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The Problem of Objectivity in Science in Imre Lakatos

Imre Lakatos'ta Bilimde Nesnellik Sorunu

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The Problem of Objectivity in Science in Imre Lakatos*

Abstract

From the 17th century, new scientific developments accompanied science philosophers started to discuss how to distinguish scientific propositions from metaphysical propositions. That problem was replaced by how to discriminate between scientific and non-scientific in the 20th century. In that period, different scientific understandings started to come up. Imre Lakatos is one of the leading thinkers who came forward with his views during this period. In Lakatos' view, not being rational criteria for scientific knowledge was relativised natural sciences developing sciences such as social sciences, ethics and science fields were too and this caused dangerous results. Due to that, Lakatos defends the importance of determining criteria to distinguish scientific knowledge from non-scientific one. He says that the history of science must be known for the philosophy of science well and philosophy of science must be known for the history of science well. Lakatos says that there aren't certain verification and falsification in science; for to him, science is fallible at the same time. He advocates that there aren't certain and unchangeable methods in science. Due to his ideas, he affected Feyerabend. Lakatos asserted that science is progressing rationally; he is against Popper and Kuhn but tried to synthesize between them.

Keywords: Philosophy of Science, Imre Lakatos, Verification, Falsification, K. Popper.

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Öz

17. yüzyıldan itibaren yeni bilimsel gelişmelerin ortaya çıkmasıyla birlikte bilim felsefecileri, bilimsel önermeleri metafizik önermelerden nasıl ayırt edecekleri konusunda tartışmalara başladılar. 20. yüzyılda bu sorunun yerini bilimsel ve bilimsel olmayan ayrımının nasıl yapılacağı konusu aldı. Bu dönemde farklı bilimsel anlayışlar ortaya çıkmaya başladı. Bu dönemde görüşleriyle öne çıkan öneli düşünürlerden biri de Imre Lakatos'tur. Lakatos'a göre bilimsel bilginin rasyonel ölçüt olmaması, sosyal bilimler, etik ve bilim alanları gibi bilimleri geliştiren doğa bilimleri de göreceli hale getirilmiş ve bu tehlikeli sonuçlara neden olmuştur. Bu nedenle Lakatos, bilimsel bilgiyi bilimsel olmayandan ayırt etmek için bir kriter belirlemenin önemini savunur. Bilim felsefesi için bilim tarihinin iyi bilinmesi, bilim tarihi için de bilim felsefesinin iyi bilinmesi gerektiğine işaret etmektedir. Lakatos, bilimde kesin doğrulama ve kesin yanlışlamanın olmadığını belirtmekte ve bilimde kesin ve değişmez yöntemlerin olmadığını iddia etmektedir. Lakatos, bu fikirleriyle Feyerabend'i etkiledi. Lakatos bilimin rasyonel bir şekilde ilerlediğini, Popper ve Kuhn'a karşı olduğunu ancak aralarında sentezler yapmaya çalıştığını ileri sürdü.

Anahtar Kelimeler: Bilim Felsefesi, Imre Lakatos, Doğrulama, Yanlışlama, K. Popper.

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Introduction

The separation of science from philosophy and the fact that there is no reliable information outside of science has become a prevailing thought since the seventeenth century. During this period, Kant argued that metaphysical knowledge was impossible, which caused this knowledge to lose its importance. The fact that scientific knowledge was based on observation and experiment allowed him to be considered the only reliable information. In addition, the deductive method in science has become ahead of the inductive method.

In the 20th scientists abandoned the possibility of metaphysical knowledge earlier, as well as saw that the view that scientific knowledge is now proven knowledge is untenable. This, in turn, led to the emergence of a new crisis. With this crisis, the philosophy of science began to gain importance again. This was also since scientific knowledge was uncontrollable. Popper's theory of "falsification" replaced the principle of "verification". In this regard, Popper's principle of falsifiability can be considered a 'moderate' approach to logical positivism, since it allows us to distinguish statements belonging to the field of experimental science from metaphysical statements, logic, and mathematics[1].

