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Las relaciones de equivalencia como criterio de análisis de la pertinencia científica de categorías analíticas

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Resumen

El objetivo del presente trabajo es proponer las relaciones de equivalencia como criterio estructural o de ordenamiento analítico mediante el cual se puedan delimitar las funciones del conocimiento requeridas en una actividad científica. Se parte de considerar al conocimiento como un fenómeno estudiado por la psicología y cuya explicación requiere de dar cuenta de la manera en que se establecen, organizan y actualizan las funciones conductuales o del conocimiento. De este modo, se considera que las tareas de igualación a la muestra permiten comprender el modo de abstraer las categorías analíticas que estructuran científicamente el conocimiento de la realidad. Cuando se usan estos procedimiento, se derivan nuevas relaciones sin la necesidad de un entrenamiento directo y que no pueden explicarse con base en principios de generalización de estímulos, sino, más bien, como relaciones equivalentes diferenciadas mediante los entrenamientos previos y que adquieren un cierre en una categoría analítica cuando se abstraen los criterios categoriales o, si se quiere, cuando estas relaciones se nominan. Así, al categorizarse o nominarse, estas trascienden la situación —porque nominar se entiende como un ajuste a criterios convencionales— y una vez que las interacciones situacionales se nominan, regulan todas las prácticas sociales, incluidas las prácticas del conocimiento científico.
Palabras clave: Conocimiento científico, relaciones de equivalencia, categoría analítica.

Equivalence relations as an analysis criterion of scientific relevance of analytical categories

Abstract

The aim of this paper is to propose equivalence relations as a structural criterion or analytical order, through which the functions of knowledge required in a scientific activity are delimited. It begins by considering knowledge as a phenomenon studied by psychology, whose explanation requires giving an account of the way in which such behavioral or knowledge functions are established, organized and updated. It is considered that the procedures of matching—to-sample allow understanding the way of abstracting the analytical categories that scientifically structure the knowledge of reality. When using these procedures, new relationships are derived that without the need for direct training, cannot be explained based on principles of stimulus generalization, but rather as equivalent relations differentiated through previous training. They get a closure in an analytical category, once the categorical criteria are abstracted or if desired, when these relationships are nominated. And when categorized or nominated, they transcend the situation, since nominating is understood as an adjustment to conventional criteria. Once situational interactions are nominated, they regulate all social practices, including practices of scientific knowledge.
Key words: Scientific knowledge, equivalence relations, analytical category.

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Este trabajo es el resultado de la línea de investigación con la formación científica, que los autores han venido presentando en la publicación de artículos.

As relações de equivalência como critério de análise da pertinência científica de categorias analíticas

Resumo

O objetivo deste trabalho é propor as relações de equivalência como critério estrutural ou de ordenamento analítico pelo qual possam ser delimitadas as funções do conhecimento requeridas numa atividade científica. Parte-se de considerar o conhecimento como um fenômeno estudado pela psicologia e cuja explicação requer evidenciar a maneira na qual são estabelecidas, organizadas e atualizadas as funções comportamentais ou do conhecimento. Desse modo, considera-se que as tarefas de igualação à amostra permitem compreender o modo de abstrair as categorias analíticas que estruturam cientificamente o conhecimento da realidade. Quando são usados esses procedimentos, são derivadas novas relações que, sem a necessidade de um treinamento direto, não podem ser explicadas com base em princípios de generalização de estímulos, mas sim como relações equivalentes diferenciadas mediante os treinamentos prévios e que adquirem uma delimitação numa categoria analítica quando são abstraídos os critérios categoriais ou, se se quiser, quando essas relações são nominadas. Assim, ao serem categorizadas ou nominadas, elas transcendem a situação —porque nominar se entende como um ajuste a critérios convencionais— e, uma vez que as interações situacionais são nominadas, regulam todas as práticas sociais, incluídas as práticas do conhecimento científico.
Palavras-chave: categoria analítica, conhecimento científico, relações de equivalência.

INTRODUCTION

Science, as an analytical category and a social practice, has derived its meaning from the everyday uses of language. Padilla (2014) states that "[…] science has been the subject of study of philosophy, sociology, history, economics, etc., and only since the 1960s, has also become the subject matter of psychology" (p.35). In everyday usage, the word science contains multiple meanings. With this word reference is made to specialized knowledge of a segment of reality and is also used to refer to the procedures used to establish and validate different types of knowledge.

