



THE TAYLOR-KUHN DEBATE ON THE DISTINCTION BETWEEN THE NATURAL AND SOCIAL SCIENCES

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Resumo

Este artigo tem por objetivo esclarecer os pontos relevantes no debate contemporâneo da distinção entre as ciências naturais e ciências humanas realizado por Charles Taylor e Thomas S. Kuhn. Inicialmente, procuramos elucidar relações entre a Antropologia Filosófica e o esforço de definição das denominadas Ciências da Natureza e Ciências do Espírito desenvolvidas na obra de Wilhelm Dilthey, base para Taylor em seu artigo *Interpretation and the Sciences of Man*. Assim, Kuhn discutirá o capítulo de Taylor em *As ciências naturais e as ciências humanas* que envolvem crítica sobre a natureza e objetivo das ciências incluindo a participação do sujeito, da comunidade científica e da hermenêutica estabelecida dentro do paradigma de tal área na constituição de sua interpretação. São feitos esclarecimentos de caráter filosófico e genealógico destas obras, bem como a análise sobre pontos convergentes e divergentes na distinção entre os tipos de ciências. Ao final, comentários críticos por parte de Hugh Lacey dos tópicos abordados no debate são implementados, em conjunto com interpretações de escritos tardios do próprio Kuhn, ampliando a discussão a partir de sua própria filosofia e dos valores epistêmicos presentes no empreendimento científico atual.

Palavras-chave: Charles Taylor. Ciência Normal. Hermenêutica. Thomas S. Kuhn. Valores Epistêmicos.

Abstract

*This paper aims to clarify the points considered relevant in the contemporary debate on the distinction between natural and human sciences carried out by Charles Taylor and Thomas S. Kuhn. Initially, we seek to elucidate relationships between Philosophical Anthropology and the effort to define the so-called Sciences of Nature and Sciences of the Spirit developed in the work of Wilhelm Dilthey – basis for Taylor in his paper *Interpretation and the Sciences of Man*. Thus, Kuhn will discuss Taylor's chapter in *The natural sciences and the human sciences*, which involves criticism of the nature and objective of the sciences including the participation of the subject, the scientific community and the hermeneutics established within the paradigm of such an area in the constitution of its interpretation. Philosophical and genealogical clarifications of their work are made, as well as analysis of convergent and divergent points in the distinction between types of science. In the end, critical comments by Hugh Lacey on the topics covered in the debate are implemented together with interpretations of Kuhn's late writings, expanding the discussion based on his own philosophy and the epistemic values present in the current scientific endeavor.*

Keywords: Charles Taylor. Epistemic Values. Hermeneutics. Normal Science. Thomas S. Kuhn

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THE NATURAL SCIENCES AND THE SPIRITUAL SCIENCES

Humans are the only known species capable of imagining and producing systems and structures for elaborating and describing the phenomena that surround them. Such developments enable the creation of instruments and experiments, whether theoretical or practical, that provide us with greater explanations and understanding of how the world, in its constituent physical parts, works. This world, with its underlying laws and set of objects that exist independently of any artifice that measures and identifies them, makes up what we call the natural world, and the human endeavors that investigate it are called natural sciences or sciences of nature (Naturwissenschaften).

However, due to its own characteristics of elaboration, reflection, and symbolic attribution, society, based on its actions and behaviors toward one another, develops rules, rites, concepts, and instruments within its social practices. Besides enabling and allowing coexistence in society, these phenomena fundamentally change and alter over time, depending on interactions, and new social phenomena are added to the community's body of experience, whether intentional or not. This dynamics — because it integrates and is dependent on human creative capacities — appears to have a distinct nature or ontological status from the natural sciences, *prima facie* independent of social practices and conceptual determinations. In the philosophical tradition, this branch is referred to as the social/human sciences or Spiritual Sciences (Geisteswissenschaften).

The sciences, whether natural or social, are endeavors that lead us to certain more fundamental questions about understanding its own nature and processes. And like all human activity, beyond explanations specific to its field of investigation, there is a lack of philosophical elaborations that provide an understanding of this type of activity. So, in what area of philosophical investigation does such activity fall? Within current perspectives, we have the strand of Philosophical Anthropology, concerned with the conception and investigation of what constitutes the human being (antrophos). Attempts to signify and explain the human integrate different aspects of philosophical analysis, of an ontological nature (the constitution and ways of being of the human), epistemic, methodological (the ways of investigating and knowing the human, its properties, relationships) and history (the views of the human in different eras).

Even these interrelated and difficult to dissociate aspects – such relationships being dependent on the philosophical approach to the subject itself – there is the possibility of a specific and appropriate emphasis on the analysis. This is what research seeks to do to identify anthropological epistemic status. According to philosopher Henrique C. de Lima Vaz (Lima Vaz, 1991, pp. 9-10), the aim is to understand how this distinction arises within the naturalist approach—more reductive of human beings to the natural world

and its scientific-methodological methods—and the culturalist approach—which advocates a more fundamental distinction between culture and nature in human studies. It is in this latter anthropological context that the debate arises regarding the distinction between types of science and their foundations. We have the German philosopher Wilhelm Dilthey as a precursor of this hermeneutic distinction.

