Culture in Infancy: An Account of a Way the Object "Sculpts" Early Development

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The aim of this paper is to bring into consideration a way of studying culture in infancy. An emphasis is put on the role that the material object plays in early interactive processes. Accounted as a cultural artefact, the object is seen as a fundamental element within triadic mother-object-infant interactions and is believed to be a driving force both for communicative and cognitive development. In order to reconsider the importance of the object in child development and to present an approach of studying object construction, accounts in literature on early communication development and the importance of the object are reviewed and discussed under the light of the cultural specificity of the material object.

How does culture influence early human psychological development? How can we find evidence for the way a child becomes a member of his or her surrounding cultural society? These questions have shaken developmental scientists since the importance of the interpersonal relationship dynamics was unanimously admitted. The enormity of such questions is overwhelming when a single study tries to address it in order to provide general laws of psychological development. However, in the past 50 years, important advances have been made. With many others, J.S. Bruner provided brilliant insights of the way culture shapes the mind. In one of his most known studies, he found that young children's social environment has an impact on the way they perceive the size of American coins – when a child is raised in a significantly poorer socio-economic environment, he or she tends to overestimate the size of coins (Bruner & Goodman, 1947).

Among the classical theories of child development, there are approaches that study the influence of social, cultural and historical dimensions on the child's psychological functioning. Vygotsky's cultural-historical theory is one of the most considered. He opened the scope of studying child development by theorizing that the mind is mediated by cultural signs and only by accounting for those mediation processes, human psychology can be approached. According to Vygotsky, the signs that mediate the mind are the linguistic signs; in an ontogenetic perspective, that means that the child's psychological functioning starts to be mediated by culture when language emerges, around age 2. Before that, during the two first years of life, development is a fruit of the child's internal biological processes. It is with language that the natural and cultural lines of development would merge and allow the development of higher mental functions.

Moro and Rodríguez (2005) questioned this nature-culture dualism in the preverbal years. Since the infant is in constant relations with other people and artifacts, this necessarily has an impact on his or her development. The authors emphasized the fact that interaction and

communication between a mother and an infant is highly influenced by an external object, such as a toy. In order to provide evidence for the cultural impact on development and how it can be studied, Moro and Rodríguez suggested to examine the way the mother transmits signs of how objects are used conventionally. According to this approach, mothers transmit social and cultural knowledge in the preverbal years (how objects are used in a conventional way); thus, interesting studies of how this transmission shapes the child's development could be suggested.

Following the approach of object construction in infancy, this paper aims to provide reflection on the importance of the material object in early child development. In order to address this topic, two questions are asked: What is the importance of the object in literature on early communication development? How is the object considered in literature on the child's psychological functioning? The first two sections deal respectively with these two questions. In the third section, I provide a reflection of how to reconsider the importance of the object according to its cultural specificity. The major question of the conventional use of the object is presented in this section. In the fourth and last section, the approach of object construction in infancy (Moro & Rodríguez, 2005) and its theoretical backgrounds are presented.

The importance of the object in early communication development

In this section, I summarize some of the major topics in early development that engender fundamental progresses in communication development and I highlight the importance of the object in each of them.

A qualitative turn in development of communication is marked by the period when the infant starts to integrate a third term in previously dyadic mother-infant interactions (Dunham & Moore, 1995). Around the age of 9-10 months, infants become able to orient their attention both to another person and to an external object or event. This triadic ability is what different authors refer to as secondary intersubjectivity (Trevarthen et Hubley, 1978), joint engagement (Bakeman & Adamson, 1984), joint attention (Tomasello, 1995), etc.

According to Adamson, Bakeman and Deckner (2004), episodes of shared attention with a caregiver and an object are important in early developmental contexts during which children gain access to a culture's ways of interacting (Bruner, 1983) and to its tools, including its symbol systems (Vygotsky, 1978; Werner & Kaplan, 1963). Longitudinal research shows that infant's joint attention skills are correlated with various aspects of later development such as social understanding (Charman, et al., 2000), representational skills in theory of mind (Perner, 1991; Wellman, 1993), language development (Bakeman & Adamson, 1984; Bruner, 1974-5; Carpenter, Nagell, & Tomasello, 1998; McArthur & Adamson, 1996; Smith, Adamson, & Bakeman, 1988; Tomasello & Farrar, 1986) and growing narrative skills (Bruner & Feldman, 1993).