Sometimes the concept of science is used as a synonym for scientific theory or theories. In general, the word science encompasses: (a) products endorsed and categorized by a community as scientific products, (b) the set of activities that a community endorses as scientific activities, and (c) a justification for the various scientific activities such as procedures and theories. Each of these activities is intended to make the various phenomena of nature understandable, so that, on the basis of this understanding, the different modes of relation or orientations regarding the subjects the scientific theories deal with are established.

When speaking about scientific products, usually reference is made to theories, scientific laws, or applications derived from theory. And when talking about scientific activities, although sometimes they refer to scientific competences, or scientific thinking, the truth is that there are no criteria yet with which to delimit the scientific activities from those that are not.

It is worth remembering that this is not a new problem in the history of knowledge. The validity of knowledge was a problem for the Greeks, who sought criteria to distinguish between *doxa* and true knowledge (Platón, 1993). And it was a problem also addressed by Descartes, who tried to substantiate all knowledge in a metaphysical entity as *res cogitans*, characterized by its performance of reason operations as the foundation of truth.

Later, Kant (1781/2016), not satisfied with the solution of Descartes, undertakes the task of establishing the fundamental principles of reason and moves the metaphysical discussion about *what is reason* towards *what are the necessary conditions for its expression* and on *what is based* reason itself. Thus Kant centers his analysis on the conditions of validity of judgments, for it is through judgments that our knowledge of reality is expressed. Later, the Neo-Kantians interpreted Kant as a philosopher of language, and reason became the condition for the meaningful (Wittgestein, 1953). Thus, philosophical analyzes have served as a basis for the diversity of scientific approaches to the problem of knowledge from psychology (Piaget, 1977; Piaget & García, 1982).

For his part, Skinner (1957/1981) referred to scientific activities as those activities that a scientific community shapes and maintains through reinforcement contingencies and whose nature and the principles that explain them are not different from those applied to the explanation of any other behavior. What is then the distinction between scientific knowledge and other knowledge? From pragmatism (Peirce, translated in 1935), it is only in social practices that differences are established, since it is in these practices where the implications of different activities are delineated and not in *a priori* principles. That is, knowledge is embedded in these practices as a way of life. Pragmatism brought into discussion the relationship that could occur

between experience as a "subjective" form of knowledge and effective social practices regulated linguistically and also opened the possibility for scientific investigation of subjective experience, or rather, its mode of expression.

Scientific knowledge as a product (theories or laws) is not different from other knowledge products such as mathematical, technological, artistic or other knowledge. As suggested above, the Greeks sought to distinguish between different types of knowledge, mainly between knowledge of science, and of belief. In this sense, as a distinction criterion, they proposed different types of justification: formal justifications (logical criterion), and justifications from the possible action on reality, (which, as it would be said today, correspond to an empirical criterion). However, whatever the justification, it cannot start from any assumption, as this would give rise to a dogmatic justification, or a begging the question.

Although philosophers had widely discussed the possibilities of knowledge, it was from Darwin (1859, 1983) and the theory of evolution through natural selection, that the interest in knowledge began as a natural process that happens to living beings and takes place in their action —with special reference to humans—, and which could be accounted for by the scientific methods (knowledge as a natural fact). It is enough to contrast the theocentric vision of knowledge (Thomas, 1944,1945) understood as the experience reflecting in a transcendental mind, and which illuminated and guided action —mainly as a guide to human actions interpreted in the light of moral and political assumptions as an *a priori* duty —interpretation which also predetermined the purpose of man beyond this world.

In spite of the fact that the theory of evolution facilitated the naturalization of "thought", regarding it as inherent to the earthly man, it was necessary to make the following precisions: considering that evolution theorists have emphasized the evolution of structures and have paid little attention to the elements of the life context of the organism, as facilitators of the structure or as dispositional events —to use Ryle's conceptualization (1949)—, by emphasizing the evolution of structures, the organism was separated from the environment and its ways of life, instead of seeing it as an interactive unit.

The separation of organisms from their life forms has profoundly influenced the way knowledge is conceived as a psychological phenomenon. This has led to consider, for example, that the psychological is a structure that helps the organism in its adaptation to the environment. Thus, when we lose sight of the context as a necessary condition for the occurrence of psychological phenomena, we opt for an explanation of these phenomena from theoretical levels other than the properly psychological ones, such as the theory of evolution, as proposed by evolutionary epistemologies (Cambell, 1974, Lorenz, 1977, Pinker, 1997, Skinner, 1981).