Dilthey, in his book *Introduction to the Sciences of Spirit* (Dilthey, 1986), seeks to affirm why the Sciences of Spirit are a field of investigation independent of the Sciences of Nature. Because they are historical-social in nature, their objectives are not the *explanans* (*Erklären*) and mastery of the underlying reality, but rather the understanding (*Verstehen*) of it, evoking their independence:

(...) in the depth and totality of human self-consciousness. Still untouched by investigations into the origin of the spiritual, man finds in this self-consciousness a sovereignty of the will, responsibility for his actions, a faculty to submit everything to thought and resist all forms of imprisonment—the freedom of his person, which distinguishes him from all nature. In this nature, indeed, to use a Spinozistic expression, it is found as *imperium in imperio* (Dilthey, 1986, p. 41, our translation).

Carrying out an ontological-historical review to understand the philosophical concepts involved in the distinction between natural life and spiritual life, Dilthey arrives at the opposition between the phenomena of the external world experienced through sensations, and the apprehension of one's own psychic activities, which occurs through reflection – the latter encountering limitations to be treated empirically – having its autonomous constitution in the dynamics between the material and spiritual components in this “inner sphere”. Thus, even if we find an incompatibility residing in the dichotomy involving regularity, quantity and divisibility of matter in physical phenomena and the spontaneity of will and unity of consciousness in mental phenomena, it has the Kantian consequence that we cannot suppress the limits of experience, as well as not being able to discard spiritual life based on it.

However, as Dilthey defends the independence of the sciences of the spirit, the philosopher highlights a mutual dependence of the facts of the spirit (which aim at ends, values and goods) and of nature (underlying physical structures and laws) which, by linking and integrating themselves together with the background of the existing historical-social reality, make it possible within the sciences of the spirit to develop a comprehensive articulation through what he calls the synthetic spirit of the researcher (Dilthey, 1986, p. 67), thus constituting the work of science that seeks to understand the abstract regularities of a particular historical-social reality. Based on these particular sciences based on the understanding of external and internal experiences in a historical-social context established individually, added to the component of subjects sharing experiences and carrying out actions having certain motivations, feelings and desires in interaction with other subjects that leads to an extension of these abstract regularities, one can investigate the representative structures of the elements that constitute the consciousness of these

individuals located historically and culturally: These structures are the object of investigation in anthropology and psychology, determining their regularity and constantly in flux, through actions and activities driven by the wills and values of the social environment, which are both constituted and constituent of historical-social investigations. It is based on this traditional analysis provided by Dilthey that Charles Taylor seeks to investigate the status of the human sciences.

Taylor and the hermeneutic circle

In addressing the debate between Charles Taylor and Thomas Kuhn on the nature of the human sciences and their distinction from the natural sciences, we will initially draw on the article that initiated the discussion, entitled “*Interpretation and the Sciences of Man*”¹ In this article, Taylor seeks to explain the relevance and primacy of interpretation within the context of the human sciences for explaining the phenomena the researcher intends to analyze. For Taylor, interpretation seeks to bring clarity and coherence to an underlying object of study. Therefore, we must first establish a field of objects, distinguishing the signifiers and expressions of this field of objects from their meanings — acknowledging that the latter can be denoted by various expressions², and that such dynamics occur through or directed toward an area of investigation or topic (*subject*).

Taylor implicitly highlights in this part of the text that there are distinctions between expressions used in the natural sciences – such as rock samples and snow crystals – and those contained in the interpretive human sciences, as we can talk about the former without losing meaning and coherence even if we do not take into account the area of investigation, while in the latter we cannot do this, as we need to elucidate the meaning of the expressions in the texts investigated, thus requiring a contextual approach to make it coherent. Therefore, the object of an interpretative science must have meaning – distinguishing it from the expressions used – for or directed towards a topic.

Thus, Taylor introduces a new problem to be clarified, involving epistemological and ontological aspects of research: what would be the judgmental criterion in an interpretative science? He admits that even with the need for a context to separate meaning from the expression that denotes it, this may sometimes not be sufficient, due to the possibility of not being able to fully capture the nuances of the context. However, expressing the meaning of the text in a different way, clarifying it and enabling others to

¹ In Taylor, Charles. *Philosophy and the Human Sciences*. Cambridge: Cambridge University Press, pp. 15-57, 1985a.

² It is noticeable that he adopts a mode of language analysis similar to Frege's, as well as in Paul Ricoeur's work *The Living Metaphor of Study VII*. Both works use Frege's distinction between sense and reference (*Sinn and Bedeutung*), with modifications applied to the subject undertaking the hermeneutical endeavor focused on texts. For more details see (Frege, 2009, chap. 7) and (Ricoeur, 2000, study VII).

understand what was previously disjointed, opaque, and contradictory, does not imply that it has meaning for everyone. Some may disregard this alternative way of expressing the meaning of what is being discussed, resorting to rereadings and other interpretations of the previous one, in a process called the *hermeneutic circle*.

According to the Canadian philosopher, the process can also be approached as part-whole relations: one seeks to make sense of the whole and focuses on the readings and interpretations of parts of the subject being analyzed. We only understand the meaning by analyzing the relationships of expressions within the whole, and so on. In addition to the need to value convincing the interlocutor and sharing their understanding (sometimes even awakening the intuitions used for the analysis) on the topic with them (observed by Taylor as a forensic way of approaching the situation), those performing the hermeneutic analysis must also subject their own judgment to this position. The best solution to this epistemological problem is to admit a degree of uncertainty in the analysis. However, this is not the only answer to the problem.