These and many other studies provide rich evidence for the relationship between the development of early communication and the importance of the ability to integrate an

external object in the shared focus of attention. A quick look at the abilities involved in joint attention processes reveals that basic cognitive functions such as attention, intention, reference and pragmatics are built and enhanced during situations of mutual attending to an object.

Concerning intentionality, it is considered as a milestone in the child's communicative development (Bruner, 1974-5; Harding & Golinkoff, 1979; Locke, 1978; Sugarman-Bell, 1978; Tomasello, 1995). It emerges from child's awareness that his or her behaviour has an effect on his or her surrounding caregivers. It starts with rudimentary behaviours such as crying which the caregiver interprets as a signal for discomfort and causes him or her to provide soothing, most often feeding. The child then starts repeating these behaviours to provoke an effect on the caregiver. More complicated intentional behaviours emerge with the ability to integrate an object when interacting. For example, when a child wants an object out of reach, he or she would stretch the arm in the direction of the object, which would certainly be interpreted by the caregiver as a child's desire for the object. In this respect, the work of Elizabeth Bates' team (1975, 1979) on preverbal pragmatics (proto-declaratives and proto-imperatives) can be seen as an important understanding of the impact of the ability to integrate an object in interactions on the child's communication development.

Closely knit to this last aspect of early communicative competencies is the notion of reference (e.g. how the nature of the object attended to during joint engagement influences the development of reference). Establishing a relationship between things in the world and a means to refer to them is fundamental for communication development. Unlike the child from the example above who stretches his or her arm in vain attempt to reach the object, a more mature form of mutual attending to things in the world is gained when the child starts to use arbitrary codes in order to refer to things. As Bruner (1974-5) puts it, the child performs "a sound, word or gesture [that] «stands» for something in the extra-linguistic environment" (p. 267). Reference is mainly seen in literature as a linguistic construct, but evidence taken from studies of the development of preverbal pragmatics indicates that its basis is set up in the pre-linguistic period. Referring together to an external entity in infancy is essentially referring to an external object. Thus, establishing the relationship between things in the world and a means to refer to them is clearly beginning in infancy. This process is believed to take place in episodes of active participation in pre-established repetitive interactive routines, referred in the literature as formats (Bruner, 1983), scripts (Nelson, 1981), frames (Fogel, 1993), etc. This last aspect of psychological development allows us to enter the field of meaning construction. With his or her capacity to mutually attend to an object with another person, the child becomes increasingly more precise and conveys richer and more meaningful information to the social other.

From the several basic psychological aspects outlined above, we can argue that the capacity to integrate an object in interaction processes is essential to the development of basic communicative skills. It is interesting to note that, although authors of studies on early communication development commonly acknowledge the importance of the object, these studies remain an investigation of the dyadic mother-infant interaction and its effect on development.

Authors generally agree with models of communication development such as Werner and Kaplan's theory of symbol formation (1963) which highlights the importance played both by the communicative partner and the object in interactions called *primordial sharing situations.* Although heavy theoretical emphasis was put on the *sharing* aspect, the authors unfortunately did not elaborately discuss what *sharing* implies in terms of development (Adamson, 1995).

A recent and powerful account of the importance of the object is found in Vasudevi Reddy's second-person approach of development of the infant's connectedness and engagement with the other (minds) (2008). When discussing mainstream conceptions of attention, for example, she emphasize that "attention…is conceived of as a sort of psychological spotlight turned on to the world, free-moving and not bound to the things it aligns upon, thus independent (or dis-embodied) from the world it roves in" (p. 92) and discuss that such theorizing of attention is not relevant in explaining early pre-conceptual infant dynamics of engagement with other people because "from such a dis-connected definition, the only way in which we, as observers, could grasp or recognise attention would be to conceptualize it, to grasp it as an 'idea'" (p. 92). The author suggests that, in order to study the advent of infant's awareness of other's attention (as a milestone of communication development), it is important to account of the participative, emotionally-bound connectedness between the infant, the communicative partner and the external world. This account of the importance of the object in early interactions is highly relevant for the purpose of this article. However, without neglecting the emotional aspects of infant-object-partner engagements and how they lay the foundations of children's awareness of the other, we go further and question the role played by the object as a separate and specific entity in these early interactive dynamics – how the object's characteristics in term of its cultural practices could shape the young children's psychological development.

