

## The Beginnings of a Child's Cultural Constitution

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This essay takes as its starting point Vygotsky's propositions that (1) man is the product of natural and cultural functions, and that (2) higher functions emerge first as an interpsychological category and then as an intrapsychological category in children. Development may thus be seen as a process of conversion of biological functions into cultural ones, through complex semiotic mechanisms. A "semiotic topology" could allow cultural and biological spaces to be combined without being confounded. The hypothesis of a *cultural zero moment* means that human development has a culturally determined beginning, not to be confounded with biological birth. As it is impossible to directly detect such origins at the beginning of the child's life, it is necessary to look for indices based on empirical data. The main objective of this essay is to indicate, in the first weeks or months of a child's life, possible indices of what can be the cultural birth of man.

Index terms: Vygotsky. Culture. Semiotics. Child development.

As origens da constituição cultural da criança. Este ensaio toma como ponto de partida as proposições de Vigotsky segundo as quais (1) o ser humano é produto de funções naturais e culturais, e (2) as funções superiores emergem inicialmente, na criança, como categorias interpsicológicas e, depois, como categorias intrapsicológicas. O desenvolvimento pode assim ser concebido como um processo pelo qual funções biológicas são convertidas em funções culturais através de mecanismos semióticos complexos. Uma "topologia semiótica" poderia permitir, sem que sejam confundidos, a combinação dos espaços cultural e biológico. De acordo com a hipótese de *um momento zero cultural*, o desenvolvimento humano tem um começo culturalmente determinado, a ser distinguido do nascimento biológico. Sendo impossível detectá-lo diretamente no início da vida da criança, torna-se necessário procurar *indícios* deste começo nos dados empíricos. O principal objetivo deste ensaio é procurar, nas primeiras semanas ou meses de vida da criança, os *indícios* do que pode ser o nascimento cultural do homem.

Descritores: Vygotsky. Cultura. Semiótica. Desenvolvimento da criança.

This paper centers on empirical research *indicia* of the influence of culture in the transformation of biological functions during the first few months of the life of the child, according to Vygotsky's thesis of the "cultural nature of human development". Such observations take for granted certain issues considered by Vygotsky at various points in his work: (1) Man is constituted of two series of

functions, the *natural* ones, which are part of the genetic structure of the human species, and the *cultural* ones, which are part of the social history of mankind (Vygotsky, 1997, pp. 15-20); (2) The constitution of cultural human functions follows a general genetic law, which implicates a certain kind of "transposition" (internalization or conversion) from the social plane, where they operate, to the personal plane, where they then

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start to operate (Vygotsky, 1997, p. 106); (3) The “transposition” of functions from one plane to the other follows a single pattern, exemplified by Vygotsky in the history of the development of the gesture of pointing (Vygotsky, 1997). It is a dialectic process of a semiotic nature. These three assumptions merit some considerations.

With the thesis of the existence of two types of functions, natural and cultural, Vygotsky is far from assuming the dualist tradition of psychology, but rather introducing a dialectical perspective in which functions of opposing nature can become intertwined, yielding a combination of certain characteristics from each of them; thus, natural functions become symbolic and symbolic functions are realized by natural ones, although each remains distinct. A similar situation can be seen in Vygotsky’s introduction of the concept of two planes, one social and one personal. The object of this metaphor suggests that transposition is of a semiotic, rather than physical nature, and it is consequently not subject to the physical constraints of space; it is however subject to the constraints of time, since there is a “before” and an “after” (Pino, 1994).

On the other hand, the idea of the transposition of planes, involving two times, one before and other after, leads to the hypothesis that there exists a “zero cultural moment” which coincides with the very beginning of the process of cultural development. This would basically be a logical moment rather than a physical one, since it would be extremely difficult to detect such a moment empirically. Nevertheless, such a real difficulty does not negate the hypothesis, which is necessary to justify the social origin of cultural functions. This hypothesis is not totally original, since Zazzo (1974) also mentioned the existence of a state of “non psychological being” at the beginning of the child’s development.

