THE PSYCHOGENESIS OF ECONOMIC VALUE

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Abstract

Viewed as a useful source of methodological inspiration, psychology has contributed substantially to the progress of economics, particularly through the overcoming of neoclassical postulations devoid of consistency. A result of a merger between both, Economic Psychology is one of the most promising developments for economists interested in the cognitive, affective and motivational factors underlying economic behavior. In this context, economists can take advantage of empirical methodological tools, which tend to lend more realism to the theoretical constructs to rescue the economy and its pragmatic function. The aim of this study is to analyze the process of a cognitive construction of an essential economic concept: value. Using Piagetian psychology and genetic epistemology as an analytical and methodological framework, it explores the psychogenesis of the concept of economic value in children aged 6 to 9 years who study at municipal schools in the Metropolitan Region of Curitiba, Paraná State, Brazil. With the critical clinical method, semi-structured interviews were held, the purpose of which was to assess how developed the concept of value was in the infant universe. Unlike the mainstream axioms, the analysis assumes that economic actors develop their skills and economic knowledge over time, and that understanding this process should combine ontological, epistemological and psychogenetic elements. The ontological elements are the nature of the concept whose construction will be investigated: value is perceived as a concept that is at the same time quantitative, sociological, economic and psychological. The epistemological elements are related to the historical trajectory of the development of economic value as discussed in economic theories. The focus is the antagonism between the objective and subjective approaches to value. The psychogenetic elements are ultimately the construction of the concept as it manifests itself in each of the subjects interviewed.

Keywords: economic value; psychogenesis, economic psychology.

1. Introduction

What is economics? What is its object of research? What is (are) the most appropriate method(s) for understanding it in its essence? In search of answers to basic questions on the exercise of scientific economics, an increasing number of economists have entered the realm of behavioral science to improve methods, test hypotheses and corroborate theories concerning the processes of decision making and choice under different circumstances. It could be no different: the ontologically complex nature of economics, being inexorably multiple, eventually mobilizes different areas of knowledge in an effort to build the concepts, methods and techniques that are potentially explanatory and predictive and which justify economic practices in their different forms of expression.

Viewed as a useful source of inspiration, scientific psychology has made substantial contributions to the progress of Economics (EC). The result of a merger between both, Economic...
Psychology (EP), along with behavioral economics, is one of the most promising developments for economists interested in the cognitive, affective and motivational factors underlying economic decision making. The rationality is certainly one of the most prominent themes – given the cognitive connotation that it assumes in the field of economic debate; and it has been approached by different theoretical schools of psychology. Seeking for empirical evidence of the (im)possibility of a major cognitive neoclassical postulation, several studies of EP ask consumers to identify the specifics of their preferences, their choice, their attitude when faced with uncertainty, thereby explaining the weakness of the tautological axiom and psychological profile of the mainstream *homo economicus*.

The experimental methods included among the major contributions of EP to EC. Furthermore, the results of work grounded in PE urge greater flexibility of the behavioral assumptions used in economic theory, particularly with respect to rationality. We assume in this work that the economic rationale that survives in traditional economic theory is not innate to the economic actors. We assume that the economic concepts (including fewer hermetic and abstract forms of rationality) are necessarily constructed, relational, dynamic and socially shaped. We assume that economic actors are, in essence, heterogeneous, and that this heterogeneity reflects and implies differences in behavior. We also suppose that economic man has already been children who necessarily undergo a process of socialization, learning of concepts, ideas, skills and economic behaviors.

The aim of this study is to analyze the cognitive construction of a key economic concept: value. In this sense, using psychology and the genetic epistemology of Piaget as a theoretical and methodological framework, the article analyzes the concept of economic value psychogenesis in children aged 6 to 9 years who study at municipal schools in the Metropolitan Region of Curitiba (RMC), Paraná State, Brazil. With the critical clinical method, we conducted semi-structured interviews followed by simple activities, the purpose of which was to assess the degree of development of the concept of value in the infant universe. Our analysis assumes, therefore, that
economic actors develop their economic skills, competences and knowledge over historical and biographical time, and that understanding this process should combine ontological, epistemological and psychogenetic elements. The ontological elements here have to do with the nature of the concept whose construction will be investigated: value is perceived as a concept that is simultaneously quantitative, sociological, economic and psychological. The epistemological elements are related to the historical trajectory of development of economic value as discussed in economic theories. The focus is the antagonism between the objective and subjective approaches to value. The psychogenetic elements refer ultimately to the construction of the concept as it manifests in each of the subjects interviewed.

2. Psychology and genetic epistemology

The behavioral assumptions underlying the traditional economic theory historically and unnecessarily dispense with consistent psychological foundations. Given the importance of decision-making and choice for the economy, it is surprising that scientific psychology is insistently overlooked by certain branches of economics. The use of concepts and methods of behavioral sciences only tends to reduce the embarrassing academic discomfort of those who, oblivious to the progress of these disciplines, make excessive use of axiomatic modeling and ad hoc arguments in a vain effort to justify explanatory rhetorical failures.

The predominance of the introspective method in the theoretical formulation undoubtedly made it possible to disseminate important contributions to Economics. However, it ended up conforming to an aesthetic, monolithic and surprisingly predictable character that was dreadfully far from the pragmatic and empirical universe inhabited by the “real” economy. With the danger of becoming irrelevant and unscientific, the orthodox approach uses a concept of rationality grounded in methodological individualism that is mangled and devoid of minimal plausibility. In contrast, a steady stream of “heterodoxy”, committed to the realism of the assumptions and the relevance of the EC has relied on systemic and structuralist methods, interdisciplinary strategies and even biological metaphors, rather than the outdated metaphor of the physical, mechanistic and
reductionist traditional approach. In this context, it is fair to say that rationality is essentially a cognitive concept and should be taken in the light of a theory of knowledge that is less reductionist, more interactive and relational and, therefore, does not deserve the *homo economicus* approach, but rather something closer to *homo sapiens*.

One of the main representatives of research into the formation and development of human knowledge was Jean Piaget. Piaget was, above all, a biologist concerned with the problem of the adaptation of species to their environment. Unlike and far beyond the evolution of ES, its approach is not built from a biological metaphor. Seminal questions that it asks about human knowledge (what, after all, is knowledge?) were treated as biological problems. This is a different approach, according to Furth (1974, p. 22), since “... Piaget rejects the knowledge and intelligence of philosophical beliefs, placing them in all of biological life”. Introspection is not enough, and limits the need for objectivity. Piaget is aware that cognitive activity is only one aspect of the concrete behavior of the organism. The fact that he did not dedicate as much effort to the affective or motivational aspects does not mean that he was unaware of them. The delimitation of his research to the cognitive is merely a pragmatic procedure, a cut that is necessary for scientific practice.

The fundamental notions of Piaget’s theoretical framework are linked on the one hand to biology, and on the other to the theory of knowledge and epistemology. As for biological development, this perspective encompasses the development of intelligence and corresponds to the nature of the organism is not “something coming from outside and being added to it”, the example of neoclassical economic rationality, *deus ex machina*. Explaining the development of intelligence, therefore, requires an understanding of the structure of intelligence:

An organism or biological organization implies a structure that is responsive to its environment. The structure is set up and maintains its integrity through factors that are not entirely extrinsic to the organism. When we say that the body expresses a degree of spontaneity, we are referring to some kind of internal activity like this. However, this spontaneity is not something arbitrary, away from self-determination. On the contrary: intrinsic spontaneity is a criterion of living and legitimate structure that the organism possesses (FURTH, 1974, p. 29).

While the weaker behavioral assumption of ES has an ambiguous rationality – sometimes attributed to the market, sometimes to the actors – in which all the economic powers are inherent to
the atomistic economic man, Piaget’s genetic epistemology seeks to understand the genesis of knowledge, but there is no predetermined structure or knowledge, given that they are the result of effective and continuous constructs. According to Dolle (1981, p. 45-46): “It is therefore in the context of an interaction (Piaget’s interactionism) between subject and object that the problem lies. This genetic epistemology therefore seeks to draw out the different varieties of knowledge from their basic forms and follow their development levels, including further scientific thought”. It is therefore the achievement of objectivity from an epistemological question that emerges from the biological, and underscores the importance of the environment the physical, biological and social construction of knowledge. The biological environment is the necessary world within the biological organization it lives and with which it interacts. If, as in the case of humans, social and cultural influences are part of the common medium, then can never humanly develop in men without the social and cultural milieu” (FURTH, 1974, p. 34).