Evolutionist epistemologies have made use of the concepts of phylogeny and ontogeny when analyzing knowledge, and have proposed a parallel between knowledge as a product, and the brain as the main mechanism of knowledge production. This approach suggests that knowledge is a function of the brain, which is known as property dualism (Changeaux, 1985; Edelman, 1987).

This type of proposal indicates that the selection processes operating in phylogeny and their difference with ontogenetic development ones have not been understood. The later ones, although dependent on phylogeny, are not necessarily determined by it, and for which it is also feasible to apply the selective logic, albeit at a different level. Thus, the selective explanation has been applied indiscriminately to both phylogenetic and ontogenetic differentiation processes. For example, selective processes are used to explain ontogenetic development, such as when development is already codified by genes, without bearing in mind that structural differentiation, rather than coming already prefigured, is dependent on the conditions present during the development of an organism that updates mechanisms of phylogenetic origin.

Perhaps it is time to abandon the idea of traditional epistemologies (mainly rationalism and empiricism), which distinguish between the subject and the object of knowledge, as two substances of a different nature, since this way of analysis has led to consider as true, assumptions such as that knowledge is the product of biological mechanisms —the brain—, thus reducing all process of knowledge to the activity of that causal agent, or even worse, that knowledge activities are analogues of the activity of a mental agent. This is simply to appeal to dogmatism embedded in a knowledgeable agent. It should be clarified that it is different to consider the existence of two substances than considering different categories of analysis. For the case, one thing is a descriptive category and another one, an explanatory category. This perspective is also different from the empiricist or rationalist proposals as ways of knowing.

If the idea of subject as a substantive entity is abandoned, we are faced with the proposal of Aristotle, for whom the psychological, including knowledge, can be understood as acts. That is to say, interactivity is the characteristic of every living being, and what we call consciousness is the same interactive property. As acts, these only take shape and can be known when they are carried out or updated. Even when psychological actions are potential (ie, even if I am not speaking at this moment, when I speak and there is a listener who responds, it is at this moment when the

act takes psychological interest and is different from the "act of sounding"), and potentials are updated in relation to stimulation conditions (it would not make much sense to speak of an eye that does not see, as it would not make sense to speak of a subject that does not act).

Based on the above, it can be said that an analysis of knowledge should focus on acts coordinated by a community and recognized as acts of knowledge rather than focusing on the analysis of an agent in whose nature is knowing (whether it is called mind or brain).

KNOWLEDGE ACTS

Knowing involves acts but does not constitute acts (Ribes, 2010). Generally, the verb to know is used when something is done for some purpose, such as when I say that I know how to ride a bicycle or that I know English. On the other hand, the verb to know has a "declarative" use, or it is used as a referent in a speech episode, to specify something to someone, for example when one says, "I know who can fix the phone". Sarmiento (2011) considers that

> […] most of the clarifications on epistemic terms have been made in the last years in English with the difficulty that in this language there is no difference between the verbs to *believe* and *to know,* because the word 'know' encompasses both of them. A different thing happens in Castilian (*conocer* and *saber*), German (*kennen* and *wissen*), French (*connaître* and *savoir)* "(p.81).

In Latin, the verb to know has two meanings, g*noscere* and *scire*, which mean "to know by the senses" and "to know by the mind", respectively. These meanings express the same conceptions of to know and knowing. In this order, it can be said that knowing refers to the specification of actions. Thus, knowledge and its specification (knowing) occur in a different time and space (from here and now and from there and then), as proposed by Barnes and Roche (1997); that is to say, it is a functional relationship between doing and specifying the criteria of doing.

All knowledge acts are basically acts of differentiation that are performed as social practices. That is, of delimitations or categorization of the actions. As Ribes (2010) states, knowing implies acts, but it is not acts like reasoning, judging, thinking, or others of this kind and use in mentalist theories. These are acts that can be placed in the categories of space and time, but also take the character of knowledge when establishing the analytical categories that will give the different acts their distinct meanings or criteria for doing. That is to say, knowledge corresponds to the analytical criteria or categories that mean or guide the different human actions.