Research concerning the *indicia* of the beginning of the cultural constitution of child is based on the following premises: a) if human development is of a *cultural nature*, b) if culture is not the work of nature, but rather of man himself, who is simultaneously both producer and product of culture, c) consequently, cultural development must have a beginning other

than biological birth. Even though the latter is a necessary condition for the former it does not cause it. The first two of these premises can be found in the work of Vygotsky, while the third term is a logical conclusion based on them. These premises will serve as the point of departure of issues addressed by this paper: the first of these is the relation between biological and cultural functions in the child, which supposes a prior analysis of Vygotsky’s concept of culture; the second involves discussing the most effective methodological procedure for such an investigation.

### Biological and Cultural Functions

It must be acknowledged that Vygotsky did not directly discuss the concept of culture, even though it is extremely important in his work. This lack makes an already difficult task even more difficult, especially in the face of the evident semantic variation in the use of the term, as pointed out by Kroeber and Kluckhohn (1952).

Etymologically, the word culture (derived from the Latin word, *cultura*, which in turn was derived from the verb *colere*) initially referred to “agricultural production”. Later on, but still in Roman times, the meaning of the term developed to include “cultivation of the mind”, as in the expression “*cultura mentis*”, used by Cicero to refer figuratively to philosophy. The Greeks, on the other hand, had two different terms for these concepts: *georgia*, for the cultivation of fields, and *mathema*, for that of knowledge. Many centuries later, starting in the Enlightenment of the 18<sup>th</sup> century, the term *culture* came to be used to refer to “refinement of the mind” and to “good manners”. Being a “cultured” person was synonymous to “having a refined style of behavior and customs, different from that of the members of a certain social class easily identified with a rising bourgeoisie”. Another idea, that of civilization, was also associated with the word *culture* in certain European countries. The term civilization is used as a contrast with the ideas of a barbarian and savage state and suggests a certain level of material and spiritual progress,

such as that achieved by certain peoples. While civilization was used to refer to material and technological progress, culture was used to refer to the values and spiritual aspects of a given people. In the early anthropological works of the 19<sup>th</sup> century, these two terms were used synonymously, as evidenced by the definition of E. B. Tylor.

In contemporary thinking, the term culture tends to be associated with anthropology, that field of knowledge which took form in the 19<sup>th</sup> century, especially in the work of Franz Boas and Marcel Mauss. As the history of this science shows, variation in the use of the term culture is generally related to the different conceptions of human nature predominating in different historical periods; the meaning has changed from the idea of a biological unit of human nature and natural equality among men – position which diminishes the importance of cultural differences between peoples – to that characteristic assumption of culturist school that the very determinants of history of societies is his cultural dissimilarity rather biological similarity..

Despite the various interpretations of the concept of culture, Jahoda (1992, p. 4) points out that there is a general consensus among authors in to exclude genetic aspects from this concept. This is not much, but it is a beginning. At least we can conclude that there is a dividing line between the work of nature, such as genetics, and that of man, which necessarily involves the symbolic functions of culture.

Although Vygotsky does not discuss the concept of culture, he asserts that “culture is both a product of social life and of the social activity of man” (1997, p. 106). This statement can perhaps be considered to be a definition. Although at first glance it is not enough to explain what he understood by culture, this statement does appear to refer to some of the more important theses of Marx and Engels about the relation between Man and Nature. In this assertion, Vygotsky makes two distinct aspects of culture clear: 1) culture is a human product and 2) this product originates simultaneously from two sources, from social life and from the social activity of man. The first of these sources is identified with the

dynamics of the practices which constitute the social life of humans, whereas the second source seems to be related to the concept of social work, as in Marx and Engels. It is thus possible to say that for Vygotsky culture is the set of all works of mankind at all times, independent of whether he lives in tribal communities or contemporary societies. Cultural production is thus fused with the history of the constitution of *homo* as a human species.

One of the major concerns of Vygotsky was to show the existence of both rupture and continuity between the plane of *nature* (or elementary functions) and the plane of *culture* (or superior functions). Rupture refers to the transforming action of signs (symbolic systems, essential elements of culture) on the biological functions, whereas continuity refers to the fact that cultural functions are necessarily based on the use of our natural or biological resources for their concrete expression. Culture does, however, seem to be a kind of “aggregated value” to nature. As Vygotsky says, “Culture, generally speaking, does not produce anything new apart from that which is given by nature. But it transforms nature to suit the ends of man.” (1994, p. 59). Culture is thus not a substitute for nature, but rather assumes it, transforming natural data without creating them. The verb “transform” here is understood as “conferring a new form”, in the Aristotelean sense of the word “form”.