Two theses can be highlighted in the methodological question: one is the Hegelian “rationalist” thesis, which holds that understanding the whole occurs within an internal necessity of thought, in which there is no other way to conceive what is thought, and therefore there is no greater degree of certainty to be achieved, reaching the Absolute and breaking the infinity of the circle; the other is called “empiricist,” in which there is no level of interpretation to be considered. Thus, the aim is to go beyond and avoid such a circle driven by subjectivity, by considering so-called sensitive data as “fundamental blocks” of knowledge and the analysis of raw data as minimal units of information. Such data are not subject to any prior judgment or interpretation, and are not invalidated by any other interpretation.

To this end, logical positivists sought to add logical and mathematical aspects to the empirical verification of raw data, making the inductive process more amenable to certainty and necessity. However, Taylor considers this latter epistemology sterile in its attempt to explain the most varied aspects and dimensions of human life, in which the notion of interpretation can succeed in explicating such nuances and intersubjective meanings. Now, it falls to Taylor to argue more conclusively why the hermeneutic method would be more appropriate for the human sciences, and within his justification, he will work with a notion of meaning that he considers broader than that of linguistic meaning³.

³ An important part of this elaboration is that he begins to introduce interpretation not only focused on understanding human beings, but also highlighting their actions, and this will be more important as a methodological criterion for distinguishing between the human sciences and the natural sciences.

Experiential Meaning and Self-Interpretation

In this way, the philosopher establishes that meaning must have a substrate — that is, it must be about something — in a *semantic field*, as no meaning is established without being related to other meanings that give it form, describing it, invoking it, acquiring its place within the categories and the established network of concepts. However, as a new concept is introduced into this field, there is a shift in the delineation of the adjacent concepts that constitute it. Because the integration of the term occurs in this interaction and use between and by other terms, its meaning is fixed by what are called fields of contrast within the language games of practices in their uses within a community and its political, economic, and social structures. Thus, at this point, there is a differentiation between linguistic meaning and what he is seeking to clarify here, calling it *experiential meaning*, the latter having three dimensions that compose it. This is the meaning for a topic, for something in a field of contrasts, distinct from linguistic meaning, which contains another component: the so-called *world of referents* for the terms that make up the field under consideration.

Thus, Taylor emphasizes that the human sciences contain terms that describe the performance of actions, behaviors, procedures, and emotions within their social context, and this is where the hermeneutic circle arises: experiential meanings can only be understood within a context in which we have lived experiences in conjunction with the use of such terms and their adjacent contrasts. In this way, we can do something (exalt, praise, reprimand, excuse) through the language common to all, and due to these interactions within a community, we add more social signifiers to the terms, which are contextualized within a way of life that we cannot conceive of without experiencing or at least imagining ourselves in these significant social practices concerning the linguistic community in which such a term is used. Without this condition, there is no possible translation or explanation of the term. Thus, when we take an action, for example, in seeking to understand it, we also seek coherence and meaning on the part of the agent, even if it appears irrational or contradictory. Within a context, interpreting the attitudes and actions of individuals or groups in a community that make sense and bring to light an understanding of the situation under analysis, that is, a topic, necessarily falls within one of the conditions of what hermeneutics aims to do: to bring meaning.

However, a stalemate arises in the analysis when we address the next condition of making something coherent and making sense, which is the distinction between meaning and the underlying substance involved. Meaning can be realized in other substances, be they actions, attitudes, or behavioral patterns. However, we may have a substance whose experiential meaning is only expressed in a certain way within the language it integrates. Therefore, interpreting an analogous text results in another analogous text, as there are different ways to express the meaning. But how could we clearly interpret these types of terms

that denote experiential meanings for another text, given that they would be completely distinct in comparison? This is clarified by observing that contrasting fields and semantic fields are not independent of each other. Therefore, the variations and nuances of adjacent terms—such as certain desires, judgments, and feelings—that define a contrasting field of an experiential meaning at the cultural and social level are not dissociated from the semantic field that characterizes such meanings.

We must also consider, when speaking about experiential meaning, the type of relationship between these qualitative aspects of the subject and their vocabulary, whether descriptive or expressive. We could first define sentimental vocabulary as being based on pre-existing feelings, to which their corresponding words are applied. However, this model is unsustainable, because according to Taylor, there are circumstances in which the more sophisticated account we are subjected to of emotions and feelings makes our own affective life more sophisticated. Therefore, our vocabulary about emotional and affective states can influence our own awareness, perception, and thinking about them. Let us consider a second model, which corroborates everything stated in this paragraph and concludes that “thinking about” causes us to have such emotional states. This would also be unsustainable, because we have no *prima facie* way of knowing whether, by providing more clearly defined descriptions or definitions, the subject cannot be misled, mistaken, or be attributed in bad faith when using them in certain circumstances.