To our knowledge, there are no studies on what effects the specificity of the object during triadic mother-object-infant interactions could have on communication development (for example, how the nature of the attended object would influence development of reference). However, there are studies and different approaches found in literature on how children perceive and understand objects. In the attempt in this paper to bring together the importance of communication development and the importance of the object, the next section examines how the object is studied in literature concerning child psychological development and the importance that authors give to the object according to early psychological acquisitions.

Approaches of the object in psychological development

In the following section I summarise the main approaches of studying the object and its importance in the development of child's psychological functioning. As in the preceding section, the summary of the basic studies points to the dyadic nature of the investigations; however, in this section, the dyad is no longer a subject-subject dyad (mother-child) but a subject-object dyad (child-object).

Interestingly, in the classical theoretical view of the development of object manipulation, neither the caregiver nor the object is seen as essential. The infant was expected to develop manual ability with objects resulting from inherent biological maturational processes and adaptive behaviours (Gesell & Amatruda, 1944).

Dyadic accounts emerged only later in the second half of the last century. A less innate, largely influential theoretical account of the importance of the object in early development was proposed by Piaget. According to Piaget, the psychological development of the child, including the processes of object manipulation in infancy, result from the active experience that he or she has in the environment. He put an emphasis on the importance of the *experience* even though this experience is fundamentally self-generated.

For Piaget the importance of the object lies early in the developmental levels that he described. In the first level of psychological development that he described (i.e. the sensori-motor level), the object plays a major role and achieving object permanence (the knowledge that the object has continuity of existence even when out of sight) marks a qualitative turn in development, which allows the transition to the next developmental level (i.e. the pre-operational stage). Piaget described the different stages of how the object becomes a stable content for the infant. For this purpose, he used a paradigm consisting of hiding objects and observing the child's reaction. According to Piaget, during stages 1 and 2 of the sensori-motor level, the "universe of the baby is a world without objects" (Piaget & Inhelder, 1969, p. 14) - when an object disappears from the baby's sight, there is no reaction at all. It is during stage 3 that the child starts to react when an object disappears, especially if it is an interesting one, but the child still will not search for it. Starting from stage 4 (coordination of secondary circular reactions) the child will search for a hidden object and at stage 5 he or she will be able to find an object if it is hidden in various places. The sensori-motor stage ends when the child starts to make inferences about the various displacements of the object and succeeds in locating it. In order to explain these progresses, Piaget refers essentially to the biological functional mechanism of *assimilation*. According to Piaget, this consists of the transformation of the world by the child - by the repetitive exercise of the biological schemes by the child, assimilation assures stability and allows the object to become permanent.

In Piaget's theory of psychological development, a major emphasis is put on the subject – the child – as the unique creator of his or her understanding of the material world. Piaget was aware of the impact of social interaction on development since he stated that "human intelligence is subject to the action of social life at all levels of development from the first to the last days of life" (Piaget, 1977/1995, p. 278). His theory of psychological development incorporates important aspects of how interpersonal dynamics influence the child – the relation of constraint through the imposition of authority and group traditions on the individual; and the relation of cooperation based on equality and reciprocity. Although these types of social relations are important contributions to the understanding of the influence of the social on the developing child, Piaget discussed them only for grown-up children, neglecting the impact of the social relations in the early years (Muller & Carpendale, 2000). He considered that "The social intervenes before language through sensory-motor training, imitation, etc., though without essentially modifying pre-verbal

intelligence" (Piaget, 1977/1995, p. 38). Among other aspects of psychological development, this view directly influences the way Piaget accounted for the child's comprehension of the material world. Since social interactions are not considered as important in pre-verbal development, the only way a child can gain understanding of objects is by solitary physical manipulation. This means that the only aspects of the object that the child can access to are the physical properties of the object (such as shape, texture, colour, etc). I will return at the end of this section on the limits of this viewpoint.