In a historical-cultural perspective, saying that culture confers a new form to nature should be understood as having a double meaning: material and symbolic. The transformation of nature by man is linked to mediated activity using techniques and symbolic means, with the former making it possible to change the material form of nature, and the latter making it possible to imbue it with a symbolic existence. Using technical means, the genius of Michelangelo was able to create new forms from stone without its losing material form. As the material changed in form, the image of Moses took shape in the way in which the sculptor had imagined. This new material shape of the stone, however, made it possible for the observer to call to mind the idea of the famous Hebrew leader. Without the material form, the stone

would have remained silent. Nevertheless, the material form as such does not guarantee that the observer will identify the symbolic dimensions of the idea which is to be evoked. As Charles S. Peirce would say, for this to happen, it is necessary to have "collateral knowledge" about Moses. This shows that at one and the same time materiality can become significant without losing its material characteristics, yet without this materiality, the sign lacks the form of expression.

If culture is the set of human products, then cultural development implies the conversion of meanings which these products have for adults (in the social or public plane) into meanings for the child, especially within the social group of which the child is a part. At the same time, cultural development also implies the acquisition of abilities resulting from the productive activity itself.

The relationship between biological and cultural functions is quite complex, since, on the one hand, they exercise uniquely separate functions, while, to a certain extent, on the other they are inseparably interrelated. We can, for instance, distinguish between the unpleasant aspects of physical pain provoked by injury and the happiness resulting from having suffered for a great cause. But how can one separate the happiness of suffering from the physical pain which nurtures it? The physical aspects of life are not the same as the feelings that this life causes, but how can one separate one from the other? How can one fail to distinguish the act of eating from the pleasure caused by food? But, at same time, how can one separate one from the other? This seems to suggest that even though, on the theoretical plane, it is easy enough to establish a distinction between natural and cultural functions, it is actually difficult to establish the limits between them.

From the little that we know about the natural state of the human infant, we know that, from the beginning of life, he has an incipient sensory and motor activity, but that this is sufficient to guarantee the necessary contact with its physical and social surroundings. This biologically-determined activity, however, even when it attains a certain level of functional

stability, is totally insufficient for the human infant to be able to relate initially with the cultural world. This gives rise to the question of how to explain how from this hypothetical "zero cultural moment" a cultural being who will some day be fully integrated into the human world can arise. One plausible answer would be that this sensory and motor activity constitutes the basis for the first forms of communication of the child with its cultural medium, even before these two functions become mutually interactive. According to Piaget (1971), Wallon (1942) and others, this happens throughout the first year of life. The existence of sensory activity makes it possible for the child to capture the signs coming from the medium, while the motor activity makes it possible for the child to express internal states, both emotions and needs, with its body. In this way, the presence of both receptors and the capacity for expressive movement makes it possible for the child to fulfill what ethological research considers to be the basic necessity of superior mammals: the need for contact with peers.

### Semiotic analysis

Given the impossibility of directly observing the effects of the action of culture on the biological nature of the child in the first few months of life, this research was designed to try to capture and identify the presence of *indicia* of this action. This decision is based on two premises: (1) the existence of so many experiences of use of different forms of signs (traces, clues, symptoms) reveals that it is entirely possible to create real links between things which are not directly known and the *indicia* of their existence; (2) it must be possible to identify *indicia* suggesting the effect of cultural action on the biological functions of the child during the first few months of his life;

Therefore, we should be able to conclude that the presence of the *indicia* of the action of culture at the beginnings of the child's existence allows us to assert that the process of cultural constitution of the child starts immediately after birth, as suggested by Vygotsky.

In terms of critical logic, the research design adopted here is more closely related to abduction (Peirce, 1990) than to deduction. Abduction seems to be more adequate for conjectural studies than more deductive methods, since it operates with logical suppositions rather than causal relationships. According to Peirce, one particularity of argument by abduction is the relation of similarity between an enunciated fact as the conclusion of reasoning and facts which constitute the underlying premises, since premises can be perfectly true without a conclusion necessarily being so. Thus, a failure to identify *indicia* of the process of cultural constitution of the child is independent of the truth of the two premises that “there is truly a link between an event and its *indicium*” and that “there truly exists a link between the process of cultural constitution and the *indicia* of that process”.