Thus, correspondence or arbitrary relationships between the vocabulary used and emotions, feelings, intentions, and other mental states are not acceptable in isolation, but both models are justified. To demonstrate this, Taylor focuses on two beliefs about certain qualities of the interpreting subject that favor or hinder the use of appropriate vocabulary: self-lucidity and self-deception. He points out that both sides of the relationship exist within these two models, for when there is lucidity about oneself and one's own thoughts, some change can occur through them. However, when there is an error in the way of thinking and making sense of something, this can be seen as a form of inauthenticity, illusion, and bad faith. Observing the interdependence between the two models and a dialectic established between the two forms of relationship, even in the mental states of the analyzing subject, it becomes clear that such a dynamic implies that the human being is a *self-interpreting* animal. Therefore, there is no human interpretation that does not involve a self-interpretation permeated by a flow of actions. These second-order interpretations of experiential meanings integrate and compose these meanings.

Thus, the second condition for a science of interpretation arises from the correspondence and dialectic between actions and behaviors and experiential meaning, which is constituted when the explanation of these movements is incorporated into their self-interpretation into the *explicans*. And even if these descriptions of actions or behaviors are expressed differently through different terms, such descriptions seek to denote the same meaning more clearly. Therefore, experiential meaning provides an explanatory

pattern that makes sense and makes the body of actions and behaviors involved more coherent (the fact that it “makes sense” is an offering of interpretation). Thus, we can seek to express the *explicandum* differently, because we link this interpretation and its meanings to our agency; this agency changes, and when we return to the behavioral flow in which these meanings come to life, they are reinterpreted, achieving one of the goals of a hermeneutic science.

Ergo, to demonstrate the third condition of a hermeneutic science in the chapter—which would be to focus on an area of inquiry—Taylor gives examples of how certain economic and political concepts—such as “negotiation” and “equity”—are dependent on an entire intersubjective context involving the actions and intentional behaviors of the members of the community that uses these concepts. This demonstrates that a hermeneutic approach is necessary to elucidate the relationships and meaning of the topic in question, and thus the area of inquiry concerning the interpreted semantic field, based on the associated experiential meanings, which require this hermeneutic circle to establish such a semantic field, which can always be reinterpreted.

There are discussions about a point involving the notion of *institutional rules*: constituent and sometimes constituting, shaping what is called social reality, whose meaning is based on this intersubjective semantic structure among the agents involved socially. These rules underlie the behaviors and actions of these agents, which, through the beliefs and intentions linked to such behaviors, ultimately modify or reinforce the semantic structure itself. This alters social reality itself, seemingly further rendering an empirical analysis impossible, since this would conduct its scientific investigation through *brute data identifiable*.

The in-depth analysis of the above phenomenon, called the *looping effect*, was initially written by Canadian philosopher Ian Hacking in (Hacking, 2009). This stems from readings of Kuhn's work and Foucault's project of establishing a “historical ontology of ourselves.” Hacking describes in this context the characteristic restructuring of our ways of conceptualizing, categorizing, and delimiting particulars through universals. In the processes of naming and instantiation involved, other properties and dispositions associated with such processes manifest, a form of concept known as *interactive kinds*. This topic was further explored and discussed by other philosophers⁴, but Hacking himself did not continue the approach due to problems that he considered indissoluble in establishing a clear and distinct definition of interactive types⁵, but delving into this topic, even if fruitful, would go beyond the scope of this article.

⁴ For more in-depth information and critiques of interactive types, see (Khalidi, 2010) and (Bird, 2014).

⁵ In (Hacking, 2009b) he recapitulates his examples and reinterprets some of them through other cases, demonstrating a certain vagueness in identifying types that can be considered interactive due to the fact that certain sets of particulars are what he calls moving targets, i.e. difficult to distinguish conceptually.

Kuhnian Philosophy and the Human Sciences

Thomas S. Kuhn directly discusses Taylor's chapter in his article entitled “*The Natural Sciences and the Human Sciences*,” even though he discusses some topics *en passant* or takes them as implied. He begins with an autobiographical account of his own academic trajectory, which parallels hermeneutic approaches to the social sciences, despite not having a strong grasp of the material. He highlights his reading of texts by Max Weber and Ernst Cassirer⁷, demonstrating appreciation for and similarity with their notions and ideas on how scientific research is conducted and understood in the sciences. However, they are almost two sides of the same coin, because while these authors emphasize research in the social sciences or humanities in a more interpretive manner and against a historicist backdrop, Kuhn's account of the natural sciences follows a similar pattern. The basis of this account serves to introduce a direct critique of the traditional conception of the natural sciences—the way they describe and reproduce the way they are viewed by scientists and philosophers of science—along positivist and empiricist lines, and their objective aspect, taking into account raw data and the complete independence of natural entities from any subject or linguistic community for their foundation. Kuhn demonstrates his historicist vision in his book-essay “*The Structure of Scientific Revolutions*” (hereinafter *Structure*), in which we must understand some of his terms and main insights in conjunction with other articles to grasp what he argues based on Taylor's chapter.

In *Structure*, Kuhn highlights a science with a historiographical basis and completely distinct from the form reported in textbooks, which emphasized the hypothetical-deductive method, cumulativeness, and methodological unity. Science is described in the *Structure*, establishing its entities, methods, values, and practices within its community within a necessary historical framework — due to its well-defined

⁶ Kuhn, Thomas S., *The Natural Sciences and the Human Sciences*. In: *The Road Since Structure*. Conant, James; Haugeland, John (eds.). Translated by César Mortari: Editora Unesp, São Paulo, pp. 265-273, 2003a.