The Piagetian research program is organized around some key concepts and assumptions consistent with the formation (biology), interests (epistemology) and academic needs (psychology) of its predecessor:

Piaget’s theory has an intrinsic unity. His perspective is only the logic of its corresponding biological perspective, and his psychological investigations can only be understood in light of both. (...) For Piaget, this approach has the special implication of seeing development and evolution as an intrinsic biological cognitive process, not as facts external to the process. In terms of theory of knowledge, this notion [biological organism in constant interaction with its environment] corresponds to the thesis that knowledge is not only neither in the subject nor in a supposedly independent object, but that is constituted by the subject as a subject-object relationship (FURTH, 1974, p. 36)

Moreover, one must note that for Piaget: “The instruments of our knowledge are part of our body, which is part of the external world (Piaget, Inhelder, 1962, p. 42). Not being extrinsic to the subject, cognitive development takes place, thus essentially based on the development activity of the subject: it is acting on the external world that he prepares a more adequate knowledge of reality (FURTH, 1974, p. 41). This follows on from the relational approach that underlies the structuralist theory and genetic epistemology, particularly because of the principle of wholeness¹ that

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¹ The entire structure is a characteristic that distinguishes the parts. It is the same old saying, that “the whole is not in any way, the sum of its parts.” The elements of the structure are subject to the laws of composition that characterize the system as such, not
characterizes it: “a structure is a system of transformations that includes laws as a system (as opposed to the properties of the elements) and it is conserved or enriched by its own set of transformations, without which they will lead to outside its borders or appeal to outside elements. “ (Piaget, 1970, p. 8)

Action as a source of knowledge, genetic relativism, structuralism and dialectic assimilation-accommodation in the balancing process ensures all at once that some progress and stability are fundamental elements of his theoretical edifice. With the insight of a biologist, Piaget addressed the issue of knowledge – historically taken in the light of philosophy – in terms of adaptation: the problem of knowledge thus assumes the character of a problem of relations between a thinking and acting subject and the objects of his experience (Doll, 1981). It is thus clear that we distance ourselves from the exceedingly unusual homo economicus.

Knowledge and intelligence are, for Piaget, ways of adapting the subject to his environment, and this is highlighted in his work, since it is a form of biological adaptation. Since adaptation is essentially an intelligent organization, having the function of structuring the universe as the body structures its immediate environment. Thus, the body adapts by building new forms of material to be inserted in the universe, while intelligence extends the mentally creating structures that can be applied to the environment (Doll, 1981).

There is intelligence – as in living organisms – changing and unchanging elements. The invariant elements or, more appropriately, invarian ts must be taken in light of two general biological functions, namely, organization and adaptation. Adaptation is defined as the conservation and survival, the balance between the organism and its environment. Thus, it is said that there is adaptation where the body becomes a function of the resulting increase in the variation of trade between them and facilitating the preservation of the body. Two processes are interdependent and intertwining invariants: assimilation and accommodation. In the former, “…elements of the environment are incorporated into the structured set that turns itself on” while in the latter “…an

merely cumulative associations. The whole, under such circumstances, has compositional characteristics that are different from those assigned to the elements (Piaget, 1970).
environment changes and the organization adapts to this change by becoming its own “...to the extent that there is “...one part is assimilated, that is, [when] elements from the environment are incorporated into the structure. There is also modification according to environmental changes or, in other words, accommodation” (Doll, 1981, p. 50). The balance between them characterizes the adaptation.

It is this sense that the organization becomes inseparable from adaptation:

Regarding the relations between the parties and the whole that define the organization, we know well enough that every intellectual operation is always relative to all others and its own elements that are governed by the same law. Each scheme is well coordinated at all and is itself a sum of different parts. Every act of intelligence assumes a system of meanings and implications of mutual solidarity. The relationship between this organization and adaptation are therefore the same as at the organic level: the main “categories” that use intelligence to adapt to the outside world – space, time, causality and substance, the classification and number etc... each correspond each to an aspect of reality, as the organs of the body are all related to one special characteristic of the environment, but, in addition to their adaptation to things, they are involved with each other to such an extent that it is impossible to isolate them logically. The “agreement of thought with things” and “agreement of thought with itself” expresses this double invariant functional adaptation and organization. However, these two aspects of thought are inseparable: it is adapting to the things that thought itself is organized and is through organizing itself that it structures things. (Piaget, 1985, p. 51).

The notion of balance, in keeping with the notion of reversibility, should be taken in parallel with increasingly mobile intellectual development and balance. “The balance being dealt with is primarily mobile and supportive of a structure of a set, with all of its laws, and remains as such. A balanced structure is a structure capable of compensation (disturbance from outside, for example), but is also an open structure, capable of adapting to changing environmental conditions.” (Doll, 1981, p. 56-57).

To understand the development of knowledge, it is worth beginning from the fundamental concept of operation, given the importance of action for the development of knowledge:

Knowledge is not a copy of reality. Knowing an object, a known event, is not only experiencing reality. Knowing an object, knowing an event, is not simply looking at it and making a mental image or copy of it. Knowing a subject is acting upon it. To know is to modify, change the subject and understand the process of this transformation and, consequently, understanding how the object is constructed. (Piaget, 1964, p. 1).

The operation is an action that turns inward, modifying the object of knowledge; it is the very essence of it. Gathering objects in a class to construct their classification is an operation. Measuring and counting are operations. The set of actions that modify the object and allow the expert to achieve the transformation of structures is called an operation. It is an interiorized and
reversible (bidirectional) action, is a particular type of action that characterizes the logical structure. It is never alone: it is bound to other operations where it is always part of an overall structure: “For example, a logical class does not exist: what exists is the overall structure of the classification. An asymmetrical relationship does not exist in isolation. Serializability is the natural and basic operational structure. A number does not exist in isolation, that is, it is the series of numbers that form the structure, a huge, rich structure, whose various properties have been revealed by mathematicians.” (Piaget, 1964, p. 2).

With these structures forming the basis of organizational knowledge, the fundamental problem of development shifts to understanding how they form, develop and operate, i.e., their psychogenesis. The construction of these ways of knowing, or more precisely, the transformation of certain other structures, expressed in stages, can be explained by four main factors: maturity, experience, social transmission and equilibration (Piaget, 1964).

Maturation, as defined by Gesell – reflecting the stages of maturation within the nervous system – has a significant influence on each transformation during a child’s development, but is not enough by itself: the average chronological age for each stage of development varies greatly from one society to another. The order of stages, however, is constant, as shown in a number of studies conducted in different countries (Switzerland, USA, Iran, Canada and some African countries) (Piaget, 1964).

Experience with objects of physical reality is another basic factor in the development of cognitive structures. But again this is not a sufficient factor for two reasons. First, the nature of some of the concepts that arise in the early stage of concrete operations does not reflect the nature of concepts derived from experience (for example, the evidence relating to the conservation of a substance, such as the changing shape of a ball of plasticene, the notion of substance is built before the weight and volume). One indication of progress of knowledge in this context is the logical necessity of conservation, even though no experiment could have led to such a notion. The second limit of experience as an explanatory factor is the very notion of experience. Two distinct
psychologically and pedagogically important types of experience can be identified: physical and logical-mathematical experience. The former has to do with acting on objects, extracting knowledge of their properties by the abstraction of empirical attributes. This is an experience in the ordinary sense, for empirical purposes (e.g., the discovery of the difference in weight between two objects is a difference found in the objects themselves). In the latter, logical-mathematical experience, knowledge is not abstracted from objects, but rather the results of actions performed on them by reflective abstraction (Piaget, 1964).

Regarding the third factor, we can say that it contemplates the social linguistic or educational transmission and social interactions. Again, this is an insufficient factor by itself, as a piece of information can only be of value to a child who can understand it. The receipt of information depends on the existence of a structure that enables the child to assimilate it. Only when the subject has acquired a certain mastery of logical structures (i.e., that they are built according to specific laws of development) can he understand linguistic expressions concerning these relations. (Piaget, 1964).

The fourth and final factor to be defined is the balancing. The three other factors are necessary and important, in this way. However, the importance of balancing lies in the ability to regulate the action required of the other factors. If the subject is active in the construction of knowledge, i.e., the act of knowing, when confronted with some external disturbance he reacts in order to compensate for it, thereby using equilibrium. Thus, balance is defined by active compensation that leads to reversibility. This operational reversibility is itself a model of a balanced system in which transformation in one direction is compensated by a transformation in the opposite direction. Therefore, balancing is a self-regulatory process and a key asset for development, taking the form of a succession of equilibrium levels with a certain probability sequence: “All development is composed of momentary conflicts and incompatibilities that must be overcome to achieve a higher level of balance” (Piaget, 1964, p. 10). This means that the second level of coordination of actions cannot be achieved unless the first level has achieved equilibrium, and
balance at the third level is possible only after balance at the second level has been achieved, and so on. Thus, given that the previous level has been reached, each level is determined as the most likely account for this process of finding ways to balance. The developmental stages of the concepts that are widely used in psychogenetic studies stem from this.

3. **Research on the psychogenesis of economic concepts**

Having recognized the importance of the ontological relationship between the concepts of epistemology and psychogenesis, many researchers have studied the notions of social and economic psychogenesis, concerned mainly with the peculiarities of their construction and the epistemological obstacles that characterize them. Research on the development of economic concepts, details about the evolution of economic understanding of the universe, begin with the approach concerning the notions of children’s economic reality. These notions have been the subject of investigation by a number of late twentieth-century authors. This academic work focused on children’s understanding of money and the habit of saving (Delval, 2002).

