En J. Valsiner y A. Rosa Rivero, *The Cambridge Handbook of Socio-Cultural Psychology*. New York (Estados Unidos): Cambridge University Press.

Time and Movement in Symbol Formation.

Español, Silvia.

Cita:

Español, Silvia (2007). *Time and Movement in Symbol Formation. En J. Valsiner y A. Rosa Rivero The Cambridge Handbook of Socio-Cultural Psychology. New York (Estados Unidos): Cambridge University Press.*

Dirección estable: https://www.aacademica.org/silvia.espanol/136

ARK: https://n2t.net/ark:/13683/pH0V/nxT

Acta Académica es un proyecto académico sin fines de lucro enmarcado en la iniciativa de acceso abierto*. Acta Académica fue creado para facilitar a investigadores de todo el mundo el compartir su producción académica. Para crear un perfil gratuitamente o acceder a otros trabajos visite: https://www.aacademica.org*.

CHAPTER 11

Time and Movement in Symbol Formation

Silvia Español

Language is usually taken to be the human symbolic system par excellence, but this does not necessarily means that it is the best window from which to observe the development of the symbolic function. Jean Piaget (1945) was aware that the social signs – formed by arbitrary and conventional signifiers – that conform language are not as fertile ground for the observation of symbol formation as are the more idiosyncratic and motivated products of fictional play. Following the same argument, Ángel Rivière (1984) emphasized that enactive symbols – forms of action in which the link between signifier and signified is not arbitrary but motivated – provide a window with a privileged view for the study of symbol formation.

Daniel Stern (1985) also observed that although children become members of a cultural group through the acquisition of language, they do so at the risk of loosing the crossmodal wholeness and richness of their original experience. An infant's experience comes from multiple sensory modalities, but when linked to a word, that experience is anchored to only one modality and so becomes isolated from the original sensory flow, since language fractures the original experience and freezes its temporal flow (Valsiner, 1992). When a child perceives a yellow solar light spot on the wall – Stern says – s/he experiences intensity, warmness, shape, brightness, movement and other crossmodal qualities of this spot. To be able to conserve this flexible perspective, the child needs to ignore particular properties (such as color) that specify sensory channels through which the spot is experienced. He/she must not be aware that it is a visual experience. And this is exactly what language will force him/her to do: "*look* at that *yellow* sunlight." The conventional linguistic version buries the sensorial flow of the experience, which can only reappear when certain conditions prevail over the linguistic version: as happens in certain contemplative or emotional states, or before a work of art whose aim is to evoke experiences that defy verbal categorization. However, even though language, in its ordinary use, buries the flow of global experience stemming from multiple modalities, in its poetical form it is able to evoke experiences that go beyond its expressive capabilities (Stern, 1985).

These features of language suggest the need to go beyond the first manifestations when focusing on the study of the symbol function in children. However this does not mean leaving aside the consideration of the functions it carries out, because in developmental linguistics, as Jerome Bruner (1990) states, *function usually precedes form*, and so it is in children's actions and gestures where we can anticipate functions traditionally associated with language. Moreover, and this will be my attempt here, it is in the actions and gestures of infants where we find the prolongation of previous functions, connected to the qualities of movement, that predominate in the earliest moments of development. My first step will be to clarify what I mean by *movement*, highlighting its intimate connection with emotion. But before that, I would like to remind the reader of some well-known hallmarks of developmental psychology.

Ritualization in the Origin of Gestures and Pretend Play

The application of pragmatics to the studies on language acquisition in the 1970s made clear that preverbal children were able to communicate. And, in parallel, *action* and *social interaction* became central in the explanation of development. The pre-verbal child could ask or declare through gestures; and these gestures, as Vygotsky (1931) observed, stemmed from the transformation of action in contexts of social interaction.

Researchers observed that some actions oriented towards the world – such as grabbing, touching or giving something –, when performed in communicative contexts, suffered two substantial changes: first, the reorientation of the action towards the other that interprets and completes it; and second, the transformation of the form of the action, becoming abbreviated or exaggerated, until it transforms itself into a gesture. In this manner, actions, such as touching or giving an object, evolve into communicative gestures (such as pointing or showing), giving rise to the so-called deictic gestures (Clark, 1978; Lock, 1978; Español & Rivière, 2000). These gestures, which do not vary when changing their referents (i.e., one does not point differently when signaling the moon, a piece of bread or a ball), generally emerge towards the end of the first year of life and anticipate the imperative and the declarative functions of language. In spite of the central role that ritualization plays in the explanation of the formation of gestures, it was also sustained that some gestures – the so-called conventional and representative gestures – are acquired through imitation (Tomasello & Camaioni, 1997).