A different but very fertile line of research concerns infants' perception of objects. The techniques which are used rely on behavioural measures of very young infants developed by T.G.R. Bower in the 1960s; this consisted mainly of observing the infant's reaction to events that violate physical principles. Research teams like of the ones of Elizabeth Spelke and Renée Baillargeon performed numerous studies on topics of object perception such as object unity, violations of expectancy, the effect of object size on its visibility and movement of the object under the effect of gravity (for an overview, see Spelke, Breinlinger, Macomber, & Jacobson, 1992). The findings reported by these studies shed light on fundamental cognitive processes in early development. The authors conclude that the nature of object perception is essentially inherent to the subject (very young infants have an awareness of the world which would match that of adults) and emphasize the nativist interpretation of their findings.

Currently, the more commonly accepted approach in developmental psychology literature on how young children understand the object is the ecological approach of perception of James Gibson (1979). Considered as the major contribution to the studies of perception-action in infancy, this approach aims to explain how an 'organism' can regulate the relationship with the environment due to the perception-action relation. For our purposes in this paper, it is important to emphasize the role played by Gibson's theory of affordances. According to this theory, objects are considered as transparent; they allow direct, non-mediated understanding. Affordance means that the object affords an action. A ball affords to be bounced; a chair affords to be seated in. Thus, the theory of objects' affordances relies heavily on the physical characteristics and properties of the object itself. A ball affords as well to be smashed and a chair affords to be thrown by the window. The theory of affordances even supports the idea that "each thing says what it is… a fruit says "Eat me"; water says "Drink me"; thunder says "Fear me"; and a woman says "Love me" (Koffka cited by Gibson, 1979, p. 138). This last aspect goes beyond the direct perception of object's characteristics and accounts for highly elaborated knowledge on how to act on an object from the simple sight of it. Even though Gibson's theory of affordances accounts for object's functionality – something that the other studies summarized above omit –, the way to gain and develop understanding about objects relies again only on the subject and his or her activities on it. The subject remains a solitary explorer of the material world. Although some studies incorporate the contributions of caregivers to the development of perception-action coupling entailed in object manipulation (Lockman & McHale, 1989), the findings are essentially discussed in terms of maximazing *physical* information gain from the objects. Thus, following Gibson's theory of object's affordances, the only qualities and functionalities of the object that the subject can gain access to are the object's purely physical ones.

An important vein of research situated within the perception-action theoretical framework aims to explain how motor development influences the mind (Bertenthal & Clifton, 1998; Bushnell & Boudreau, 1993; Gibson & Pick, 2000; Schmuckler, 1993). Such studies provide data on how infants perform various kinds of physical exploration (fingering, grasping, pushing objects) and how they learn the material variables as well as the changes in visual and auditory stimuli that objects provide such as shape, dimension, texture, etc. (Lockman & McHale, 1989; Palmer, 1989; Ruff, 1984; Thelen & Fogel, 1986). Eleanor Gibson (1988) proposed a developmental path of how exploratory competencies in infancy – all active modes of discovering the object's physical properties – are organized in successive stages. The findings of Gibson's studies point to the role played by subject-object interactions which allow an understanding of the physical characteristics of the material world.

Several other major theories of perception have been developed through the last century. Without attempting to review the existing theories of perception, this paper aims to provide an account of how the developing child would acknowledge and understand the material world. The Gibsonian ecological approach of perception is commented essentially because of its famous conclusions of how objects are perceived and understood in their (supposedly) *functional* aspects (i.e. affordances) going beyond the physical aspects of perception (as in the constructivist approach). The "classical" constructivist approach of perception of Helmholtz (see Rock, 1997) is generally opposed to the ecological, direct and proximal approach of Gibson because of its central assumption that perception is indirect and sustains interdependent relations with other perceptions. The constructivist approach is potentially closer to the understanding of the mind as being mediated and not directly perceivable and thus it represents a fertile ground for bridging the gap between perceiving the world (in physical terms) and understanding it (in functional and/or semantic terms). A discussion of such an endeavor however surpasses the scope of this article.