Economic knowledge was studied by Schuessler and Strauss (1950) as part of a broader objective: the investigation of the socialization process, understood by the authors as the learning of concepts that have some social origin. The concept of money was raised according to an analysis of scales, and finally determined whether children develop consistently with respect to the concept of money, whether the establishment of well defined stages in the development of this concept is possible, and what conditions or types of learning are prerequisites for a particular stage of development.

Children’s economic ideas were also investigated by Danzinger (1958). The interviews he conducted with Australian children were guided by three issues: the functions of the chief, the meaning of “rich” and “poor” and the use of money. The subjects’ responses to the interviewers varied according to their age, being either predominantly anchored in moral issues, specifically economic aspects or moral and economic aspects. When asked about the need to carry cash to the store, the younger children reported only the case of a compulsory procedure for moral connotation,
while the older children were able to recognize that the shopkeeper has to buy more of the products he sells to replace his stock (Danziger, 1958).

Regarding what the shopkeeper did with the money he received, Danziger (1958) established three categories for the formulations presented by children, in increasing order of sophistication. In the responses classified as primitive, the act of purchasing is governed by essentially moral considerations and the functions of money are unknown. Its role in the act of buying and selling is essentially ritual. The exchange is interpreted as an exchange of money between the person who buys and the person who sells, just part of the act of buying without any intrinsic connection. Thus, handing over money does not have any economic meaning. It is seen as merely a morally imposed ritual.

Delval et al. (1971) conducted a series of exploratory studies about different aspects of social knowledge, particularly about the political and economic aspects. Using the clinical method, the authors addressed three themes: the distribution of capital, the relationships of exchange, and the production process and the sources of wealth of nations. With regard to the relations of exchange, the purpose of the questions was to ascertain the need to carry cash to the store and what the shopkeeper does with the money he receives in exchange for the goods he sells. The explanations given by children were classified into three levels according to their complexity. The answers framed in the first level considered the delivery of money a ritual act with no relation to the acquisition of goods: the buyer gives the seller money and sometimes the seller hands over a much higher, lower or equal number of banknotes or coins, the value of which is not taken into consideration. At this level, it is common for children to be amazed when they receive in an exchange a larger amount of coins or bills than they gave. At the second level, a prevailing answer was that the seller uses the money received from selling goods to ensure his own survival and to replenishment his stock of products. The exchange process is understood with some degree of sophistication. At the third level are the children who are capable of referring to the profit that the trader invests to expand his business (Delval et al., 1971). Delval (2002, p. 189) highlights as an
interesting fact that the subjects with more elaborate responses incorporate, in whole or in part, the previous answers into a coherent whole, thereby establishing “… a manifestation of the integrative character of the different phases of development.”

In this sense, Furth, Baur and Smith (1976) envisage the establishment of a framework for the Piagetian approach to social institutions. The authors found that, referring to the store, for example, young children believe that money comes from other activities performed by the shopkeeper or the change that remains in the establishment. Some children said that the trader does not need to pay for the goods he sells, since these will be given to him. These children are still unable to connect the concepts of buying and selling.

The work of Furth (1980) is an extensive study of children’s conceptions of the social world, structured into three areas: the understanding that children have of the government and the community, an understanding of money, and an understanding of social roles. By holding open and almost unstructured interviews, such as the critical clinical method, the author distinguishes stages in the overall understanding of social phenomena.

The difficulty in understanding the underlying concept of profit is mentioned in the study by Furth, Baur and Smith (1978), but the focus remains on understanding the work of change and exchange. The youngest children interviewed consider the exchange as a way that the buyer has found to obtain cash, while the older ones are able to understand that the shopkeeper has to buy the products he sells.

Profit was one of the concepts discussed by Jahoda (1959, 1964, 1979, 1983), a researcher who has addressed several issues related to social knowledge, in particular the perception of social differences, the notion of nation, time and history. His work on economic concepts dates from the late 1970s. Children’s progress is interpreted by Jahoda (1979) according to the understanding of different systems: the working system, the banking system and the profit system, all of which are interrelated.
Berti and Bombi (1981) also conducted a series of studies on various aspects of the understanding of economic problems. Their most scathing was Il bambino nel mondo economico (1981), part of the analysis of the understanding of remuneration for work. The authors found that younger children see economic relations as a direct relationship between two people: one who pays and another charges, or two people who pay and two that charge. Older children, in turn, begin to establish hierarchical relationships between the person that works and the person who pays. These relations generalize progressively until subjects become capable of connecting various aspects of economic life.

The origin of money, the notions of rich and poor, the role of banks, knowledge about the means of production and the idea of ownership were also included among the objects of research of Berti and Bombi (1981), who also explored the problem of price setting. The authors present the following levels of understanding of subjects about pricing: at level 0 buying and selling are not understood, the shopkeeper at this level does not need to buy the goods, either because the goods are given to him or he himself is the manufacture; at level 2 there is no difference between the price at the factory and the price at the store, or prices that are higher than this. At level 3, prices at the factory are lower and the decision falls to the shopkeeper. At this level, the child reconstructs the factory price from the store price. At the fourth and final level, the participants recognize that the store price is higher than at the factory. Children at this level have a more global view of the exchange process.

Four levels of understanding of the concept of income are outlined by Berti and Bombi (1981). At level 1, children believe that the wholesale price and retail price are the same. They argue that what the shopkeeper pays a fair price for the goods, and that the money obtained this way is enough for his personal expenses and restocking his shop. At level 2 children believe that the price may be changed by the shopkeeper, who can reduce it to attract customers or increase it to make more money. In both cases, the money is enough for his personal expenses and for replacing his stock. At this level three children believe that the shopkeeper pays only when he raises prices,  

\[ \text{Note that the price is not formed under the concept of economic value in its epistemological dimension.} \]
although this is a sporadic practice. The subjects at this level state that the shopkeeper changes prices, increasing them according to his needs. At level four, subjects claim that shopkeepers always raise prices for their own benefit.

Berti and Bombi (1981) analyzed the requirements and logical mnemonics for understanding the concept of profit, also approaching the arithmetic that lies behind the relationship between wholesale price and retail price. This is a fundamental aspect: the idea of profit can only be considered consolidated when the subject can make comparisons between the purchase and sale price\(^3\). The authors summarized in three topics the difficulties of understanding the concept of profit:

a) to begin with, economic concepts for children incorporate only partial aspects of economic reality through systems that are fragmented and isolated from each other. Note that understanding the concept of profit makes it necessary to integrate, in a single system, the exchanges between buyers and shopkeepers, shopkeepers and suppliers and shopkeepers and employees.

b) there is a tendency for children to apply economics the “laws” governing interpersonal relations. It would be reasonable to assert, for example, that the shopkeeper sells his products at the same price he pays for them from the factory because he applies the rule that equality prevails in relationships between friends who pay for favors with favors, not expecting to receive more than he ought.

c) children believe that price is an intrinsic attribute of the goods, as are the size and utility. Since neither of these changes during the transaction, there is no apparent reason for the price to change.

These difficulties are highlighted by Delval in his various works on the concept of profit. Children under the age of 10 are still unable to understand that the trader must charge more for the goods than they cost him. As they do not know the cost price, they believe that profit is a synonym for price. The sale is not seen as a profitable activity, but rather as a form of social work, through which the seller provides others with everything they need. As a social work, for moral reasons, children this age believe that you should not charge more for goods than they cost. The seller is seen as a friend to those who buy, and his relationship with the buyer is considered personal, not as an institutional relationship between individuals playing roles. (Delval, 2002).

Echeita (1985) addressed several economic concepts in 198 students from the first to fifth grades at a public school in Madrid, subjects of the middle and upper-middle class, aged 5 to 11.

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\(^3\)To Delval (2002), this is an indication that the possibility of accounts is necessary - although not enough - to understand the concept of profit.
First, they asked questions concerning the recognition of coins (its equivalent) and exchange. Children were asked about: the role of money, the need to carry money when going to the store, the need to pay for the goods, the destination of the money handed to the shopkeeper and the source / origin of the goods he sells, the existence of cost to the shopkeeper, the difference (or lack of difference) between the purchase price and the selling price, how the shopkeeper gets money for personal expenses, and the official responsible for setting prices and their freedom (or not) to do so.

The children’s responses were classified into three levels. The first level believed that “earning” money in a store is the same as receiving the money as such, irrespective of economic considerations. They do not recognize the difference between the prices of the shop and factory. At the second level, the subjects usually argue that the merchant can sell goods for a higher sum of money than it cost him. The increase in cost price is not logically necessary. It is a voluntary action, and it is easier to make money when you sell more goods at a lower price than by selling fewer products at a higher price. You make money while it is in circulation, passing from the hands of the buyer to the manufacturer and remaining for a time with the shopkeeper. For subjects of the third level, the merchant always sells the goods at a higher price than he paid to the manufacturer. The difference between them is recognized as a result of the work of the shopkeeper, and this money can be saved or used to expand the business. At this level, the idea of profit becomes a logically necessary principle that gives meaning to the activities of the shopkeeper (Echeita, 1988).

