns that connect them (Smith, 2003, p. 27).

As we saw in the *Tractatus*, Wittgenstein's insistence on the existence of simple entities was that at the end sense must be definite. If what the person says about the world is actually true, then the person cannot define one word by another and go on infinitely. The process must come to an end. The end comes where what the person means can be verified in the world. Schlick says that the meaning of the word at the end must be shown. The words that cannot be further defined are given by experience. What attaches these indefinable names to the world is ostensive definition (by pointing to the object) [1] (Baker & Hacker, 2005, p. 7).

Logical positivists, like traditional empiricists, take that all ideas, experiences, and perceptions as made up of more basic elementary sensory features. The complex is seen as just a constituent or association of these elementary features. The meaning of a word or in other words its truth condition is given in perception. Like the traditional empiricists, the positivists take sense experience to be the stable basis of knowledge. The positivists with their radical empiricism reduced all terms and statements to immediate sense perception. They take commonsense to be passive, where nature imprints on a perfectly inert mind (Lakatos cited in Munevar, 1981, p. 12). Empirical knowledge is regarded to grow by repetition and aggregation of isolated sensory experiences. Like Wittgenstein's claim that complex statements are the truth function of elementary propositions, so complex ideas are also the associations and truth functions of simple ideas.

[1] This point will be later criticized by Wittgenstein: he says that ostensive definition cannot assign meaning

Wittgenstein has stated that logic and mathematics consist of analytic propositions (T. 6.11) and all other true propositions are the propositions of natural science, which are true depending on what is the case. This has influenced the logical positivists' other central claim of the analytic/synthetic distinction. They too, like Wittgenstein, hold that the only meaningful propositions are either analytic or synthetic propositions. Analytic propositions are propositions which are true by virtue of their meaning- independent of experience. Examples (including truths of logic and mathematics) are statements like 'All bachelors are unmarried'. Synthetic propositions are true by virtue of how the meanings of the statements are related to the world, by what is the case. Example, 'All bachelors are happy'[2] (Quine, 1998).

The logic of the *Tractatus* relied on the independence of elementary propositions; Wittgenstein has said that an elementary proposition can be true or false independently of the truth or falsity of the other propositions. The existence or truth value of one elementary proposition does not entail the existence or truth value of the other (T. 2.061, 5.134). The possibility of such an independent verification in the *Tractatus* is one of the influences for the positivists' claim that every scientific statement can be verified independently of other statements. This is one of the points that is contrasted to holism, which claims that such an independent verification is not possible (which is the topic of the second part).

Wittgenstein, with his claim that metaphysics is nonsensical, gave the whole picturing of facts to the natural sciences. He said that the totality of true proposition is the whole of natural science (T.4.11). Moreover, he claimed that philosophy is not a body of doctrine but an activity that aims at the clarification of our thoughts (T. 4.112). He claims that without philosophy our thoughts would be cloudy and indistinct and the role of philosophy is to clarify our language by giving it clear and sharp boundaries by definition (T. 4.112). The positivists, influenced by the restriction of philosophy to only conceptual analysis, claimed that philosophy should give the necessary and sufficient condition for terms of state, event, etc. Such definitions will remove vagueness and give terms an explicit boundary. As Rosenberg (2012, p. 41) notes, the demand that philosophical analysis gives such precise and

[2] The analytic/synthetic distinction is criticized by Quine.

complete definition is the influence of mathematical logic on parts of the logical positivists. Though he says that there is an advantage of clarity by such definitions, it is also often impossible to give such complete definitions.

Rosenberg notes (2012, p. 43) that the logical positivists claiming that metaphysics was empirically meaningless and trying to avoid causation from there explanation faced many challenges. For example to explain what natural laws explain is difficult. Though they claim that natural laws explain natural necessities, these necessities are not logical necessities. Like the *Tractatus'* claim that the only necessity is a logical necessity, it is not a contradiction for a natural law to be otherwise. For example, instead of Newton's inverse square root of gravitational law it could have been inverse of cube root. As Hume had shown necessity cannot be give by experience.

## 2.2 Observation/theory distinction

The principle of verification states that every meaningful proposition must be given verification in experience, otherwise the term will be meaningless. With regards to non-observational theoretical terms in sciences, the positivists' model required that every theoretical term must be given an explicit definition composed of entirely observational terms (Klee, 1997, p. 33). This meant that each theoretical definition, to be meaningful, should be given a necessary and sufficient condition by observational terms. For example, the meaning of 'current' will be exhausted by specifying all of its observational consequences, for example, current has one of its observational expressions such as that it moves an ammeter.

As Klee notes, by giving such a definition the two terms become coextensive (share same boundary, scope and limit), which is called the correspondence rule or c-rule (Klee, 1997, p. 53). The c-rule of a theoretical term attempts to provide purely observational necessary and sufficient conditions for the correct use of the theoretical term. This rule, for Klee, inhibits science from making exotic theoretical claims – a criterion which differentiates science from pseudoscience. According to the positivists, if a theoretical term does not make any

difference to observational experience then it should not be posited. This will help, Klee says, to reduce expunge theoretical terms form science, e.g. phlogiston, aether, etc (Klee, 1997, pp. 32-35).

The distinction between observational and theoretical terms is important to the positivist because it helps to identify observable entities from theoretical ones. Science has many theoretical terms like phlogiston, aether, etc, which were regarded later as nonexistent. In order to identify this there was a problem in where to draw the line between observational and theoretical terms. Klee sates that Carnap gave a criteria to distinguish between observational and theoretical terms. Carnap's criteria sates that : 'A term t is observational if a practitioner using the theory in which t occurs could determine t's correct application with relative ease, that is, quickly and with minimal effort; otherwise, t is a theoretical term' (quoted in Klee, 1997, p. 42).

As Klee notes, Carnap's criteria made observational terms to be dependent and relative to the knowledge and experience of a practitioner who uses the term. Such a criteria has many difficulties. Klee gives an example from immunology. Medical practitioners are able to immediately diagnose allergic inflammation from an infection inflamed tissue by noting the color of the patient's nasal and throat membranes. Such practitioners who are with trained and experienced eye see the pinkish tint created because of the flooded white blood cells called 'eosinophils' in case of allergies by contrasting it with the deeper reddish color of inflamed tissue. Though the allergist could identify 'eosinophils' by the observation of the color with some ease, it is not an observational term[3] (Klee, 1997, p. 42).

## 2.3 Reduction and the "Unity of science thesis"

In the first chapter we have seen how Wittgenstein was influenced by the development of mathematical logic. He claimed that logic is the mirror image of the world and that it can reveal the structure of language. The logical positivists like the *Tractatus* were influenced by the development of logic. They used mathematical logic to analyse all forms of knowledge.

[3] As later discussed Kuhn criticizes this point by saying that observation is only through a paradigm.

They used mathematical logic because of its subject-neutral language. Such a tool, they claimed, can capture any subject matter with mathematically precise and unambiguous meanings (Klee, 1997, p. 30). As Klee relates, the logical positivists took science as a collection of theory's expressed in the language of first-order mathematical logic. First order logic is language written in the truth function connectives (or, and, if then, not, if and only if) and the two standard quantifiers (for all objects, there is at least one object). For example, the law that "all pure metals conduct electricity" can be symbolically be written in the language of mathematical logic using universal quantifier as: $(\forall x)\ (Mx \supset Cx)$ which can be read as for all x, if x is a pure metal then x conducts electricity. The positivists assumed that this logically defined symbols mirror the lawful relationship between the cause and an effect (Klee, 1997, p. 31).

For the positivists, every theory can be formulated in the formal language of mathematical logic. We have also seen their claim that every theoretical terms to be given explicit definition in observational terms. Given these, it is possible to make inter-theoretical translations. That is, for example, the theories of biology can be formulated to the language of chemistry or physics (Laudan, 1996, p. 7).

Every theory written in such a common language is transposable to other theories. As complex statements are derived from elementary propositions, the progress of science is also seen through reduction. The progress of science through reduction is when a theory is explained by a more basic theory, in which the reduced theory can be derived from the reducing theory. Here the reduced theory is explained as a form of derivation. As Rosenberg (2012, p. 137) shows, in the reduced theory 'the axioms of the less basic theory are theorems of the more basic one'. The best example of reduction is that of Newton's laws which reduced Galileo's and Kepler's laws, hence unified by a more general theory (Newton's four axioms).

Under the positivist model of science, the ultimate model of science is the reduction of one theory to the other (Klee, 1997, p. 83). Analogous to complex statements reduced and derived from simple statements, the positivists' claim of science is also similar. They claim

that isolated and less fundamental theories can be reduced to and derived from fewer fundamental theories.

The translation of theoretical terms to observational terms gave theoretical terms their very meaning while the inter-theoretical translation was important to the reduction of theories. This reduction of one theory to the other is suggestive of unity in science. (The relation between different theories in the science as a unified system forming one hierarchical network, is called the "unity of science" thesis (Rosenberg, 2012, p. 138); see also Klee, 1997, p. 90).

The progress of science was also seen from its reductive power. Behind such claim, Rosenberg (2012, p. 138) maintains, is the epistemological claim that all sciences share the same method of knowledge acquisition and the metaphysical claim that the reality that sciences explore is also unified. The different sciences are unified by derivation or reduction. In this reductivist unity of science, psychology is reduced to biology, biology is reduced to chemistry through molecular biology, and chemistry to physics. Physics is seen as the most basic of the sciences (Klee, 1997, p. 90).

Putnam and Oppenheim argued for the unity of science by involving procedure that study the relationships of part/whole (Klee1997, p. 91). They proposed the principle of evolution, which hold that the universe evolved from smaller to larger forms of organization. It assumes that there is a one natural and uniquely correct way to decompose the universe into its part. The parts determine the whole and the whole is explained by the parts.

