

THE SIGNPOSTS OF INQUIRY: DEWEY'S LOGIC AND KUHN'S PHILOSOPHY OF SCIENCE

*LAS SEÑALES DE LA INVESTIGACIÓN:
LA LÓGICA DE DEWEY Y LA FILOSOFÍA DE LA CIENCIA DE KUHN*

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ABSTRACT

In this article, I review John Dewey's *Logic: The Theory of Inquiry* in order to show some points of coincidence with the work of a later author: Thomas S. Kuhn. I support the view that despite the disparities that their works sometimes show—and the reservations that Kuhn himself had about Dewey's work—there are interesting coincidental points that help to offer a common standpoint that goes against more traditional views on logic, inquiry and scientific methodology. I focus on three main aspects: the contextual and social nature of logic; the significance they both grant to problem-solving contexts; and their convergence on a developmental view of the progress of knowledge.

KEYWORDS: logic; inquiry; knowledge; situation; lexicons; paradigm; development; Dewey; Kuhn.

RESUMEN

En este artículo reviso el libro *Lógica: La teoría de la investigación*, de John Dewey para mostrar algunas coincidencias con el trabajo de un autor posterior: Thomas S. Kuhn. Defiendo la perspectiva de que, a pesar de los desacuerdos que sus respectivos trabajos muestran en ocasiones —y que Kuhn sostuvo acerca del trabajo de Dewey— hay puntos en común que ayudan a construir un frente unido en contra de visiones más tradicionales de la lógica, la investigación y la metodología científica. Me centro en

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tres aspectos principales de sus trabajos: la naturaleza contextual y social de la lógica; la importancia que conceden ambos a los contextos de solución de problemas, y su convergencia hacia una visión del progreso del conocimiento basada en su desarrollo.

PALABRAS CLAVE: lógica; investigación; conocimiento, situación; léxico; paradigma; desarrollo; Dewey; Kuhn.

1. INTRODUCTION

There are some stances and ideas that are common to both Thomas Kuhn's philosophy of science and John Dewey's account of the process of inquiry—including scientific inquiry. Of course, a first common stance is in their attitudes toward tradition in the philosophy of scientific method. For both, tradition is imbued with assumptions that originate in the combination of modern logic and an empiricist epistemology—assumptions that they try to expound, and that they suggest substituting with more proper ones.²

There are other significant points in common in their respective philosophies, which I shall shortly comment on. However, it should also be remarked that there are points in which their respective philosophies differ.³ A first difference between them is that Kuhn does not debate tradition in logic, while Dewey presents a comprehensive argument against the foundations of traditional views like Gottlob Frege's (see, e.g., Hookway 2012; Faerna 2019). Dewey's views on scientific method largely depend on that broader reform whereas Kuhn's attack on tradition does not have a similar basis. In addition to this, Dewey devoted many moments in his lifetime to reflections and work on logic. Meanwhile, Kuhn seems to have been attracted to logic only very early in his career: first of all, in 1945, as a graduate student of physics at Harvard, when he studied with H. M. Sheffer and became acquainted with C. I. Lewis' modal logic (see Kuhn 1945; Mayoral 2009, 2017a, Ch. 2); then, after those early, predoctoral years, he dealt with logic, geometry and Boolean algebra in some classes and lectures (see

² I shall not discuss the relation of Dewey's work to general philosophy of science—either of his own time or current. See, in that respect, Brown 2012, pp. 258-261, 265-267.

³ See also the difference between them that Mladenovic (2017, pp. 183-184) points out concerning the attention to the influence of external factors in science, not so clear in Kuhn as in Dewey, according to her. I shall not comment on this point.

Kuhn 1951a, VII; 1951b).⁴ Other than that, his work does not demonstrate a great deal of interest in the field, especially in the years leading to *The Structure of Scientific Revolutions* (and from then on).

There are other differences, but I am more interested in some specific coincidences; particularly, in those that amount to a common standpoint against the logico-empiricist tradition in philosophy of science. Even so, there were at best mixed feelings on the part of Kuhn toward Dewey's theses on scientific matters. In a letter to his mentor James Bryant Conant in 1961, Kuhn told him that he had "always [found] Dewey's treatment of science so very very far from the mark, though in talking about mores and morals and social theory he says many things that he ought to continue to say when he talks of science."⁵ Kuhn had read at least one of Dewey's books by that time, *Reconstruction in Philosophy*, and he seems to have read some others over time—namely, *Human Nature and Conduct*, *The Quest for Certainty* and Dewey and Arthur Bentley's *Knowing and the Known*.⁶ Despite that, Kuhn's attitude toward Dewey's work continued to be critical for the most part. Before *Structure*, he said, "I had read some Dewey on pedagogical issues, but I have never been all that enthusiastic about pragmatism as a philosophical position" (Borradori 1994, pp. 157-158). However, it is not Kuhn's *attitude* toward Dewey's work, and pragmatism at large, that most interests me. That is, I am not trying to locate Kuhn among those influenced by Dewey, or who pursued a philosophical position with a propensity for American pragmatism—something Kuhn did not do (but see Mladenovic 2017, esp. pp. 184-195). In other words, it is *not a historical* question that I want to pose and answer—rather, it is a *theoretical* one. My main

⁴ Though examining his lessons on geometry and Boolean algebra in "Natural Science 4" is of interest, I shall not discuss these here. However, similarities and differences with regard to Dewey's conceptions might be of interest for those interested in this comparison. I shall pursue this comparison elsewhere.

⁵ Letter from Thomas S. Kuhn to James B. Conant, 29 June 1961, TSKP 25.53, p. 6.

⁶ We know definitively that Kuhn read *Reconstruction in Philosophy* in late March, 1949. The next two titles are registered in his personal records—the first one with a brief commentary—without date, and Dewey and Bentley's book is only mentioned in a letter. Other than these, there seems to be no mention of further books by Dewey. See Kuhn 1949, p. 1; Kuhn's bibliographic cards in TSKP 8-9; Kuhn's letter to the psychiatrist Harley C. Shands, 12 March 1963, TSKP 4.15, p. 2. For an account of these readings, see Mayoral 2017a, p. 212. I have argued elsewhere that Dewey's educational reform may have influenced Kuhn's development (indirectly, of course), insofar as he attended progressive schools that were created according to Dewey's guidelines. See Mayoral 2017a, Ch. 1.

aim in this paper is to compare aspects of their respective positions concerning scientific method in order to ascertain if they form a solid standpoint against the logico-empiricist tradition in philosophy of science.⁷

There are three main points of coincidence that I would like to examine. The first, more general point, has to do with their attitude that methods of inquiry—of *scientific* inquiry, more specifically, in Kuhn's case—are something to be researched in real contexts. So, their attitude to traditional logic is not so much of hostility as of a discipline in need of relocation, or reassignment of roles, and of a more naturalistic explanation of its origins. Dewey practices this kind of rethinking much more deeply than Kuhn ever did. Despite that, we find some harmony between their respective positions, even though, in Kuhn's case, his attitude toward logic is often hard to trace. I shall deal with that point in § 2. Then, I examine what they each say about problem-solving contexts and their significance. This parallelism, as Matthew Brown (2012, p. 274) says, runs the risk of being superficial in nature. I agree with Brown and try to avoid that risk. Nevertheless, I think it important that their points of coincidence—and their likely disagreements—are described and emphasized, because they both show that the praxis of problem-solving points toward an important context to be examined carefully in philosophy of science. I shall examine this point in § 3. Finally, in § 4 I shall examine Kuhn's defense of a developmental philosophy of science and show some coincidences with Dewey's views here, too. I shall close this comparison with a section of concluding thoughts (§ 5).