Aiming to enrich these analyses, Delval and Echeita (1991) set out to investigate in detail the kinds of difficulties faced by subjects when it comes to understanding the concept of profit. The authors examine the concepts that view selling as a social activity, the performance of work by which benefits are obtained, since the money for personal expenses can be obtained through other activities. Furthermore, they analyze the different reasons for the higher payment to the factories, the emergence of the concept of profit as a logical necessity and the inherent difficulties of explanations for discounts. Delval (2002, p. 198) presents some interesting considerations:
We note that the idea that many children maintain that things have a fixed price is a correlation found in the ideas that have been sustained throughout the history of economic thought and has been set down especially in economic writings of the scholastic philosophers, including Thomas Aquinas. The theory of “fair price” is elaborated in its more subtle forms by the late Scholastics, like the Jesuits of the sixteenth century, among them Luis de Molina (1535-1600). Molina, referring to setting a price for the first time, states that a “fair price must be declared and established by the criterion of prudence, considering its quality, its usefulness, its scarcity or abundance, the difficulties, expense and risks involved in transporting it to the province. It should also be taken into account that newness makes it more popular” (Molina, 1597). Several of these factors are also mentioned in the responses of the subjects, but a detailed examination of the theory of value in children would require further study. (Delval, 2002, p. 198).

The difficulties encountered by the subjects were grouped by Delval and Echeita (1991) into cognitive and socio-moral difficulties. The type of cognitive difficulties can be grouped into concentration on one aspect and problems with accounts and above all to the handling of large amounts of information at the same time. When the subject is unable to control all aspects of the problem, he limits himself to just one. Children aged 5 or 6 can understand that by buying a commodity to sell it at a higher price you can obtain benefits, but that notion alone does not allow them to articulate more details and aspects of a complex situation. This concentration is similar to that found in conservation the concept of numbers. Placing emphasis on one aspect in detriment of others is a frequent problem. The child is incapable of grasping the notion of seller as buyer and seller at the same time.

Because children have yet to dominate arithmetic operations, being unable to apply such knowledge to concrete situations, it is difficult for them to understand the process of buying and selling. The wholesale price is not easily separated from the retail price. The subjects said the shopkeeper paid more because they buy in large quantities, assigning the largest manufacturer work (produce) and the smaller retailer (sell), which justifies the need for the shopkeeper to charge less.
These children have a peculiar inability of synthesis and cannot connect all the acts of the buying and selling process, considering the price set by retailer as a unique reflection of his effort and being unaware of the earlier work of the manufacturer, carrier, distributor, etc. While adults understand the total cost as a result of the addition of a series of partial costs, children cannot compute them, considering each of them independent of the others, assuming that the cost to the manufacturer is higher than to the seller, which is why the former’s price should be higher (Delval; Echeita, 1991).

The social and moral problems, however, are generally entrenched in ideological assumptions, beliefs that hinder the understanding of economic relations. They can basically be of two kinds: identifying economics with morality and the believing in a fixed price. Regarding the first type, the difficulty lies in moving from a characteristically personal vision of social reality to an impersonal perspective. While adults view the social world as being governed by laws of its own, different from those governing other aspects of social life, children still see the seller as a friend who does a favor by providing the goods we need, a fact that prevents him from charging more for his products than they cost him, which would not be morally correct (Delval; Echeita, 1991).

Children believe that the goods have a fixed price, denominated a “fair price”. This is seen as a product attribute, just like the size, weight and color. This “realism” is analogous to that described by Piaget (1994). The subjects, like as the scholastic philosophers, believe that an object has a certain price and that it is abusive to sell it for more. The contradiction here lies in the coexistence defended by the children of a fixed price along with the freedom of the shopkeeper to set prices. It is easier to understand a fixed price rather than price as the result of interaction between supply and demand (Delval; Echeita, 1991).

Specifically on the concept of price, Delval and Cohen (2001) conducted an empirical study using the clinical method to address the following issues: what to buy, and the knowledge of prices of different goods, price comparisons and explanations of differences between prices: a pencil, a video game, a computer, bread, a pair of sports shoes and a gold ring; the idea of profit for the
retailer as the difference between purchase and sale price; differences between flowers collected in
the field and bought in a store, payment of services, taking the bus to the movies, and price
differences between stores. According to the authors, the subjects complied with the following
rules: bigger things are more expensive, durable goods are more expensive things, things that have a
greater number of components are more expensive, selling cheap means selling more and selling
expensive means selling less; the price depends on the needs of the seller, the price is determined so
that the buyer can purchase the product, the state (government) regulates prices, the seller sets the
price he desires, provided it is above the cost price, and the seller sets the price he wants, provided it
is above the cost price, but also considering the price of competitors.

The criteria by which prices are determined according to the explanations of the subjects
interviewed were classified as economic, psychological and the properties of objects. The economic
factors relate to the production (materials, machinery, energy and labor), distribution
(transportation) and market (supply and demand). Psychological factors include the reasons for the
seller’s actions (profit maximization, desire for money) and those of the consumer’s (income,
preferences for the object and lower price). The properties of the object refer to its size, its duration,
components, materials, brand, quality and usefulness. According to these criteria, the prices may be
fair or arbitrary or be a result of the balance between demand and supply (Delval; Kohen, 2001).

More recently, Leiser and Halachmi (2006) resorted to short stories, including illustrations,
to present problem situations to children in order to explore their knowledge of market forces. The
results obtained by the authors indicate that children in preschool first understand the effects of
demand. Only then are they able to understand the effects of supply. This trend, they point out, is
characterized by the transition from isolated partial systems to a growing understanding of the
integration of different systems, and a developing understanding of the positive correlation between
cause and effect.

What many of the works referred to above have in common, in addition to the theme, is the
analytical framework that enables the Piagetian description of the evolution of concepts. They
present evidence of the progressive construction of the concepts under study, expressed in stages, and this process is inherently complex. Furthermore, there are important relationships to be considered in the analysis of the psychogenesis of socio-economic concepts: the transition from isolated elements to harmonic systems, the transition from elements of personal and impersonal moral aspects to economic aspects. Note that the definition of stages and the very assumptions that underlie these works stem mainly from Piagetian genetic epistemology.

4. Method

All the theoretical constructs of Piaget’s theoretical framework have great explanatory potential in the definition of the psychogenesis of naturally different kinds of concepts, mainly because they support a robust methodology for collecting and analyzing empirical data. Thus, this appears to be strong ally in the investigation of psychogenesis of the concept of price.

The main distinguishing factor of the method developed by Jean Piaget is the (possible) systematic intervention by the experimenter. It is this intervention, prior to and in response to the action, explaining the subject in a problem situation that constitutes, according Delval (2002), the essence of the critical clinical method. Domahhidy-Dami and Milk (1987, p. 35) list three main features of the clinical method from an experimental viewpoint, namely:

a) the use of adaptable material that is available to the child. The child is asked to watch it, handle it and often make judgments regarding the changes made. At other times, the child must organize the material in order to resolve problems posed by the examiner.

b) flexible interrogation tailored for each subject. From a few basic questions, we seek to develop a dialogue driven by assumptions made by the examiner during the interview. Each answer given by the child leads to the formulation of a hypothesis that engenders a new issue from the Examiner. It is this linkage and sequence of questions, response, new hypothesis, new question that gives coherence and unity to the interrogation.

c) qualitative analysis of the behavior of the subject in an attempt to understand the psychological processes at play in different examination situations, rather than being satisfied with the outcome, performance, performances provided.

It is by bearing these advantages in mind that the method of this work is constructed.

We assume here that the concept of economic value is complex because it is united with several other interdependent social, economic and mathematic concepts. To be able to say that a child understands the concept of value, it is important that the concepts such as property shortage,
division of) labor, exchange, price, equity, currency (money) and market are sufficiently integrated into a harmonious system. It is necessary for the child to be aware that the value is a concept that “makes sense” in a society whose consumption habits are limited to the restricted availability of resources, so it is through work, the expenditure of human effort, which needs are met. It is necessary that it should understand that individuals are not self-sufficient in meeting their needs, that the work they perform depends on the work of others as we do not completely produce all the items we consume and we must therefore exchange the products of our work in a certain place (concrete or abstract) and in specific proportions, with measures and instruments. The child must understand the price as a measure of economic value.

To be able to grasp the understanding that individuals have a concept as sophisticated as economic value – the protagonist of countless philosophical and theoretical works in economics – it is necessary to adjust the method described in the literature review to collect relevant data. Each of the adjustments is described below.

For the interviews and tests, it is enough for the participants to have some schooling, regardless of their socio-economic origin, and are not involved in paid work (our aims do not include assessing the impact of work on economic knowledge). For this reason, we contacted an educational establishment situated in the city of São José dos Pinhais in the Curitiba Metropolitan District, Paraná State, Brazil, and the school provided us with subjects and space to conduct our study.

a. Subjects

The sample of participants consisted of twenty-four children aged six to nine and studying in the first, second or third grade and chosen at random. Eight children were aged six, four were seven years old and seven were nine years old.
b. Structure of the interview

The data that form the empirical part of the study were obtained by conducting semi-structured interviews along the lines of Piaget’s critical clinical method with the aid of some of the activities described below. The interviews were conducted individually and took an average of twenty minutes.

c. Procedures and materials for data collection

We did not find in the literature any methodological and empirical material on the psychogenesis of economic value such as we learned it: epistemologically and ontologically. The construction of a series of interviews started with an overview of issues from the method used by Furth (1980), for the analysis of economic concepts in general, beyond the questions guiding the clinical method as employed by Delval (2002). For the proposed tasks pictures of commodities and non-commodities were used, as well as images of Brazilian coins and banknotes. The images were obtained on the Internet.