Reduction of sciences is ultimately possible because the universe is seen as a cosmos, ordered and integrated whole. In such a cosmos, reality is conceived as a complex entity which is built from simple entities which are governed by fewer laws. Reality at the bottom is composed of simple combinations and operations. If such a view is correct, that every meaningful statement having a referent in the world, atomic proposition being ahistorical and simple repetition, then as Rosenberg (2012, p. 139) shows, there will be a 'uniquely correct

description of nature'. There will be no science whose laws will be outside of the reductive hierarchy. Hence, there will be only one correct way to describe the world.

## 2.4 Some difficulties in the positivists' model

The insistent of the positivists translating theoretical terms to observational terms by giving their empirical content had many difficulties. Rosenberg (2012, p. 89) gives an example of such difficulties. He says that electrons and protons are given "negative" and "positive" charges but there is nothing intrinsically present or absent in electrons that such terms are given. What we "see", he says, is the effects of electrons behaviour in the visible tracks in cloud chambers. He says that terms like 'negative' and 'positive' only help us to describe and organize such behaviours. If we remove such terms then, he says, the theory will lose its explanatory power. There are many scientific terms like 'electron', 'gravity', etc that cannot be explicit given an observational statements. Moreover, universal statements or universal laws in science cannot be verified for all possible cases nor can be given complete observational statements, which according to their criteria will make them meaningless. Hence, the positivists' model did not specify that even scientific terms were meaningful; more criticism is given later.

The logical positivists have tried to translate scientific terms and theories to their observational terms. According to Quine, influence by Wittgenstein's *Tractatus*, Carnap carried out a project of translating statements about the physical world to statements about immediate experience. Carnap later abandoned this project finding that such translation of theoretical terms to observational terms was not possible (Quine, 1998, p. 295).

# Part II

# Holism and Philosophy of Science

In the previous section, we have seen how the atomistic view is central to the progress and unity of science thesis. Moreover, the claim that every meaningful expression has a referent together with the reductivist claim suggest that there is a uniquely correct interpretation of nature. We have seen earlier that logical atomism claims that complex propositions can be reduced to elementary propositions which are independent from each other. Also when applied in the sciences atomism claims that each proposition can be verified independent of other propositions. The whole is understood by reducing it to its constituent parts. In other words, the whole is characterized by the collection of its parts. The other project against logical atomism is holism. Holism has different varieties in different context. Hence, I will define the word as it has been used in this paper.

1. Holism in the negative sense can be defined against the views of logical atomism. That is the essence of meaning is not naming. A single word or statement will not have a meaning in isolation. With regards to confirmation, a single statement cannot be confirmed or infirmed in isolation.
2. On a positive sense, a statement has its meaning in a language. With regards to confirmation, it claims that what is confirmed is not a single statement but as a whole.
3. Holism is the anti-thesis of atomism by claiming that the whole is not just the collection of the parts. Holism claims that the parts are not separated but interconnected with the whole and when it is applied to the sciences holism claims that independent verification is not possible.

Holism claims that we cannot understand (test) a single statement (a particular thing) in isolation without looking its place in a larger whole (Smith, 2003, p. 31). When testing is made, it is not a single statement but a conjunction of many interconnected statements. The major proponent of such holism, Quine, proposed that the simplistic testing of logical positivism be replaced with a holistic version of empiricism.

Wittgenstein in his later work has repudiated much of the central claim of the *Tractatus*. He gave a different analysis of language in his other major work *Philosophical Investigations* (PI). I will make some of its relation in science by referring to Kuhn's work in *The Structure of Scientific Revolutions* (SSR). A more developed holism is also seen in Quine's influential paper *The Two Dogmas of Empiricism*.

Quine and Wittgenstein have developed their philosophies in different ways. Though they have their differences they are both similar in being a critique to logical atomism and logical positivism. Quine's criticism to logical positivism is regarded as internal to the project of logical positivists.

Under the holistic view, all the claims discussed in the previous chapter will be under attack. Meaning as naming, analytic/synthetic distinction, the verification theory of meaning, reductionism and the unity of science thesis, observation/theory distinction all comes under attack. As in the first part, I will start by exposing Wittgenstein's rejection of his earlier work and showing his new conception of language and meaning. Later I will show Quine's holism and the underdetermination of theories. In the end I will discuss Kuhn's *The Structure of Scientific Revolutions* in light of Wittgenstein and Quine and also the additional claims by Kuhn himself.

# Chapter Three
# Wittgenstein's Critique of His Earlier Work

## 3.1 Transitional periods

Wittgenstein in the *Tractatus* was committed to the idea that there is an essence to language which is picturing. By giving this essence to language he tried to solve all the problems of philosophy. He was insistent on the idea of the 'simple' in the sense of stating that for language to be possible there has to be 'simple' entities. He also held that ordinary language can be completely clarified by analysis and reduced into simple components. He thought in

the *Tractatus* that unless reality was constituted of simple things, that analysis will not be complete. Norman Malcom (1993, P 35) notes that Wittgenstein later realized that he did not have in his grasp such a procedure of analysis that could produce a final analysis to every proportion.

Malcolm also noted that when he asked Wittgenstein whether he thought of examples of 'simple object', Wittgenstein said that as a logician it is not his business to give examples and that it was a purely empirical matter that something was simple or complex. But later he regarded his answer was absurd (Cited in Fann, 1969, p. 12).

In the *Notebooks* Wittgenstein says that 'Our difficulty was that we kept speaking of simple objects but were unable to mention a single one' (quoted in Fann, 1969, p. 42).

In his *Philosophical Investigations (PI)*, Wittgenstein rejected much of the central claims of the *Tractatus*. In the preface to the *Investigations* Wittgenstein writes that he recognized grave mistakes in what he wrote in the first book. In the PI he argued that there is no one essence to language. He claims that this is not how language really is, but he says that we prescribe this to language. The logical purity that Wittgenstein assigned to language in the *Tractatus*, he came to believe is 'not a result of investigation [But] it was a requirement' (PI 107). The more we examine actual language, Wittgenstein says, is the sharper the conflict between it and our requirement.

The problem is, he says, that we want to give one theoretical claim that will explain all. The claim that there is an essence to language is, he says, what held us captive. He says, 'It is like a pair of glasses on our nose through which we see whatever we look at. It never occurs to us to take them off' (PI 103). The nature of language seemed that it is a picture. Later Wittgenstein says that we need to stop all kinds of explanation and replace it with description (PI 109), since explanation needs some theoretical bases.

In the *Tractatus* Wittgenstein thought that there is one essence to language that is picturing and this picturing ultimately rests on the denotative relation between the names and object.

In the PI, Wittgenstein explicitly denied that there is such logic of language. In his later work Wittgenstein claims that instead of one single essence, language had different uses having its own logic.

The *Investigations* arguably does not have any theoretical claim. In the preface, Wittgenstein says that this cannot be given because of the diverse uses of language. In the preface of the *Investigations* (PI ix), he compares his book to an album that shows the sketches of different landscapes.

### 3.2 Meaning and naming: Augustinian conception of language

Wittgenstein begins the PI with a long quotation from St. Augustine how language is acquired. Augustine says,

> When they (my elders) named some object, and accordingly moved towards something, I saw this and I grasped that the thing was called by the sound they uttered when they meant to point it out... Thus, as I heard words repeatedly used in their proper places in various sentences, I gradually learnt to understand what object they signified; and after I had trained my mouth to form these signs, I used them to express my own desires. (PI 1) (Augustine, *Confessions*, I.8.)

The quotation is similar to the view Wittgenstein held in the *Tractatus* but it seems that he used it to show that such a view had a long tradition. Wittgenstein says that this passage gives a picture of the essence of human language. These are: 1) Individual words in language name objects; 2) Sentences are combinations of names; 3) Every word has a meaning and this meaning is correlated with the word, and 4) The meaning of a word is the object it stands for.

Wittgenstein claims that there are languages or we can imagine a primitive language where all the words name an object, where every word in a language picks out a referent.

One example given by Wittgenstein is between two builders A and B communicating in building. There are blocks, pillars, slabs and beams. B has to pass these in the order A needs them. Here, their language consists of words like 'block', 'pillar', and 'slab'. B then learns to bring these objects at such and such a call (PI 2).

In this language-game all the words stands for some objects. But Wittgenstein claims that this is not the whole of language. Such a description is only appropriate for this narrow circumstance. Wittgenstein says that if someone defines a game as 'a game consists in moving objects on a surface according to certain rules' then, he says, we reply that 'the person is thinking of board games but there are others; in this case the person is right only if he restricts his definition applying to those games' (PI.3) Wittgenstein says that Augustine's conception of language is over-simplified (PI.4).

But Wittgenstein says that this is not the only structure (language-game) there is. He gives another example

> I send someone shopping, I give him a slip marked "five red apples". He takes the slip to the shopkeeper who open the drawer marked "apples", then he looks up the word "red" in a table and finds a colour sample opposite it; then he says the series of cardinal numbers I assume that he knows them by heart – up to the word "five" and for each number he takes an apple of the same colour as the sample out of the drawer. - It is in this and similar ways that one operates with words" (PI 1).

The shopkeeper here has used the words in different ways: "apple" is a name like "block" &"pillar" in the above language-game, but words such as "red" and "five" are used differently.