It is interesting to note that, concerning physical perception (e.g. the typically studied question of size perception), attempts have been made to reconcile the opposed approaches with new and promising findings for integration emerging from recent studies including neurosciences (see e.g., Norman, 2002). Future research is needed in order to provide not only further evidence for this interesting integration between immediate and mediate perception of the physical world but also in order to answer complex questions of how perception shapes the construction of meaning.

The common aspect of the approaches presented here (as representative of the studies on the importance of the object in psychological development) is that they consider learning from the physical world (tools, i.e. objects) as the fruit of strictly individual physical exploration of a subject encountering things (subject-object dyadic interactions). It is during solitary exploratory behaviours that the child will develop his or her perceptive competencies (colour, texture, weight etc.) of the objects and will gain an "insight" on the functional aspects of the object (e.g. a child would "test" by himself or herself what can be done with the object, its affordances). Certainly, for some objects that can be considered as highly "iconic" or analogical, this solitary manipulation and exploration of the object allows

the child to "understand" the object in account for its functionality and utility (for example the child would understand by himself or herself what he or she can do with an object such as a ball). However, this hardly applies for the vast majority of objects in our surrounding material world. The child needs an adult who shows how things should be done, who adjusts the child's clumsy attempts, who corrects the child's wrong actions. In other words, in order to act on the material world and understand it, the child needs social interaction with a more knowledgeable person.

Reconsidering the importance of the object and its cultural specificity

From the sections above we can summarize that a) in the process of communication development, the ability to mutually attend to an external object is fundamental to subsequent developmental processes; and b) that the object and how it is perceived and acted upon by the developing child is a main topic in developmental cognitive science. These two domains of study concerning the object differ considerably: studies on joint engagement and attention that focus on the communicative processes in development and thereby study essentially the mother-infant relation; and studies on perception-action that focus on the cognitive mechanisms developed during activities with the object and thereby study essentially the infant-object relation. This means that the study of the importance of the object in early triadic interactions can potentially give considerable insights on both communicative and cognitive development. We consider that an integrated triadic study of mother-object-infant interaction with a strong emphasis on the role of the object can provide interesting perspectives of both communicative and cognitive development (Moro & Rodríguez, 2005). How can this be done? How can we "put together" considerations of mother-infant communication and infant's understanding of the object?

What is suggested here, following the studies of Moro and Rodríguez, 2005, is to give substantial credit to the role played by the object and its characteristics within the mother-object-infant interaction. From the first section presenting an overview of the main studies of early communication development in infancy, we can conclude that the object is acknowledged as important but that no studies focus on its role and impact. From the second section summarizing leading approaches of how the child perceives and acts on objects, we can conclude that the characteristics of the object that are taken into account are the object's physical ones. But are objects only defined and understood by their physical characteristics? Are objects only defined by what we *can* do with them (i.e. their affordances)?

If one looks at this picture below and is not familiar with it, he or she will probably see a strange thing, possibly coming from science-fiction art; maybe he or she will think it is an alien; and he or she probably won't think about functionality or use. However, this is an object; and it is even a functional and practical one; it is actually a kitchen accessory. Maybe even with this information which characterizes the object a person won't be able to *understand* the object; it won't be enough to start using the object from simply viewing it.

This is what the main concern is about. Objects do not reveal their function and use from simple sight. Objects are not transparent. We need more than perception and action in order to be able to act on them in their conventional use (for a discussion of the convention, design and goal in representing artificial kinds, see German, Truxaw, & Defeyter, 2007). For example, the object here definitely affords to hurt someone for example; and that still does not give you any clue for the way we *should* use it.

What we do know about objects comes essentially from the way we observed others acting on them or what others told us about them. This object here is a citrus-squeezer. You put a half citrus on the top, a glass under, you squeeze and the juice goes right down in the glass. It is an unfamiliar object for us because *in our culture and/or historical period*, citrus-squeezers have different appearances and we are not used to infer this kind of information from such an object. If there are objects that can be so difficult for adults to understand, with all the background they have from experiencing the material world, then for small children all the objects would be unknown and they won't immediately know how to use them.