![Illustrations used for data collection](image)

We used two inter-complementary procedures: a conversation with the child and the separation and sorting of some pictures, with the interview structured into three stages. The first stage involved an introduction and a chat between the interviewer and the participant. The child was

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4 Book, yogurt (brand A), stroller doll, shirt, pen, toy car, soda, love, sea, shopping cart, diamond ring, car (old), cycling, chocolate, orange, cloud, motorcycle, sun, money, baby, car (modern), yogurt (brand B) stroller, friend, wind, home, family, cell phone.
asked his name and age and informed of the purpose of the interview to prepare him for the activities. The child was asked to perform some arithmetical calculations to test his knowledge of mathematics. The purpose of these tests was to determine whether the child had sufficient knowledge of arithmetic so that he could identify a “more expensive” or “cheaper” product and understand monetary units, constructing classes and operations psychogenically. As this task alone was not sufficient to identify the degree of development of his concept of number – bearing in mind the interfaces between this concept and price – the questions regarding knowledge arithmetic were complemented by other activities: the order and composition of amounts using coins and bills.

In the first stage of the interview, the participant was also asked if he had been to a supermarket or equivalent (a fair, sale, bookstore etc., terms that have a meaning in the child’s lexicon). If the answer was affirmative, the subject was asked what he did there and to recount the event, highlighting what he saw inside. Questions were asked about the origin (who made them, where they came from) of the things in the store and their ownership (who do they belong to, whose are they). These questions were intended to introduce the theme of economics and investigate the child’s familiarity with situations of sale, identifying the presence or absence of terms like “money”, “payment”, “expensive” and so on in order to identify the participant’s vocabulary and the subjects the child relates to. With these questions, we hoped to have arguments to define the elements that the child identifies with the market.

In the second stage of the interview the child was shown a series of images, among which were commodities and non-commodities. (Figure 1) He was asked to separate the images of commodities from non-commodities (what is on sale in the market and what is not). This is an important distinction, since the measure of economic value and the concept of price depends on whether the goods are commodities or not, i.e., whether they are commercially interchangeable. The “market” appears here as an institution and an equivalent of any commercial establishment. If the child said that he had never been to a market (which did not occur during the interviews) the interviewer would refer to some other establishment (shop, sale, trade fair, etc.).
The child was asked to explain the separation. The goal here was to identify, in his arguments, the economic elements or the moral elements, depending on his stage, to characterize something as a commodity or non-commodity. It is crucial in this context, to identify in the children’s discourse their justifications for certain items being traded or not. The evaluation of the arguments is part of the larger or smaller representation of the impersonal and economic elements. They are then asked to select only the commodities and list them as “cheapest to most expensive” in ascending order. The purpose of this activity is to identify the level of understanding of the quantitative aspect of the price under the Piagetian notions of operation and composition of classes. Here it is important to pay attention to the ranking criteria, to identify non-figurative and figurative criteria (see, for example, if the arguments point towards a tendency for bigger goods to be more expensive and smaller goods cheaper etc.) The participant is then asked to write the sequence number created by it and the prices they believe that each product should have. The purpose of this activity is to identify how reasonable the estimates of prices are and how the child registers them. Here it should be noted that the record itself is important (see, for example, if the child uses canonical notations such as “$”, which make a number a carrier unit of social meaning, or the actual decimal representation inherent in the recorded prices).

The participant was then asked to explain the ordinance and the prices they gave. They were asked about the possibility of altering the order of products (switch from cheapest to most expensive). This provides an opportunity to explore their explanations of quantitative and qualitative differences that provided the basis for the categorization of participants.

The child was then asked what has to be done if he wants to take home (i.e., buy) some of the items he had selected as a commodity, an item likely to be bought at a market. The purpose of this question is to see if he will mention money. If money was mentioned, he was asked the required amount, its origin and what would happen to the money after he had paid. We hoped that he would refer to the price components, cost components, labor and others. Specifically with regard to the amount of money needed, we were exploring the associations the participant made. For instance,
more money is required when they wish to buy more items or when an item is more expensive. This is one of the moments when the interview should explore the quantitative aspects of the price, bearing in mind the interface between the psychogenic and epistemological concept of price and number. 5 Therefore, the child is asked if he had seen number in the market. If he had, he is asked exactly where. It is hoped that with this question he will mention units of measurement – i.e., price, kilograms, meters, etc. units, indicating the recognition of semiotic systems in a metrological context.

The purpose of the third stage of the interview is to show illustrations of bills and coins to the child, asking him to assign the value and order, “that’s worth less to worth more.” Will the child, using bills and coins, make up some figures for the price quoted for any goods or even the value of other notes or coins. Taking this activity as a context of new issues, we intended to investigate his operative capacity for composition and recomposition of units (in this case, decimal monetary units). There is, in this activity6, the chance to explore the arithmetic competence of the participant and his familiarity with a measurement system, a historically constructed, institutionalized element, component of a measurement system for measuring fundamental economic value.

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5 When Piaget and Szeminska (1975) explore the process of construction of the notions of conservation and invariance inherent in the numbers, they analyze them in the path of overcoming (a) subject to quantification intensive perceptual appearances / figurative aspects by (b) understanding of durable equivalence between collections with matching term by term, this year to coordinate perceptual issue in a system of operations “when the same system [procedure] applies to the sets by making an abstraction of qualities, then performs the fusion of inclusion and ranking of all elements in a single operative formed classes and asymmetrical relations together, and this is the whole range of finite integers, ordinals and cardinals are inextricable “(Piaget, Szeminska, 1975, p. 12-13). If we consider the importance of the quantitative dimension of economic value, we should also consider the dichotomy between qualitative and quantitative correspondence: We call for a qualitative match based solely on the qualities of the corresponding elements.(...). The quantifying numerical correspondence or, rather, is that which makes abstraction of the qualities of the parties and considered as so many units. We call on the other hand, intuitive all correspondence based solely on perceptions (or on the representative images) and that, consequently, is not conserved outside the current perceptual field (or its memory fuzzy). Operative correspondence, in contrast, consists of relations of an intellectual order and its distinctive mark is, of course, their storage, regardless of current perception, as well as the mobility of its composition or, in one word, their ‘reversibility’. A qualitative correlation can therefore be intuitive (if it was attached to two similar figures) or surgery (correspondence arises in two different figures), while the numerical correspondence is necessarily operative (Piaget; Szeminska, 1975, p. 106 - 107).

6 Piaget and Szeminska (1975) using coins in the tests conducted to analyze the correlation term to term cardinal and ordinal (one against an exchange of currencies and commodities). In this mode of application of the method, the authors overlooked the value of money, or rather, assigned it a unit value only.
The interviews were recorded on audio files (MP3), and notes were made during the tests. Notes were made of the order in which the participants put the figures for goods, bank notes and coins using numbering. This record was made by the children themselves once they had become minimally familiar with the writing, or otherwise, the interviewer herself. The audio files were transcribed and the resulting material of the interviews was grouped per subject, posted physically and reproduced in electronic form.

d. Categories of qualitative analysis

Considering the complex nature of the concept of price, one must study its different dimensions. Given the definition required to perform the work, only a few of these dimensions were chosen. In this sense, the categories of analysis are structured here. The stages that make up the categories of analysis were based mainly on the work of Furth (1980) and Delval and Kohen (2001), as well as on pilot studies conducted for the purpose of defining the methodology.