Language does not have just one function of naming, he says, but it is a host of different activities. In the *Tractatus*, Wittgenstein has stated that the general form of proportions is: "This is how things stand". 'A proposition shows how things stand if it is true. And it says that they do so stand' (T 4.022)

The *Tractatus*, he claims, has neglected the many uses of language. Anthony Kenny (1973, p. 121) makes a broad distinction of uses of language. Imperative use (uses of language to guide behaviour such as commands, suggestion, etc) and indicative use (uses of language to report facts). He claims that when logicians talked of propositions they had only the indicative sentences in mind. Reason: there is no ways of applying truth-function to suggestions or commands like 'pass the slat' ( Kenny, 1973, p. 121).

Wittgenstein has stated that propositions are the basic unit of language and that their function is to picture possible states of affair. In the *Investigations*, he states that there are countless uses of language. In other words, the uses of language are not fixed that can be given all at once; new language-games come and others become obsolete and get forgotten (PI. 23). Wittgenstein says,

> Think of the tools in a tool-box: there is a hammer, pillars, a saw, a screw-driver, a rule, a glue-pot, glue, nails and screws. The functions of words are as diverse as the functions of these objects (And in both cases there are similarities)…It is like looking into the cabin of a locomotive. We see handles all looking more or less alike. (Naturally, since they are all supposed to be handled). But one is the handle of a crank which can be moved continuously (it regulates the opening of a valve); another is the handle of a switch, which has only two effective portions, it is either off or on; a third is the handle of a break-lever, the harder one pulls on it, the harder it breaks; a fourth, the handle of a pump; it has an effect only so long as it is moved to and fro.

Words like tools have different functions. Wittgenstein says that because of the uniform appearances of words, their application is not clear to us (PI.11). They all seem to be names, names which are given by pointing to the objects. But to understand a language, Wittgenstein claims, we must recognize its variety and multiplicity.

## 3.3 Language-game

Wittgenstein uses language-game to describe the various uses of language. He states: 'The term "language-game" is meant to bring into prominence the fact that the speaking of a language is part of an activity, or of a form of life'. (PI 23). He therefore calls the whole of language and its actions into which it is woven as the language-game (PI 7) and also in certain parts it is the partial system that are called language-games (PI 23). In the *Investigations* Wittgenstein says that we cannot understand words outside the context of human activities in which the use of language is interwoven (Kenny, 1973, p. 14). The language-games we play are conditioned by our nature and the nature of the world around us, which are part of our form of life (Baker & Hacker, 2005, p. 64). Language is woven into all human activities and behaviour. The language-games, the different uses of language are given content and significance by our actions, practical affairs and our dealings with one another. Language is part of the fabric of an inclusive form of life (Grayling, 1988, p. 67).

He gives examples of the multiplicity of language-games:- Giving orders, and obeying them; describing the appearance of an object, or giving its measurements; constructing an object from a description (a drawing); reporting an event; speculating about an event; forming and testing a hypothesis; making up a story and reading it; Asking; thanking; cursing; greeting; praying, etc (PI 23).

Wittgenstein contrasted the irreducible multiplicity of language-games, the multiplicity of tools in language and their uses with what logicians (including himself in the *Tractatus*) have said about the structure of language (PI 23). The *Tractatus* claims that all propositions with sense are pictures.

Language-game also contrasts with the rigid closed rules of the calculus model of the *Tractatus*. He used it to show the logical diversity and multiplicity of our language. Instead of the geometric calculus it focuses on the activities our symbolism of language weaves. In the *Investigations* Wittgenstein argues that language is interwoven with human activities and we cannot understand words outside the context of such activities (Kenny, 1973, p. 14).

## 3.4 Ostensive definition

In the *Tractatus*, Wittgenstein took naming as central in connecting language and the world. In the *Tractatus* he also described the whole of language with the denotative model. Language is thought to get attached to the world by means of ostensive definition (by pointing to the object). Ostensive definition which 'steps outside of language' was supposed to ultimately link between the words and their meanings, which are either mental images or 'objects'. As Baker & Hacker notes, ostensive definitions were required to be complete and unambiguous to secure the foundation of language (2005, pp. 6-8). Wittgenstein argues that there is a problem with such definition.

One problem with ostensive definition is, for example, if someone wants to define a 'watch' by pointing to a watch in his wrist then the other person will not grasp the meaning of what the person wanted to say because ostensive definitions can be interpreted in various ways. The other person above might think that he is referring to its colour, or the material it is made of or other things.

Wittgenstein says that one cannot define 'two' by pointing to two nuts because it will be interpreted in different ways. Moreover, he says, that perhaps one says that two can only be defined ostensively by saying "this number is called two". But in order to understand 'two' the person must understand what a 'number' means. Then the word "number" must be explained before the ostensive definition can be understood. Then we give another definition using other words. But Wittgenstein says that there is no last definition in this chain. It is like, he says, "There isn't a last house in this road; one can always build an additional one" (PI. 29).

The denotative theory of meaning, which is ascribed in the *Tractatus*, is wrong. Language cannot be learned, Wittgenstein claims, if meaning is denoting or something dependent on ostensive definitions. Against his logical atomism, Wittgenstein contends that a single word will not have a meaning since one cannot understand just a single word. A word has meaning

only in a certain language-game. He says that something will not have a name except in the language-game (PI 48).

As shown above, ostensive definition cannot be a foundation for language learning. He argues that naming is not something that can be established merely by ostensive association of the sound and the object. To understand an ostensive definition one has to already know some other things. Ostensive definition, Wittgenstein underlines, is useful only in language, a language-game. One cannot start language by ostensive definition.

He further explains: if someone is given the explanation in chess that "this is the king", this explanation tells him the use of the piece only if he already know what game is. Wittgenstein states, "we may say: only someone who already know how to do something with it can significantly asks a name" (PI. 31). So a name will be a name only in a language-game (PI 48).

In the *Tractatus*, Wittgenstein had argued that for proportions to have sense there needs to be simple entities. He has also argued that there is only one and only one complete analysis to proportions, where a name means an object and the object is its meaning; it is like no object, no meaning. In the *Investigations*, Wittgenstein argues that the meaning of a name is not its bearer. He says 'When Mr. N.N dies one says that the bearer of the name dies, not that the meaning dies" (PI 40). That is if the meaning of Mr.N.N was the person, then when the person dies Mr. N.N will not have meaning, but this is not true.

Wittgenstein argues that the meaning of a name is not its bearer. The meaning of a name is only in a particular language-game, a certain role in a form of life. He says that, "The question "what is a word really?' is analogous to 'what is a piece in chess?" (PI 108). He gives a very general definition for meaning. He says:-

> For a large class of classes – though not for all – in which we employ the word "meaning" it can be defined thus; the meaning of a word is its use in the language (PI 43).

Wittgenstein rejects the major claim of the *Tractatus* that there has to be absolute simples:

> But what are the simple constituent parts of which reality is composed? – What are the simple constituent parts of a chair? – The bits of wood of which it is made? Or the molecules, or the atoms?... It makes no sense to speak absolutely of the 'simple' parts of a chair. (PI 47)

Wittgenstein claims that we cannot talk about absolute simple and composite without a certain language-game, independent of a language-game. 'Simple' and 'complex' are at the end accepted conventions for specific purposes. The word "composite", "simple" are used in any different ways. He gives example –

> Is the colour of a square on a chessboard simple or does it consist of pure white and pure yellow? And is white simple or does it consists of the colours of the rainbow? – Is this length of 2cm. simple, or does it consist of two parts, each 1cm, long? But why not of one bit 3cm long and one bit 1cm. long measured in the opposite direction? (PI 47)

### 3.5 Family resemblance

Wittgenstein asks that, someone might say that you talk about all the sorts of language-game but you have not specified what the essence of a language-game, hence a language is (PI 65). But he adds that there is no one essence to a language, but only an interconnected relations or family resemblances. He gives an example with the concept of a "game". He says that there are different games: board games, card games, ball games, Olympic games, etc. And he asks since all are called games, we think there is something in common to them all or they will not be called games (PI 66). Then he queries,

> ...what is common to them all?...don't think, but look! Look for example at board-games, with their multifarious relationships. Now pass to card-games; here you find many correspondences with the first group, but many common features drop out, and others appear. When we pass next to ball games, much that is common is retained, but much is

> lost. -Are they all 'amusing'? Compare chess with noughts and crosses. Or is there always winning and losing, or competition between players? Think of patience. In ball games there is winning and losing; but when a child throws his ball at the wall and catches it again, this features has disappeared... And we can go through the many, many other groups of games in the same way; can see how similarities crop up and disappear. (PI 66)

Wittgenstein says that there is nothing common to all what we call games but he says that their similarities form "family resemblances". He relates "games' form a family" (PI 67). When someone asks the definition for a certain word or concept, we analyze the concept and give the necessary and sufficient conditions for the case. Wittgenstein undermines such a conclusive answer. He claims that the natures of our concepts are not precise.

Socrates was looking for the essence of pity, justice, etc. Socrates dismisses all the definitions given by Euthyphro. Baker & Hacker says that Socrates' puzzle about knowledge comes from his quest for a strict definition, where there is none (Baker & Hacker, 2005, p. 56). For Wittgenstein, like there is no essence to game there is no essence of language, there are only overlapping similarities, family resemblances. Here the concept of 'game' is not given by listing the necessary and sufficient conditions but by reference to a series of examples and similarities.

It is not true, Wittgenstein contends, to say that if one does not give the definition by specifying the essence then one cannot say what one knows. In the *Tractatus* one of his claims for the existence of simples was the requirement that sense has to be definite. He took this from Frege who compared a concept with an area: 'an area with vague boundaries cannot be called an area at all'. But when it comes to Wittgenstein it is not senseless to say "Stand roughly there?" (PI 71) or we cannot say that I do not know what I am talking about until I gave a definite definition. One can give definition and boundary for specific purposes.