⁷ There are interesting precedents of this kind of comparison. Burke (2000, pp. 109-111) provides an apt starting point for this kind of comparison in the analogy between Kuhn's account of the process of scientific investigation and Dewey's account of inquiry. Burke's aim is not to go into this likely theoretical relationship too deeply, but rather to use Kuhn's theory as a way to interpret Dewey's views on logic—in particular, the concept of logic as related to experience and the concept of "situation" (again, see Burke 2000, esp. pp. 109 ff.). Even so, Burke's analogy is worth some commentary, which I shall pursue later. Another interesting starting point is Mladenovic's book on Kuhn (Mladenovic 2017, Pt. III, esp. pp. 174-178, 182-184). Mladenovic's approach assumes a broader perspective about the influence of pragmatism in general on Kuhn's views, with specific points of discussion of the Kuhn-Dewey connection. I shall not attempt that broader discussion here. Hempel (1979/2001, pp. 366-367) also expounded a point of coincidence regarding the connection between descriptive and normative aspects of philosophy of science. And, of course, R. N. Giere, as we shall see in the next section, pointed out other coincidences.

2. LOGIC AND SCIENTIFIC METHOD

In the first pages of his *Experience and Prediction*—which, as Dewey's *Logic*, was published in 1938—Hans Reichenbach famously introduced the distinction between the context of justification and the context of discovery (Reichenbach 1938/2006, pp. 6-7).⁸ His main aim was to set up those specific goals and methods that define the epistemology of science. He first aimed to show that it had nothing to do with the sociological or psychological reconstruction of the process of discovery. Whatever the social or psychological circumstances that may underlie a scientific innovation, they are not the business of epistemology. Epistemology's goal is the “rational reconstruction” of knowledge as a *descriptive* replacement—a “logical substitute,” he says—for “real processes” (1938/2006, p. 5), to which the *critical* resources of epistemology are then applied (what he calls the “analysis of science”; see 1938/2006, p. 8). Therefore, the DJ distinction helps to draw the conceptual and methodological frontier between the epistemological project, on the one hand, and the role both psychology and sociology play in the examination of scientific method, on the other (see Reichenbach 1938, § 1, for further details).

As Ronald N. Giere (1999a, 1999b) shows, John Dewey's and Thomas Kuhn's respective (and independent) attitude toward the DJ distinction is a source of their being rejected by the mid-century philosophical establishment, which assumed it as a foundation for their method (1999a, pp. 13 ff.; 1999b, p. 232).⁹ That's because their views range from an openly critical attitude to it (Kuhn) to simple disregard for it (Dewey). Indeed, Kuhn's attitude toward the DJ distinction is reflected in the two last paragraphs of *Structure*, § I. He suggests at that point that the DJ distinction is part of a historically-situated answer, not a principled basis, so to speak, and it may be submitted to criticism just like any other theory (see Kuhn 1962/2012, pp. 8-9).

⁸ Actually, it is well-known that Reichenbach echoed a traditional distinction that was available since John Herschel's times and, according to some authors, even since Aristotle's. See Hoyningen-Huene 1987, pp. 502-503, for further historical details. Hereafter, I shall use “DJ,” as Hoyningen-Huene (2006, p. 119) does, to refer to that distinction.

⁹ Interestingly, Paul Hoyningen-Huene (2006) calls our attention to a paper by Wesley Salmon (1991), whose opening paragraph says: “On my first reading of Thomas S. Kuhn's *The Structure of Scientific Revolutions* (1962) I was so deeply shocked at his repudiation of the distinction between the context of discovery and the context of justification that I put the book down without finishing it” (Salmon 1991, p. 325; as quoted by Hoyningen-Huene 2006, p. 130, n. 1).

Dewey's and Kuhn's stance toward scientific method involves a rejection of the DJ distinction. There is a role for logic in the theory of science for both of them, but it is no longer a foundational role—at least as regards the traditional construal of modern logic—and its relationships with other disciplines like psychology or sociology are considered. So, the DJ distinction gets blurred. Epistemology of science is naturalized and, particularly in Kuhn, sociologized, and some aspects of scientific knowledge that were traditionally located in the context of justification alone are now examined on the basis of resources that traditionally belonged to the context of discovery. Their attitude toward the DJ distinction is that it leads to an incorrect distribution of available and relevant resources for the analysis of science—to use Reichenbach's expression in a more general sense. Let us now compare Dewey's and Kuhn's perspectives on scientific method on the basis of their respective views on the nature and the role of logic in scientific method. I shall explore their common points by virtue of two main ideas: the contextual and social nature of logic (§ 2.1), and the view on logic as a method of inquiry—of discovery, too (§ 2.2).

2.1. The Contextual and Social Nature of Logic

Concerning the *contextual* nature of logic, Dewey makes a statement in Chapter 1 of *Logic* that helps us understand what logic means for him. It is not only a “theory of inquiry,” as the subtitle of the book states, but also a theory of inquiry *in its cultural setting*. As he says, “The naturalistic conception of logic, which underlies the position here taken is thus *cultural naturalism*. Neither inquiry nor the most abstractly formal set of symbols can escape from the cultural matrix in which they live, move and have their being” (LW 12, p. 28). Indeed, in Dewey's work, logic links up our reasoning abilities—which are part of our species' biological “equipment,” so to speak—with the immediate environment in which those abilities are put into practice as an adaptive resource.¹⁰ Our task, in practical terms, may be summarized as a series of problem-solving situations that are often related to each other (see LW 12, pp. 26-27, for these aspects of

¹⁰ See also LW 12, p. 484, as well as Ch. 2, “The Existential Matrix of Inquiry: Biological,” which is devoted to expounding those facts in detail. On the relation between the organism (in this case, the human being) and his or her environment—and the relevant variation that consciousness involve—see Gronda 2020, pp. 94-97; on the relation of this point of view with the notions of meaning and significance, see also Gronda 2020, pp. 61-65.

Dewey's view).¹¹ Logic is, thus, never completely separable from the cultural setting those situations—and the language in which thinking is coded and action is communicated—provide.¹²

In his 1951 Lowell lectures, Kuhn describes logic in a similar fashion. For him, we may understand logic as based on a set of conventional symbols and rules. Even logical truth can be considered a “truth by convention,” to use the frequent phrase (see Mayoral 2013, pp. 470-471, for further details). However, for him this position is not devoid of difficulties, and we should explore logic in its cultural setting:

The rules of formal logic or of formal language are conventions. They are the rules of the game which we play with other human beings when we communicate. In themselves, they are no more necessary than any other adequate set of rules, but without some such set no communication or very little communication would be possible. (Kuhn 1951a, VII, p. 27; GR 127.)