⁷ In his book *Essay on Man* (Cassirer, 2005), Cassirer defines and distinguishes man from other animals in his anthropological philosophy as a symbolic animal. There are chapters that address science as the most lofty and meticulous human activity, developing in extraordinary situations that manifest themselves in certain values that are both social and epistemic (this will be discussed later in the article) that were integrated and considered by a certain community — such as regularity in the natural order and beauty as a trait of reality — together with greater linguistic elaboration, opening the way for the classification and mathematization of Nature. This historicist analysis of science has much in common with Kuhnian conceptions: not surprisingly, since Kuhn knew of, and indeed was inspired by, Kuhn's work. A passage on the notion of number demonstrates this similarity very well: “*Mythical and mathematical languages interpenetrate in a very curious way in the early Babylonian astrological systems, whose origins date back to around 3800 BC. The distinction between the different stellar groups and the division of the zodiac into twelve parts were introduced by Babylonian astronomers. All these results would not have been achieved without a new theoretical basis. But a much bolder generalization was necessary to create the first philosophy of numbers. The Pythagorean thinkers were the first to conceive of number as a comprehensive, truly universal element. Its use is no longer confined to the limits of a special field of investigation. It extends throughout the territory of being. When Pythagoras made his first great discovery, when he discovered the dependence of the pitch of a sound on the length of vibrating strings, it was not the fact itself, but its interpretation, that proved decisive for the future orientation of mathematical and philosophical thought. Pythagoras could not see this discovery as an isolated phenomenon.*” *One of the deepest mysteries, the mystery of beauty, seemed to have been revealed in her. For the Greek mind, beauty always had an entirely objective meaning*” (Cassirer, 2005, pp. 342-343).

movements — and with clearly identified periodicity. This framework predates any type of scientific body and research community, with various groups vying for theoretical and practical hegemony in explaining certain natural phenomena. This period is referred to as *pre-paradigmatic*. With the success of “(...) some implicit body of interconnected methodological and theoretical beliefs that allows for selection, evaluation, and critique” (Kuhn, 2013, p. 79), we have what Kuhn calls *normal science*. During this period, the scientific community reaches a consensus, albeit incomplete, characterized by activities such as puzzle-solving, mathematization of accepted theories, technological application, measurement of constants, and conducting experiments to further conceptual clarification and flesh out the semantic field used by the scientific community. All of this is based on the established *paradigm*. The term paradigm, despite being demonstrably broad and controversial⁸, Kuhn focused on its two fundamental aspects: the paradigm as a *concrete achievement*, which involves the successful use and operation of concepts to solve existing problems within the context of the theoretical framework accepted by the community, and the paradigm as a *set of shared values*. Regarding the latter, Ian Hacking emphasizes that:

A given group possesses a common set of methods, standards, and basic assumptions, which are passed on to students, included in textbooks, and used in decisions about which research should receive support, which problems should be considered important, which solutions are admissible, who should be promoted, who judges articles, who gets published, and who disappears. This is a paradigm, as a set of shared values (Hacking, 2012, pp. 70-71).

However, normal science remains stable as long as its paradigm does not enter into predictive dissonance with the experiments performed. When the conceptual framework adopted by the community begins to fail to account for certain phenomena, requiring *ad hoc* arguments to explain them, and yielding results outside its predictive scope, an *anomaly* in the paradigm is observed. When the paradigm sheds light on many complications for which scientists had no answers and they consider it potentially fruitful, the community can often deal with—or at least successfully dismiss — a number of anomalies without interfering with the process of normal science. However, when these inconsistencies accumulate, and the paradigm itself — which provides the basis for solving puzzles — begins to fail to provide sufficient conceptual tools for their solutions, but instead becomes problematic in the activities of the scientific community, the community enters a crisis. There is no longer a secure belief that the paradigm will address the problems arising. Scientists view their theoretical commitments as flawed, and thus some

⁸ There are complications involved in clarifying what a paradigm actually is within the Structure itself, which introduces the term. The first forceful criticism that led Kuhn to rethink and solidify the concept came from Margaret Masterman, who identified 22 definitions for the term paradigm in the Structure. See (Masterman, 1979). A few years after the use of the term and the criticisms surrounding it, Kuhn recognized its vagueness and distributed its characteristics into two conceptions: that of a disciplinary matrix and that of an exemplar. This change is already present in the postscript to the 1969 Structure. See (Kuhn 2013, pp. 279-323). I will not use the other terms because in the article involving Taylor, Kuhn chooses to use them, and also to avoid any kind of conceptual confusion.

members of the community may view the situation from a different perspective: such problems are no longer puzzles to be solved, but counterexamples to the paradigm.