As Baker & Hacker note, Wittgenstein rejects the essentialist claim that 'What it is to be something is defined by specifying the Form common to all Things' (Baker & Hacker, 2005,

p. 211). Wittgenstein claims that if one explains the use of a word in its various contexts then one can say what one knows (PI 71).

### 3.6 Analogy of language with chess and rule-following

Wittgenstein makes the analogy of language with the game of chess. He relates that when one shows someone the king in chess and says: "This is the king", this does not tell him the use of this piece unless he already knows the rules of the game. What gives the king meaning is the rule, its use in the game. What makes "the king" in a chess are the rules of the game in chess. Similarly, Wittgenstein says, "The question 'What is a word really?' is analogous to the question 'What is a piece in chess?' (PI. 108). Wittgenstein has said in *Philosophical Grammer* that a chess move is a move only in a game, and a sentence is a sentence only in a language (cited in Baker & Hacker, 2005, pp. 52-53).

Wittgenstein has said in the *Philosophical Remarks* that 'A word has a meaning only in the context of a sentence: that is like saying only in use is a rod a lever. Only the application makes it a lever' (quoted in Baker & Hacker, 2005, p. 172). Wittgenstein has made the analogy of language with the game of chess. The move of a piece in chess depends on the rule of the game. Also a name, he says, will have a meaning in a language-game. The naming is like putting a chess piece on the board, thus preparing to move. 'A move is a move only in the context of a game' (quoted in Baker & Hacker, 2005, p. 173). One cannot make just one move in a game and not know how to make another. Hence 'To understand a sentence means to understand a language. To understand a language means to be master of a technique' (PI 199).

Like the game in chess, language is a rule following activity. To understand a language is to master the rules of its use. But the rule of the correct use of a word in the *Tractatus* was determined by the rules of logic and by the referents. In the *Tractatus* and generally the Augustinian view of language, the meaning of a word depends on the correct referent it picks out. The strict rules of logic give a determined way of application which is independent of us. The calculus nature of language in the *Tractatus* ties the use of a word with definite rules to certain object or a referent. What guides the use of the word is an objective rule of logic.

In the *Investigations*, Wittgenstein rejects that there is such an independent strict rule which is independent of us, the practitioners. Wittgenstein replaced the calculus of the *Tractatus* with a language-game in the *Investigations* where it was underlined that the rules of logic cannot be applied to language because language is recognized or portrayed as diverse with different rules of application. To understand a language is to master these different rules of use.

Wittgenstein asks how we come to follow a rule (PI 198). Being guided by a rule is not like in the *Tractatus* something of an external restrain. Wittgenstein asks "what has the expression of a rule – say a sign-post – got to do with my action?" (PI 198). The signpost does not coerce someone to go in that direction. A person goes by a signpost, Wittgenstein say, is because there is a regular use, a custom of following signposts (PI 198). The very grammar (logic) of rule following is embedded in customs, institutions. Wittgenstein says, "To obey a rule, to make a report, to give an order, to play a game of chess, are customs (uses, institutions)" (PI 199).

According to Wittgenstein, if rule following is a custom then it presupposes a community of practitioners. If someone asks the justification for following a rule, justification comes to an end: 'I have reached bedrock, and my spade is turned, then I am inclined to say "This is simply what I do."' (PI 217).

Rule following is then essentially a social practice; it exists in a community. The justification of our practices is not external but in the practices themselves. A.C. Grayling (Grayling, 1988, p. 83) says that if someone is playing chess, then one does not ask why the king moves only one square at a time. If it is chess then that is simply the rule. Games are our creations in social interactions. Baker & Hacker explains saying that, 'The rule of chess have no foundation and cannot be justified by reference to reality'. The rules could be different. If we change the rules then we change the game. What justifies it is our decision. So too Wittgenstein says that the rules of language are arbitrary. The rules could be different. But in such case the words would mean something different (Baker & Hacker, 2005, p. 47). One language-game cannot be reduced to the other. We cannot reduce football to cricket or chess

to bowling. But, he cautions, the various language-games form a family. They are part of the whole language (PI 23).

If we change the rules in chess the pieces will have different functions. But the rules that guide and give the standard of correctness are not guided by an external objective 'meta rule'. They are agreements. What justifies our use is our shared form of life.

Wittgenstein says that one does not understand a single statement but to understand a statement one has to understand the language-game. *On Certainty,* Wittgenstein repudiating his earlier atomism, has said that, 'When we first begin to believe anything, what we believe is not a single proposition; it is a whole system of propositions. (Light dawns gradually over the whole.)' (C 141).

Wittgenstein has argued that we should not conceive of words as names but as tools with different uses. In the *Tractatus* he has spent a lot of energy trying to connect language and the world with strict objective rules. In the *Investigations* he conceives of language as a public, rule governed activity. Here words have referent only in the language-game. There is no direct connection of language and the world. Baker and Hacker relate (echoing Wittgenstein in the *Investigations*) that language is a free-floating structure and speaking a language is not relating language with reality (Baker & Hacker, 2005, p. 16).

## 3.7 Doubting and hinge propositions

In order to draw some more relations between Wittgenstein and Kuhn, I will discuss some of the points Wittgenstein discusses *On Certainty* (C). Some of these points are related to Kuhn's discussion of communication breakdown across paradigms.

Wittgenstein claims that we cannot doubt everything in our language-game. *On certainty* Wittgenstein articulates that 'the game of doubting itself presupposes certainty' (C 115). One cannot doubt everything or doubting will not be possible. He underlines, 'Doubt comes after belief' (C 160). If someone doubts that he has a 'hand' then first he must understand that he

doubts. If one is not certain of any facts then he will not be certain of the meanings of his words either (C 114). A legitimate doubting is within a framework. In our language-game, Wittgenstein insists, there are certain background beliefs that cannot be doubted. The questions we raise and the doubts we make depends on the fact that some of our propositions are exempted from doubt (C 341). These propositions are, he says, like hinges on which others turn (C 341).

As these propositions have special place in our system of reference, they set the system by which all testing takes place. I will try to explain this by an example he gave in the *Investigations*: there is something that one cannot say that it is one meter long or that it is not. And this is the standard meter in Paris since the standard meter in Paris is what sets what a one meter is. In this respect, in the language-game of measuring with a meter rule, the standard meter has a peculiar role. In the language-game of measuring with meter it is not represented as a meter but it is a means of representation. He says, 'it is a paradigm in our language-game; something by which comparison is made' (PI 49-50).

The testing of beliefs is also possible against a background of accepted beliefs: 'it belongs to the logic of our scientific investigation that certain things are not doubted' (C 342). We get to these pictures not by satisfying ourselves of their correctness, but 'it is the inherited backgrounds against which I distinguish between true and false' (C 94). These propositions are not fixed or necessary propositions. It is possible that we could acquire different language-games. But each will have a set of standards of argument.

G.E. Moore has argued in *A Defence of Common sense* that there are many propositions we know with certainty. Some of the propositions he mentions include: I have two hands, the earth existed many years before I was born, etc (Grayling, 1988, p. 94). Wittgenstein did not disagree; he posed a question, instead:

> ...why should not a king be brought up in the belief that the world began with him? And if Moore and this King were to meet and discuss, could Moore really prove his belief to be the right one? I do not say that Moore could not convert the king to his view, but it

> would be a conversion of a special kind; the king would be brought to look at the world in a different way. (C 92)

It is possible to have different such proposition, hence different world pictures. Wittgenstein says that when we see natives consulting oracles, we consider them primitive. But he queries, aren't we using our language-game to combat theirs? (C 609) Wittgenstein maintains:

> Where two principles really do meet which cannot be reconciled with one another, then each man declared the other a fool and a heretic. I said I would "combat" the other man, - but wouldn't I give him reason? Certainly, but how far do they go? At the end of reasons comes persuasion. (Think of what happens when missionaries convert natives). (C 611-2)

Wittgensteins' writing in the *Investigations* is more difficult than the *Tractatus*. I therefore want to focus his analogy of language with chess – a scheme which I think has some parallel with what Kuhn did to in describing scientific paradigms. Kuhn – more detailed discussion below – represents a paradigm as a set of the standards and the rules of science. The change in paradigm is a change in the standards and rules of the game. Such a change displaces the whole conceptual network the scientists see through the world; the concepts are laid in a new setting. Hence, like the pieces in the chess will change their meaning and role in the game if we change the rules of chess, for Kuhn terms like 'mass', 'force', 'time', 'space' change their referents and they will have different meanings and relations in the new paradigm.

Wittgenstein argues that the meaning of a word is determined by the rules of the game and the rules are, in turn, based on social practice. Kuhn on his part states that there are hinge propositions that cannot be doubted in ours scientific testing and also that when two different worldviews or paradigms come there is no rational ground to change.

# Chapter Four

# Wittgenstein, Quine and Kuhn: the Implication of Holism in Philosophy of Science

In the previous chapter we have seen logical atomism and its import on logical positivism. We have also seen the critique that comes from Wittgenstein's holism against atomism. Here I will relate Wittgenstein and Quine's holism with Kuhn's *The Structure of Scientific Revolutions*. I will show that Wittgenstein's and also Quine's conception of meaning is applied in Kuhn's analysis of scientific revolution.

## 4.1 Quine's holism and the underdetermination of theories.

The logical positivists hold the analytic/synthetic distinction and the verification theory of meaning as central to their system. With their theory of meaning the positivists hold the reductivist view that every statement and also theoretical term will have an independent verification in sense perception given by observational terms.

Quine in his essay "*Two Dogmas of Empiricism*" (TDE) has criticized the analytic/synthetic distinction and reductionism as the two dogmas of empiricism. Quine's rejection of both dogmas and holding a holistic view led to the underdetermination thesis. Before we see the view on the underdetermination of theories let us first see Quine's critique of the two dogmas.