Shortly after this initial statement on the conventional nature of logic, he adds that “I confess that this view that the truths of logic are products of linguistic convention is not by any means free of difficulty [...] I adhere to it at this time in spite of my inability to resolve all the difficulties [...]” (Kuhn 1951a, VII, pp. 27-28; GR 127-128).

The difficulties he considers are related to the independence of logic with regard to the surrounding linguistic, and thus cultural, context. Kuhn shows for instance that logical conventions might not be the result of free choice, because they are related to language and to communication, even though they are supposed to be prior to the former and independent from the latter (1951a, VII, pp. 28-29; GR 128). Moreover, if our logical conventions are obtained from “rules implicit in our language” (1951a, VII, p. 26; GR 127), it is nevertheless possible for them to be different from one language to another. We could call this possibility *pluralistic conventionalism*. Certainly, Kuhn did not use that denomination, but the position is present in the Lowell Lectures as a possibility, and it makes it possible for him to

¹¹ The word “situation” has a specific meaning in Dewey's work that is worth a commentary. I shall get back to that specific meaning in § 3.1, though I will continue to use the word before that, usually without considering that specific sense.

¹² As Dewey says, “Any theory of logic has to take some stand on the question [...] whether language is the dress of ‘thought’ or is something without which ‘thought’ cannot be” (LW 12, p. 27).

wonder “To what extent is the structure of Indo-European language responsible for the highly developed state of our mathematics and our science?” (1951a, VII, p. 30; GR 128). Logical conventions might thus be culturally relative and “changes in them might be associated with [...] changes in experience,” he says (1951a, VII, pp. 30-31; GR 129). The relationship, in short, between logical conventions and the linguistic vehicle that serves for communication among members of a culture makes the cultural ascription of logical conventions a possibility that is at least worth careful consideration.

Turning now to the *social* nature of logic, their attitude toward this second aspect is clearly an outgrowth of that with the previous one, so I shall be brief. Insofar as logic is culturally conditioned, it plays a specific role in a *social* context, and it is therefore part of that living environment. For Dewey, “man is *naturally* a being that lives in association with others in communities possessing language [...] Inquiry is a mode of activity that is socially conditioned [...]” (LW 12, pp. 26-27). Logic, therefore, only makes sense in a living social context in which it is the basis on which problems are solved. The problem-solving process in which logic must be studied is a social context, too. It provides the ends that are meant to be achieved by virtue of that process (see LW 12, pp. 481-484; more on this point in § 3).

Kuhn is not an exception to this position, of course. After all, the social context of scientific communities provides such ends of scientific inquiry and the procedures by means of which those ends are achieved. As regards logic, Kuhn already mentioned in 1951 that logic plays the role of a necessary condition for living in society: those who do not obey its rules are immediately self-excluded from the group and its epistemic activities. He says:

We are not then obliged to admit the necessity of the syllogism, but an announcement that we will not do so is an announcement that we will not abide by the rules of the game, that we will not play. It is therefore in the most literal sense antisocial, and it carries the penalty of other antisocial acts, it deprives us of the privilege of learning certain things from the experience of others. (Kuhn 1951a, VII, p. 27; GR 127.¹³)

Dewey would surely have agreed with the latter statement. In a footnote to Ch. 1, he emphasizes that the social setting provides—in L. S. Stebbing’s words,

¹³ Reisch’s version (GR) of the last statement is slightly different from the original typescript. The original is the version I have opted for.

which Dewey reproduces here—"the context of experience" (1930, p. 16, as quoted in LW 12, p. 27, fn. 6) in which human activities take place. The scientist, Dewey also says, is not an exception in that regard—something with which Kuhn himself would also agree.¹⁴

2.2. Logic as the Method of Inquiry

Finally, with regard to Dewey's conception of logic as the method of inquiry, it is clear that this vision turns logic into a resource that makes sense in the so-called "context of discovery." As with previous points, Chapter 1 of *Logic* is particularly informative in that respect. There, Dewey discusses some previous preconceptions on which more traditional conceptions of logic and scientific method depend.

One of them is the vision of knowledge as a set of independent statements that are true and independently justified. *Prima facie*, knowledge should only be connected to the process of inquiry to which it serves as a "terminating point," so to speak. Dewey says: "That which satisfactorily terminates inquiry is, by definition, knowledge; it is knowledge because it *is* the appropriate close of inquiry" (LW 12, p. 15).¹⁵ Yet, the previously mentioned understanding of knowledge as independent of inquiry goes beyond that merely tautological thought—it holds a higher status over and above its terminating function. "Knowledge," Dewey says, "is then supposed to have a meaning of its own apart from connection with and reference to inquiry" (LW 12, p. 15).¹⁶ Moreover, knowledge is, for him, the result of separate forms of inquiry in diverse disciplinary or common-sense fields (see LW 12, p. 16). If we understand knowledge that way, that result may be emancipated from any difference between those different fields. The pathway toward a unified perspective on scientific method, as understood from the perspective of the DJ distinction, is clear on that point. Logic may also be abstracted from the context of knowledge-achievement.

Dewey, of course, supports the contrary position. First of all, logic is not something different or external to the method of inquiry. As he says later in the

¹⁴ See LW 12, p. 27, fn. 6, for further details. Dewey is actually correcting Stebbing's words concerning the influence of the social setting on the scientist's work.

¹⁵ A similar functional perspective is applied to the understanding of propositions—or, more precisely, of their nature in inquiry; see LW 12, pp. 151-152.

¹⁶ See Gronda 2020, pp. 106-108, for a more complete account of Dewey's position against a more classical epistemological tradition.

book, “the phrase ‘logic *and* scientific method’ has no valid meaning when ‘and’ is taken to mean an external relation between the two terms” (LW 12, p. 388).¹⁷ We discover logical forms and rules *in the process* of scientific inquiry, so logic is inseparable from it. It arises from it and is corrected in the process itself in a kind of circular way. Dewey is, actually, particularly critical of the progress of logic at that historical point, insofar as it has detached from the advances in mathematics and empirical knowledge since the Scientific Revolution (see LW 12, pp. 84-85, 388-390). Second, insofar as logic becomes a part of inquiry (including scientific inquiry), it is the thread that connects all the steps in the problem-context that promotes the search for solution. Logic, in short, *belongs* to the context of inquiry and, therefore, to the context of discovery. The DJ distinction looks somewhat artificial on that account. In that sense, Dewey says:

When methods and results of inquiry are studied as objective data, the distinction that has often been drawn between noting and reporting the ways in which men *do* think, and prescribing the ways in which they *ought* to think, takes on a very different interpretation from that usually given. The usual interpretation is in terms of the difference between the psychological and the logical, the latter consisting of “norms” provided from some source wholly outside of and independent of “experience.” (LW 12, p. 107.)