It is essentially within triadic mother-infant-interactions that mothers transmit the way the object *should be used* (in contrast by how an object *can be used*, i.e. its affordances). Most of the time, mothers are not aware of the fact that they transmit such conventional knowledge about the object because this is so natural and obvious for them. It is within these interactive situations of sharing about nearby objects that early communication emerges, joint engagement and attention consolidates and communication develops. In these situations, the infant gains considerable knowledge about the object which goes beyond the physical properties of the object. Conventional use of objects is the fruit of long processes of *negotiations* within the members of a culture and is determined by the historical and temporal rhythm of a given society. Comparing the first patent of a telephone by A.G. Bell and Steve Jobs' invention of the iPhone can give a nuanced example.

This account of object use is not new even though, to our knowledge, there are no studies that explore infant or child development from this perspective. Similar theoretical developments have been provided. Tomasello (1999), for example, discussed object use within the framework of greater developmental processes – in this case, what he refers to as *cultural learning*. He put strong emphasis on people's *intentionality* when using an object

in order to explain the perspective-taking issues of how cultural learning becomes possible. What he calls the "intentional affordances" of an object mainly refers to the intentions that social agents have when communicating with others. Even though in this account there is recognition of the role played both by the other and the object, the author discusses the object's role in terms of interpersonal dynamics between the communicative partner and his intentions and the child without a consideration of the cultural dimension of the object and how, in the processes of cultural learning, culture could possibly mediate child's learning.

In this section, the question of how we can theoretically integrate considerations of mother-infant communication and infant's understanding of the object was addressed. In the following section, the more precise question of how we can study the effects of triadic interaction on child's development when accounting for the cultural specificity of the object will be addressed. A relevant approach will be presented.

The semiotic approach of object construction in infancy

In order to study triadic mother-object-infant interactions with an emphasis on the object's cultural characteristics, Moro and Rodríguez (2005) proposed to investigate early interactions from a semiotic perspective. This approach is based essentially on two theoretical backgrounds: Vygotsky's theory of cultural-historical development and Peirce's semiotic model.

In Moro and Rodríguez's approach of object construction, the importance given to the way mother and child communicate about an object is inspired by L.S. Vygotsky's works (1934/1997) of mediation of the mind by the sign. According to Vygotsky and the majority of the Russian school of psychology of the first half of the 20th century, development of psychic functions is conceived as the progressive appropriation of the culture mediated by the signs. As Zittoun, Gillespie, Cornish, and Psaltis (2007) describe, in "the interpsychological relation [:] the mother mediates the relation of the child toward some object – a subject-other-object triangle – and this leads to the creation of a *sign*" (p. 214, emphasis in original). The advent of the cultural-historical development goes by the internalization of the cultural signs. In Vygotsky's account of psychological functioning, only the analysis of the meanings contained in the systems of signs allows the understanding of the development of mental processes.

In the study of triadic interactions, this means to investigate how the mother transmits culturally-specific communicative behaviours (i.e. the signs that she uses when communicating with her child; cf. empirical studies of Moro & Rodríguez, 2005) and then to account of the processes of how the child internalizes and generalizes these signs in order to be able to make conclusions about the impact of cultural knowledge on the developing mind.

Although the semiotic approach of object construction relies on the theory of mediation of the psyché by the signs, Moro and Rodríguez (2005) differ on one considerable aspect from Vygotsky's theory. Vygotsky considered that the mediating activity of the sign is closely