Consequently, the community⁹ begins to demand significant changes, beginning to consider other extraordinary lines of research (in the sense of being heterodox) based on other principles, conceptual definitions, and even values, thus generating the possibility of conducting other experiments based on a different worldview. A distinct way of interpreting the phenomena, experiments, and practices that coordinate and guide the group of “converted” researchers emerges, in addition to being constituted by them, giving rise to a new paradigm. This period is called *extraordinary science*, establishing a revolution that modifies and reorients the way of seeing the world. We can say that we see here a conception of science and the nature of scientific practice that is essentially historical, interdependent on the values and commitments of communities that hold interpretations and practices associated with the phenomena and entities described and predicted in this field of research. Due to interconnected epistemological (anomalies), psychological, and sociological (crisis) aspects, there is a movement of reinterpretation and the establishment of another, intersubjectively defined semantic field (paradigm). From this perspective, we can see the great number of similarities to Taylor and Kuhn's conceptions of the sciences, but there are distinctions regarding the types and to what degrees they converge.

Agreements and Disagreements

Even though they appeared to agree, Kuhn initially appeared agnostic regarding the lack of any epistemically substantial distinction between the natural sciences and the human sciences, as the distinction still seemed vague to him. The point of disagreement between them lay in Taylor's account that the natural sciences, lacking any kind of object of analysis that takes into account what Kuhn calls the intentionality of behavior, distance themselves from such sciences. Human actions have as components certain mental properties that, because they are not susceptible to empirical analysis, require interpretation and are distinct from natural phenomena, which have no meaning, or if they did, they would be the same “(...) as Taylor more recently formulated it, absolute, independent of interpretation by human subjects” (Kuhn, 2003a, p. 267). Therefore, in Kuhn's view, Taylor still has a conception of natural

⁹ Kuhn (2013, pp. 174-175) highlights the characteristic of crisis solutions provided by extraordinary research often being found by newer members of the research field or young people, perhaps because they have little scientific experience with previously shared values, perceiving the critical factor and the need for change more easily. This is because, as Kuhn himself stated, paradigm shift and acceptance occur as a conversion, and through a different language, a different world is observed. Just as someone who has had a particular language as an instrument for a long time and is older finds it more difficult to learn and understand another language than young people in a linguistic community, the same occurs in the scientific community during times of crisis and revolution.

science imbued with a more realistic, and we might even say naive, perspective on scientific entities, such as snowflakes and stars in the sky.

As we see in the *Structure*, a set of values, exemplary problems, and a significant body of theory are needed, shared by a scientific and linguistic community. Their paradigm serves as a model of interpretation for the natural phenomena under investigation. Therefore, it is necessary to establish a conceptual framework that allows for the organization of data, bringing coherence and meaning to the phenomena. This occurs intersubjectively among community members and in the community's dynamics during problem-solving research activities. This is how the next generation of researchers learns the semantic field of science¹⁰. This is where a point of convergence among philosophers emerges: that concepts are not independent of the community that uses them, but rather dependent on the community itself. The philosophers argue that distinct communities—even from different eras, such as the Greeks—that are in other communities and have distinct paradigms that conceptualize the same phenomena do not see exactly the same entities due to the dependence on something that is pointed to or “observed,” and the meanings associated with the references of both paradigms constitute the very worldview of these communities.

Conclusively, after these highlights, Kuhn returns to the distinction between the natural and social sciences, noting that there was no disagreement about whether a distinction existed—and if so, what it might be—pointing to a question not of nature, but perhaps of epistemic condition involving the degree of maturity of both types of scientific fields. Thus, he begins his argument by summarizing his historicist thesis about the natural sciences:

My thesis so far has been that the natural sciences of any period are grounded in a set of concepts that the current generation of practitioners inherits from their immediate predecessors. This set of concepts is a historical product, grounded in the culture into which current practitioners are initiated during their apprenticeship, and accessible to non-members only through the hermeneutical techniques by which historians and anthropologists come to understand other modes of thought. I have sometimes spoken of this as the hermeneutical basis for the science of a given period; you may notice that it bears considerable resemblance to one sense of what I have called a paradigm (Kuhn, 2003a, p. 271).

Based on the notion of paradigm, Kuhn observes that even though the function of those who set out to understand a given conceptual scheme is hermeneutic, that of the scientist is not, since the period of crisis and revolutionary science in which new paradigms are introduced does not characterize much of their activity. The period that characterizes the production and work of the natural scientist is that of normal science, in which they expand and perfect the correspondence between theory and experience in their puzzle-solving, seeking to maintain the paradigm in force, even in the detection of anomalies.

¹⁰ In later works, Kuhn refers to the structure of concepts in a given area as a structured lexicon – which we will discuss at the end of this article. This term was omitted for reasons of conceptual economy and because it shows similarity to Charles Taylor's notion of semantic field.

Revolutions and paradigm shifts occur without prior intention from the research community, eventually establishing themselves and flourishing in another generation of researchers. Thus, the search for new interpretations of natural phenomena would not be the objective of scientists or the natural sciences. At this point, one type of science can be compared from the axiological perspective of another, and Kuhn has an interesting *insight*: just as the goal of the natural sciences is not to understand the behavior of scientists or to develop new worldviews, the goal of the human sciences may not be to solve puzzles through an established paradigm.