The implications of the adoption of this abductive methodology for the present investigation deserve further consideration. In the first place, it must be remembered that looking for *indicia* of some kind is quite different from looking for causal relations between facts, as these two kinds of results involve different methodological options. Looking for *indicia* requires an analysis involving traces, not proof; signs, not ready meanings; although these *indicia* can make it possible to complete a logical chain, thus making it possible to draw reliable conclusions about what is being sought. The *indicia* as such have no value as proof, since they only acquire such a value once the interpreter is able to find a logical reason to permit their inclusion in a sort of logical or semiotic network of meaning, assuming, as does Peirce, that semiotics and logic are synonymous.

In the second place, verifying the existence of a process is more than pointing to facts. It involves following the course of events to reveal the transformations which have occurred at some specific historical moment. But verifying the existence of the transformations of interest here, i.e., the transformation of biological functions as a function of culture, assumes a dialectical view of what has happened; in fact, it is only possible

to talk about the transformation of one thing into another if that which is transposed both maintains and changes something of its own specific nature.

Finally, speaking of *indicia* of a process from a historical-cultural perspective implies dealing with something which is a part of the process itself, and which shares some of its specific characteristics. *Indicia* constitute the visible expression of something which is invisible, or, in other words, they indicate the presence of an absence. From this perspective, cultural development is characterized by two aspects: it is historical and it is dialectical. If it is true that “behavior may be understood only as a history of behavior” (Vygotsky, 1997, p. 97), the understanding of a process comes from the understanding of the history of that process. This means that the *indicia* constitute part of the history of the process; they are also transformed during the course of observation, thus revealing the dynamic nature of the process. But if the process is historical, it gives rise to new forms from the old, which makes it possible for us to interpret *indicia* as links in the evolving chain of forms of the process. This fact greatly facilitates the task of interpretation, since the meaning of *indicia* is linked to genetic evolution during the period studied. Translated into concrete terms, the *indicia* should provide evidence of the presence of a series of new forms which reveals the biological transformations occurring during this phase of development, as well as evolution toward new forms as a result of the action of the socio-cultural medium. It is this transformation which furnishes the structural dynamics of the process.

The kind of methodological model which seems to fit these theoretical fundamentals and the nature of the object of investigation is what authors like Ginsburg (1948) call the “indicial paradigm”, a model appropriate for a semiotic analysis. The analysis of *indicia* involves interpretational acts rather than a mere description of the facts that they represent. If all research requires some sort of interpretation because the phenomenon investigated is not in itself obvious, when the object of investigation consists of *indicia*, an interpretive method seems to be the only one possible. The present research does not, however, utilize a specific

model which has been used by various authors working with a different semiotic methods, since what is of interest here is not the establishment of relationships between *indicia* (clues, symptoms, etc.) and some specific event but rather the verification of the existence of the *indicia* during the process of the cultural constitution of the child, i.e., the transformation from a biological being to a cultural being, without any attempt to explain the process nor the reason for its existence.

This paper is based on the investigation of a single child during the six first months of his life. Brief video recordings were made at various times neither totally random in selection, nor rigorously scheduled, since transformations are slow and only perceptible once they have reached a certain level of temporary stabilization. The use of video recordings was especially important because the child still has no possibility of speech and can only express itself with the language of its body. On the other hand, this procedure makes it possible for the research worker to observe the data as often as necessary, as interpretation is an extremely dynamic process which is constantly fed by re-observations of the same data. The sequence of observations makes it possible to accompany the process in construction without treating it as a pre-conceived and linear phenomenon. In this case, the metaphor “arrow in time”, outlined by Prigogine (1996), seems to be more appropriate for define an irreversible processes such as the history of development.

For the analysis of empirical data, a table of “developmental indicators” was constructed, similar to those used by René Spitz and others. Spitz used the term “development organizers”, which he defined as the result of “convergence of various lines of biological development of the embryonic organism in a given point” (Spitz, 1968, p. 88). However, there is an important difference between the conception of these organizers by Spitz and the way the indicators are considered here. We consider them to be expressive acts based on “natural functions”. Although they are represented in the genetic marks of human beings (i.e., of human biology constructed throughout the humanization of

the species *Homo sapiens*) they were originally biological functions and must necessarily pass through a process of transformation, which will give them a symbolic form. The indicators of development are of a sensory-motor nature because they are elementary forms perceivable during the first weeks or months of life of the child. But their function as indicators of the process of interest here lies in their relationship to *indicia* of the changes that occur in them which suggest the action of culture. The indicators include 1) glance fixation, 2) body movements (of the hands, feet, arms, legs), 3) vocalizations 4) cries, 5) smiles, and 6) various combinations of these, in situations of “great happiness”.