### 4.1.1 Analytic/synthetic distinction

The first dogma of empiricism, Quine says, is the belief that there is a cleavage between truths which are analytic and synthetic. Analytic statements are regarded as true independent of matter of fact by virtue of their meaning while the truth of synthetic statements is based on matters of fact. Analytic statements, including statements of logic and mathematics, are statements like 'All bachelors are unmarried', which are considered as true by virtue of their

meaning. Synthetic statements take the form ‘All bachelors are happy’ and its truth is determined by its relation to the world.

Quine objecting to this makes a distinction between first order logic and second order logic. First order logic addresses statements which have the form “No unmarried man is married” – a statement which is a true and remain true under all reinterpretation of its components (‘man’ and ‘married’) other than the logical particulars (comprising ‘no’, ‘not’, ‘if then’, etc). Second order logic deals with statements with a form like “No bachelor is married.” For such a statement to be reduced to the form of the first order logic we need further explanations. Some of the solutions given include: that the components ‘bachelor’ and ‘unmarried’ are synonyms that they have the same definition, are interchangeable, etc. Quine says that to say ‘bachelor’ and ‘unmarried’ are synonyms means to say ‘bachelor’ is defined as ‘unmarried man’.

But Quine asks, who defines it thus and when? He contends that we cannot refer to a dictionary or consult a lexicographer since their definition already relies on their belief they are synonyms. He therefore notes that all attempts, including the others, to draw the distinction is either circular to the concept of analyticity or not properly drawn. Hence, Quine recommends that the distinction be dropped (Quine, 1998, p. 288). Because he rejects this distinction, he argues that there is no statement which is immune from revision. He claims that even the revision of the logical law, the law of excluded middle, has been utilized as a means to simplify quantum mechanics (1998, p. 297).

### 4.1.2 Reductionism and the verification theory of meaning

The other dogma of empiricism that Quine attacks is the verification theory of meaning, which claims that ‘the meaning of a statement is the method of empirically confirming or infirming (disconfirming) it’. And analytic statements are confirmed no matter what (Quine, 1998, p. 292).

Quine refers here to radical reductionism as a problematic position – a position that claims that every meaningful statement can be translated to statements which are true or false about immediate experience. This view which is held by Lock and Hume tries to establish that every idea either originates directly in sense experience or it is a compound of such ideas which originate from direct experience. In other words, such a view holds that every significant term is a 'name of sense datum or compound of such names or an abbreviation of such a compound' (Quine, 1998, p. 293). This doctrine, Quine contends, is ambiguous that it is impossible that all our statements be translated term by term. A better alternative for Quine might be taking a full statement as a whole to be translatable to a sense-datum. Hence the object of verification becomes the whole of statements (p.293).

As Quine points out, it was Carnap who held this position. Based on Wittgenstein's *Tractatus*. Carnap 'tried to reduce all the concepts used in science to everyday life to the sensory qualities given in immediate experience'. But he later abandoned the reductionist thesis of translating every statement about the physical world to equivalent statements about immediate experience (Quine, 1998, pp. 293-94).

Quine notes that the other dogma, which is reductionism, has survived in the supposition that 'each statement taken in isolation from its fellows, can admit of confirmation or infirmation' (Quine, 1998, p. 295). Quine asserting his holism claims that it is not possible to confirm or disconfirm a statement in isolation from other statements. Instead he counter suggests that 'our statements about the external world face the tribunal of sense experience not individually but only as a corporate body... The unit of empirical significance is the whole of science' (Quine, 1998, p. 296).

In this respect, instead of the atomistic model which claims that the truth value of one statement is independent of whether other statements are true or false and that we can make independent verification, Quine accentuates that our statements are logically interconnected. He states:

> The totality of our so-called knowledge or beliefs, from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic, is a man-made fabric which impinges on experience only along the edges. (Quine, 1998, p. 296)

He notes that a conflict at the periphery of experience will lead to the readjustment in the center. Because of the logical interconnections of statements, the re-evaluation of one statement will lead to the revaluation of another. Quine, dismissing the idea of an unrevisalble *a priori* proposition, holds that the laws of logic are themselves certain kinds of statements which are further in the system (*ibid*.)

### 4.1.3 Underdetermination of theories

Quine asserts that "the total field is so underdetermined by its boundary conditions" because we have much choice as to which statement we re-evaluate in case of any single contrary experience. Therefore, instead of any one particular element linked to any particular statement, it is connected indirectly to the field as a whole (p. 296). Hence, Quine underlines, it will be misleading to talk about the empirical content of an individual statement especially if the statement is much to the center of the field away from the experiential periphery.

In this holistic conception, scientific theories form an interdependent network. Within this web of belief, like a spider web or a jigsaw puzzle, a change in the periphery will not affect the center much but a change in the center will make a change throughout the web. A test therefore should involve not an individual hypothesis but the collection of beliefs. The question here becomes, are we testing a relevant group of beliefs or the whole web of the belief? Quine defends the more radical view that we test the whole web of belief. The whole web, he said, face the tribunal of experience.

It is always possible to reject an auxiliary hypothesis than giving up the main theory itself. For example if we want to disconfirm a certain theory (T) with a certain observational statement (O), we have a deductive argument.

If T then O

Not O

Therefore, it is not T

But instead of such an observation disconfirming the theory, it is possible that it is one of the auxiliary hypothesis that is wrong. Hence,

If T, and A1, and A2, and A3 . . . , and An then O

Not O

Therefore, it is not T, or not A1, or not A2 . . ., or not An (Dewitt, 2004, p. 42)

In such case a theory could be held in the presence of disconfirming evidence. Any seemingly disconfirming evidence can be accommodated to any theory by changing other background beliefs. Hence a theory is underdetermined vis-à-vis an observation (given data, evidence, etc). Pushed to its logical limit, this means any experimental result can be made fit with any theory or any theory can be preserved in the face of disconfirming evidence. Hence, a given evidence cannot fully determine whether a theory is correct or incorrect, hence it is underdetermined. But Quine has rejected this extreme form of holism. (This point is discussed later.)

Moreover, he claims that it is folly to make a boundary distinction between synthetic statements, whose truth is contingent on experience, and analytic statements which are true because of the relation of concepts within them. He relates: ‘Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system’ (1998, p. 297). Even statements of experience can be held true ‘by pleading hallucination or by amending certain statements called logical laws’ (1998, p. 297). Quine argues that there is no statement which is immune from revision.

However, Quine as an empiricist takes the ‘conceptual scheme of science as a tool, ultimately, for predicting future experiences in light of past experience’ (Quine, 1998, p.

297). Quine states that in epistemological footing, the Homeric gods are not different from that of physical objects. But this will be a scientific error to believe in such entities if we hold the belief as a physicalist. With his shift towards pragmatics, Quine says that the myth of physical objects is more efficient device for managing the structure of experience, hence it is epistemologically superior to other myths (1998, pp. 289-99).

As shown, Quine claims that it is potentially possible to revise any statement in our web of belief. By contrast, Wittgenstine argues that there are hing propositions which are fixed and not revisable in a certain language-game, though he also believes that we can change them when we have other language-games, which they too will have other hing propositions. Though they have such a difference, both later Wittgenstein and Quine take the holistic view that claims that terms, statements will have meaning in a theory or with their relation in the language. In the next section I will show the influnce of the holism of both Wittgenstein and Quine in Kuhn's analysis of science.

## 4.2 Thomas Kuhn: Paradigms, revolutions and holism

Logical positivists hold that the only meaningful statements are analytic and synthetic statements. They also hold that there is a steady and linear growth in science and theory choice is determined by observation. There came a new understanding of science during the second half of the 20$^{th}$ century, among which Kuhn's is the prominent one. His analysis of the history of science led to a severe criticism of the logical positivists' conception of science. The following few pages are concerned in showing how Kuhn's representation of science must have been influenced by the writings of Wittgenstein and Quine though there is no explicit statement from Kuhn himself that that was the case[4].

[4] Kuhn mentioned Wittgenstein only once while using family resemblance to describe the different rules in normal science (Kuhn, 1996, pp. 44-45).

### 4.2.1 The primacy of language-game and paradigms

We have seen Wittgenstein's argument that language is not to be identified with naming. Instead Wittgenstein talked about the primacy of a language-game that gives sense to naming itself. Words, names, will have meaning only in language-game. He compared a word with a piece in a chess game. Similarly in the context of science, Kuhn talks about the primacy of a paradigm. Kuhn claims that paradigm is what set the rules, the research problems, what is and is not science. Paradigm, he says, is a kind of worldview that specifies what is right and wrong, and how science should be perused (Kuhn, 1996, p. 47). The paradigm is also what specifies meaning to scientific terms. For example the concept of space is different in different paradigms. In Newton it is flat, homogonous and unaffected by matter, while in Einstein it is curved and affected by matter (Kuhn, 1996, p. 149).

Kuhn claims that it is the paradigm that makes the problem worth investigating. The paradigm determines the facts that scientists seek as important. In other words, there is no research without a paradigm. Rejecting all paradigms simultaneously is to reject science itself (1996, p.78).

What is engaged by the scientists within the given accepted paradigm is what Kuhn calls 'normal science'. In what Kuhn (1996) calls 'normal science', scientists do not try to create new paradigms or new theories but they try 'to force nature into the relative inflexible box that the paradigm supplies' (1996, p. 24). Normal science is therefore compared with a jigsaw puzzle, which promises that there is a solution to the problem (Kuhn, 1996, p. 37). And Kuhn regards normal science as a puzzle solving enterprise. He in other words compares a researcher in a normal science as a puzzle solver and not a tester of paradigm. The researcher is like a chess player trying different moves for a solution.