Ultimately, unlike Taylor, Kuhn remains reluctant to take a more defined position. However, he points out two situations possible connections to the human sciences, and first, inspired by an argument involving scientific success within the natural sciences of areas where no type of establishment as a natural science was conceived, he explains that some human sciences, even with a distinct objective from the natural sciences, would not be clearly prevented from engaging in research that requires solving puzzles. He also maintains the impression that possible success may already be involving topics in economics and psychology in this sense. Kuhn considers the other argument to be strong and based on a characteristic we have when we turn to natural phenomena but do not have when we speak of historical or social phenomena: the inability to pinpoint specific phenomena mediated by a paradigm, since the object of the human sciences is constantly changing. In this sense, Kuhn believes that the formation of a normal science is unfeasible, and only in these sectors should hermeneutic interpretations be required and thus remain.

Hugh Lacey's Criticisms and Their Relationship to Kuhn's Later Writings

The themes involved in the debate are diverse, but it brings to light an axis that centers on what are the constituents of a science, be it natural or human. Hugh Lacey, in his article “*Interpretation and Theory in the Social Sciences and Humanities*,” summarizes Taylor's view that the natural sciences deal with absolute terms, while the human sciences have terms related to the subject (Lacey, 1997, pp. 89-90). Therefore, the description of the natural world is made independently of human agents and does not involve underlying values, behaviors, or intentions on the part of its object of study or the scientific community that require hermeneutic interpretation, as required by the understanding of what Lacey calls *the world of agents*. What Kuhn shows the philosopher of science is that there is no guarantee that the natural sciences have the commitments Taylor posits, and Kuhn's own scientific, historiographical, and philosophical work seeks to demonstrate this. Therefore, Taylor's distinction between types of science, based on absolute terms and terms related to the subject, becomes unsustainable.

From this point on, Lacey observes that the terms Taylor defines as absolute are related to some type of measurement. To this end, through practices promoted by the scientific community itself, experiments are conducted and instruments or even phenomena¹¹ created to perform measurements and verifications based on the underlying laws contained in the paradigm. All these scientific components depend on the research community to be constructed and implemented. Thus, we cannot completely dissociate the measured objects from all the practices that enable scientists to perform such measurements, highlighting in this process what he calls *visibly interpretive* terms, which have a certain human influence in their application. As Kuhn elucidates at the end of his article and Lacey reiterates, nothing prevents a physicalist approach that further mitigates such classes of terms in parts of the humanities. However, human influence, besides being unclear in certain cases, occurs in degrees, and certain influences can be removed, while others remain in demand. This remains open to speculation, however, opening the discussion to the case of possible parts of the human sciences impacting activities of normal science, and what types of values would be included in it.

Thus, Lacey begins by commenting on Taylor's essay (Taylor, 1985b), in which the Canadian philosopher asserts that the natural sciences explain, provide the foundation and origin of technology and its instruments, in addition to providing an understanding of the capabilities and possibilities involved, as experimental practices help us possess and extend this predictive and explanatory power. In this way, theory delimits and provides the conditions for the possibility of technological development and the sciences themselves. And in the case of technological production, the *control* of phenomena provided by the science from which the instruments are derived can be used in applied sciences to dominate and control nature and existing spaces. Therefore, there is a dialectical relationship between technology and science, mediated primarily by control as one of the values relevant to the community that influences the direction of research and the paradigm itself.

Lacey also recalls that Kuhn highlights in the article “*Objectivity, Value Judgment, and Theory Choice*” (Kuhn, 2009) the main epistemic values of a scientific theory, that is, commitments embodied by the scientific community. These would be *precision, simplicity, consistency, comprehensiveness explanatory power, predictive power, and fruitfulness*. Lacey then questions the relevance of *technological control* — through theory to obtain the instrumentalization and manipulation of phenomena — and its role in conjunction with such values, as Kuhn initially does not accept that control is included as an epistemic value; for him, more would be a social value that could delineate epistemic values, but not integrate them. Lacey disagrees, because his

¹¹ The creation of physical phenomena is an aspect not highlighted by Lacey, but in the context discussed it is relevant to show the close relationship between natural entities and scientific practices and theories. There is a relatively recent philosophical analysis of the role of experimentation in the natural sciences by Ian Hacking (Hacking, 2013).

critique of the debate favors Taylor — who takes into account the importance of technology in the construction of science and the advent of control over nature in the modern world — and opposes Kuhn's position, showing that explanatory gaps in Kuhn's conception of science can be addressed by considering that the value of the primacy of control over nature is a modern value that constrained the paradigm in science to adapt to its demands, thus shaping the interpretation of aggregated epistemic values (Lacey, 1997, pp. 102-103).

Here, however, we must highlight some of Kuhn's later writings that also involve values in the choice of certain theories over others, as well as approaching acceptance Control as an epistemic value that should, indeed, be considered. In the article “*Rationality and Theory Choice*” (Kuhn, 2003), he discusses ideas similar to those of philosopher Carl G. Hempel regarding the desiderata (such as the six outlined above) that determine the goodness of a theory in scientific activity and investigation. These desiderata are also determinant and often intertwined, determined by the scientific enterprise itself — guides for the community's own practices. Kuhn uses an approach he calls local holism to explain that some terms, both evaluative and epistemic, as well as theoretical and taxonomic, are interdefined and empirically grounded within the disciplines themselves, in which these terms are part of their structured lexicon, and we learn to use them by being inserted into this lexicon. Terms like “force” and “mass” to “rationality” and “justification” are included in this context of mutual, simultaneous learning.