The “usual interpretation” that Dewey expounds in this paragraph accurately reflects the DJ distinction. For him, that distinction relegates the conduct of inquiry to outside of the realm of norms. These latter are devised for the criticism of actual behavior on a sort of principled basis, which does not include past experience of inquiry. However, the frontier that is drawn on the basis of the DJ distinction should be removed, because it is previous experience of inquiry that helps to correct norms, whatever they are. Dewey goes on to say this:

We know that some methods of inquiry are better than others in just the same way in which we know that some methods of surgery, farming, road-making, navigating or what-not are better than others. It does not follow in any of these cases that the “better” methods are ideally perfect, or that they are regulative or “normative” because of conformity to some absolute form. They are the methods which experience up to the present time shows to be the best methods available for achieving certain results, while abstraction of these methods does supply a (relative) norm or standard for further undertakings.

¹⁷ On this link between logic and method in Dewey, see Brown 2012, pp. 266-268.

The search for a pattern of inquiry is, accordingly, not one instituted in the dark or at large. It is checked and controlled by knowledge of the kinds of inquiry that have and have not worked; methods which [...] can be so compared as to yield reasoned or rational conclusions. (LW 12, p. 108.)¹⁸

In Kuhn, we find cautionary points concerning the purely external nature of logic, and accordingly about its status as a truly independent tool useful for the analysis of scientific knowledge. As noted in § 2.1, current symbolic logic seems for him to elaborate on some conventions that underlie communication, whose origin is at least variable and might also be culturally situated. Surely, logic may be applied to other fields of inquiry and knowledge as a method of analysis and research (see Kuhn 1951a, VII, pp. 37-41; GR 131-133), but handling it as a kind of external resource, so to speak, does not make it any more “external” in the same sense Dewey is criticizing. Formal logic is for Kuhn the result of an inquiry into the usual conventions by virtue of which we communicate with each other in the context of our linguistic and cultural setting—a point of view that Dewey would not dispute, indeed. Logical statements thus obtained are not related to experience the way an empirical generalization is; that is, they cannot be tested and, once refuted, transformed. Accordingly, he grants a couple of truisms: “Logic would remain independent of particular experience. Logical truths cannot be invalidated by experience.” (1951a, VII, 30; GR 129). But insofar as logical theory works with human conventions and elaborates on them with language (see Kuhn 1951a, VII, pp. 28-29; GR 128), which for Kuhn is also changing (1951a, VI, pp. 30-34; GR 108-110), it is hard to depict it the way the defenders of the DJ distinction assume—that is, as the study of an external repository of rules on the basis of which the reconstructive and normative inquiry are pursued. That seems to be the position Kuhn assumes.¹⁹

¹⁸ Philosophers of science like Larry Laudan have followed this path. See Laudan 1996, esp. pp. 134 ff. See also Laudan 1984, pp. 39-40, where he explicitly mentions Dewey. As an introduction, see Nola and Sankey 2007, pp. 321 ff. Godfrey-Smith (2003, p. 153) also testifies to the influence of this position in post-positivistic philosophy of science.

¹⁹ Generally speaking, in his Lowell Lectures, esp. VI-VIII, Kuhn supports a form of linguistic and perceptual relativism that makes it highly likely that linguistic (and thus logical) conventions vary according to variances in the human experience of the world. That's why his position seems very close to Dewey's—much more than to the theorists Dewey criticizes. As evident from lectures VII to VIII (1951a), Kuhn was, at this point, already a critic of that current. See Kuhn 1951a, VI-VIII, for further details.

What happened, then, to the DJ distinction? As with similar constructs, Kuhn explains in *Structure*, it partakes of the language and perspective to whose analysis it seems to serve (Kuhn 1962/2012, p. 9). As such a historically-located resource, it does not seem the kind of difference on which the inquiry into knowledge must necessarily rely. It is clear, then, that scientific method must be studied without recourse to the DJ distinction at all, and Kuhn's perspective testifies to the benefits that can be obtained from observing our normative practices in a whole context that does not separate descriptive and normative aspects of methodological inquiry—in addition to considering the history of science a valuable source of insight. (See Kuhn 1962/2012, esp. § I, on this latter point.) On that point, too, Dewey and Kuhn seem to be in harmony (see again Hempel 1979/2001, pp. 366-367, who makes this point very clear).

As noted, there are clear differences between both thinkers. Whereas in Dewey our point of view about scientific method, or inquiry, relies on a deeper understanding of the nature of logic itself—so, after all, logical rules are not superfluous in scientific method, but rather ill-understood both in nature and in the broader context to which they belong—Kuhn assumes and supports a diminishing role for it (and especially for the notion of “rule”),²⁰ and proposes its replacement with insights from other kinds of science, including sociology and history of science. As previously mentioned, I shall not enter into a discussion of differences here. It seems more interesting to show what kind of common standpoint their respective philosophies help to create. The naturalization of scientific method is good way to introduce that common standpoint, which is strong despite some differences and disagreements.

3. THE PROBLEM-SOLVING CONTEXT

In his *Logic*, Dewey attempted to debunk the assumption that logical theory belonged to a foundational level of inference against which scientific reasoning should be compared and evaluated. Going against this ideal, Dewey located logic at the center of human problem-solving, and so in the relationship between the human being and his or her immediate environment (and the problems that the latter gives rise to). Logic is the very structure of human reasoning, but it is understood as an activity by means of which human beings face up to challenges in that environment and turn them into problems that they learn to solve. This

²⁰ See, e.g., Kuhn 1977, pp. xviii-xix, for a well-known autobiographical account of the way he substituted paradigms for rules.

activity is ill-understood if we consider that every solution, if well made, must be a token of an absolute and detached type of general inferential schemes. They, as in the case of the structure of inquiry itself, evolve and are improved as inquiry (and our awareness of it) evolves and is more successful—that is, as problem-solving processes show ways of improving methods themselves.

In § 2, we have seen some of Dewey's points on behalf of that opposition to a well-established tradition and on behalf of the naturalization of scientific method. Logic and scientific method—as we saw, he did not consider them separate compartments (see LW 12, pp. 84-85)—thus become a continuum of inquiry and inquiry into inquiry itself. We have also seen Kuhn's version of that point. For him, philosophical answers to methodological questions are part of the same set of issues and solutions the sciences provide. So, for him, alluding to an independent realm of regulative lines as part of the so-called scientific method is not credible as we get deeper into the fabric of real scientific knowledge and practice. For him, those guidelines—if they have ever existed at all as explicit rules—are more likely to be discovered in the context of inquiry, that is, in the setting in which the individual confronts an open issue that upsets the scientific community. As for Dewey, for Kuhn they evolve as knowledge of nature evolves as well. On the other hand, Kuhn barely refers to logic and its relation to inquiry in his mature work. For the most part, Kuhn's arguments leave logic itself untouched. In his view, scientific method simply needs a different set of auxiliary sciences. Yet, for both inquiry is better understood when studied in its human context and with regard to problem-solving activities (see Mladenovic 2017, p. 182). As Brown (2012, pp. 274-275) rightly notes, this is not to say that the former (inquiry) reduces to the latter (a problem-solving activity). Indeed, Dewey specifies that problem-solving is *part* of the inquiry process (LW 12, p. 111). As Dewey and Kuhn coincide on that particular part, I focus on it in this section.