In turn, the study of pretend play also suffered the impact of the communicative breezes. On the one hand, it was observed that some inadequate action schemes that characterize second-year pretend play are sometimes used with communicative aims (Iverson, Capirci, & Caselli, 1994), and, what perhaps is most relevant, some ideas from the socio-historical school were recovered, and so social interaction was incorporated as the undercurrent without which symbolic genesis is not possible. The Piagetian tradition of describing the process of ritualization in pretend play was continued, but now bringing to light the participation of adults in this process (Bates, 1979; Español, 2001, 2004; Kavanaugh, 2002; Mc Cune & Agayoff, 2002; Mc Cune-Nicolich, 1977).

The term ritualization has been used in different ways. In the literature on gesture formation, it refers to the way in which deictic gestures are shaped so that the patterns of actions are abbreviated or exaggerated making them adequate only for achieving a communicative goal. In the Piagetian tradition of studies on the formation of symbols, ritualization is a part of the development of representation, allowing a gradual differentiation between signifier and signified; it refers to the performance, repetition, and combination of schemes of action carried out, removed from their adaptive contexts, and so submitted to deforming assimilation.

This double meaning of the term *ritualization* is not irrelevant: it denotes that the transformation of *action* was (and still is) a key for understanding the genesis of

communicative and symbolic abilities. However, it is not rare that in Psychology alternative modes of approaching a question coexist at a given time. This is the case of the information-processing cognitive approach that offered a representational explanation both for communication and fiction in childhood (Baron-Cohen, 1991; Leslie, 1987; Lillard, 1993; Smith, 2002). According to the most radical version of this view, representation substitutes action, computation prevails over interaction, and pre-programmed mechanisms play the role of the genesis of novelty during development. It was even postulated (in the case of Leslie) that the "decoupled representations" that characterize pretend play result from innate and programmed mechanisms that are triggered during the second year of life. However, the representational approach had the virtue of suggesting a link between fictional play and the development of children's Theory of Mind, so allowing a dialogue between cognitivists and interactionists that led to interesting hybrid postures, such as those offered by Hobson (1993), Rivière (1997), and Gómez (1998).

In sum, transformation of *action* and computation over *representations* are the two main approaches that have attempted to explain the genesis of the first communicative gestures and pretend play. My intention here is to show how, when the focus of attention moves to *movement*, it becomes possible for (a) a finer approximation into the emotional world, (b) a better understanding of how some communicative symbols of the child develop, and (c) a different way of picturing the process of ritualization involved in the genesis of pretend play.

Movement as an Expression of the Vitality Affects

Movement and Action

Movement can be understood as a component of action. However, I will make a distinction between these two concepts on the basis of the predominance of *intention* in the case of *action*, and of *feeling* in the case of *movement*. A distinction that needs to be explored in some depth.

First, movement and action are not the same; all action implies movement but the inverse is not true. *Inanimate movement* does not imply any kind of intentionality whatsoever, and therefore it is not an action. Action, on the contrary, is inherently propositive, is determined by intentions, and always tends towards a future. Besides inanimate movement, there is *living movement*, which is the movement of organisms. Alexander Truslit (1938, cited in Repp, 1993) postulated "the law of movement in music," according to which *dynamic* musical information has kinetic properties, so that the underlying movement of music is transmitted to the listener who, after the received auditory information can embody movement to it. This "translation" of sound into movement has no intentionality; it simply occurs. In a different manner, the qualities of the *movements that compose an action* – such as the movements of the arms, hands, legs, and trunk implied in the action of lifting a box – are determined by the *intention* that guides them. Their form, amplitude, and tension would be different if they were directed to lifting another object, such as a piece of paper.

Some movements of the newborn infant are teleonomic in nature, but very early on they start to show some intentional features that indicate that they will soon drift towards action. For example, the suction patterns of newborn infants show that these are not a reflex behavior, but rather a function of the organism. In the act of sucking, the infant – sensitive to the flow of milk – performs different movements with his/her mouth, with which he/she adjusts the pressure of suction in advance, so regulating the flow of liquid (von Hofsten, 2003). In suction, the form, amplitude, and tension of the movements of the lips and tongue are the result of the intention that guides them. The infant even makes attempts at correction – in which the mother participates – with the aim of achieving a better interaction between both parties. We can ask ourselves whether suction also includes "modes of feeling" that participate in the regulation of some of its features

such as rhythm. Movements involved in suction are probably the earliest movements in human development that become action. And all action, besides being determined by intentions, also assumes, in a higher or lesser degree, qualities of movement that result from "modes of feeling."