In the twentieth century, another philosopher of science saw that the lack of a rational criterion for scientific knowledge would lead to dangerous consequences, such as relativizing the natural sciences, as well as the developing social sciences, ethics, and political fields. That is why he concluded that it is very important to introduce criteria into scientific knowledge. This philosopher is Imre Lakatos (1922-1974). Lakatos is a philosopher of science and mathematics. He held a position at the London School of Economics from 1960 until his death. Lakatos mentioned in his article "Methodology of Scientific Research Programmes" that it is necessary to consider theories not separately but within a research programme. He is known for his assessments of this concept[2].

Lakatos, which Feyerabend dedicates in *Against Method* as a "friend and fellow anarchist", is generally known for both sides. One of them is Lakatos in his book *Proofs and Refutations*, in which he examines the history of mathematics, mathematicians, the philosophy of mathematics, in short, mathematics. The other is Lakatos in "Falsification and the Methodology of Scientific Research Programmes," which he considered part of his book *The Changing Logic of Scientific Discovery*, which he intended to write in 1968-69. In this paper he

[1] Ali Yıldırım, *Din Dilinin Ahlaki Yorumu* (Ankara: Elis Yayınları, 2015), 43.
[2] Dominique Lecourt, *Bilim Felsefesi* (Ankara: Dost Kitapevi Yayınları, 2006), 88.

developed his design of science, trying both to correct Popperian falsificationism and to answer objections to Popperian falsificationism[3].

Lakatos is a philosopher who argues that scientific progress can be explained rationally in the contemporary philosophy of science literature. To him, in addition to knowing the history of science well for the philosophy of science, it is necessary to know the analysis of the philosophy of science about what science is to be able to describe the facts in the history of science well. In other words, philosophical analysis of the distinction of science from other non-science activities is required. He changed Kant's famous saying: "Philosophy of science without history of science is empty; history of science without philosophy of science is blind[4].

Before introducing the criterion of scientificity, Lakatos examined the problem of "setting boundaries" in the past. Some postmodern scientists, such as Feyerabend, have said that rational criteria cannot be set based on the problems caused by the scientific criteria put forward by the contemporary philosophy of science. Feyerabend's "Anything goes" principle and Kuhn's criticism of the scientific revolution, which he likened to conversion, were the factors that made Lakatos stand out in the philosophy of science[5].

Lakatos created the methodology of science to solve three fundamental problems. These; science or pseudoscience, that is, the question of setting boundaries; falsification and the methodology of scientific research programmes, namely fallibility versus falsificationism; it is a methodology for scientific research programmes.

1. The Problem of Distinguishing Science or Pseudoscience

According to Lakatos, who argues that knowledge is something that is respected by man, science is also the most respected type of knowledge. He, like Popper, asks the question of what is the criterion that distinguishes knowledge from superstition, ideology, or pseudo-science. It is also important to criticize the problem of placing a boundary between sciences and pseudo-science in terms of its theorization. Deciphering the problem is also important in terms of its theorization. To Lakatos, decimating between science and pseudo-science is as much a problem of philosophy as it is a problem of vital, social, political relations and has ethical inclusions.

[3] Cemal Güzel, *Çoğulculuğun Kuramcısı: Lakatos* (Ankara: Bilim ve Sanat, 1999), 7.
[4] Imre Lakatos, *The Methodology of Scientific Research Programmes* (New York: Cambridge University Press, 1978), 102.
[5] Lakatos, *The Methodology of Scientific Research Programmes*, 28.

Looking at how the problem of setting boundaries has been tried to be resolved in the past, Lakatos says that the degree of commitment to a proposition does not make it knowledge. Accordingly, even if a proposition is clearly 'plausible' and even if everyone believes it, it can be quite scientific. A theory can be highly scientific even if no one understands it, let everyone believes it[6].

A distinctive feature of scientific behaviour is that it is viewed with a certain scepticism even against theories that are given too much importance. Lakatos's statement best explains this scientific behaviour: "Indeed, the hallmark of scientific behaviour is a certain scepticism even towards one's most cherished theories. Blind commitment to a theory is not an intellectual virtue: it is an intellectual crime"[7].