#### The *indicia* and their interpretation

Having arrived at this point, the original inquiry which was the source of the problem and objectives of this investigation arise again: if the “cultural development” of the child originates in the Other rather than in the child itself – i.e., in the social and cultural practices of man in the context of social relationships – it should be possible to find *indicia* of the conversion of biological functions into the cultural ones during the first moments of life; and in this case it should be possible to visualize them in some manner.

It is clear that this is a difficult question which has not yet been posed in the psychological literature, at least not in this form. The difficulty lies in the nature of the question itself and in the way in which it can be posed. Two completely different orders of reality are involved. The first of these is the order of nature, of “things in themselves”, in which man is a part and over which he has no direct power since he does not create it but only reproduces and transforms it. The other is the symbolic order, an order created by man and over which he exercises direct power. The first is a material reality, the second is not. The first can acquire symbolic quality without losing materiality; the second, however, can only become concrete through the former and it still does not lose its symbolic nature. Paradoxically, these two disparate natures which have historically been

considered to be incompatible and mutually exclusive – are what makes the relationship between the natural and the symbolic orders possible or, in other terms, triggers the transformation of nature into culture. The history of man is the proof of this.

The search for *indicia* of the action of culture on the biological functions during the initial phase of the life of the infant is a reminder of the fact that the nature inherited at the moment of conception is already that of a *human* nature, i.e., a biological reality transformed by the history of mankind. This nature implies that the members of this biological species can *become* humans. Therefore it implies that the human infant is the recipient of a nature already marked by culture, thus making it a natural candidate for the achievement of the human condition. This is not automatic, but a gradual conquest achieved during the time which defines that individual's personal history.

These considerations suggest that the search for *indicia* of the action of culture on the nature of the infant should consider not only potential future changes in this nature, but also what has already happened in the past. Ignoring biological evolution and human evolution is a serious mistake. In order to understand something of the complex process of the conversion of nature into culture, one must suppose that this results from the action of external agents on various levels simultaneously.

Despite the risk of oversimplification, the following figure (Figure 1) should help clarify these concepts. This figure attempts to show the different planes of the process of the constitution of the complex structure of an adult human being, a process which the infant must live if he is to become an human being by the action of the cultural medium surrounding it. During the evolution of the genus *Homo*, a structure which was originally only biological, shaped by the ecological conditions of the natural habitat, gave rise to new forms which were acquired along with the ability to influence nature and modify the conditions of this habitat. Transforming nature by creating one's own habitat is the great adventure of mankind and it was this adventure which has led to the

development of the new species *Homo sapiens*. It can be said that biological aspects are modified by the instrumental and symbolic activity of mankind, i.e. by the culture of which this activity is the expression.

The concentric circles represent the various phases in human evolution. The outer circle (a) represents the primitive biological heritage of our primate ancestors, whereas the second (b) represents this heritage as transformed by culture throughout the social history of man – what is called here of *human* nature. The inner circle (c) represents the specific and concrete history of each individual human being within the cultural history of mankind.

When a human infant is born, it is a biological being already marked by culture, so that the first two circles (a and b) do not constitute two separate entities - despite their representation of the dialectic opposition between nature and culture - but rather a single human nature. This is the hard core of the historical-cultural perspective of psychology, something totally strange for the psychological tradition. It is this human nature that each human infant receives from its parents at the moment of fertilization. As this nature enters into contact with the reality of the "cultural medium" - the only medium/reality available for humans - these cultural marks are gradually activated, so that the various cultural functions can develop (consciousness, thought, speech, feelings, etc.). These functions imply the transformation of natural functions which were appropriate for the biological reality of our ancestors into modern days functions. In other words, biology reaches the most advanced stage of its evolution, so that a flower stalk emerges from a base branch.