There are other movements of the infant, which are fundamentally determined by the feeling that they express, whether or not guided by some intention. As Henri Wallon (1956, 1982) pointed out, "sensitivity" is connected to motor reactions from the very beginning of human life; the muscular apparatus responds with movements that do not possess orientations or objectives: movements, cries, or vocalizations after an increased arousal. When looking at an infant's arm movements and feet-kicking while excited, the image of progressive attempts at accommodation vanishes, and we are left with movements that simply express a certain feeling. The essential issue is that this primitive level, which can be analyzed solely in terms of levels of arousal, is reorganized in the emotional stage, in which *movement* is a wholly "*exteriorized emotion*" (Zazzo, 1976, quoted in Vila, 1986), oriented towards the other, that will progressively be modeled within the universe of the adult-infant dyad.

Movement, Time, and Feeling

In human life, there are two extreme ways in which "modes of feeling" are responsible for the form, amplitude, and tension of movements. One happens in the inter-exchanges in the adult-infant dyad from the second month of life onwards; the other is one of the most primeval forms of art: dance. Between these two extremes, all the graduations of corporal acts where "modes of feeling" and intentionality combine can be scaled.

Dance is the art of dynamics and design of movement. Dynamics is given by the qualities of movement, its speed, and tension. This is intertwined with its design in space – the shapes the body takes – which through continuous succession gives rise to the temporal form of movement. What the dance spectator sees is mainly a movement (with independence of the story behind the ballet), that can be "read" through the diffuse and alluded meanings conveyed by the temporal and dynamic form. Dance is pure movement distilled by culture.

In the studies of early interaction, the fluency of corporal exchanges that give rise to a feeling of communion or closeness are labeled "face-to-face interactions" and form the basis of what Colwin Trevarthen (1982) called "primary intersubjectivity." In these exchanges, each movement, vocalization, or expression is oriented towards the other while maintaining a prolonged eye contact. The mother's movements do not seem to be motivated by a mere attempt to regulating the baby's state of arousal. Rather, it has to do with a maternal call for social and emotional exchange that finds an immediate response in the infant. The mother's movements and vocalizations show a temporal and dynamic shape that cannot be separated from the "modes of feeling" that flow from her. In dancing, as well as in these early states of communion, movement and feelings merge. What comes to the forefront in both cases is the *essential quality of movement for expressing* what Daniel Stern (1985) calls *vitality affects*, a concept that will permit us to consider afresh view of the emotional world.

Before going further into the argument of this chapter, it is at issue to remind ourselves of the deeply rooted Darwinian hypothesis that a few discrete expressions – seven or eight, solely or combined – explain the whole emotional repertoire of human beings. We tend to think of affective life in terms of discrete categories such as happiness, sadness, fear, anger, and so on, at the same time that we tend to believe that there is an innate facial display that corresponds to each one of these categories. This hypothesis played a crucial role in developmental psychology. The analysis of the emergence of pre-verbal declarative communicative patterns has led to a reconsideration of the importance of emotions and primitive experiences of sharing that Wallon (1956) and Werner and Kaplan (1963) claimed long

ago. Currently, the idea that primitive experiences of sharing get shaped in the exchange of (Darwinian) emotional expressions that characterize the first dyadic interactions is widespread. So, it is suggested that infants have resources for emotional expression that project internal states such as happiness, sadness, anger, fear, surprise, dislike, and interest (Ekman & Oster, 1979; Izard, 1979), and that they also have an incipient capacity for imitation, which usually is taken to be the foundation for the capacity of sharing emotions. Imitation then allows for the establishing of a connection between the internal states of the infant's emotional experience and the expression of emotions (Kugiumutzakis, 1998; Maratos, 1998). The origin of the human experience of sharing would therefore be in the play of mutual imitations of emotional expressions.

Vitality affects, on the contrary, blur and extend the emotional world. They are temporal "modes of feeling" that are not reflected in the lexicon of the Darwinian affects. These multiple forms of feeling are profiles of activation in time; they are temporally patterned changes in the intensity of sensation that may be described in terms of *agitation, progressive fleeting, explosiveness, crescendo, outbreak, dilation,* and *faint.* They cover all our experiences: they are in our states and movements, in our actions, and may also accompany Darwinian emotions. They are present in the vertigo of sudden memory, in the retarded movement of a caress, in the fleetingness of a gesture, or in lethargic modes of combing. Laughter can be fleeting or explosive, as can the motion of unbuttoning a blouse be dilated or excited.