related to the linguistic signs. Thus he gave exclusive importance to language in the primary process of development of higher psychological functions, as highlighted in the introduction. Moro and Rodríguez contest that cultural transmission only occurs with the advent of linguistic signs. Interaction in the preverbal period between the mother and the infant is considered equally as important, since mothers use various cultural signs in order to communicate with their children. In order to study the cultural signs that mothers use when communicating with their preverbal infants, the authors put a heavy emphasis on the role of the object in the interacting triad and the importance of the object's conventional use. They considered that any communicative behaviour concerning the object's conventional use is culturally determined and thereby should be considered as a *sign*; a preverbal sign. This conception of the sign as being not only verbal but also preverbal deals with Vygotsky's dichotomy of development in the preverbal period. According to Vygotsky, in the preverbal period there is only a natural line of development; the child develops according to his or her biological mechanisms and culture does not have any impact on psychological development. Cultural mediation begins as the child starts to use and understand linguistic signs, around the second birthday. By suggesting that communicating about object's conventional use can be interpreted as a pre-linguistic mediating activity, Moro and Rodríguez (2005) opened the scope of studies on culture influences on the very early developing mind.

In order to analyze and interpret the preverbal communicative acts and how they convey cultural meaning, Moro and Rodríguez refer to the works of C.S. Peirce on semiotics (1966). Peirce's theory of signs is a theory of reasoning and of cognition which asserts that all modes of thinking depend on the use of signs. He argues that every thought is a sign, and that every act of reasoning consists of the interpretation of signs. Signs function as mediators between the external world of objects and the internal world of ideas. 'Semiosis' is defined as the process by which representations of objects function as signs and is conceived as a process of cooperation between signs, their objects, and their 'interpretants' (i.e. their mental representations).Unlike Ferdinand de Saussure's theory of signs, which crystallizes meaning as a direct representation between a signifier and signified, according to Peirce, 'meaning' is a triadic relation between a sign, an object, and an interpretant. This triadic relation is not reducible to a set of dyadic relations between a sign and an object or between an object and an interpretant (CP 1.345). Breaking with traditional dualistic conceptions of symbolization, Peirce's triadic theory of signs "makes possible the articulation of the semantic universes between the subjects themselves, in a tight relation with the world, particularly the world of objects…" (Moro & Rodríguez, 2005, p. 127).

With the approach of object construction in infancy, new horizons of studying communication and cognition in early development are opened. Observing triadic mother-object-infant interactions could provide insights of how culture mediates the mind of the growing child when looking closely at the communicative dynamics of how partners mutually attend to an object. By being the focus of attention, the object and its characteristics make communicative partners exchange, elaborate, and negotiate cultural meaning. These dynamics allow the development of both communicative and cognitive functions. Studying these functions provides an integrated approach of how complex psychological functioning develops.

DISCUSSION

In this paper, the aim was to highlight the level of importance of the physical world surrounding the growing child, especially when materiality is regarded as a social agreement within the cultural milieu of the child. Studies on child development already acknowledged the importance of the object in genetic processes – major research in studies of communication development and in perception-action relationships, as was outlined at the beginning of this paper. Despite its contributions, research did not provide empirical evidence of how the object as a cultural artefact can influence psychological functioning. In order to set up a theoretical paradigm which could allow such studies, an approach of how children elaborate knowledge about objects within triadic social interactions was presented (Moro & Rodríguez, 2005).

How culture influences the mind is a difficult question crossing disciplines like anthropology, ethnology, sociology and psychology at the least. It could be erroneous to make conclusions of how such an approach accounting for cultural knowledge can be generalized in order to provide universal explanations of psychological growth. This is not the purpose here. Great differences exist not only in the ways of using objects among different cultures (for example, the notion of a table to eat on Occidental and Oriental societies) but also within individuals of the same cultural environment.

Instead, the approach of object construction in infancy aims to study how *specific,* culturally determined, use of an object influence the way the mother and the child communicate in early interactions involving an object and how this communication sculpts subsequent development. These communicative processes are analyzed in terms of communicative acts (mostly preverbal ones – i.e. gestures) that depend on the object and its type of use. In order to study the processes of object use by the child in a given cultural context, evidence of the communicative acts of both the mother and the child and their relationships are sought.

Within such a theoretical framework it wouldn't be possible to claim universal rules of psychological development but rather to suggest a modest contribution to the understanding of how a specific cultural environment can influence the very early mechanisms of the child becoming a member of his cultural society. Future empirical evidence should be able to bring interesting and important insights of how the 'culture shapes the mind' (Bruner, 1996), providing opportunities to study the articulation of social interaction and early cognitive psychological development.

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