Lakatos argues that the cognitive value of a theory has nothing to do with the psychological impact of the theory on people's minds, that is, the cognitive value of a theory is independent of the human mind (such as faith, commitment, understanding) that created it or understood it. According to him, only the objective basis on which the predictions of the theory have determined the scientific value of that theory[8].

In this context, for Lakatos, who said that it is important to look at what experimental reasoning is, one of the main conditions of scientific reasoning is that theories are supported by facts. The collapse of Newton's theory in the 17th century indicates that the scientist's criterion is imaginary thought. While many scientists before Einstein thought that Newton solved the ultimate laws of God by proving them with facts, some scientists at the beginning of the 19th century acknowledged that a few experiments on this theory had never actually been conducted and that even the necessary mechanisms could not be established[9].

This time, the question "if all scientific theories cannot be proved to the same extent, what distinguishes scientific knowledge from ignorance and science from pseudo-science" is raised. One of the answers to this question in the 20th century is the answer of the logician positivists [10] Logistic positivists say that the existence of other theories is based on total proof. If a theory has a high mathematical probability, this theory is considered scientific; if it is low or zeroes, it is not scientific, and as a result, the indicator of scientific honesty is to say nothing that does not show at least a high probability[11].

[6] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 8.
[7] Lakatos, *The Methodology of Scientific Research Programmes*, 1.
[8] Lakatos, *The Methodology of Scientific Research Programmes*, 1.
[9] Lakatos, *The Methodology of Scientific Research Programmes*, 1–2.
[10] A. Jules Ayer, *Dil, Doğruluk ve Mantık*, trans. Vehbi Hacıkadiroğlu (İstanbul: Metis Yayınları, 1988).
[11] Lakatos, *The Methodology of Scientific Research Programmes*, 3.

Even if logical positivists are allowed to distinguish between the style of discovery and the style of verification, their position is still threatened by the fact that the propositions of observation are theoretic and therefore fallible. They are ambitious enough to say that theories will acquire meaning only if they can be confirmed by direct observation. This position is fundamentally decimated by the fact that the sharp distinction between observation and theory cannot be verified because the theory is steeped in propositions derived from observation or rather an observation. Compared to other competing theories, he thought that induction should be abandoned because it was not new and uninteresting about the nature of science[12]. This phenomenon has led to the definition of Lakatos' inductive programme as a programme that is making a decline. But in 1934 Popper showed that the probability of mathematics of all theories, whether scientific or pseudoscientific, is zero to whatever extent the proof is given. If Popper is right, both scientific theories cannot be proven to the same extent, and they will be impossible to the same extent[13].

It was necessary to set a new distinction criterion between science and pseudo-science. Lakatos says that Popper offers a good criterion: A theory can be scientific without a piece of evidence to support it. Again, a theory can be pseudo-scientific if it is supported by all available evidence. In other words, the scientific or non-scientific feature of a theory can be determined independently of the facts. If a very strict experiment (or observation) can be mistaken, the theory can be "scientific". If such a 'possible falsifier' is rejected, that theory may be pseudo-scientific. Lakatos opposes the claim that a border is placed between science and pseudo-science by doing so, he is arguing that a border is set between a more scientific method and a non-scientific method. A distinction of the scientific method is a distinction of the pseudo-scientific method. Whether a proposition will be a pseudo-scientific dogma, or a real knowledge depends on whether it is possible to prepare observable conditions that can falsify it[14].

According to Lakatos, Popper's falsifiability criterion is also not effective in the analysis of the problem. Because this criterion of Popper ignores the stability of scientific theories. Scientists do not abandon a theory simply because facts contradict it. Usually, if they don't explain the anomaly, they ignore it and move on to other problems[15].