According to Stern, the infant perceives these temporal patterns – the succession of tensions and dis-tensions of continuity, regularity, disruptions, or breaches – both through its proprioceptive experience (when carrying out acts such as putting a finger inside his/her mouth), and through parental stimulation from the time of birth. However, his main emphasis is: (1) that the social world experienced by the infant is primarily a world of vitality affects, and (2) that *temporal arts* are the main vehicle for the expression of these vitality affects. The intimate link between sound and movement, and their temporal character, has led music and dance to be considered as temporal arts (Shifres, 2002; Repp, 1993). Dance directly shows multiple vitality affects and its variants, without the need of recurring to any plot nor to the signs of Darwinian emotions. The choreographer tries to explain a mode of feeling, but does not convey a specific feeling. Music and dance have an exact point in common: what the choreographer and the composer experiment is a mode of feeling, rather than a particular feeling (Imberty, 2002). This is why Stern states that the infant, when seeing a parental behavior – with or without Darwinian signs of emotion – is in the same position as the spectator of an abstract dance performance, or one listening to music.

Diversity, Attunement, and Communion

Vitality affects are crossmodal experiences; they have to do with the global perception of profiles of activation in time that occur in different modalities. They are fragments of time, viewed in the present of variations of sensation intensities that *unite the diverse* (Imberty, 2002). A diversity of sensations coming from different modalities of the broad spectrum of all our experience, from a torrent of light to a torrent of thoughts, says Stern, in which the profile is alike, but the background is completely different. The ability to translate information from one modality to another is crucial for the social development of the infant. This ability lies at the basis of neonatal imitation, which requires the establishment of a correspondence between visual and proprioceptive information (Meltzoff & Moore, 1998). But this also allows the infant to unite the stimulation coming from different channels. In this manner, if a maternal caress is accompanied by some kind of vocalization, the infant will perceive a certain profile of activation in different simultaneous stimulations and will be able to unite the sound of a voice with the caress of a hand, so long

as they have, for example, a similar duration, initial force, and final withdrawal. Both stimulations (tactile and auditory) will have the effect of making the same vitality affects arise.

Vitality affects can hardly be put into words. They belong to the kind of global and crossmodal experiences that ordinary language undermines but that, paradoxically, poetic language is able to express. They flood the infant's social world, but they are also masterly expressed in adulthood, and in the plenitude of the temporal arts they are shaped in the dynamics of sound or movement in time. This is why researchers interested in the origin of the temporal arts focus on infancy and trace the antecedents of music and dance in the interactions between mothers and infants (and vice versa) (Cross, 2000, 2003; Dissanayake, 2000a, 2000b; Gratier, 2000; Imberty, 1997, 2000, 2002; Stern, 1985, 1995; Trevarthen, 1998, 2000).

Temporal arts are the foremost modes of expression of vitality affects. *Attunement* is a primitive way of transmitting them (Stern, 1985). It is a type of imitation of some chosen features, while others are disregarded. It is not about a faithful translation of the open conduct, but rather of a type of matching, frequently cross-modal, of intensity, temporal or spatial patterns of some conduct. In this manner, there are at least six types of matches: (1) absolute intensity: the level of intensity of conduct A is equal to the level of intensity of conduct B, whatever its modality, (2) profile of intensity: the object to be matched is the changes of intensity in time (for example, acceleration-de-acceleration), (3) pulsation: a regular pulsation is matched in time, (4) rhythm: a pattern of pulsations of unequal emphasis are matched, (5) duration: the lapse of the conduct is matched, (6) spatial pattern: some spatial features of the conducts, susceptible of being abstracted and transformed into different acts, are matched. As opposed to imitation, which keeps attention focused on the external shape of behavior, attunement brings out that which underlies behavior, the "character of the shared feeling," to the focus of attention. That is why attunement is the predominant mode of sharing internal states or showing that they are being shared. The matched external conducts may differ in shape and mode but they are interchangeable as manifestations of a recognizable internal state.