Following this line, in the response and commentary to an article by Ian Hacking (Hacking, 1993) in the text entitled *Postscripts* (Kuhn, 2003b, p. 275), there are more descriptive details of this notion and the emphasis on other terms in which species (or types) are learned as elements of a contrast set, i.e. together with other terms that have certain properties and referents that, within general rules, provide the differentiation of the terms of the set from one another – the first type of term not having this contrast set: terms like “space,” “time,” and “mass” do not integrate with other pairs of contrast sets (such as the quasi-informal notions of liquid, solid, and gas), and are taught mutually through laws of nature, for example. This sketch above is a conception that Kuhn would possibly bring to maturity in his work, unfortunately unfinished, *The Plurality of Worlds*.

What we see in his later writings (Kuhn, 2024) is the separation of the first terms exemplified by Kuhn as unitary sets (singletons)¹², contained in the so-called artificial species, while those associated with contrast sets are taxonomic terms, constituted by natural species. Kuhn, in his sixth chapter of *Plurality*, apparently would further develop the notion of artificial species: they would have a dual nature in the

¹² Prior to Chapter 5 of *Plurality*, Kuhn considered this distinction only between taxonomic species and singletons, as he makes clear in the footnote in (Kuhn, 2024, p. 350).

sense of being identified by certain observable properties, but grouped by their functions (Kuhn, 2024, p. 350). The artifacts organized within this category of species can be both intellectual (the economic concept of money or justice in law) and physical (from paradigmatic cases of tools like the telescope to the concept of field or mass).

Now, within theories that incorporate a specific structured lexicon, the greater the capacity of the community speaking this lexicon to organize and systematize data obtained through the use of artifacts for observation, manipulation, or control of phenomena in scientific practice, the more robust and legitimized these theories become. The editor of Kuhn's later writings, Bojana Mladenović, gives an example of how the dynamics in the above statement play out in the transition from primitive to mature science:

Primitive science begins with an inquiry into the nature of such objects; this sometimes results in the reclassification of some of them, sometimes in the refinement or improvement of classificatory boundaries, and sometimes in the creation of new taxa. In this process, primitive science also creates new artificial species: objects to be used as tools and instruments in investigation, as well as abstract concepts for explanatory and predictive purposes. The lexical structures of mature science develop from all these resources and achievements of primitive science (Kuhn, 2024, p. 39).

The researcher also emphasizes that Kuhn, in the third part of his book, emphasized the priority and certain independence of scientific practice over theory, as did some works by philosophers Peter Galison, Jed Buchwald, and Ian Hacking himself, whom Kuhn thanks and acknowledges as having addressed this topic more forcefully. Here, we see in experimentation a certain need for technological control of phenomena so that, through the manipulation of artifacts (whether intellectual or physical), the scientific community can obtain significant results. Depending on whether this control is considered a value per se in the scientific enterprise — due to social factors, as Lacey points out, and like the other epistemic values highlighted by Kuhn—it can lead to certain areas in which control becomes a more cultivated value. Interestingly, Kuhn's own intention in his last work aligns with Lacey's analysis of why his historical narrative does not embrace technological control as a more primary epistemic value, which would include “(...) an explanation of the centrality of experiment in modern science” (Lacey, 1997, p. 100). Therefore, perhaps *the* Thomas Kuhn who was elaborating on Plurality would agree with Lacey in his claim of the primacy of control as a de facto epistemic value.

Conclusion

We can see, therefore, that such a debate about the distinction between the sciences can be extremely fruitful for deepening and extending the philosophical understanding of the ideas of Charles Taylor and Thomas Kuhn (including expanding the interpretative scope of their later writings), as well as enabling

other important analyses that had not been considered by either of them. From the core of the issue discussed by Dilthey, the theme is enriched when we add factors that demonstrate the influence of one type of science on the other. Even though both have objects and objectives that can be considered fundamentally distinct, the crucial point that intersects their endeavors is the very conception of hermeneutic interpretation, common to both sciences.

Even though the role of hermeneutics in the social and natural sciences varies in degree and with different epistemic or social dimensions to be considered, we must keep in mind a certain guideline: whether it is the scientific community regarding a structured lexicon to be passed on to another generation, a historian of science seeking to understand the meaning of terms in a lexicon considered outdated¹³, an anthropologist observing the behaviors of a community seeking to understand how it was established and took shape communally, or a social scientist seeking to explain why, in the so-called information age, the lack of responsibility regarding the veracity of any shared information is increasingly prominent, there is this search for meaning and coherence at a fundamental level, taking into account a set of values, actions, and phenomena to be understood, because all scientific investigation demands and is essentially constituted by human activity. Such an understanding of a possible gradation or distinction between the sciences might follow evaluative paths that involve the very notion of hermeneutics – both extrinsically and intrinsically linked to a structured lexicon – as a methodological tool upon which scientific activity rests, as well as the role of experimentation and the development of artificial species. Since some of Kuhn's later writings were guided by this horizon, future investigations may provide a fruitful avenue for this topic.

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¹³ This theme within the Philosophy of Natural Sciences of understanding and incorporating the past by the historian is very well elaborated in Kuhn's three Shearman Lectures (Kuhn, 2024).

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