For such a practice to be possible, the researcher must take the paradigm for granted (1996, p 145). Since puzzles already guarantee the solution, the scientist in normal science is destined to find it. In normal science, he says, 'there are rules that limit both the nature of acceptable solutions and the steps by which they are to be obtained' (Kuhn, 1996, p. 38). Very well

suggestive of Wittgenstein's view, Kuhn shows that the game in question is not a random game, but with rules how to play.

But Kuhn also notes that there could be different sets of rules within a paradigm. It is therefore frustrating to find common sets of rules that guide normal research. That is why Kuhn seems to utilize Wittgenstein's concept of family resemblance to explain the different crisscrossing and overlapping characteristics of the different research problems and techniques that arise within a single normal scientific tradition or in a paradigm. What is common to them all is, Kuhn says, not rules but paradigm (Kuhn, 1996, p. 45). A paradigm is the one which is binding and also guide research even without the discoverable common rules.

Wittgenstein's language-game is informed similarly. In a certain language-game, there are certain accepted rules for how to play the game. Put it differently, Wittgenstein believes that there are accepted beliefs, or hing propsitions, that have special place in that particular language-game. Parallel to this, the scientist in a normal science also takes the general rules in a paradigm for granted. But like there are other language-games there are also other paradigms, which is discussed below.

### 4.2.2 Paradigm change and meaning holism

Kuhn says that while normal science is a cumulative enterprise, the emergence of a new paradigm comes with a break from its predecessor (1996, p.84). The change is a gestalt switch, represented by the rabbit-duck picture. The duck in the picture is seen as a rabbit – a prototype used to portray a full scale paradigm shift (1996, p. 85). The new paradigm introduces different rules along with a new world/worldview.

In the logical positivist model of science we have seen that with their theory of meaning and their reductionist view of science, it is assumed that there is a uniquely correct description of nature and there will be no scientific law which will be outside of the reductive hierarchy. For Kuhn, on the other hand, it is possible that we have two different rival theories without

contradicting each other to the extent each could predict the same natural phenomena while having different (at times incompatible) procedures and concepts (p.98). For example, Einstein's theory of dynamics cannot show that the Newtonian version is wrong because the latter is still used – and successfully at that – by current engineers and physicists.

In a way that reveals how powerful Wittgenstein's influence on Kuhn was, we see the thesis in the former how language-games are governed by different rules and for different uses. Wittgenstein has also argued how we cannot reduce one language-game to the other, as we cannot reduce football to cricket or chess. And each language-game will be as good as the other. Likewise, different paradigms in Kuhn are also governed with different rules and standards, which cannot be reduced to the other. As shown above, a paradigm is what determines the meanings and relations of the terms and statements. This is like Wittgenstein's analogy of words with pieces in chess, when the rules of the game in chess changes, the pieces will have different roles and meanings. Likewise, though there are similar words used in different paradigms, like 'mass', 'force', 'space' etc, with the paradigm change, which changes the rules of the game, the words will have different meanings, referents and relations.

Parallel to Wittgenstein's description of people (or different cultural groups), Kuhn maintains: "When paradigms enter, as they must, into a debate about paradigm choice, their role is necessarily circular. Each group uses its own paradigm to argue in that paradigm's defence" (1996, p. 94).

### 4.2.3 Observation/theory distinction

In the logical positivists analysis of science, observational statements were regarded as 'the given'. They were considered as permanent and fixed. What were regarded as problematic was theoretical statements, because theoretical statements get precision in observational statements. But Kuhn undercutting this view says that even perception is paradigm dependent. He also argues that a paradigm is a prerequisite to perception (1996, p. 131). Hence observation and theory are closely related. One example he gives is about a card

which the psychologists show to participants with one of the cards being different from the commonly known. But many failed to see the difference at first because of their previous expectation. We usually see what our previous visual-conceptual experience has taught us to see.

Kuhn denies that there is any neutral observational language. The scientist's operations and measurements in the laboratory are not "the given" of experience. One can only see through a paradigm. If we leave one paradigm, then it will be another (1996, p. 126).

### 4.2.4 Verification, falsification and underdetermination of theories

Kuhn says that it is not possible to conclusively verify a theory to all relevant evidence. The other alternative to verification is falsification. Kuhn calls these falsifying experiences as anomalies. Anomalies are what cannot be explained by the existing paradigm. Like Quine who holds that theories are underdeterminined with a falsifying observational statements, Kuhn says that anomalies experiences may not falsify a theory. He says that he even doubts that falsifying ones exist. Moreover, Kuhn says that no theory actually solves every problem that it is confronted at a given time. Also, he says that the solutions it achieved are not perfect either. He says that if we take failure as a ground to reject a theory then all theories ought to be rejected at all time. He claims that such incompleteness and imperfection is the defining feature of normal science (Kuhn, 1996, pp. 146-47).

### 4.2.5 Revolutions as changes of worldviews

Given the change of paradigms as changes of the rules of the game and because of these, like the pieces in chess changes their role, the words used in one paradigm will have different meanings, referents and relations. Moreover Kuhn has claimed that observation is paradigm dependent. Because of all this changes, Kuhn says that after revolution scientists see the world differently as if taken to another planet. The change is like the gestalt switch: what was duck is seen as rabbit.

But, Kuhn notes, there is a crucial difference between the gestalt switch and paradigm change. In the picture of duck and rabbit, the person looking to a gestalt picture knows the change because he can go back and forth. Or in the case of the card, the psychologists or another external authority can assure the person that the anomalous card was there all the time. But for the scientist with a paradigm change, such an external standard is not possible. The scientist do not have any resource beyond what he sees with his eyes and instruments, no fixed reference because as Kuhn says the criteria is gone with the shift (Kuhn, 1996, pp. 113-15).

With the new paradigm redefining the previous science, some problems may be regarded as 'unscientific' and others which were trivial may become archetypes of science. The change from one paradigm to another is difficult. Kuhn says that the professionalism of the scientists makes them more rigid to paradigm changes (Kuhn, 1996, pp. 63-4). Here Kuhn's take of professionalism or the rigid stance that scientists adopt towards paradigm change seems to enforce Wittgenstein's claim that some of our claims are not revisable in the paradigm. For Wittgenstein, some statements are like hinges on which others turn. This is one of the reasons that creates communication breakdown among paradigms.

### 4.2.6 Incommensurability

When a given paradigm changes, the rules and standards that distinguish real scientific solution from mere metaphysical speculation also change. A revolution in normal science is often, Kuhn says, not only incompatible but also incommensurable with the previous. The competing paradigms fail to make complete contact with each other's view points. There are three forms of incommensurability Kuhn specifies,

1. Incommensurability of standards: the competing paradigms differ in their standard or definition of science. They often disagree about the list of problem that must be resolved. Example: disagreement whether the theory of motion should explain the cause of the force or just simply note the existence of such force. Aristotle and Descartes explained

this while Newton's dynamics did not. Therefore in Newton's paradigm, Kuhn says, some questions vanish; while Einstein's relativity claims to solve the same question.

2. Incommensurability in language. Though competing paradigms share the same vocabulary and apparatus, the old terms, concepts and experiments are seen in new relations. This, Kuhn says, brings misunderstanding between the two conceptual schools. Example: the concept of space in Einstein and Newton are different. Space in Newtonian physics was 'flat, homogenous, isotropic and unaffected by the presence of matter'. But the concept of a "curved" space in Einstein was very different. He says that many mathematicians and philosophers tried to develop an Euclidian version of Einstein's theory. In Einsteinian universe the whole conceptual web of space, time, matter, force are shifted and lay down as whole. Similarly, before Copernicus, part of what meant by 'earth' was fixed and could not move. Copernicus view changed both the meaning of 'earth' and 'motion' by a whole new way of regarding the problems of physics and astronomy. Without such changes Kuhn says that the statement that the Earth moves will be mad. Hence, he says that 'communication across the revolutionary divide is inevitably partial' (1996, p.149)

3. Incommensurability in perception. They see the world differently. 'The proponents of competing paradigms practice their trades in different worlds' (p. 150). They see different things in different relation to one another. Some laws that are not possible to demonstrate to one scientist are intuitively obvious to the other. The transitions between incommensurables are not going to be made a step at a time, forced by logic and neutral experience. Kuhn says that it is like a gestalt switch. It must occur all at once or it just does not at all.

Like Wittgenstein's claim of Moore and the king who is brought up in the belief that the world started with him, Moore can only convert the king to see the world differently than prove it; The change from one paradigm to another, Kuhn says, cannot be justified by proof, it is a conversion process; persuasion takes more place than proof.

This conversion itself is not an easy process, either. Kuhn citing Darwin and Max Plank says that it is more the new generation who makes the conversion because they see both paradigms side by side with impartiality. Kuhn says that 'conversion will occur a few at a time until, after the last holdouts have died, the whole profession will again be practicing under a single, but now a different paradigm' (Kuhn, 1996, p. 152).

Kuhn says that individual scientist's embrace new paradigm for many reasons. He says that Kepler's Sun worship helped him to be a Copernican, some by others autobiography and personality, or some by nationality or prior reputation of the innovator and his teacher (Kuhn, 1996, pp. 151-52).