The idea of knowledge, both in Aristotle (1980) and in Plato (1993), referred to a justified judgment, and it was considered that in order for it to be meaningful as judgment, it should have the form of justified action. In order to understand the present work, justified action can be understood as an authorization for the mode of action, particularly to act in one way and not another. This "authorization" arises both from the consequences resulting from natural laws and from social practices, or from the effects derived from the action being justified.

To speak of judgments only makes sense as language, that is, as a linguistic act. And this is different from the consideration of acts done by cognitive theories, which speak of acts as if they were actions of internal agents (Palmer and Donahou, 1992), who are credited with special qualities and powers. They are put into action when they are needed, as in the case of acts like reasoning (reasoning about something), remembering (remembering something), and judging (judging something). The mind is the reasoner, the mind is the one who remembers, the mind is the judge; and it is in a mental space where these operations take place.

The specification of knowledge as an act of knowledge is performed as a linguistically mediated social practice. For Kantor and Smith (1975), linguistic behavior is a communicative act (a way of influencing another), implying that whoever performs the act interacts with both a conventional object (the referent) and an object that operates as referred. That is to say, it is a double interaction; it is a bi-stimulational condition. In saying that linguistic behavior is an act, the door was opened to a logic other than mechanicism, proposed in the Renaissance to explain the world of non-living objects. In turn, linguistic acts make sense in a logic of the conventional, and different from causal logic.

In terms of Wittgenstein (1953/1988), it is rather "language games", although this conception also eliminates the idea that language is a means to reflect or name reality, for verbal acts are activities of distinction, which are performed by categorical criteria, of differential response. These are interactions, not things or labels to convey a message that is used by those who speak or act linguistically. It is rather the coordination of actions taking place between the referrer and the referred, mediated by the actions that reality makes possible -the referent-. Thus, "the level of language competence that an individual possesses determines his or her linguistic performance" (Castro, Mathiesen, Mora, Merino & Navarro, 2011, p.40)

In a linguistic interaction, as mentioned before, one of the objects or the stimulating object with which interaction occurs corresponds to the person with whom one speaks, to

whom one writes or signals, whereas the second stimulus object corresponds to that part of the reality that mediates the interaction. However, it is necessary to clarify that the stimuli objects are significant by the functions they establish with respect to something; for example, to see, corresponds to a function that is established between the biological reactivity and the stimulating conditions (wavelength, for this case). By this same logic, for example, if someone says "pass me the salt," he is not expressing an idea resulting from an experience verbalized at the present moment, but what this speaker is doing is arranging an stimulus event that has a conventionally elaborated response function: "to pass the salt." And the same occurs with the listener, since one is listener to the extent that a pertinent answer is given, that is to say, by "passing the salt ".

The linguistic interactions, as conventional functions that are institutionalized in social practices, shape the different modes of interaction and constitute what Wittgenstein (1953) calls "language games", within which the different actions acquire meaning as part of the functions of the different elements that make up the various language games.

For Wittgenstein (1953), a language game is a functional space organized through analytical categories (behavioral functions organized according to the modes that define the game). Biologists, for example, make use of analytical categories such as "tree", by which they delimit a set of objects or empirical data, so that, depending on the different forms of interaction enabled by the objects, the biologist will elaborate categories of greater or lesser coverage with which he can give an account of the objects to be explained.

Science is one of those functional spaces constituted by categories that are still to be delimited precisely. In this sense, Ribes (2003) proposed the following categories for psychology: (a) taxonomic category, (b) operational category, (c) measurement category, (d) representational category.

As it was said before, an analytical category is the result of an abstraction in the Skinnerian sense. Skinner (1981/1957) refers to abstraction as follows: "Abstraction is a peculiarly verbal process, because a non-verbal environment cannot provide the constrained contingencies that need it" (p.123). With the development of new conceptualizations and procedures such as those related to the equivalence of stimuli, it has become possible that conventional contingencies can be specified and procedurally restricted, as proposed in the present investigation.

This paper proposes equivalence relations as a criterion (standard of inclusion) to integrate the different functions of research activities into analytical categories, such as those raised by Ribes (2003) and to structure the field of knowledge or discipline.

Behavior researchers such as Sidman (1986) have proposed a coherent explanation of such expressions as "meanings, referent and rule-governed behavior" based on the establishment of relationships, mainly of equivalence relations, and which basically include what people say, and the reactions or responses to what is said.