The idea of activation of the cultural marks of the infant organism upon contact with the cultural medium led to the concept of a *cultural zero moment* - a phase which must necessarily precede the process of activation - and to the search for *indicia* of this processes. Although many studies have investigated human infants in the first few months or years of life, none has started from the theoretical precepts underlying

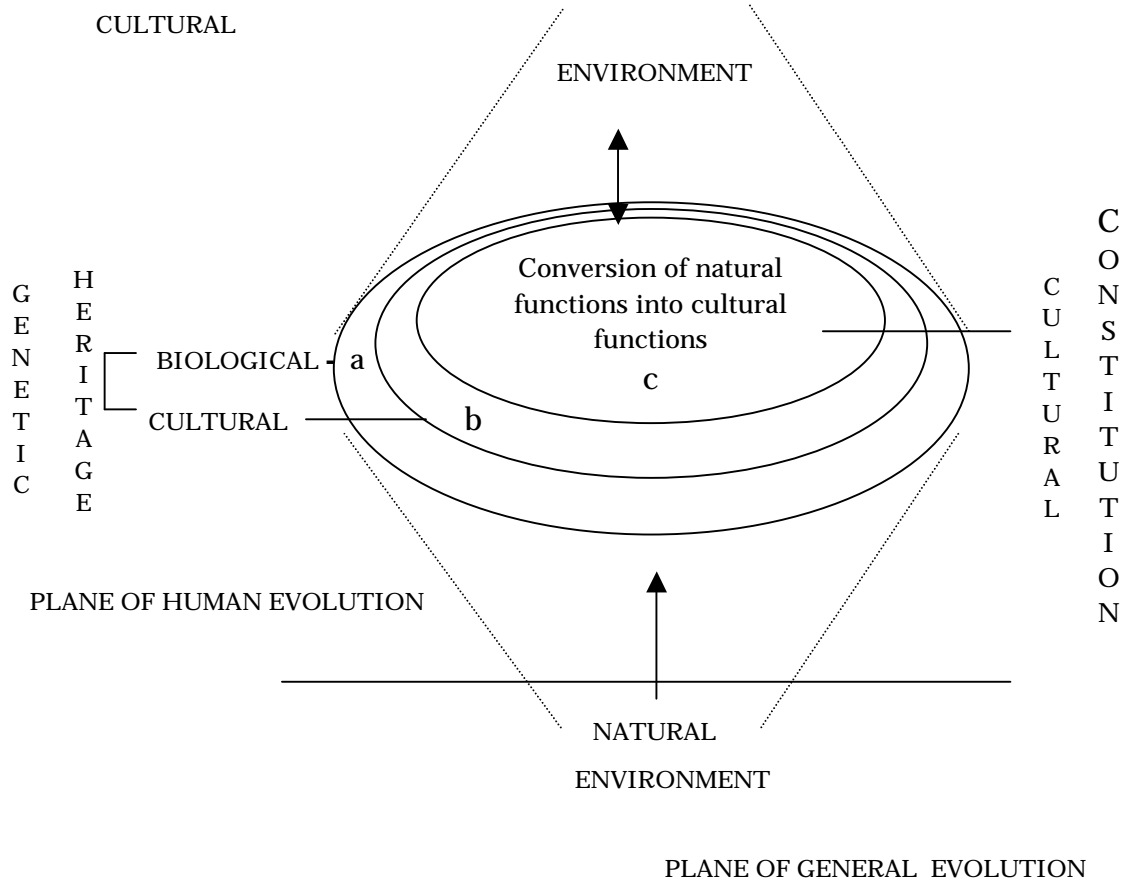


Figure 1. Representation of the constitution of a human being

the present paper. Prior to Vygotsky, attempts to explain the relationship between the different biological and psychological aspects of human being (*soma x psychè*) were never able to overcome dualist explanations, even in interactionist models such as those of Piaget. This explains why the reader may feel a certain discomfort with the ideas presented here, as these are drastically different from those considered in the numerous research papers available about infants. The originality of the Vygotskian thesis about the social origin of the psyche arises in the idea of the *conversion* of the biological nature of the infant into a cultural one as the result of the action of the human medium on that infant, a culture which is

internalized due to the mechanism of semiotic mediation. In the logic of these thesis of Vygotsky, this *conversion* can only take place after birth, even though one cannot forget that the infant's nature has been marked by the cultural history of mankind ever since conception. It thus carries the "mark of the human".