Beyond that point of coincidence, Dewey's and Kuhn's positions are complementary rather than coincidental. Although both consider scientific inquiry to be an extension of human inquiry at large, Dewey presents some specific characteristics that must be dealt with separately.²¹ Meanwhile, by focusing on

²¹ Dewey says that “inquiry,” in all its variety, “has a common structure or pattern: that this common structure is applied both in common sense and science, although because of the nature of the problems with which they are concerned, the emphasis upon the factors involved varies widely in the two modes” (LW 12, p. 106). Chapter 23 of *Logic* specifies some particularities of physical science (see esp. LW 12, pp. 475-479). See also Brown 2012, pp. 262-264, on the relationship (and differences) between common-sense and scientific inquiry.

the scientific problem-solving context, Kuhn classifies problem-solving activities by means of a simple but meaningful dichotomy, the one between puzzle-solving and problem-solving. *Structure* explained in depth the significance of the difference between both kinds of inquiry and, accordingly, the different social structure that underlies them (see Kuhn 1962/2012, §§ II-III, esp. pp. 36-37). Dewey did not enter that arena as Kuhn did. Dewey often comments on specific features of the scientific case in his *Logic*, but leaves a huge ground of inquiry to cover. Meanwhile, he pursues other foundational issues on logic and inquiry with a degree of specificity that Kuhn never dreamed of. Though again not lacking in some potential points of discrepancy, their views coincide to some extent; more importantly, they complement each other pretty well.

I would like to consider Dewey's and Kuhn's views as such complementary aspects of the naturalization of scientific method in the two next subsections. The first one (§ 3.1) explores Dewey's structure for logic as his theory for inquiry at large. The second one (§ 3.2) shows a complementary structure for scientific inquiry: the one Kuhn expounded in *Structure*.

3.1. A Structure for Inquiry

Dewey says (LW 12, pp. 105-106) that, just as other disciplines build up a theoretical approach to their initial common-sense domain of facts in order to explore and explain them more perspicuously, logic is the kind of theoretical study that results from our interest in inquiry itself. Of course, that kind of study cannot be pursued in isolation. Dewey's theory shows that this claim is true in a specific sense: logic cannot be explored without reference to its subject-matter, which is variable. Logic is usually considered a formal doctrine, *prima facie* detached from its relation to more mundane facts. However, that option need not be a general case, and for him, certainly, it is not. Logical inferences may be schematized as a symbolic device for practical purposes, but those schemes represent the steps that lead from premises to a warranted conclusion that is related to practice.²² That well-founded conclusion is judgment itself, and, as

²² Oftentimes, Dewey presents his own version of the historical origins of that detachment, which is the basis of modern logical theory. For instance, in Chapter 10, he says: "The development of modern science destroyed the conceptions of fixed species, defined by fixed essences, upon which the Aristotelian logic rested. This destruction affected, therefore, the classic conceptions of universal and particular, whole and part, and the scheme of their relationships with one another. Modern logic, however, attempted to retain the scheme but

such, its practical consequences must be taken into consideration when building a theory of logic. Dewey summarizes his position in the next passage of his *Logic*:

The traditional theory in both its empiricistic and rationalistic forms amounts to holding that all propositions are purely declaratory or enunciative of what antecedently exists or subsists, and that this declarative office is complete and final in itself. The position here taken holds, on the contrary, that declarative propositions, whether of facts or of conceptions (principles and laws) are intermediary means or instruments (respectively material and procedural) of effecting that controlled transformation of subject-matter which is the end-in-view (and final goal) of all declarative affirmations and negations. (LW 12, p. 162.)

Dewey's idea of judgment as the final station of our train of transformative reasoning in problem-solving processes involves dealing with the facts of the matter out of which the problematic situation itself arose. Accordingly, problem-solving reasoning is closely linked to existential and practical consequences. As he says, "judgment may be identified as the settled outcome of inquiry," and—in marked contrast with interim propositions leading to it—"judgment [...] has *direct* existential import" (LW 12, p. 123): "inquiry effects *existential* transformation and reconstruction of the material with which it deals; the result of the transformation [...] being conversion of an indeterminate problematic situation into a determinate solved one" (LW 12, p. 161; see also pp. 483-484).

In modern logical theory, especially when it is employed for reconstructing scientific reasoning, this relationship often goes unnoticed. From a logical empiricism's point of view, a properly called scientific language adopts the form of an interpreted first-order calculus with a domain of entities or processes that is diversely partitioned in each case (i.e., for a given theory) according to the requirements of the predicates and relations involved. Operational ways to provide those predicates and relations with empirical meanings are the practical counterpart of that kind of reconstruction.²³ For Dewey, this view oversimplifies

with the understanding that it is purely formal, devoid of ontological import. The inevitable consequence is the mechanical way in which affirmative and negative propositions and their relationships are conceived in both traditional and modern formalistic logic. They have lost their ontological basis without gaining a functional relation to the conduct of inquiry." (LW 12, p. 183.)

²³ See Hempel 1965 for further details on this position. On the inability of scientific methodology from an empiricist tradition to grasp this relationship and the distinctions involved (more on them below), see LW 12, p. 260.

the inquiry situation. He focuses on the way our dealings with the environment (the world) are not only a source of knowledge but also of problems, and thus of inquiry. Logical theory must be built upon those details as well.

Accordingly, Dewey distinguishes between two kinds of proposition in his *Logic*. He differentiates between the way we compose kinds and the way we reflect on more general categories. For him, propositions with kind-terms describe situations in which experienced entities are involved. The statement “Every polar bear is white” expresses a description about those polar bears that have been observed so far. With that statement, we are asserting that every instance of the kind “polar bear” so far observed has been white, and committing to the prediction that any other perceived polar bear shall be white too. Such generalizations apply terms to objects of experience. In his *Logic*, Dewey calls such general propositions “generic” (LW 12, p. 253).²⁴ But, of course, not all of our reasonings involve generalizations about kinds—generic statements obtained on the basis of an inductive reasoning (LW 12, p. 255). A second sense involved in some of our general propositions adopts the form of “If x is an F , then x is a G ,” or, likewise, “ F -ness entails G -ness.” For him, this kind of reasoning involves categories rather than kinds, and these categories, he says, involve “conceptions” or “universals” (LW 12, pp. 253, 255). A proposition of this second kind is part of a reasoning in which aspects of our conceptual system are involved, whether those aspects have real existence or not. Dewey calls propositions in this second sense “universal” (LW 12, p. 253 ff.; see also p. 468).²⁵ In his words:

Propositions about kinds and classes in the sense of kinds will be called *generic* propositions [...] while propositions whose subject-matter is provided by the operation by means of which a set of traits is determined to describe a kind, will be called *universal*. Correspondingly, the universals as such, will be called *categories*, in order to avoid the ambiguity found in the current use of the term “classes” in logical theory—the word “class” being used to describe both kinds and universals, which in logical function and form are distinct, as it is shown later. (LW 12, p. 253).

²⁴ See LW 12, pp. 254-255 for Dewey’s argument, here summarized; see also LW 12, p. 465, as well as pp. 494-495 for an example of the role of those propositions in inquiry in the social sciences.

²⁵ On the difference between generic (and so existential) and universal propositions in Dewey’s *Logic*, see Gronda 2020, pp. 142-144, 163-165.