Equivalence relations are widely used in mathematics and refer to a relation being part of the Cartesian product of A x B, where an "x" element belongs to the set A, and "y" element belongs to the set B. Based on this, equivalence relations are established, which have the following properties: a) *reflexivity,* which refers to "x" being related to itself; b) *symmetry*, which refers to the fact that if "x" is related to "y", then "y" is related to "x"; c) *transitivity*, which means that if you have a Cartesian product A x B, B x C, then the elements "z" of C, are related to "x", as they also relate to "y".

Sidman (1971) used this same logic to study psychological phenomena, mainly those related to verbal behavior. In analogy with mathematics, classes A, B, C, which in mathematics refer to a set of elements, in psychology, these are constituted through conditional control, by which categories A, B and C, whose elements, also through conditional control can be placed in relations with other categories, to form equivalence relations. For example, category A may consist of elements x1, x2, x3; category B consists of elements y1, y2, and y3, and category C, by elements z1, z2, z3.

The procedures for constituting the categories are the matching- to- sample tasks, since these consist of presenting a sample stimulus (SS) in the center of a board, and in the lower part of the board three comparative stimuli (CS), with some of which some type of conventional relationship or inclusion criterion is established, corresponding to a first phase of training. In a second phase, the elements of category A, with elements of category B, or C, are related (with the same procedure), depending on the case. The investigations carried out with these procedures are already very extensive such as the ones conducted by Dugdale and Lowe (1990); Fiorentine et al.,(2013); Hayes, Tilley and Hayes (1988); Saunders, Wachter and Spradlin (1988).

The concept of equivalence relations as a mathematical concept was used mainly for descriptive purposes, rather than for giving an explanation of the origin of such relations as indicated by Sidman (1994), and although it is not made explicit, it can be deduced that the explanatory function also originates in social practices. Sidman (1994) also considers that equivalence relations have their origin as an effect of reinforcing contingencies, and those particular equivalence relations or grouped into classes, result

from contextual control, and therefore arise from specific reinforcement histories.

On the other hand, Hayes and Hayes (1989) consider that equivalence relations are only one example of a behavior of relating (such as equating, differentiating and opposing) and can be treated like any other operant. Therefore, they are also under contextual control and can be treated as an abstraction in the sense proposed by Skinner, that is, abstraction arises through social contingencies. In this sense, in order to explain complex human functions such as knowing and thinking, among others, Hayes, Barnes-Holmes and Roche (2001) have proposed the Relational Frame Theory (RFT).

An inter-behaviorist view of equivalence relations considers that these originate when an event can act as a function of stimulus, and in turn, establish a response function in the organism. Thus, the word "red" can perform a stimulus function, in whose case, a listener, upon hearing the word, could answer by indicating or signaling a specific color. But this same listener, on another occasion, could say "red" to indicate, or signal to a listener, the presence of that color. The coordination of the stimulus function and the response function is what is identified as *reflective property* in equivalence relations, which is the fundamental interaction for the establishment of equivalence relations-that is, the reflective property in this case corresponds to what is known as "name", that in the example would be “red”. For a broader analysis, see Barnes and Roche (1997).

On the other hand, the *combinatorial property*, characteristic of equivalence relations, arises when different stimulus functions are combined or exchanged with different response functions (eg, before the word “red”, which acts as a stimulus, different responses can be given: one can make a drawing, signal or write), to what Skinner refers to as an extended tact. In addition, Hayes et al. (2001), expanded the combinatorial property not only to the elements of the relations, but to the relationships themselves.

Thus, knowledge understood as a set of functions or a network of relations of analytical categories (understood as A, B and C), conventionally delimiting a knowledge domain, as is the case of a discipline, such functions result from the relations given between stimulus functions and response functions, to constitute the category A —or descriptive category—, referred to as the "properties of objects" or stimulus functions. And the category B —of differential responses or response functions— conventionally mediated and corresponding to the "subject" category. In a nominalist and dualistic interpretation, category A was nominated as "object" and category B as "subject."