So, what is the criterion of scientificity or the criterion of being a science? Seeing the naivety of Popper's falsification, Kuhn refers to the scientific revolution as

[12] Alan Chalmers, *Bilim Dedikleri,* trans. *Hüsamettin Arslan* (Ankara: Vadi Yayınları, 1997), 77–79.
[13] Lakatos, *The Methodology of Scientific Research Programmes*, 3.
[14] Lakatos, *The Methodology of Scientific Research Programmes*, 4.
[15] Lakatos, *The Methodology of Scientific Research Programmes*, 4.

an irrational development. But it is not true that the scientific revolution is a kind of irrational change, a change of religion. Because if what Kuhn says is true, there will be no specific criteria for distinguishing between science and pseudo-science. There will be no distinction between scientific progress and intellectual decay, and there will be no objective criterion of scientific decency[16]. So, what criterion can Kuhn offer us in this case that will distinguish scientific progress from intellectual decadence?

Lakatos lays out a methodology of scientific research programmes that solved some problems that Popper and Kuhn could not solve in the 1970s: First, he claims that the defining unit of great scientific achievements is a research programme rather than a single isolated hypothesis. He also says that science is not just about trial and error or a series of conjectures and rebuttals. As regards Lakatos, it is not science if the proposition "All swans are white" can be falsified by the discovery of a black swan [17]

So, how do scientific revolutions happen according to Lakatos? For him, if there are two competing programmes and one of these programmes are degenerating and the other is progressing, scientists tend to join the advancing programme. Thus, as a result, scientific revolutions take place. Lakatos sees keeping them public as a matter of intellectual honesty. He argues that it is not dishonest to try perpetuating the corrupting programme and turn it into a progressive one[18].

2. Falsification against Fallibility

Lakatos, who wants to reveal the conflicting arguments better, thinks that it is necessary to reconstruct the situation in the philosophy of science after the "demolition of verificationism".

Scholars belonging to the verification school argue that scientific knowledge consists of proven postulates. Whether they are intellectualists or experimentalists, they all think that a singular proposition expressing an undeniable fact can refute a universal theory. But Lakatos believes that few of them think that the unity of a finite number of factual propositions is sufficient to prove a universal theory inductively. In the end, it is seen that all theories are equally unverifiable[19].

For centuries verificationists were the prevailing tradition in rational thought. Scepticism claimed only proven knowledge, and therefore any knowledge, that there is not and cannot be, but it did not reject verificationism. For scepticism,

[16] Lakatos, *The Methodology of Scientific Research Programmes*, 5.
[17] Imre Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, ed. Imre Lakatos, Alan Musgrave (London: Cambridge University Press, 1970), 102.
[18] Lakatos, *The Methodology of Scientific Research Programmes*, 12.
[19] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 11.

"knowledge" was nothing more than animal belief. Thus, confirmationist scepticism mocked objective knowledge and opened the door to irrationalism, mysticism, and superstition[20]. Even when the classical justificationists accepted theoretical science as unverifiable, they were afraid of having to admit that it was a fallacy. New validators reject such a requirement[21].

For Lakatos, substituting probability for evidence was an important step back for verification thinking. Particularly through the efforts of Popper, all theories are demonstrated to have zero probability, whatever the evidence. Not only are all theories equally unverifiable, but they are also equally improbable. Thus, the falsificationist thought of Popper gains importance.

Falsificationism is, in a sense, an important step back in rational thought. But since it was a step back from utopian criteria, it also enabled progress by destroying many confusing thoughts[22]. Lakatos analyzes Popper's falsificationism in three parts: Dogmatic falsificationism, methodological falsificationism, and sophisticated falsificationism.

2.1. Dogmatic Falsificationism

Dogmatic falsificationism is a very important type of falsificationism. It accepts the unconditional fallibility of all scientific theories; it is strictly empiricist without being inductive: It denies that the certainty of the empirical basis can be carried over to theories. Thus, dogmatic falsificationism is the weakest type of verificationism[23].

The hallmark of dogmatic falsificationism is the assumption that all theories are equally predictive. Although science cannot prove any theory, it can be disproved; "It can, with complete logical certainty, renounce (the act of rejecting) what is false," that is, there is a very solid empirical foundation of facts that can be used to refute theories[24].