In the analysis of empirical data two basics points should be taken into account. The first is that the cultural functions must to be incorporated into the natural functions of the infant, which are in full development once birth has taken place. The second is that these natural functions bring about their own transformation because they carry the cultural marks of the human species.



From the empirical data of the various selected indicators of the natural functions of infant a set of *gradients*<sup>1</sup> of their evolution was constructed where we can to detect the *indicia* of the cultural action over them (Pino, 2002).

Although no attempt will be made here to furnish a complete analysis of each of these indicators, a general outline will be provided.

The empirical data show that, immediately after birth and during the first days of life, the only functional *indicia* presents was the existence of purely biological rhythm (sleeping, waking and feeding) as well as reactions to organic discomfort (cries and spasms). Only after the fourth day was our infant able to open its eyes during the limited time it was awake, but even then he was unable to fix its gaze on anything in surrounding world, as if it were a nebulous of some sort. "great cloud". On the fifth day, the auditory function become operative and ocular movements "sweeping the visual space" were observed, apparently an unsuccessful attempt to locate the "human voices" in the surroundings. After the first week, the "sweeping of the visual space" had become more intensive, suggesting that, despite the presence of numerous simultaneous sounds (music, household noises, street noises, etc.), only human voices aroused the infant's attention. It was thus identified as the first indication of the effect of the intense human presence during the first days of the infant's life. By the tenth day spontaneous attempts to smile were observed, even without any human presence, and by the beginning of the fifth week, attempts at eye fixation on the parents were also observed. Nevertheless only after two months had this behavior acquired the status of elementary communication of the infant with the known Other (parents) who cared for it (speaking, stroking, playing etc.). By the end of the third month, this communication had become a "wordless dialogue" of the infant with the known Other, exploiting the simple, yet effective, means available (simultaneous use of glances, smiles, sounds, and body movements) in response to the Other.

In only three months, that infant who had barely been able to open its eyes, and at best loose its glance in empty space, as Piaget would say, had already become sensitive to the presence of the Other, to which it responded with limited, yet effective natural resources. In constant contact with this Other, its eyes gradually take on a shine, and the smile which was initially a mere muscular contraction becomes a social smile, other movements also increase in flexibility and expressiveness. If biological nature still predominates, as it has since the first moments of fetal existence, only three months of intimate interaction with other humans has been sufficient for it to be modified. Although barely perceptible, signs of humanity are already present.

What was only a vague *indicia* of the action of culture on the social interactions of Lucas prior to the first three months had gradually emerged as a clear *indicia* of this action on the plane of socialization, with the appearance of complex set of behaviors involving sensitivity to the voice and presence of the Other, as well as reactions to this voice through the use of a gaze and the fixation of this gaze on the figure of the Other (the mother).

Perhaps the reader may think that this behavior reflects the plane of biological phenomena of animal sociability pointed out by specialists in Ethology, such as K. von Frisch, K. Lorenz and N. Tinbergen. If, however, the animal forms of sociability correspond to the specific conditions of the life of each species, the forms of sociability which arise in the human infant are also specific to the human species, developed by this species during its long history.

During the period extending from the fifth to the eighth month of life, Lucas developed an increasing interest in objects, an interest in contrast with the prior focus on people. During this period, the *indicia* of cultural action become more numerous and visible to the observer. They are concentrated on the axis of "objects  $\neq$  people", the two principal dimensions which compose the cultural universe in which Lucas is immersed. In summary, the main *indicia* are the following:

- ⌋ Things are no longer merely a focus for contemplation, but have become the object of manipulation, and a manipulation in a search for knowledge rather than as a ludic activity. These objects gradually assume individual identities, provoking specific reactions of the infant along the continuum of “interest  $\approx$  disinterest”.
- ⌋ Relations with people (accompanied by looks, smiles, sounds, gestures, and other movements) seem to no longer be characterized by “magic power” such as attraction and fascination exerted by the Other up to that time. These relationships are now regulated to some extent by Lucas himself along the two continua of (1) “connection to  $\approx$  disconnection from” the Other as a function of the circumstances, and (2) “appeal by the Other  $\approx$  search by the child”.

Various authors have shown in their research concerning the infants that objects gradually take on their own identities as the result of the manual-visual contact of the child. Although this produces the effect of “playing”, what is experienced by Lucas is more of an activity of discovery than of a “pastime”.