The stages proposed here are based on the following: arithmetic concepts (whose importance is greater in its relation to the quantitative dimension of the concept of price), the concept of market and Measures (metrology systems in general, but in the context of the market) property, money, labor, merchandise and price.
<table>
<thead>
<tr>
<th>Investigated notion</th>
<th>Elaboration stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetical concepts</td>
<td>No minimum knowledge for identifying numerals for counting, sorting and performing simple calculations with small values. Inability in terms of numerical register (writing numbers).</td>
</tr>
<tr>
<td></td>
<td>Ability to identify numbers, counting, sorting and fledgling recording abilities (for lower values). Inability to perform simple calculations with money.</td>
</tr>
<tr>
<td></td>
<td>Capacities of counting, sorting and recording well developed. Capability for incipient composition of low values (lower than 50) with money.</td>
</tr>
<tr>
<td></td>
<td>Capacities for counting, sorting and recording well developed. Ease of composition of low (below 50) with money.</td>
</tr>
<tr>
<td></td>
<td>Domination of simple arithmetical operations, counting skills, ordering and registration statements with the ability to record and structure calculations with high values.</td>
</tr>
<tr>
<td>Market</td>
<td>Lack of contact or very limited familiarity with business situations.</td>
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<tr>
<td></td>
<td>Identification of the market with a physical establishment, an establishment situated in particular in the vicinity of the respondent that provides absolute parameters. All items that are on the market are commodities and are for sale.</td>
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<tr>
<td></td>
<td>Ability to understand the market as a place of trade equivalent to the store, the fair, sales, bakery etc.. Ability to identify what is good and what is not, even in different contexts (not everything is on the market is on sale).</td>
</tr>
<tr>
<td></td>
<td>The market appears, as well, in its impersonal form of supply and demand, but with some misconceptions regarding its mechanisms (such as reverse causality).</td>
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<tr>
<td></td>
<td>The market is understood as both locus and impersonal as a mechanism of economic exchange.</td>
</tr>
<tr>
<td>Measures – measurement system in the context</td>
<td>Absolutely no familiarity with the metrology systems used in the marketing of goods (unit, liter, kilogram, meter, etc.), except the price.</td>
</tr>
<tr>
<td></td>
<td>Recognition capabilities of some units of measurement (kilograms, liters, etc. units.) present in a market, but lack of coordination of metrology systems for composition and equivalence ratio.</td>
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<tr>
<td></td>
<td>The price appears as the principal unit of measure in a market, but is still not coordinated with other measurement systems.</td>
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<tr>
<td></td>
<td>Incipient and partial capacity to recognize and coordinate different metrology systems in the context of economic exchange mediated by money.</td>
</tr>
<tr>
<td></td>
<td>Ability to recognize the different metrology systems involved in economic transactions, as well as to grasp their proportions of equivalence in terms of economic value.</td>
</tr>
<tr>
<td>Property exchange.</td>
<td>No complete exchange of the concept.</td>
</tr>
<tr>
<td></td>
<td>Incipient recognition of the concept of ownership. The participants recognize the need for payment, but do not know who owns the goods from a supermarket.</td>
</tr>
<tr>
<td></td>
<td>Children already mention the institutional mechanisms (legal) punishment for offenders who violate the law (stealing is &quot;wrong&quot;, thieves are arrested), but they do not justify their existence. Recognition of the need for payment.</td>
</tr>
<tr>
<td></td>
<td>Things that are on the market belong to the owner of the establishment, which gets the previous owners as producers or traders. The manufacturing processes appear linked to ownership.</td>
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<tr>
<td></td>
<td>Recognition of property as a fundamental element of the economy: buying and selling are interpreted as part of a process of exchange, property exchange mediated by money, expression of economic value.</td>
</tr>
<tr>
<td>Cash, coins and paper money</td>
<td>Absolutely no ability to recognize coins and notes. Ignorance of their functions.</td>
</tr>
<tr>
<td></td>
<td>Recognition of banknotes and coins and their instrumental function as means of payment. Initial but inconsistent capacity to separate bank notes and coins or greater or lesser values (those that are more valuable and worth less). The source of institutional money is unknown.</td>
</tr>
<tr>
<td></td>
<td>The origin of money is not known or is unclear: can the exchange a factory or a bank. Immediate recognition of coins and paper money and their function as a means of payment. Initial capacity to order bills and coins. Money is obtained through work. The function of the bank is still unclear.</td>
</tr>
<tr>
<td></td>
<td>Immediate recognition of coins and paper money and their function as a means of payment with the ability to recognize the functional equivalence between coins, banknotes, checks and cards. Consistent ability in ordering coins and notes. The origin of the money remains unclear: it may be the result of an exchange in a factory or a bank.</td>
</tr>
<tr>
<td></td>
<td>Recognition of its role as a medium of exchange, unit of account and store of value. Its function is equivalent to checks and credit cards. Its origin is unclear (central bank) and understanding of their role in economic relations is well articulated. It is recognized, including its position on a specific measurement system and the role of credit.</td>
</tr>
<tr>
<td>Work</td>
<td>Lack of awareness of their role in a market economy (labour as a source of income / cash)</td>
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<tr>
<td></td>
<td>Recognition of work as a means of obtaining money.</td>
</tr>
<tr>
<td></td>
<td>Different professions are mentioned, some of them are paid. Still cannot define differences in wages nor the complementaritity of roles.</td>
</tr>
<tr>
<td></td>
<td>The function of work is to obtain money for the legal consumption of different goods and services. It recognizes the difference in wages with some arguments (difficulty</td>
</tr>
<tr>
<td></td>
<td>Work as paid work is perceived in its historical context as an important factor of the relations of economic exchange. It is regarded as a component of cost or as a...</td>
</tr>
<tr>
<td>Investigated notion</td>
<td>Elaboration stage</td>
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<tr>
<td>--------------------</td>
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<tr>
<td></td>
<td>0</td>
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<tr>
<td><strong>Goods</strong></td>
<td></td>
</tr>
<tr>
<td>Inability to distinguish between commodities and non-commodities (free goods, for example).</td>
<td>There is the ability to separate non-commodities, but no explanations about the differences. The concept of commodity is bound to context: what goods are to be sold in a market.</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>Absolutely no familiarity with the concept. Inability to sort (and even segregate) between cheap and expensive.</td>
</tr>
<tr>
<td><strong>Synthesis: the economic value</strong></td>
<td>Lack of knowledge about the minimum dimensions detailed above.</td>
</tr>
</tbody>
</table>
5. Results and discussion

From the interviews it was found that most of the subjects still have quite rudimentary economic notions, stemming from the initial stages, as shown in the table below:

<table>
<thead>
<tr>
<th>Investigated notion</th>
<th>Estágio de elaboração</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Arithmetical concepts</td>
<td>6</td>
</tr>
<tr>
<td>Market</td>
<td>4</td>
</tr>
<tr>
<td>Measures – measurement system in the context</td>
<td>5</td>
</tr>
<tr>
<td>Property – exchange.</td>
<td>7</td>
</tr>
<tr>
<td>Cash, coins and paper money</td>
<td>1</td>
</tr>
<tr>
<td>Work</td>
<td>7</td>
</tr>
<tr>
<td>Goods</td>
<td>1</td>
</tr>
<tr>
<td>Price</td>
<td>17</td>
</tr>
<tr>
<td>Economic value</td>
<td>2</td>
</tr>
</tbody>
</table>

The small number of subjects in the sample compromises the relevance of the depth of statistical analysis. However, the promising character of empirical studies of this nature lies precisely in the qualitative analysis that it enables, and the results discussed below.

a. Convergence and divergence with previous work

Compared to the work already conducted on the psychogenesis of economic concepts in general, there were similarities and slight differences. Not observed, for example, was the identification of economics with morality as described by Delval and Echeita (1991). Although some moral arguments were identified, they were not as categorical as described by these authors. What was found was the belief of the participants in a fixed price, referred to as the “fair price” mentioned in the works of Berti and Bombi (1988), Beni (1992) and Delval and Echeita (1991).

However, some rules laid down by Delval and Kohen (2001) in subjects’ reasoning concerning the price differences were also identified in this work, namely, the idea that larger items are more expensive\(^7\), durable items are more expensive\(^8\), items that have a greater number of

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\(^7\)Example, literal transcript: “Interviewer: Is the car more expensive than the bike? LI (girl, age 6, first grade): Dearer, because it’s bigger. I: And the orange, is it more expensive or cheaper than the house? RI: Cheaper because the house is bigger. I: Is the Beetle car dearer or cheaper than this other car? LI: Dearer. I: Why? LI: I don’t know.”

\(^8\)Example: “I: What costs more, the motorbike or the bike? DA: (girl, age 7, first grade): The motorbike lasts a long time, bikes don’t.”
components are more expensive\textsuperscript{9}, selling cheap means selling more and selling expensive means selling less\textsuperscript{10}, the price is set so that the buyer can purchase the product. Rules were identified that define how the price depends on the needs of the seller, the state (government) regulates prices, the seller sets the price he wants, provided it is above the cost price, but also considering the prices set by competitors.

The congruence with the work of Delval and Kohen (2001) could also be seen in the similarity of the criteria by which prices are determined, especially with regard to economic factors and the properties of objects. Psychological factors as defined by the authors were not observed in our study criteria. One important difference, however, was the characterization of the arguments that we employ in the classification of participants. Taking the economic literature as a reference, unlike Delval and Kohen (2001), we included the usefulness of the objects as an economic argument (keeping in mind the notion of use value).

\textsuperscript{7}Example: “I: Here you say the Beetle is cheaper. Why? RE (boy, age 8, third grade): Because it’s older. I: If the Beetle were new, what would you say? RE: This (other car) would cost more. I: Why? RE: Because it’s bigger and has more things than a Beetle \[integration of arguments\] E: What sort of things? RE: A radio aerial, four doors, the hood isn’t up front. I: Why’s the motorbike cheaper? RE: Because it’s smaller. I: Why’s the cell phone dearer than the motorbike? RE: Because you need less money to buy the motorbike. I: And the ring, why is it more expensive than the pen? RE: Because it’s made of diamonds. I: And if the pen were made of diamonds? Would it be more expensive? RE: No.”