It is the basis of scientific honesty to predetermine an experiment that will lead to the abandonment of the theory in case the result contradicts the theory. For the falsificationist, even once a proposition is falsified, it must be rejected unconditionally. The dogmatic falsificationist ignores falsifiable (non-

[20] Lakatos, *The Methodology of Scientific Research Programmes*, 11.
[21] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 11.
[22] Lakatos, *The Methodology of Scientific Research Programmes*, 11.
[23] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 96–98.
[24] Seda Özsoy, 'Popper ve Kuhn Arasında: Imre Lakatos ve Bilimsel Metodoloji İçin Yeni Bir Öneri', *Kaygı* 30/ (2018), 218.

tautological) propositions and rejects their scientific status, calling them "metaphysical".[25]

For dogmatic falsificationism, science progresses by repeatedly breaking down theories with the help of strong facts. For example, on this view, Descartes' vortex theory of gravity was refuted and ruled out by the fact that planets move in ellipses, not Cartesian circles; however, Newton's theory successfully explained the phenomena present at the time, both those explained by Descartes' theory and those that refuted it. Thus, Newton's theory replaced Descartes's. Similarly, as seen by the falsificationists, Newton's theory was in turn disproved and proved false by the irregular perihelion of Mercury. Einstein's theory explained this[26]. Thus, science proceeds with fearless fiction that has never been proven or even made possible. But some of these fictions are later eliminated by unshakable final falsifications, giving way to new and, at least at first, unfalsified fictions even more fearlessly.

2.1.1. Dogmatic Falsificationism Criticism

According to Lakatos, dogmatic falsificationism which is based on two false assumptions is untenable. The first of these assumptions is that there is both a natural and a psychological boundary between theoretical or speculative propositions on the one hand and fact or observation statements on the other. Secondly, a proposition will be true if it has the criterion of being a psychological, factual proposition, or observation proposition; In this case, it is the assumption that the proposition can be said to be proven by the facts[27]. For Lakatos, a limiting criterion also complements these assumptions, and only those theories that prohibit certain observable states of fact, so that they are factually irrefutable, are "scientific".[28] In other words, the fact that a theory has an empirical basis makes it "scientific".

Lakatos argues that both assumptions are wrong. While he says that the first assumption is wrong, he states that the mind is not a blank slate (tabula rasa), as the experimenters argue, and that every mind is full of needs and expectations. However, while these assumptions are accepted, the latter is inconsistent. Thus, there are no natural (i.e., psychological) criteria for demarcating between observational and theoretical statements. This allows the first assumption to be overturned. While the truth values of observation statements cannot be determined precisely, the experiment does not prove any factual statement. Propositions cannot be derived from facts and cannot be proved by experiment, but they can derive from other propositions. But the

[25] Lakatos, *The Methodology of Scientific Research Programmes*, 19.
[26] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 97.
[27] Lakatos, *The Methodology of Scientific Research Programmes*, 14.
[28] Lakatos, *The Methodology of Scientific Research Programmes*, 14.

peculiarity of both theories and factual propositions is that they are fallible[29]. Therefore, we can neither prove nor falsify theories. The theoretical nature of scientific propositions and their irreversibly fallible are facts that falsify the second assumption.

Finally, even if there were a natural decimation between the propositions of observation and theories, if experiments could verify the experimental reports, their power of falsification would still be limited. Scientific theories cannot completely prevent any observable situation. As such, the 'relentless' functioning of dogmatic falsification collapses[30]. Lakatos summarizes this as follows: Scientific theories are not only equally unprovable, and equally improbable, but they are also equally undisprovable. But the recognition that not only the theoretical but all the propositions in science are fallible, means the total collapse of all forms of dogmatic justificationism as theories of scientific rationality [31]

2.2 Methodological Falsificationism

The predominance of fallible evidence has led to the collapse of dogmatic falsificationism. If all scientific theories are fallible, it will only be possible to criticize them for inconsistency. In that case, the followıng question will come to mind: "In what sense is science empirical?" If it is possible to prove and disprove scientific theories, then the sceptics will be completely right. From this point of view, science is nothing but empty doubt, and there is no such thing as scientific progress. So, can it produce a thesis against scepticism? Can scientific criticism save us from fallibility, that is, from delusions? Could there be a fallible theory of scientific progress? On what basis can a theory be ruled out if scientific criticism is wrong? It will be possible to ask this and similar questions[32].