It is important to note that inquiry takes place in a problem-solving situation in which two dimensions of our conceptualization of the world must be considered. For one, Dewey describes how entities and processes are included in classes that represent our acquaintance with the world and its inhabitants. Inductive reasoning underlies this process. The world is thus subject to a kind-taxonomy, which is formed on the basis of our interaction with tokens of every kind (LW 12, p. 251). For another, Dewey also considers the conceptual framework that supports the classification of incoming information. This framework is a categorical scheme on whose basis kinds may be specified logically and operationally. For him, inquiry into problems of the natural world cannot be pursued without the interaction between the handling of incoming information and the “ideational” aspects of our knowledge (see LW 12, p. 253).

A key concept of Dewey's view on problem-solving is also worth mentioning. I am referring to the idea of *situation* as the context in which inquiry takes place. For Dewey, a situation is more than a mere context, though. To be more specific, the problem-situation includes all those elements that inquiry transforms into a recognizable state of facts. In situations, qualities are no longer the primitive elements of analysis, nor are for that matter those elements to which logical resources must ultimately turn to. A situation, for Dewey, includes every object, process, or aspect of the whole slice of the world to which we pay attention, in which we and the problem or difficulty we confront are embedded, and which we shall deal with in order to find out the proper solution. The kind of clarification of a conceptual framework that, in combination with the handling of existential elements, leads to a solution (to a conclusion and so a judgment), takes place within that evolving situation—it is part of it. As Brown (2012) says, “Situations are agent relative and practice relative” (2012, p. 273), so our selective role is crucial in talking about them, but they emerge as a result of the agent's dealings with their surrounding environment. (See LW 12, pp. 72-73; Brown 2012, p. 272.)²⁶

Kuhn also considers that the process of inquiry takes place in the clarification of the categorial structure of kinds that is formed in the interaction between our contact with nature and the set of concepts by virtue of which we classify its phenomena. Though Kuhn does not adopt anything like the concept of situation that Dewey emphasizes (much less with Dewey's sense in mind), scientific inquiry takes place for him in a cognitive scenery—a *phenomenal world* he often calls it—in

²⁶ Again, see LW 12, pp. 492-494, for a case of that concept as applied to inquiry in the social sciences.

which the relevant entities (whole objects, or processes) that sciences deal with are the primitive elements of analysis.²⁷ The conundrum of scientific method cannot escape, for Kuhn, from the nuances of inquiry, and this Deweyan arrangement of the process is an apt representation of the main elements involved. Kuhn complements it with a further dimension: the *social* dimension of inquiry, which may be added to the existential, the conceptual and the situational ones. I shall deal with that contribution in the next subsection.

3.2. A Structure for Socially-Organized Inquiry

In order to grasp how Kuhn's perspective on problem-solving may be complementary to Dewey's views, I shall pay attention first to his mature lexical theory, where the problem-solving (or rather puzzle-solving) activities that are part of normal science are expressed in terms of the search for the actual world in a set of possible worlds. This latter is Kuhn's definition of scientific inquiry in normal-science stages (see Kuhn 1987, II, p. 63; 1989/2000, p. 76). Then, I shall employ this model as the basis for my comparison with Dewey's views.

For Kuhn, a lexicon is an interrelated series of terms that form a hierarchical structure (see Kuhn 1987, II, p. 50; III, pp. 81-82; 1991/2000, p. 94; 1993/2000, p. 242). Any lexicon is usually the evolved version of a previous, more primitive one. Terms within that lexicon are applied on the basis of a behavior in which term-usage and interaction with the world are simultaneously learned (see Kuhn 1974/1977 for further details on this learning system). It is through this mode of learning that we gain access to the meaning of terms in our lexicon. In other words, we cannot learn how to apply those terms (only) by definition: we learn how to apply them at the same time that we develop the corresponding behavior around them. In so doing, learning the differences between instances of the kind K_1 and those of kind K_2 is as important as learning when a legitimate member of one of them is before us. The learned ability (in practice) to classify members of a given class by virtue of similarities *and* differences makes the learner able to properly apply the term that corresponds to K_1 to likely incoming instances of that kind. The set of similarities and differences obtained in the practical learning context allows the agent to arrange the terms of his or her vocabulary in a lexical structure that is functional in a social context (see Kuhn 1974/1977, pp. 307 ff).

²⁷ For Kuhn's usage of "phenomenal world," see, e.g., Kuhn 1951a, V, pp. 3, 16; GR 78, 83; or Kuhn 1987/2000, p. 20. See also Hoyningen-Huene 1993, pp. 31-42; Mayoral 2017a, pp. 267-270, 287-288; 2017b.

Kuhn does not distinguish between kinds of propositions as Dewey does—that is, between existential (and generic) propositions on the one hand, and universal ones on the other. Moreover, for him the lexicon divides the world into kinds and thus offers the learner and speaker a corresponding categorical set (the conceptual scheme), but Kuhn does not distinguish between the ideational and the existential aspects of that set, either. Lexicons just apply to the world at large and, whenever there is a lack of adjustment between them, they are corrected accordingly. Yet, Kuhn does differentiate between the kind-term structure and the features that kind-members share according to every speaker. In that sense, there is room for the sort of meaning-clarification and meaning-exploration that Dewey seems to have in mind when he talks about thinking in terms of universal propositions (see Kuhn 1987, II, pp. 45-50).

Kind-terms are rigidly arranged in Kuhnian lexicons. Its structure *must* be preserved throughout, or else scientific revolutions happen and incommensurability emerges. Lexical structure is thus preserved in the normal practice of science, (see Kuhn 1987, II, pp. 47-50; 1993/2000, p. 242). However, there is room left for some difference and even for some vagueness as regards the features that speakers associate with kinds and kind-terms. Not every two speakers need to share the same set of features characterizing a certain kind-term in order for one speaker to share the same lexical structure with the other speaker. Such structure is acquired in a variety of real settings and therefore they may be different from one speaker to another. Scientific inquiry takes place in that space of potential variation, which is sometimes more conceptual, sometimes more empirical. Mutual correction of these details in the kind-structure and the feature space is an essential part of what makes lexicons an ever-improving vehicle for dealing with the world through science. (See Kuhn 1987, II, pp. 47-50; 1993, p. 242.)

Selected extracts of Kuhn's Shearman Memorial Lectures at the University College, London (1987) nicely summarize that view. First, he shows that a lexical structure does not require that every speaker acquires it in the same way:

To the extent that acquiring the lexicon of a language community depends upon a process like ostension, the acquisition process must invoke the actual world, either by exhibiting it or by describing the way things occur in it. [...] But a person who uses the lexicon thus acquired is not bound by all the generalizations or examples that played a role in its acquisition. [...]

Different individuals can [...] acquire identically structured lexicons by traversing different routes. Features that one person encounters in the learning process may be acquired later or not at all by another. It is only the structure of the lexicon,

not the feature space in which each community member embeds it, that need be shared. (Kuhn 1987, II, p. 62.)