Some of the proofs given for a new paradigm, Kuhn says, include that the new can solve the problem that led the one to crisis, but such arguments are coined by persuasive arguments. This is because Kuhn notes that new paradigms are crude and they seldom solve more than few problems. For example, until Kepler, Copernicus's theory was not more accurate than Ptolemy's. Similarly, wave theory was not as successful as its corpuscular rival (Kuhn, 1996, p.152). The acceptance of the new paradigm is not on the problems it solves but on the promise it makes. Kuhn, like the underdetermination of theory in Quine, says that old paradigms can be articulated to meet the challenges of the new ones. Sometimes the argument and counter argument could be very close. The person who embraces a new paradigm with its many problems (than the few problems that confront the old one) is not because of the evidence but Kuhn says his faith in the success of the new paradigm. Also what helps the new to triumph is personal sense of aesthetic considerations. Kuhn says, that aesthetic consideration is very decisive and that some scientists take the new for some personal reasons (Kuhn, 1996, p. 155).

According to Wittgenstein, where people with different culture and hinge propositions come in contact, reason comes to an end and one tries to convert the other by persuasion. Likewise, Kuhn says that it is not reason but persuasion that makes more converts to the new paradigm. Kuhn adds that there will be more converts if the paradigm is destined to win the fight (Kuhn, 1996, p. 158). Then more and more converts will come to the fore. Wittgenstein

claims that when two principles that cannot be reconciled meet, one calls the other a fool and a heretic.

By the same token, Kuhn says, those who resist the new paradigm will come to a point they could be seen as holding a position that is illogical and unscientific (Kuhn, 1996, p. 159). What makes science progressive is, Kuhn says, the rewriting of the new science by distorting of the old science. He also says that though there are loses and gains in revolutions the scientists become blind to the former (p. 167). The new becomes the arbiter of the rule of the game. Change in paradigm is not a progress to truth or an evolution to somewhere. Kuhn compares this to Darwin natural selection in the evolution of species which abolished teleological explanation: a goal that is neither set by God nor by nature (Kuhn, 1996, p. 171-72)

# Chapter Five
# Holism and Relativism

We can say that the logical atomists' view of language is oversimplified and does not cover all the uses of our languages and that their conception of language is too simplified and unattainable. The *Tractatus*, as the logical positivists' guideline, had an oversimplified conception of language that tried to tie each word to the object "out there". The positivists with their radical empiricism wanted to reduce all terms and statements to immediate sense perception. Like the traditional empiricism they take sense experience to be the stable basis of knowledge. According to Lakatos, (cited in Munevar, 1981, p. 12) such empiricists take common sense to be passive, where nature imprints on a perfectly inert mind. Such a view, he claims, takes empirical knowledge to grow by repetition of sensory experience. Bernstein (1983, pp. 60-75) also describes that such atomism implies that there is nothing to historical development; it is just a repetition and aggregation of isolated events. Since reality is perceived to be governed with fewer laws (given the ahistorical nature of sense experience), the empiricists assert that there is only one correct way to interpret the world. Moreover, they also insist that the only meaningful statements are scientific propositions.

It has also been discussed how the positivists were committed to the principle of verification. They insisted that all theoretical terms in science be given an explicit definition by observational terms. But this is problematic because theoretical terms cannot be given a conclusive observational entity. That is why Quine comments that if our language consisted of entirely of observational statements, then there will be no theoretical science (Gibson, 1996, p. 84). The requirement that theoretical terms be given empirical definitions – that was what the logical positivists claim – they (theoretical terms) will lose their explanatory power over observational terms. As Rosenberg (2012, p. 88) points out, with such a demand theoretical terms will only abbreviate or summarize observational statements than explaining them.

On the other hand, the strong form of holism that the meaning of a statement is connected to the entire web or language leads to some implausible form of relativism. Some of this

relativism suggests that we cannot understand other paradigms, conceptual schemes or cultures; that communication between such different groups is either partial or impossible, etc. Moreover, a strong form of holism claims that any theory can be held under any evidence, that all observational claims are paradigm dependent, and we cannot claim in a rational way for the progress of science. But by holding such forms of relativism, we cannot improve intelligibility (Davidson, 1974, p. 6).

Much of these extreme forms of relativism have actually been rectified by Quine. Kuhn has also tried to retract some of his statements in the postscript that was included in the second edition of *The Structure of Scientific Revolutions*. This chapter aims to expose and critique the extreme forms of relativism that holism gives rise.

## 5.1 Wittgenstein and forms of life

Wittgenstein in the *Investigations* gave the primacy to language-games which seem to make language to float freely in the community of speakers having its independent reality. This suggestion, as Grayling notes, seems to make the world dependent upon the 'form of life' (Grayling, 1988, p. 102). What is real for Wittgenstein is the language-game. As Grayling points out, a language-game is valid due to the shared experience, custom and rules of the speakers (1998, p. 104).

One of the prominent relativist point of view that holism shapes is cognitive relativism. This view asserts that there are different ways of perceiving and thinking about that world. It also claims that one member of a conceptual community does not grasp at all what it is to be a member of another conceptual community (Grayling, 1988, p. 105). As Davidson (1974) notes, some philosophers claim that our efforts to understand other cultures or alien worldviews can be undertaken by interpreting terms of other systems into our own. But there is a real problem of translatability. For Kuhn, because scientific theories are "structures" a given paradigm is opaque to a scientist working in another paradigm.

Wittgenstein, who has inspired the relativistic point of view, is also interpreted in a more universalistic sense, that humans share common forms of life. He says that language is for example natural; we do not plan to speak a language: "Commanding, questioning, recounting, chatting, are as much a part of our natural history as walking, eating, drinking, playing" (PI 25). He adds,

> Suppose you come as an explorer into an unknown country with a language quite strange to you. In what circumstance would you say that the people there gave orders, understood them, obeyed them, rebelled against them, and so on? The common behaviour of mankind is the system of reference by means of which we interpret an unknown language. (PI 206)

He says that if there is no enough regularity than we would not call it a language (PI 207). Grayling notes that even to say that others have different 'form of life' (or in Kuhn's sense different paradigms), then we have to somehow be able to interpret it, recognize it or the very claim will not make sense. Hence the claim that we cannot completely understand or translate other schemes or language to our own is implausible. Hence, as Grayling notes, there needs to be some common grounds, shared beliefs about the world, natural capacities, response to perception etc between the two 'forms of life' (Grayling, 1988, p. 109). One of the major troubling problems in Kuhn's conception of paradigm is that there seems to be little or no common ground between rival paradigms as their respective proponents live in different worlds (I will return to this point below).

## 5.2 Observation/theory distinction in Quine

As we have seen so far, the logical positivists are committed to the principle of verification, and they as a result demand that all theoretical terms in science be given an explicit definition by observational terms. This claim has, however, proved to be problematic. Moreover, as Quine showed, the positivists' claim that we can verify scientific statements individually looks naïve. For Quine, this can be ameliorated if we take in holism in its moderate form (cited in Gibson, 1996, p. 85).

Quine's claim that hypotheses are not tested in isolation or the claim that there could be theories that are underdetermined by evidence is not controversial. In a given conceptual scheme (or, to use Imre Lakatos's expression, 'research programme') there are more than one competing theories in science which explain the same data. What is problematic in Quine is that he seems to have stated a strong form of holism in the TDE when he said that it is the whole field of science that should face the tribunal of experience. This strong version of holism makes our statement to be interconnected to the entire web or language. Hence a revision of one statement will affect the rest. Quine's underdetermination thesis seems to shoulder a strong holism for this thesis has sometimes been interpreted to mean that any theory can be held true under any observational claim. It is in other words as if observation and theoretical claims are equal.

But this strong form of holism is not plausible; Quine too has rejected this strong version for the moderate holism. Jerry Fodor (cited in Klee, 1997, pp. 58-59) ridiculed this holism by saying that it is based on the notion that "literally, anything can be seen as anything" – something which is entirely questionable. Quine himself has disavowed this stronger claim (Gibson, 1996). Quine did not say that it will be rational to hold a theory under any observation. This is contrary to his pragmatism. He did not claim that there is no defensible rational ground for rejecting one theory over the other. Quine did not hold that any adjustment made to save a theory from disconfirming evidence is equally a preferable adjustment (Klee,1997, p. 76). As said, this claim is against his pragmatism: Some adjustments to save a theory will destroy the theory's usefulness such as in making novel predictions. Adjustments should be there on condition that they serve to make new predictions, maximize consistency, produce simplicity, etc. Quine was therefore cautious not to fall to the dictum "anything goes" in scientific practice (Klee, 1997, p. 78).

## 5.3 Paradigm change and communication breakdown

As discussed above, Wittgenstein analogously compared language with chess. What gives the meaning or their places for the chess pieces is the rule of the game. The rules could be different. Hence, we cannot reduce one language-game to the other, as we cannot reduce

football to cricket or chess. When the rules change the relation and function of the pieces will also change. Likewise, the different paradigms in Kuhn are also governed with different rules and standards that cannot be reduced to the other. In a paradigm change, the new paradigm introduces new rules within a different universe of discourse. The change is the displacement of the whole conceptual network. When the rules and standards change then the concepts like "mass", "force", "space", and "time" are utilized differently, getting a new meaning.

All these arise following a revolution because a revolution is tantamount to a breakdown of the existing order and hence the questioning of the rules of the game. Following a scientific revolution the world is set in new structure, with new rules and sets of questions. Each paradigm brings a worldview with it. A new paradigm redefines things, having different sets of problem and what is to be accepted as a solution. It is the paradigm that fixes the standards. Until the paradigm is determined the practitioners will debate on fundamental issues and it is more of an open game – a period of chaos. Kuhn has said that because scientists in different paradigms see things differently (as if they are taken to another planet), communication across paradigms is partial. Hence a better theory cannot be settled by a rational debate but by persuasion. A "mystical conversion" is in place.

Kuhn's notion of incommensurability reinforces this very well. Seeing incommensurability between paradigms is like locking practitioners to separate worlds. This gives us the impression that scientists *committed* to one paradigm could not easily leave their "world" and see or understand other paradigms or conceptual schemes.