Lakatos secondly speaks of methodological falsificationism, which he sees as a kind of conciliationism. He states that to understand methodological falsificationism, it is necessary to look at the types of conventionalism. Lakatos says that the most important type of conventionalism, which is divided into two as "passivist" and "activist"[33], is revolutionary conventionalism within the activist conventionalism. From this emerged Pierre Duhem's simplicity and Popper's methodological falsificationism[34].

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[29] Lakatos, *The Methodology of Scientific Research Programmes*, 14–17.
[30] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 103.
[31] Lakatos, *The Methodology of Scientific Research Programmes*, 19.
[32] Lakatos, *The Methodology of Scientific Research Programmes*, 20.
[33] Lakatos, *The Methodology of Scientific Research Programmes*, 20.
[34] Gökhan Gürdal, 'Bilimsel Gelişme Teorileri Açısından I. Lakatos ve L. Laudan'ın Düşüncelerinin Karşılaştırılması', *Kaygı* 27/ (2016), 33.

Lakatos says that Duhem concedes that the conventionalists' theories of physics cannot be shattered by mere refutations. He states that they attribute these defences to the following view: He claims that a building whose columns are shaken can crumble under the weight of constant repairs and well-mixed support elements when these columns are no longer able to support it. In this case, he says that the theory should lose its original simplicity and give its place to another theory[35]. However, falsification is left to subjectivity or the scientific situation, and much room is given to the foreground theory.

Saying that Popper also tried finding a more objective and more crucial criterion, Lakatos mentions that he did not accept the clipping of empiricism in Duhem and that experiments suggested a methodology that does not lose its power even in mature science. Popper's methodological falsificationism is both conventionalist and falsificationist. But Popper says that he differs from the conventions by arguing that the propositions agreed upon in Spatio-temporal terms are singular, not universal[36].

According to methodological or Popperian falsificationism, some useless theories must be abandoned. If this is not done, the development of science will cause complete turmoil. A theory is valuable if the methodological falsificationist is striving to survive under very difficult conditions to ensure that the most appropriate theories can survive. Under these conditions, the theory, once falsified, must be abandoned. These theories should only be retained if they can stand the test[37].

Unlike the dogmatic falsificationist, which combines refutation with rejection, the methodological falsificationist distinguishes it. The methodological falsificationist is fallibility, but that doesn't make it weak. Based on this, the methodological falsificationist introduces a new criterion of demarcation: Theories that can be falsified or denied are scientific. In other words, only theories with an empirical basis are scientific, which marks the difference between dogmatic falsificationism and methodological falsificationism[38].

2.2.1. Methodological Falsificationism Criticism

Methodological falsification, which is more libertarian than dogmatic falsification, nevertheless remains insufficient to explain the scientific one.

[35] Lakatos, *The Methodology of Scientific Research Programmes*, 21–22.
[36] Lakatos, *The Methodology of Scientific Research Programmes*, 22.
[37] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 13–14.
[38] Lakatos, *The Methodology of Scientific Research Programmes*, 25.

Lakatos says that deciphering the boundary between the scientific and the non-scientific can only happen by applying to the history of science[39].

Lakatos says that there are at least two critical features in both dogmatic falsification and methodological falsification that do not coincide with the history of science: The first of them, in both falsifications, is a double decider between a test, theory, and experiment, or it should be so that eventually both will meet. However, from the viewpoint of the history of science, it seems that there is at least a triple conflict between tests, decoupling theories, and experiments. The second feature is that for these falsifier views, the only interesting result of such an encounter is a (finishing) falsification; discoveries are refutations of scientific assumptions. However, at first glance, it shows that some experiments are verifications rather than falsifications[40].

Lakatos says that initially, each theory contained many outliers, that is, no theory is initially perfect. In Lakatos' view, this is an improvement if it is possible to see with certainty that scientific knowledge has ceased to search for facts. Because of this, he believes that it is pointless to read the history of science without any theories[41].

For Lakatos, methodological falsificationism is too rigid; and he then replaced the methodology and understanding of scientific progress with a sophisticated (subtle) falsificationism, in which he proposed a new falsificationism of naive forms of methodological falsificationism. Lakatos says that this is the path that Popper is following and that he intends to follow it[42].