\textsuperscript{7}Example: “I: You say Batavinho yogurt costs less than Danoninho yogurt, why? NA (girl, 9, third grade): Because you get two for one real. I: Has it always cost that? AN: Not always, sometimes it changes. Sometimes it’s fifty cents I: Why sometimes fifty cents? AN: Because sometimes they can’t sell it, so they put the price down. I: If they put a really high price on it, what happens? AN: They can’t sell it at all. I: And if they set the price really low? AN: Then they sell the whole lot. I: Why do prices sometimes go up and down? AN: Because when it’s really high they can’t sell it and when it’s low they manage to sell the lot.” Or a variation of this: “I: Why do they put the price down? AD (girl, 6, first grade): Because when they see that people don’t want to buy it, they put the price down. Then when people start to buy, they put it up. \[mechanism of supply and demand\]”

\textsuperscript{7}Example: “I: You say Batavinho yogurt costs less than Danoninho yogurt, why? LU (boy, 9, third grade): Because everyone likes this one Batavinho, even my mother. So they buy it. Then the boss at the market puts the price down to buy more.” Also GA (boy, 6, first grade): “I: What costs more, Batavinho or Danoninho? GA: Batavinho. I: Is Batavinho more expensive? GA: Yes. I: Why? GA: The best things cost more and the things that are best cost more.”

\textsuperscript{7}Exemplo: “E: O que será mais caro, a moto ou a bicicleta? DA (menina, 7 anos, 1ª série): A moto dura bastante, a bicicleta quase não dura.”

\textsuperscript{7}Exemplo: “E: Aqui você colocou que o Fusca é mais barato que esse outro carro. Por quê? RE (menino, 8 anos, 3ª série): Porque ele é mais velho. E: Se o Fusca fosse novo, como ia ficar? RE: Esse [o outro carro] ia ser mais caro. E: Por quê? RE: Porque é mais grande, \textit{tem mais coisa que o Fusca}. \[integração de argumentos\] E: O que ele tem a mais? RE: Tem a anteninha, tem as quatro portas, o capô não é na frente. E: Por que você disse que a moto é mais barata que o carro? RE: Porque a moto é menor. E: Por que o celular é mais caro que a moto? RE: Porque precisa de menos dinheiro para comprar a moto. E: E o anel, por que você colocou que ele é mais caro que a caneta? RE: Porque ele é de diamante. E: E se a caneta fosse de diamante, como ia ficar? A caneta ia ser mais cara? RE: Não.”

\textsuperscript{7}Exemplo: “E: Você colocou aqui que o Batavinho é mais barato que Danoninho. Por quê? NA (menina, 9 anos, 3ª série): Porque vem 2 e é um real. E: E sempre foi esse preço? AN: Às vezes não, às vezes muda. Às vezes é 50 [centavos] E: Por que às vezes é 50? AN: Porque às vezes eles não conseguem vender, daí eles colocam o preço mais baixo. E: Se eles colocarem o preço muito alto, o que acontece? AN: Não consegue vender nada. E: E se colocar bem baixo? AN: Vende tudo. E: Por que o preço às vezes sobe a às vezes cai? AN: Porque às vezes, quando está caro, não consegue vender, e quando está barato consegue vender tudo.” Ou uma variação disso: “E: Por que eles abaxam o preço? AD (menina, 6 anos, 1ª série): Porque quando eles vêem que as pessoas não querem comprar eles abaxam. Daí quando as pessoas estão comprando eles erguem. \[mecanismo de oferta e demanda\]”
There was one important point that was in accordance with the work of Delval (2002). As the author noted, the subjects with more elaborate responses incorporate, in whole or in part, the previous answers into a coherent whole, thus setting “... a manifestation of the integrative character of the different stages of development.” (Delval, 2002 p. 189). In this work, this was particularly clear in the co-existence of different types of arguments with the rising relative share of economic arguments rather than animist, moral and physical arguments.

Backing up the findings of Furth, Baur and Smith (1976), we noted that, when it comes to the market, for example, young children believe that money comes from other activities performed by the merchant or the change that remains in the establishment.

Some of the levels of understanding defined by Berti and Bombi (1988) were also included in our results. It is worth bearing in mind that for the authors, at level 0 buying and selling are not understood. At level 2 there is no difference between the price at the factory and the price at the store, or prices that are higher than this. At level 3, factory prices are lower and the decision falls to the shopkeeper. At this level, the child reconstructs the price at the factory from the store price. In the fourth and final level the participants recognize that the store price is higher than at the factory. Children at this level have a more global view of the exchange process. There was no correlation with level 1, in which the merchant does not need to buy the goods, either because the goods are given to him or because he manufactures them.

Finally, some resemblance with found to the findings of Leiser and Halachmi (2006) in their work on market forces. The economic arguments presented by the children in the sample of this study regarding the impersonal character of the market (supply and demand), with reverse causality, are consistent with what the authors defined as a “hard” behind the transition from stand-alone systems to integrated systems: the positive correlations between cause and effect are understood before negative correlations. If we take the statements of LUO093, a participant according to whom
“good things are cheap, because everyone likes them,” one could argue that such correlations seem to assume a moral connotation in a context where “good things” are in their entirety, including in price, while the “not so good things, do not have good prices.”

Overall, we believe, on the one hand, that the divergent findings of this study concerning the components analyzed in relation to the previous are a result of the different strategies used in data collection and conceptual delineation of the notions that psychogenesis sets out to research. While the studies mentioned are based predominantly on the analysis of concepts as manifested empirically by researchers in daily practices, here we characterize and understand the epistemological elements of the concepts under study. Moreover, the similarities identified between the different studies appear to be evidence of a core, or rather, a common trend in the socio-economic concepts of psychogenesis.

b. Epistemological relations

To discuss our findings in their epistemological dimension, we need to bear some differences in mind, the most important being the dichotomy between use-value and exchange-value:

The word VALUE, it should be noted, has two different meanings, sometimes expressing the utility of some particular object, and sometimes the power of purchasing other goods which the possession of that object conveys. One may be called “use value,” the other “exchange value”. Things that have the greatest value in use have frequently little or no exchange value and, unlike those that have the greatest value in exchange often have no use value whatsoever. Nothing is more useful than water, but it will buy almost nothing; hardly anything can be obtained in exchange for it. A diamond, by contrast, has almost no value in use, but often a very large amount of other goods can be obtained in exchange for it. (Smith, 1996, p. 39).

Exemplo: “E: E por que você colocou que o Batavinho é mais barato que o Danoninho? LU(menino, 9 anos 3ª série): Porque todo mundo gosta desse [Batavinho], até a minha mãe. Daí eles compra, daí o chefe do mercado põe mais barato para comprar mais.” Ou ainda GA (menino, 6 annos, 1ª série): “E: Qual é mais caro: o Batavinho ou o Danoninho? GA: O Batavinho. E: O Batavinho é mais caro? GA: É. E: E por que ele é mais caro? GA: As coisas que são mais boas são as coisas que são mais caras e as coisas que são mais caras são mais boas.”
For the vast majority of participants in the sample, two classes that are fundamental to the understanding of economic value are defined (commodities and non-commodities) without equivalent qualitative arguments that show high degree of development. This is not surprising: there is nothing obvious in the notion of equivalence that supports the distinction between commodities and non-commodities, unlike what might occur in the separation of large objects and small objects, green or blue objects and square or round objects. The inherent complexity of the operative distinction between objects that are not exchangeable or economic was shown in the many animist, moral and physical arguments used by the participants in their efforts to establish the qualitative equivalence classes, which later give rise to the definition of quantitative equivalence classes applicable only to goods.

Apparently, the critical factors of this distinction stem from the practical and economic experience that children have when confronted with problem situations in specific contexts. Thus, the originality of the arguments presented by the children attests that they are able to create and develop their own explanations with reasons for the responses, with several aspects of their experience with the object being taken into account, including the socio-cultural aspect. It is important to emphasize that children generally have experience with economic transactions before they go to school.

The exclusive separation of commodities into categories of “expensive” and “cheap” (as if they were two distinct classes, and not as ends of a scale to rank them) sounds like an incipient quantitative feature but is also qualitative, since it is limited by the impossibility of building a transitive ordering: lining up goods from cheaper to more expensive requires repeated comparisons of a whole. The concepts of expensive and cheap are thus interdependent, only being clearly understood from a relational perspective: something is “expensive” or “high in price” depending on some parameter (be it money, or another product), not being exactly two major dichotomous classes, but a range of gradations. In the same way that knowing 15 is more or less than 3 it is necessary understand its significance in terms of numerical magnitude, knowing whether a
commodity whose price is $1,000 is more expensive or cheaper than one whose price $1.00 it is necessary to understand its significance in economic terms. In this aspect, the data suggest that this is a pair of incipient notions in the sample. This is particularly clear in the case of participants whose sorting of goods (the most expensive to cheapest) did not coincide with the prices given.