In his discussion of incommensurability, Kuhn therefore seems to hold the strong form of holism which claims that a single statement has meaning in relation to the whole part of language. Hence, if someone asserts a certain statement then in order for the other to understand he must know the whole language. Kuhn associates scientists in rival scientific theories with an anthropologist who encounters an unknown (alien) culture (Laudan, 1996, p. 9).

Such extreme form of holism will, however, make communication not only partial but impossible. After all, humans have as a species similar 'form of life'. Their common nature and behaviour gives them lots of grounds to understand the other. Besides, as Laudan (1996) rightly put, there is no evidence provided by Kuhn that scientists with different theories failed to understand each other.

Moreover, Kuhn's incommensurability thesis seems to be largely confined to linguistic incommensurability – a limitation that gave way to an exaggerated and overstated claim that there is barely communication between scientists working in different paradigms.

Incommensurability of standards could be a problem, though; there could be more standards which are preferred than others. Some of the disagreement in standards will be settled with the later progress in science. But such disputes of course cannot be resolved especially when the claimed sciences are at their infancy. But since there is a general agreement about the objectives of science (which is problem solving) this will be resolved later based on the success of the competing standards. Smith (2003, p. 93) gives an example based on a methodological debate that happened between English biologists ('biometricians', more specifically) who formulated a mathematical law that they thought could describe inheritance and yet failed to point at the mechanism how inheritance works. A second group of biologists, based on Mendel's work, identified the mechanism of inheritance. According to Smith (2003), the two approaches were merged later despite their apparent contradiction.

## Conclusion

In this paper, I have tried to couple two broad schemes of thinking in philosophy of science, positivists and post-positivists (Kuhn being the representative) with the two theories in meaning, namely logical atomism and holism.

In meaning atomism I have taken Wittgenstein to be a representative while in holism I have taken both Wittgenstein and Quine as the major proponents. By showing the relation between Wittgenstein's atomism and the positivists, and then his holism to Kuhn's analysis

of science, I have tried to show Wittgenstein's influences and their expressions in philosophy of science.

As shown in Part I, Wittgenstein's *Tractatus* has provided the framework by which the positivists have employed to their analysis of science. The *Tractatus* model tried to exhaust the relation of language and the world as a one-to-one relation. Every proposition is taken as a description of fact which corresponds to the world. The meaning of a statement is then determined by the referent it picks out.

Influenced by the model of the *Tractatus*, the positivists took scientific terms and concepts to gain their fixed and accurate meaning from such reference in experience. Scientific theories were validated by the independent verification of statements via observations. Observational terms are given fixed in sense perception. The positivists, with their verification theory of meaning, hold that theoretical terms are meaningful as long as they are defined by observational terms. Knowledge is taken as the repetition of isolated, ahistorical events. The positivists therefore provided a conception of science that is unified by reduction. With such a view they hold that there is only one uniquely correct explanation of the world and that is given by science.

In the second part, I have to some extent tried to reduce much of Kuhn's *The Structure of Scientific Revolutions* to the works of Wittgenstein. I have roughly presented the argument as, what is done in language by the later Wittgenstein is what is applied to science by Kuhn. This holism claims that a word and a statement does not have a meaning independently but by being part of the whole. For the later Wittgenstein (as well as for Kuhn), what gives meaning to terms and statements is the rules of the game (language-games and paradigms respectively). Scientific terms and statements are not then, like the positivists, given fixed meaning; they change their meanings by the changes in theories.

Here, holism seems to go to an extreme standpoint. While the positivists' atomism claims that there is only one fixed interpretation of nature, the extreme form of holism claims that any theory can be held under any kind of evidence. This form of holism argues that science

is not cumulative but filled with incommensurable paradigms, where communication between them is either partial or impossible. Kuhn represents scientists in different paradigms as if they are people in different cultural groups, living in incommensurable different worlds.

This leads to some implausible relativism, which seems to go to the extent of arguing that any theory can be held true under any evidence and that all observational claims are paradigm dependent. It seems also to show that one paradigm or scheme is as good as the other and we cannot understand other paradigms, conceptual schemes or cultures. Such relativism maintains that communication between such different groups is either partial or impossible. I have argued against such a claim by advocating that we can make theory choice, to the most extent, on pragmatic basis. The pragmatic tools include a theory's predictive power, consistency, accuracy, simplicity, etc (we can say that these criteria could reasonably be exhausted) (Kuhn, 1977). Of course before we use such criteria the problem of a strong form of holism that makes communication and understanding impossible has to be solved. I have criticized Kuhn's concept of paradigm that locks the practitioners to their "world".

Like it is a person who has tasted both an orange and a pineapple, is the one who can tell which one tastes better; one needs to understand the other paradigms to make a comparison. We can say that for such communications and understanding to be possible we need to hold a fallible conception of truth, i.e. the claim that we should hold every belief in an open minded sprit that future evidence may require us to abandon it (Cassullo, 2000, p. 601). If a person is willing to revise his most cherished propositions, and one removes his prejudices against other views and considers the other as correct while he listens to their version, then we can have a very good ground to understand other schemes. The problem of incommensurability that makes communication partial becomes even less when applied to science, because as Kuhn said in his postscript, scientists undergo the same education, professional institution, literature and share much of the scientific world and language, which makes their communication and rational choice of theories much easier. Though our communication and

arguments do not necessarily lead us to agreements all the time, they can lead us to rational disagreements.

## References


Anscombe, G. (1967). *An Introduction to Wittgenstein's Tractarus.* London: Hutchinson & co Ltd.

Baker, G., & Hacker, P. (2005). *Wittgenstein: Understanding and Meaning Part1: Essays* (2nd edition ed.). Malden USA: Blackwell publishing.

Bernstien, R. J. (1983). *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*. Oxford: Bail Blackwell.

Casullo, A. (2000). Revisability, Reliabilism, and A Priori Knowledge. In E. Sosa, J. Kim, J. Fantl, & M. McGreth (Eds.), *Epistemology: An Anthology* (pp. 595-611). Malden: Blackwell Publishing Ltd.

Davidson, D. (1974). On the Very Idea of a Conceptual Scheme. In *Proceedings and Addresses of the American Prhilosophical Association* Vol. 47 , 5-20.

Dewitt, R. (2004). *Worldviews: An Introduction to the History and Philosophy of Science*. Malden: Blackewell publishing Ltd.

Fann, K. (1969). *Wittgenstein's Conception of Philosophy*. California: University of California Press.

Gibson, R. F. (1996). Quine, Wittgenstein and Holism. In H.-J. G. Robert L.Arrington, & H.-J. G. Robert L.Arrington (Ed.), *Wittgenstein and Quine* (pp. 80-96). London: Routledge.

Grayling, A. (1988). *Wittgenstein: Past Masters*. Oxford: Oxford University Press.

Hume, D. (1977). *Enquiry Concerning Human Understanding*. (E. Steinberg, Ed.) Indianapolis: Hackett Publishing Co.

Kenny, A. (1973). *Wittgenstein*. Harmondsworth: Penguin Books Ltd.

Klee, R. (1997). *Introduction to the Philosophy of Science - Cutting Nature at Its Seams*. New York: Oxford University Press.

Kuhn, T. S. (1996). *The Structure of Scientific Revolutions* (3rd Edition ed.). Chicago: The University of Chicago Press.

Kuhn, T.S. (1977). *The Essential Tension*. Chicago: The University of Chicago Press.

Lakatos, I. (1970). Methodology of Scientific Research Programmes. In I. Lakatos, & A. Musgrave, *Criticism and the Growth of Knowledge* (pp. 91-196). London: Cambridge university press.

Lakatos, I. (1998). Science and Psudoscience. In M. Curd, & J. Cover, *Philosophy of Science: The Central Issues* (pp. 20-26). New York; London: W.W Norton & Company.

Laudan, L. (1996). *Beyond Positivism and Relativism: Theory,Method, and Evidence*. Colorado: Westview press.

Malcom, N. (1993). *Wittgenstein: A Religious Point of View?* (P. Winch, Ed.) London: Routledge.

Munevar, G. (1981). *Radical Knowledge: A Philosophical Inquiry into the Nature and Limits of Science*. England: Avebury Publication Company.

Putnam, H. (2001). Rules, Attunement, and "applying words to the world" The struggle to understand Wittgenstein's vision of language. In L. Nag, & C. Mouffe, *The Legacy of Wittgenstein: Pragmatism or Deconstruction* (pp. 9-25). Berlin: Frankfurt am Main.

Quine, W. (1998). Two Dogmas of Empricism. In M. Curd, & J. Cover, *Philosophy of Science: The Central Issues* (pp. 280-300). New York: London: W.W. Norton & Company.

Quinton, A. (1982). Wittgenstein. Social Research: An International Quarterly , 4-31.

Rosenberg, A. (2012). *Philosophy of Science: A Contemporary Introduction* (3rd Edition ed.). New York: Routledge.

Smith, P. G. (2003). *An Introduction to the Philosophy of Science: Theory and Reality*. Chicago and London: The Universtiy of Chicago Press.

Specht, E. K. (1969). *The Foundations of Wittgenstein's Late Philosophy*. (D. Walford, Trans.) New York: Barnes & Noble inc.

Wittgenstein, L. (1953*). Philosophical Investigations*. (G. Anscombe, Trans.) New York: The Macmillan Company.

Wittgenstein, L. (1961). *Tractatus Logico-Philosophicus*. (D. Pears, & B. McGuinness, Trans.) London: Routledge and Kegen Paul.

Wittgenstein, L. (1969). *On Certainity*. Oxford: Basil Blackwell.