2.3. Sophisticated Falsificationism against Naive Methodological Falsificationism

In Lakatos' view, if the history of science fails to justify the theory of scientific rationality, there are two options: The first is to abandon the effort to provide a rational explanation for the success of science. Secondly, instead of naive variants of methodological falsificationism, a sophisticated type of falsificationism is introduced, which gives new rationality of falsification and saves methodology and the idea of scientific progress[43].

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[39] Tekin Atmaca, *Lakatos'un Bilim Felsefesinde Rasyonellik" III. Türkiye Lisansüstü Çalışmalar Kongresi Bildiriler Kitabı-II, Editörler: Nuriye Kayar, Ümit Güneş* (Sakarya: Sakarya Üniversitesi Basımevi Müdürlüğü, 2014), 174.

[40] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 14.

[41] Atmaca, *Lakatos'un Bilim Felsefesinde Rasyonellik" III. Türkiye Lisansüstü Çalışmalar Kongresi Bildiriler Kitabı-II, Editörler: Nuriye Kayar, Ümit Güneş*, 174–175.

[42] Lakatos, *The Methodology of Scientific Research Programmes*, 31.

[43] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 14.

Sophisticated falsificationism differs from naive falsificationism not only in the criterion of demarcation but also in the rules of falsification or elimination. According to the naive falsifier, a theory that is considered experimentally falsifiable is 'scientific'. For sophisticated falsification, a theory is 'scientific' only if it has more experimental content than previous theories, that is, only if it leads to the discovery of new facts. This condition can be solved in two points: firstly, the fact that the new theory has additional experimental content can be instantly checked by this a priori logical analysis, and secondly, it is scientism, which is the verification of some of this content. This can only be checked experimentally, and its duration is unclear[44].

When a naive falsificationist theory contradicts it, it is falsified by a reinforced observation statement. But to the sophisticated falsificationist, a scientific theory of T is falsifiable if and only if another theory of T* has the following characteristics: (1) T* has more empirical content on T: that is, it must predict phenomena that are unexpected or even prohibited by theory T in the light of new facts. (2) T* should describe T's previous achievement; that is, all the content of T in the unimproved state must also be contained (within the limits of its observational error) by T*; (3) Some of the extra content of T* is supported[45].

To Lakatos, a scientific theory should be evaluated together with its auxiliary assumptions and initial conditions, as well as with the preceding theories to understand what kind of change it caused. In this case, it will be a set of theories, not individual theories that are evaluated[46].

In Lakatos' view, each theory is a theory set (T1, T2, T3 …) that must contain at least as much content as the unimproved content of the preceding theory. He argues that such a set of theories is also empirically progressive if each new theory has more empirical content than its predecessor, that is, if a new theory leads to the discovery of some new facts. A problem change is progressive if it is both theoretically and empirically progressive, otherwise, it is a degenerating problem change. Problem changes should be considered scientific if they are at least theoretically progressive, otherwise, they should be dismissed as pseudo-scientific problem changes. A phenomenon is scientific if a new phenomenon can be explained together with it. Lakatos argues that it is a categorical mistake in terms of sophisticated falsificationism to shift the problem of scientificity from theories to a series of theories and to reduce scientificity to a single theory[47].

[44] Lakatos, *The Methodology of Scientific Research Programmes*, 31.
[45] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 118.
[46] Lakatos, *The Methodology of Scientific Research Programmes*, 32.
[47] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 118–119.

Lakatos says that in sophisticated falsification, falsification is impossible before the emergence of a better theory. The crucial element in falsification is whether the new theory gives extra new information compared to the previous one and whether it is confirmed. While verificationists cared about examples that confirmed a theory, naive falsifiers also highlighted examples that refuted it. To methodological falsifiers, those that are life-threatening are examples that confirm additional information, albeit relatively infrequently[48].

According to naive falsification, science develops with repeated experimental demolitions of theories, but these demolitions do not have to be. The constant increase of theories is optional. For sophisticated falsification, the spread of theories cannot wait for the refutation of accepted theories. In naive falsification, it is a question of replacing a falsified assumption with a better assumption, while in sophisticated falsification, it is a priority to replace any assumption with a better one[49].