And this, of course, is a sure way of learning, of lexical improvement, and of normal scientific research, which he interprets here in modal way. So, he continues by saying:

Given that shared structure, each can learn things that the other knows, and they can also proceed together to learn new things about the world. [...] Some of the examples ostended during the process of lexical acquisition may prove illusory; some of the descriptive generalizations may, without precipitating a crisis, prove false. There is always some play in the system, some room for adjustment. Though one may not, for example, call into question all three of the alternate routes to the Newtonian lexicon, the structure of that lexicon could probably withstand the adjustment of one or two.

What one is committed to by a lexicon is not therefore a world but a set of possible worlds, worlds which share natural kinds and thus share an ontology. Discovering the actual world among the members of that set is what the members of scientific communities undertake to do, and what results from their efforts is the enterprise I once called normal science. (Kuhn 1987, II, pp. 62-63.)

This model of lexicons is useful in order to grasp how Kuhn may complement Dewey's vision with a sort of social framework in which inquiry becomes central. In Kuhn's view, there are two main activities that any agent must perform at different moments of his or her life. One of those activities, we were told in *Structure*, was *learning* the practice of a science. We came to know that this kind of activity depends on being trained not only to solve problems already given in a textbook, but also to formulate problematic situations in real life in terms of an exemplary problem-solution—the well-known paradigm (see Kuhn 1962/2012, esp. §§ III-V).²⁸ In other words, part of the training of a would-be scientist is to build up and optimize his or her own lexicon, and to do so in a functional way, that is, by learning how to express aspects of the phenomenal world in terms of that lexicon. A second activity is, of course, *problem-solving*. As it is well-known, when it comes to a mature science—in which normal science has been fully developed

²⁸ Although I have employed the word “situation” in my previous statement, I did not intend to convey a Deweyan sense. Yet, had I done so, it does not seem to me that it would have caused an incongruency.

(see Kuhn 1962/2012, esp. § III)—we are, rather, talking about *puzzle-solving* (see Kuhn 1962/2012, pp. 36-42). We have just seen that puzzle-solving, the main activity in normal science, is a matter of adjusting the lexicon to the requirements of the phenomenal world. In other words, a main activity in normal science consists of finding out if the lexicon fairly coordinates with the phenomenal world as expected and trying to figure out an explanation in the case that it does not. This activity relies on the existence of that lexicon. Kuhn distinguishes between puzzle-solving, which involves the adjustment of the lexicon and the world to each other, from *problem-solving*, in which there is uncertainty about the availability of a solution at all, because their formulation and the expectations of a solution do not belong to any specific conceptual framework (or lexicon) at all. A mature science has transformed all problem-solving activities into puzzle-solving ones (see Kuhn 1962/2012, §§ II-III, esp. pp. 36-37; Kuhn 1974).

Learning and puzzle-solving are two aspects of inquiry associated with problem-solving contexts in scientific practice. In the former, perplexing situations are solved by rearranging our lexical categorization of the world so our conceptual scheme may become scientific; in the latter, indeterminate and puzzling situations are solved by applying and enhancing the tools that are compatible with (and often paradigmatic in) our lexicon. These activities only differ in that they operate in opposite directions. In learning, the lexicon benefits the agent by putting at his or her disposal a whole world of objects and processes as well as a new way to describe and control their behavior, and it gives access to a social group. In puzzle-solving, the agent is already part of the group and benefits the lexicon by realizing its potentialities and suppressing discrepancies. Problem-solving, in general, would be an activity in which the necessary ingredients for these two other practices are not necessarily present. Dewey's view on inquiry helps us to understand this general context properly and to make the two former modes—learning and puzzle-solving—special cases of it. So, in problem-solving activities, the situation is not necessarily translated to *an* existing and hegemonic scientific language in order to anticipate and later obtain a solution. In the two other activities, learning and puzzle-solving, the phrasing of the problem is warranted and made through the theoretical resources associated with a lexicon. In these two cases, Dewey's transformation of an "indeterminate situation" into a "problematic situation," as he calls them (LW 12, pp. 109, 111, respectively) is in Kuhn, so to speak, "delegated," "outsourced." The presence and role of the community is key to understanding how these cases of problem-solving emerge.

In conclusion, Kuhn identifies some settings in which a Deweyan perspective on inquiry—and, more specifically, problem-solving activities within it—is productively framed. These settings involve a *social* dimension. Classifying inquiry as taking part in learning processes, in puzzle-solving ones, or in problem-solving activities at large also involves pinpointing the agent in different parts or temporary (historical) stages of a scientific community. Certainly, this is not to say that the Kuhnian agent fits squarely with the Deweyan agent, but, as theoretical figures, they look compatible and complementary.

4. THE SIGNPOSTS OF INQUIRY

Dewey and Kuhn answer the question concerning not only the process, but also the *end* of inquiry. They did so from a point of view that moves away from previous epistemological accounts. Dewey, for his part, transformed our perspective of knowledge and the epistemic rules leading to it from a fallibilist and naturalistic point of view. In so doing, he did some of the groundwork for the kind of perspective on the nature of knowledge to be found in later philosophers like Quine or Kuhn. For Dewey and Kuhn, the foundationalist perspective of (scientific) knowledge is an epistemological theory that lacks many ingredients that a more complete theory of knowledge should include. By contrast, the assumption that knowledge emerges as part of socially-arranged human activity is fundamental and part of the alternative that they present to previous theories of knowledge.²⁹

The main characteristic of Dewey's view that I would like to highlight is the larger context of inquiry he provides, as compared to the idea of knowledge as a sort of repository. We saw above that Dewey's idea of knowledge did not include the idea of truth as the sure end of the process of knowledge-achievement. He opted for the alternative idea that, once asserted, and if the inquiry process had been consummated, beliefs were ultimately *warranted*. They were, in short, warranted enough for them to be considered the conclusion of inquiry in the clear sources of judgment and the end of the process of transformation in the elements involved in inquiry and reasoning. Besides that, they did not become elements deposited in a repository of sterile facts about the world, but rather elements that might be basic to any future inquiry. Let us consider them as "signposts"

²⁹ In Kuhn's "Does Knowledge 'Grow'?" (Kuhn 1976), an interesting lecture he gave at Berkeley and elsewhere in the late 1970s, Kuhn supports an even more different perspective on knowledge inspired by Wittgenstein's *On Certainty*. See Mayoral 2015 for further details.

for any future inquiry that involved them as relevant pieces in a problem-solving situation. It does not mean, however, that they are permanent and immovable. As Brown (2012, p. 297) reminds, the warranted assertion that results from an inquiry might be considered unwarranted at some later point (see LW, p. 16). Signposts are, on that account, fallible and corrigible.

It is not difficult to see Kuhn's proposal in a similar light. In Dewey's view, we see knowledge not only from a pragmatist point of view, but also from a *developmental, progressive* and even *historical* perspective. After all, he seems interested in approaching the idea of knowledge as a practical instrument to improve the relationship of organisms with their environments. This position does not damage the high status that is usually conceded to knowledge—and even to scientific knowledge—in our modern societies. If we exclude the ideas that truth and the end of inquiry must involve some transcendental relationship with something mind-independent, and that justification is only granted if we abide by an absolute catalogue of rules, the naturalistic picture that remains does not prevent us from relying on the results of our inquiries—that they are, as mentioned above, the fallible, corrigible signposts for our future inquiries. Once knowledge is reconsidered from this point of view, we see it in a new light and from a developmental point of view. We can see a similar view in Kuhn's mature position.