In light of the developments in the research on verbal behavior, B can be understood as a conventional category. Thus, the analytical categories constitute the taxonomy of the different disciplines, and they allow organizing the different interactions of the organism with the environment, distinguishing each one of the categories, based on principles of psychological reflexivity. Perhaps this is the Copernican twist to which Kant (2016) referred to in his *Critique of pure reason*

The stimulus functions and the response functions constitute a behavioral unit or function, based on which, when they are integrated into a network of conventional relations, we develop what in everyday life we mean as knowledge. Knowledge here is conceived as a game of language, and specialized knowledge can be understood as a disciplinary game, delimited by criteria or analytical categories that a scientific community has been building from their interactions with reality and with members of the specialized community, which is made possible through the institutionalization or conventionalization of behavioral functions, insofar as they are constituted in formalized modes of interaction with the other.

In that regard, to give an example, when a person in a language episode speaks of "dog", is not using a tag to name an object, is responding in an interactive episode, with conventional morphologies established for the stimulus object - dog - and from which the response functions relevant to the situation will be updated (the conditions of the verbal episode). Thus, the set of behavioral functions that are situationally deployed, or that are updated in time and in a specific space, constitute the degree of knowledge referred to a domain.

Philosophy and epistemology, whether these are of empiricist or rationalist origin, have assumed that knowledge originates from experience and from the self-observation described when such inner experience is verbalized. The difference between rationalism and empiricism basically lies in how reality is described, since it is translated from a logic into another. It is as if two people who speak, one, English and the other, Spanish, want to communicate. How can they do it? It is not a question of saying: "*in Spanish, ‘book’ is libro*", but it is a question of stimuli objects "*book*" and "*libro*" interchangeably select a set of interactions that one or another individual performs daily with the object.

An explanation of knowledge as a psychological phenomenon refers to the way behavioral functions are established, organized and updated. Thus, psychology has developed procedures that allow giving an account of these three aspects, that is, through matching- to sample. These tasks have also allowed us to unveil the "plot" of the social, while categories and concepts are modes of coordination that delimit the types of interaction with others, with things and with oneself. So powerful is the presence of categories

and concepts as functional structures of the social world, that they functionally regulate all of the theoretical practice and, therefore, all our knowledge, scientific or not (Carpio, Pacheco, Flores, and Canales, 2002) .

FINAL COMMENT

A scientific theory has the main function of delimiting the field of phenomena that the researcher intends to analyze, as well as the ways in which the analysis will be done; that is, with what concepts, with what instruments, and how the researcher will represent his analyzes. And all this is only possible through conventional means that the researcher selects for the analysis of what he intends to study, and that a scientific community has endorsed as suitable.

Usually, the first explanations given of an event are metaphorical and reductionists accounts of what is established. In fact, modern science makes extensive use of metaphors, Newton for example, refers to the functioning of the universe as "a clock", and even the law of gravity is analogous to the "attraction existing among people" (Newton, 1687/1974, cited by Cohen, 1980). The same can be said of Darwin in referring to natural selection as an analogy of the various selection operations that man performs, and to which Darwin referred to as artificial selection (see Robert Young, 1970).

Science has always made use of metaphor as a first form of understanding. Newton himself perceived this relation and for that reason made the comment that perhaps it is necessary at some point to abandon the metaphor and make use of literal language, which for Newton was the language of mathematics (Weinberg, 2015). Along this line, Ruiz and Luciano (2012) have used the paradigm of equivalence relations for the experimental study of analogical reasoning, whereas Ribes (2003) proposed a taxonomy, under which the different activities that are deployed in a scientific analysis are grouped. These would be measurement, representation and systematic or procedural analysis activities. Each of these categories has its own logic, but together, they constitute a scientific practice.

On the other hand, the works in conditional discriminations that use matching-to-sample tasks have allowed understanding the analytic from a perspective different from the one posed by rationalism. Rationalism refers to the analytic as the product of an entity called “mind”, whose mode of knowledge is represented in language. On the other hand, the work on conditional discriminations has allowed us to consider the analytic as the modes of relationship between interactions located in time and space, conventionally mediated, and understood as the kind of interactions that transcend the here and now and are updated in the there and then. This is what makes knowledge a value that, as social practice, transcends the present time (Barnes & Roche, 1997).

All the diversity and specialization of culture is the result of interactions that can be located space-temporally. In addition, its continued categorization and re-categorization result from the development of social practices, which in their founding nature are nothing other than linguistic practices. The different events of reality are understandable only if they can be integrated into a social practice. There are several concepts through which this has been discussed, for example Kuhn's *paradigm* (1971), Wittgenstein's *language games* (1953), or Pepper's *metaphor root* (1942).

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