Confirmatory honesty accepted only the proven and ignored the unproven. For the neojustificationist, honesty is the determination of the probability of any existing empirical assumption, the honesty understanding of naive falsificationism, testing of the falsifiable, negation of the unfalsifiable, and the unfalsifiable. Sophisticated methodological falsificationism also sets a new benchmark for intellectual honesty. For him, he should look at things from different points of view, propose new theories that predict new phenomena, and reject theories that have been replaced by stronger theories[50].

Lakatos supports his explanations with some examples: Einstein's theory is no better than Newton's because it has not been disproved. But Einstein's theory is better than Newton's because it makes progress. That theory explained everything that Newton's theory successfully explained, but also, to some extent, all known differences, phenomena that Newton's theory did not address. At least some of the extra content of Einstein's theory has been supported by experiments[51].

To Lakatos, replacing a theory refuted by facts with another theory is no longer a problem. The real problem is how to resolve inconsistencies between related theories. To the question of which of the inconsistent theories should be excluded, the sophisticated falsificationist proposes to replace the first one, then the other, then both. Lakatos advocated choosing the theory that led to the most

[48] Lakatos, *The Methodology of Scientific Research Programmes*, 32.
[49] Lakatos, *The Methodology of Scientific Research Programmes*, 36.
[50] Lakatos, *The Methodology of Scientific Research Programmes*, 38.
[51] Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, 124.

confirmed content increase and the most progressive problem-change after trial[52].

In Lakatos' view, the difference of sophisticated falsificationism is that it replaces the theory concept, which is the basic concept of the logic of discovery, with sets of theories. "A theory set consists of successive theories; is not a specific theory that can be considered scientific or pseudo-scientific"[53]. Each of these sets of theories is strongly and consistently linked together to become research programmes. Lakatos argues that this continuity plays an important role in the history of science, and at this point, it poses the problem: The fundamental problems of the logic of discovery cannot be satisfactorily addressed outside of the methodological examination of research programme[54].

Conclusion

Lakatos is a thinker who argues that scientific progress can be explained rationally in the contemporary philosophy of science literature. According to Lakatos, it is necessary to know the history of science well to assimilate the philosophy of science; analysis of the philosophy of science about what science is to describe the facts in the history of science well; that is, philosophical analysis is necessary, which distinguishes science from other non-science studies.

What distinguishes Lakatos from his predecessors is his thought that the point to be considered in the evaluation of theories in terms of scientificity is not a single theory, but a series of theories. It is a research programme, not a theory that needs to be evaluated. Research programmes can be divided into two parts as progressive and degenerative research programmes, depending on their power to predict new phenomena or whether some of the extra empirical content is supported by experiments. If a research programme is running after pre-existing facts to keep up with pre-existing facts instead of predicting new facts, it is a corrupt programme. Therefore, Lakatos offers us a new criterion in the philosophy of science. This criterion is a criterion that explains the basis on which evaluations of the history of science should be made and what should be considered during these evaluations; this criterion, which will also reveal the rational basis of the progress of science, offers a solution to the problem of scientific rationality. The history of science is not as irrational as some claim; on the contrary, it is possible to rationally reconstruct the history of science with a brand-new reading, and this study also needs to be done.

[52] Güzel, *Çoğulculuğun Kuramcısı: Lakatos*, 17.
[53] Lakatos, *The Methodology of Scientific Research Programmes*, 47.
[54] Lakatos, *The Methodology of Scientific Research Programmes*, 47.

In short, Lakatos defines objectivity and rationality in terms of progressive research programmes by saying that scientific progress will be through research programmes, and he is a contemporary philosopher of science who opposed the scientific criteria of modern science. According to him, the development of a research programme both empirically and theoretically is the progress of science. Lakatos has tried to emphasize that science progresses rationally. For a theory to be more valid, to Lakatos, it must be able to explain more than previous theories.

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Veri Analizi | Data Analysis: NÖ (%50), YT (%50)

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