To do so, let us start with the assumption that Kuhn nevertheless criticized Dewey's "theory of truth" in passages like the following:

To the extent that the members of a society are bound together from hour to hour and day to day, it is the truth value game—most centrally, the law of non-contradiction—that provides the ties between them. Where that law applies, differences are discussable and agreement on the basis of evidence can be anticipated. Where interests enter, the fragmentation into communities begins, discussion becomes problematic, and agreement on the basis of evidence is at risk. But if the truth-value game does promote solidarity, then about truth the pragmatists must be wrong. Truth cannot be warranted assertability: two members of a community may with warrant assert contraries, but it is a rule of the game that only one of them can be right; the dissolution of community starts with the violation of that rule. Nor can truth be the ultimate limiting product of the process of rational enquiry: as a central requisite of discourse and negotiation, it is required from day to day; to place it in principle beyond current reach is to block its function. Human communities, I am suggesting, are discourse communities, and the truth-value game is essential to them. That is most obvious—both in the breach and the observance—for communities of scientists, but I take its applicability to be universal. (Kuhn 1987, III, p. 76.)

Clearly, then, Kuhn's stance moves away from pragmatist positions about truth like Dewey's and C. S. Peirce's. Whether he is right or not in characterizing them is quite another question that I shall not address in this article. I only wish to emphasize that he does not cut down the role of truth—or rather, of the “truth-value game,” as he says—because of the significance of that concept (or game) to preserve the community's integrity. Whatever his theory of truth is, his main goal in making this point is to support the claim that there is a *role* for the truth-value game in everyday contexts and in normal science (that is, in puzzle-solving contexts). So, even though Kuhn does not support the pragmatist's theory of truth (at least as regards Dewey's and Peirce's views, broadly constructed), the results of inquiry as conclusions that are declared true serve for him as ground for future inquiries just as we saw in Dewey, and so as the kind of signposts I mentioned above. Of course, some of these signposts are abandoned as soon as a revolution takes place, in Kuhn's view.³⁰ For both of them, declaring an assertion warranted (or true) is not just a matter of considering it in some way worth becoming part of a repository of facts about the world, but also part of a holistic and interrelated *dynamic* perspective of knowledge, in which previous achievements are the (nonetheless fallible) groundwork for future inquiries. Besides that, in Kuhn's perspective, those signposts also contribute to the integrity of community and are also indicators of the nature of inquiry that takes place in a certain historical period.

Kuhn said, particularly in his later years, that his proposal introduced a *developmental* view in epistemological matters. For him, it was not so important to show that scientific knowledge is a set of true justified beliefs, and to show that they *were* individually justified, as it was to show how *belief-change* was justified; in particular, in those cases in which belief-change involved a transition from one paradigm to another—that is, from a lexical structure to another (see Kuhn 1984, I; 1991/2000, esp. p. 102). A developmental philosophy of science as the one he puts forward had that kind of process as the goal of an epistemological analysis. That was for him the process in which, as he says in the paragraph reproduced above, interests partake. The truth-value game breaks down in that context, and choice is “interest-relative,” as he said (1987, III, p. 76). At that point, pragmatism is more reliable: “With respect to lexicons, I am thus suggesting, the

³⁰ The nature of that abandonment and its consequences for the coordination of the previous theory (or paradigm, or lexicon) with the new one is part of the essence of Kuhn's complementary contribution to the common standpoint they both—Dewey and Kuhn—form.

pragmatists were generally right. Lexicons are instruments to be judged by their comparative effectiveness in promoting the ends for which they are put to use. The 'choice' between them is interest-relative" (1987, III, pp. 75-76).³¹ To what extent "instrumentalism" in Kuhn has common points with Dewey's position beyond those contemplated here is another question. For that matter, that kind of comparison of two different kinds of instrumentalism should also include a third party—Rudolf Carnap's own brand of instrumentalism. But that's a project to be pursued elsewhere.

5. CONCLUSIONS

In this article, I have examined some points in common between Kuhn and Dewey. The relationship between their theories is not that between a pioneer's and his or her follower's, nor that of two thinkers identically associated to a given philosophical trend—at least, if that trend is American pragmatism.³² Despite their differences, there are coincidences between their respective philosophies that are worth an in-depth study. The aim of this paper has been to point out some entrance points in that theoretical relationship so that a deeper reconstruction of the coincidence may be produced.

I have mentioned three points of coincidence. First of all, I discussed their similar views concerning logic as regards the thesis that it is a culturally relative set of conventional habits of reasoning and inquiry that evolve over time and with linguistic change. Logic plays a role in our societies and its study cannot be set apart from them. From Dewey's point of view, locating our reasoning abilities in the context of the relation between the organism and the environment with which it interacts is key to understanding it properly. By contrast, studying them as a merely formal theory completely detached from this evolving context prevents us from getting a full understanding of their nature. In that sense, Dewey's perspective in logic reaches well beyond the point in which Kuhn deployed some interest in the field. Still, they both coincide regarding the idea that the rules underlying any

³¹ For the sake of completeness, I add what Kuhn writes after that full stop: "With respect to lexicons my position is instrumental and relativistic. But relativism with respect to lexicons need not bring with it relativism with respect to truth, and I think it vital that it not be allowed to do so" (1987, III, p. 76). The previous paragraph reproduced above starts at that point. I have explored how Kuhn understands those two kinds of relativism in Mayoral (2017b).

³² My perspective is therefore different from Mladenovic's (2017) in that sense.

form of inquiry (scientific inquiry included) must be contextualized and their role extended beyond the limited scope of what the empiricist philosophers called the context of justification. Actually, they both support the idea that our philosophical investigation into the grounds of human inquiry must take into account ingredients that traditionally would belong to the context of discovery, and that this point of view leads in fact to the full eradication of the DJ distinction.

Secondly, Dewey's and Kuhn's views on problem-solving offer an interesting point of coincidence. In that sense, they are more complementary than strictly coincidental. Dewey focuses on the structure of inquiry itself in order to rethink the grounds of logic from a more naturalistic and fallibilistic perspective. Kuhn, however, is not as interested in logic itself—nor by extension in an individualistic reconstruction of inquiry—as in the social structure that surrounds it, and that gives it the recognizable functioning that we see in the mature sciences. From that point of view, Kuhn helps us see in what different contexts the Deweyan vision of inquiry may be seen at work, and how that general framework should be adapted accordingly, whereas Dewey provides Kuhn with the kind of general theory of inquiry that is not present in *Structure* and related work. So, though they both emphasize the significance of clarifying the problem-solving contexts, their perspectives are in harmony as complementary visions on those contexts.

Thirdly, I have shown that their respective views on knowledge have some points in common. In particular, I have shown that Kuhn's preference for a developmental perspective in epistemology and philosophy of science might find an ally in Dewey. The main problem here is Kuhn's repudiation of pragmatists' positions about truth, Dewey's included. However, even if that critical attitude is admitted, their respective views may be found convergent insofar as they both pursue a pragmatic and developmental replacement for foundationalist views on knowledge and truth.

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