As objects are manipulated, they gradually acquire their own shapes, while simultaneously changing, almost imperceptively, the way in which Lucas perceives and interacts with them. These changes can be seen in the modification of what seems to be the main selective principle used by child: “interesting  $\approx$  non interesting”. This suggests that it is not the color and shape of objects which have an automatic power to fascinate, although such a hypothesis has often been proposed, but rather that even if these aspects do actually incite the initial attention of Lucas, they do not maintain it, although the basic selective principle continues active. The dynamics of social relationships also provide *indicia* of the cultural influence as Lucas gradually frees himself from the pressure of natural order (especially determinism and regularity) to participate in what can be called the “game” of the relationship with the Other.

This relationship is gradually (re)constituted as a function of various selective principles, although at this time of life, the major principle seems to be that of “interest  $\approx$  non-interest”, whatever the motivating factor. These changes furnish new *indicia* of the role of culture in the sociability of Lucas.

In general, it can be said that evolution of the biological functions of Lucas – within the genetic parameters of the species – occur simultaneously as part of the evolution of his relationship with the Other and the nature of his interaction with objects. It is clear that the evolution of the “cry”, the “look”, the “smile” and what I have called “the combination of several of these” is directly linked to the progressive constitution of the relationship “child  $\approx$  Other”. This is not unexpected, since these constitute expressive forms of communication. But even the “motor development” of the infant takes on cultural form in the adaptation to the conditions of communication with the Other. As Wallon (1942) has said, the tonic, source of affective life, gives an expressive and thus communicative form to the movements of the infant.

It can thus be seen that the observation of the biological evolution of Lucas during the first six months of his life has revealed two fundamental points. The first of these is that culture is incorporated into his biological nature, converting this into forms which constitute human nature. The second is that the transformation of natural functions on the basis of the action of culture confirms the thesis of Vygotsky (appropriated from Marx) that “all higher mental functions are the essence of internalized relationships of a social order, a basis for the social structure of the individual” (1997, p. 106).

#### Notas

1. “Every function in the cultural development of the child appears on the stage twice, in two planes, first, the social, then the psychological, first between people as an intermental category, then within the child as a intramental category ” (SW, vol. 4, 1997, p. 106).

2. "All cultural development of the child passes through three basic stages ...using Hegel's analysis" (SW, vol. 4, 1997, p. 104).

3. "Psychology has not yet explained adequately the differences between organic and cultural processes of development and maturation, between two genetic orders different in essence and nature and, consequently, between two basically different orders of laws to which the two lines in the development of the child's behavior are subject" ; "In the development of the child, two types of mental development are represented (not repeated) which we find in an isolated form in phylogenesis: biological and historical, or natural and cultural development of behavior. In ontogenesis both processes have their analogs (not parallels)" (SW, vol. 4, 1997, p. 3 and p. 19).

4. B. B. Tylor, *Primitive culture*, 1871: Culture or civilization (...) is that complex whole which includes knowledge, belief, morals, law, custom, and any other capabilities and habits acquired by man as a member of society

5. B. Malinowski, *Argonauts of the Western Pacific*, London, Roudledge and Kagan, 1950; *A scientific theory of culture and other essays*, The University of North Carolina Press, 1944 (*Uma teoria científica da cultura*, trad. bras. Rio de Janeiro, Zahar, 1968); R. Benedict, *Patterns of culture*, Boston, Moughthon, 1961; M. Mead, *Coming of age in Samoa*, 1939 (*Adolescencia y Cultura en Samoa*, trad. española, Buenos Aires, Ed. Paidós, 2a ed. 1961).

6. H. F. Harlow, The nature of love, *American Psychologist*, 1958, 13, p. 673-685; H. F. Harlow, and M. K. Harlow. The affectional systems, in A. M Schrier and H. F. Harlow, *Behavior of nonhuman primates*, vol. II, New York, Academic Press, 1965, pp. 287-334; K. Lorenz, *Il parlait avec les mamifères, les oiseaux et les poisons*, trad. fr. Paris, Flammarion, 1968.

7. The reader is reminded that the importance of this analysis is not in the definition of ages and rigid chronological sequences for the emergence of specific changes in the behavior of the infant, but rather in the detection of those moments during the natural biological development which reveal observable *indicia* of these changes in natural functions which can be attributed to the cultural action of the social medium of the infant. What is important is to find *indicia* suggesting such changes.

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