An interesting aspect to consider is the lack of conservation in the criteria for the definition of price differences: during the interviews, there was no single, uniform criterion for determining economic value, even though this is consistently quantifiable. Picking up on some elements of the economic literature, one can say that the argument of the participants, being highly subjective in nature, given that function and utility appeared systematically in the speech of the children – is more in keeping with marginalist authors, to whom usefulness is the main determinant of value.12

The preponderance of arguments founded on the material properties of the commodities indicates that only the concept of “use value” is perceived by the participants in the sample, apparently developing before the concept of “exchange value”, this being a likely basis for this, whereas the notions of measurement are presented in the early stages of development, and a condition for the coordination of metrology systems involved in economic exchanges is possibly also provided (prerequisite) for the development of the concept of exchange value (highly quantitative).

The economic arguments of the participants regarding the availability and usefulness are close to a Walrasian conception according to which: a) social wealth is the set of tangible or intangible things that are rare, i.e., they are, on the one hand, useful and on the other are only available in limited quantities, b) things are useful since they can serve any use, provided they meet any need and provide satisfaction, c) things are only available in limited quantities since there is not enough of them for everyone to fully satisfy their needs (Walras, 1996). Epistemologically, therefore, this is different from a Marxist viewpoint, according to which:

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12 “How well a utility that can provide varies from individual to individual, and can not be measured, the value is totally subjective and depends on the assessment that each person makes.” (COSTA, 1986, p. 370)
Exchange values have to be reducible to a common thing, which represents a higher or lower amount. This thing cannot be a common property of the goods, be it geometric, physical, chemical or of any other kind. The material properties are only interesting because of the usefulness they bring to the commodity, for making these values-of-use. They set aside the use-value of the goods when it comes to the exchange ratio between them. That is what obviously characterizes this relationship. In the relationship, one use-value is as good as another, when available in appropriate amounts (Marx, 1987, p. 44).

The fact that the sparse references to work and manufacturing were identified among the participants of the higher grades suggests a reversal of the historical sequence of the development of the concept of value in economic theory. Work as a determinant of economic value, we should remember, appears in the works of classical authors (Ricardo, Smith and Marx), which chronologically precede the marginalist (Menger, Jevons and Walras), who attribute utility to value. Therefore, instead of a transition from a concept of objective value (the theory of labor value) to a subjective concept (utility theory of value) – trajectory of the history of economic thought – there is, among the subjects, a transition with a subjective value to an objective concept wherein quantitative gradually takes on greater importance.

Considering that the structure of data collection sought to implicitly grasp the notion of economic value as a concept that involves, according to Vergnaud (1981): a set of situations that provides them with meaning, a set of invariants (the distinctive properties the concept), and a set of symbols used to represent the concept, there are indications that, with regard to the context, the role of the market emerged as an important factor in the composition of the notion of economic value because of its influence on the distinction between commodities rather than the identification of the metrological systems that it involves. Concerning the invariants, there was little quantitative evidence and a near absence of conservation criteria when comparing prices. Regarding the set of symbols used in the representation of concepts, it was found, first, that the participants were unfamiliar with the system of canonical record with price as the monetary expression of economic
value and, second, that they were familiar with the significance of cash in its role as a means of payment.

With regard to monetary value, we are in agreement with the considerations of Furth (1980). For this author, it is essentially an abstract concept, purely relational, since it is a symbol for potential exchange and is not based on physical or biological objects that are transacted. Money has no meaning by itself. Its role in shaping social relations is necessary for impersonal economic transactions, allowing the exchange of values. The illustration of the author is quite appropriate: the notion that the value of a rare stamp is equal to or higher than the price of a house is an example of the impartiality of money in exchange. From this perspective, the most notable feature of money is the mathematical nature by which it can be accurately measured and saved in different forms: coins, paper money, checkbook and symbols are functionally equivalent. Thus, only in strictly mathematical or logical expressions is it possible to find the exact corresponding value that money and its equivalent symbols can provide. Money becomes part of the impersonal social exchange needed for economic exchanges. The social exchange of a personal nature – such as that suggested by JO_O_08_2, who claimed that love is a commodity whose “price is a kiss” – cannot, and we agree with Furth (1980), should not be measured in an exact corresponding amount.

The collected data suggest that the development of an invariant, a notion of conservation\(^\text{13}\), is hindered in the process of the cognitive construction of the concept of economic value, by the very nature of the concepts involved, as pointed out by Walras (1996, p. 144): “Any man, no matter how little he is concerned with economic policy, agrees that there is between the meter and frank the essential difference that the meter is a unit of length fixed and invariable, while the frank is a unit of value that is neither fixed nor invariant but, rather, changes and varies from one point to another, from one moment to another, owing to circumstances over which we are more or less in

\(^{13}\)A notion of epistemology, as argued by Piaget and Szeminska (1975, p. 125), is derived from common sense or scientific knowledge, all knowledge implicitly or explicitly assumes a system of conservation principles, a formal condition of all experience and all reasoning.
agreement. “This explains, in part, the difficulty presented by the participants in volatile arguments about price differences.

If we borrow the terms of Vergnaud (2006) to reinterpret them in new context: “It’s easy to understand, after reading Piaget, that the idea that a certain amount is retained in certain transformations is not an obvious idea to the child, who will draw this conclusion later.” If this is a well known fact in the universe of physical quantities, it also appears to be valid in the universe of economic concepts, especially if we ask: what is preserved in two different commodities marketed at the same price? The data obtained in this work allow us to argue that the construction of an invariant quantitative capable of inserting the price in a specific measurement (economic) system is a complex process.

The act of comparing and coordinating metrology systems also showed a distinct complex operation, since they were scattered attempts at coordination. Epistemological complexity is given already in Ricardo (1996), who stressed that the establishment of principles governing the exchange value and price requires careful distinction between those variations which belong to the commodity itself and those caused by a variation in the measure used to estimate the value at which the price is expressed. Thus, saying that one is employed in a good job at a cost of 1000 pounds, and in another, at a cost of 2000 pounds, does not mean that the first and the second is worth 1000 pounds 2000 pounds, but that the value of one will be as the value to the other, like 2 to 1, and that they will be replaced in that proportion.

The distinction between the purchase price and sales price, as well as the weighting of the components of the price (cost) was marked in the sample as a whole, the lack of clarity about the link between trade and the manufacturing process. Understanding the concept of economic value in this sense is compromised in its quantitative dimension, given that the qualitative (and subjective) aspects involved in setting price differences prevail when expressed as a monetary value.

Add to this the lack of familiarity with the metrology systems associated with economic transactions – even with money, as shown in the first grade – a limitation that affects the
coordination necessary for the consolidation of the quantitative notion of value. This difficulty is manifested in the multiplicity of physical arguments (size and dimensions) used to characterize expensive and cheap goods.

The preponderance of figurative (qualitative) criteria in the definition of prices precludes the necessary objectivity for understanding that quantitative dimension that makes it possible to equate and oppose. These are conditions for the coordination of different metrological systems involved in the definition of the exchanges between different commodities.

6. Final Thoughts

From an empirical effort to analyze the cognitive structure of an economic concept essential to the EC, this study used a theoretical and methodological psychology and genetic epistemology of Piaget to psychogenically analyze the concept of economic value in children aged 6-9, studying in the municipal schools of the Curitiba Metropolitan Region. Using the critical clinical method, we conducted semi-structured interviews followed by simple activities to assess the degree of development of the concept of value in the infant universe. Our analysis assumes, therefore, that economic actors develop their skills, economic knowledge and skills over time and that understanding this process should combine ontological, epistemological and psychogenetic elements.

The ontological elements had to do with the nature of the concept whose construction would be investigated, so the value is perceived as a concept that is quantitative, sociological, economic and psychological. The epistemological elements alluded to the historical trajectory of the development of economic value as discussed by economic theories. We prioritized the antagonism between the objective and subjective approaches to value. The psychogenetic elements had to do with the process of building the concept as it manifests in each of the subjects interviewed.

The results support the psychology as a fruitful source of inspiration to economics, especially to economists interested in cognitive, affective and motivational factors underlying decision-making and economic action itself.
We reiterate, with Bianchi and Silva Filho (2001), the experimental methods listed among the major contributions of EP to EC, and we emphasize that the relaxation of behavioral assumptions used in economic theory, particularly with regard to rationality, opens up an endless field of research. When we assume, in the present study, that the omniscient economic rationale that survives in traditional economic theory is not innate to economic actors, economic powers are necessarily constructed, relational, dynamic and socially shaped, that economic actors are, in essence, heterogeneous and that this heterogeneity reflects and implies differences in behavior, we can analyze the specifics of the cognitive development of an important economic concept.

With this, we have seen signs that the notion of “use value” apparently develops before the notion of “exchange value”, this being a likely basis for this, while the notions of measurement are presented in the early stages of development. Being a condition for the coordination of metrology systems involved in economic exchanges, they are possibly also a condition for the development of the concept of exchange value (mainly quantitative). Therefore, instead of a transition from a concept of objective value (labor value) to a subjective concept (utility value), what was found among children in this sample was a transition from a subjective concept of value to an objective concept in which the quantitative gradually becomes more important. It is, however, an initial analysis effort that leaves more questions remaining than answers.

7. References