During the first months of life, attunement only appears in the maternal stimulations, not in the infant's activity. For example, if the infant hits a doll with a constant rhythm, the mother falls into this rhythm but in a different modality, for example, through her vocal tone. The mother takes something from the infant's expression and transforms it into something else, changing the modality. In this manner, small "analogies" are formed among gestures, sounds, and corporal movements. Attunement may be assimilated to imitation, as well as to affective contagion or empathy, in so much as it shares the possibility of establishing an emotional resonance. However, its differentiating feature is that it does something different, it recasts the emotional experience into another form of expression, it reformulates a subjective state. It merges different forms of behavior through non-verbal "metaphors": it seeks to find the "color" or "tonality" perceived and shared, using all the cross-modal capacities the infant possesses (Imberty, 2002). Attunement treats the subjective state as a referent and the open conduct as possible expressions of the referent, becoming in this manner one of the essential means through which feelings of communion are established. According to Stern, mothers begin to perform attunements starting from the ninth month of life of their infants; but as Johnson and colleagues (2001) indicate, attunement may appear earlier in maternal conduct.

The presence of vitality affects and attunement behaviors, that refer to the former, suggest proto-musical qualities in the dyad exchange, and therefore, the existence of early proto-musical capacities in the infant. These capacities have been reported in numerous studies in the area of the Psychology of Music. For example: (1) the infant sensitivity (from the first month of life

onwards) to temporal changes of sound features, such as frequency, amplitude and harmony (Fassbender, 1996) and the early detection of changes in pitch, melodic contours, and rhythm (Treuhb, 2000), (2) the production of quasi-musical infant behaviors, such as stereotyped rhythmic movements of the head, arms, and legs (Pouthas, 1996), and (3) the synchronization of vocal and kinetic patterns, and the use of prototypical melodic outlines in order to regulate the infant's state (Papôusek, 1996; Grattier, 2000). Beyond the abundance of existing data, what is relevant for us here is that they highlight, as Dissanayake (2000a) states, the existence of *antecedents of the temporal arts* in the early exchanges of the dyad. I will later refer to the destiny of these antecedents. But before going into that, we must refer to another quality of these early exchanges.

Temporal Organization of Movement

Studies on early interaction show that mother-infant behavioral exchanges have a temporal structure from the very beginning. Sometimes they are clearly separated in time, for example, the mother acts first, then the infant does something, and again, shortly after a pause, the mother does something else, and. These early exchanges have been called "protoconversations," since there is a shared interest of two parties in the exchange of signs and a joint regulation of turn-taking (Murray & Trevarthen, 1984). But it often happens that there is an overlapping of behaviors, so that rather than a set of linked responses to each other, one may think that there is some sort of joint and synchronic performance that requires some anticipation of the stream of behavior from the other party. Murray and Trevarthen (1984) showed the temporal accuracy of these early exchanges. They observed mothers and three-month old infants placed in separate rooms interacting through a TV system that was manipulated so that there was a thirty seconds delay in the mother's response. This disturbance produced a significant uneasiness in the infants, who turned their heads away from the image of the mother, giving only occasional glances at the screen. Trevarthen (1998, 2000) emphasized that it is the ordered temporal nature of corporal movements in early social interactions that permits the sharing of temporal patterns, that allow a mutual tuning of dynamic feelings in the dyad. Another essential aspect of temporal organization is that from the beginning, it is organized in the form of repetition-variation. The mother's behavior uses repetition in all available modalities: vocalization, movements, tactile and kinetic stimulation, that is never repeated identically, but rather with subtle variations (in speed, suspense, in vocal accompaniment). The same game, such as tickling the infant's tummy up to the neck, is repeated again and again, always adding some new variation to its elements (the speed of the fingers, or the delay before the final arousal, or together with vocalizations). This structure, in which each variation is simultaneously familiar and new, is ideal for the identification of invariants in the conduct. The infant comes to know which parts of a complex conduct may be suppressed, and which others must remain for the conduct to be considered the same (Stern, 1985).

Michel Imberty (1997, 2002) links the repetition-variation form of early interactions with musical form and suggests that the former represents the original structure of which the profound reality is re-activated by the latter. Musical repetition, like the repetition of behavioral sequences, generates time and a directionality within time, a present that goes towards something else. It creates a *before* and an *after*, a device through which the composer invites the audience to remember and anticipate. This is done with sufficient margin of uncertainty, so that each time it is insinuated that the repetition may not be performed, that the future might be unknown, that the same expectation may merge with another, which in turn might not be completely different. Repetition so creates a tension, with an expectation of satisfaction (the return to the

initial sequence) followed by a more or less marked distension, depending on whether the variation is more or less distant from the initial model. It is the succession of tension-distension what institutes an original time, the primitive experience of *duration*. Repetition allows the infant to understand time through varied and ornamented regularities, which form the universal substratum of music in all cultures. The infant learns to adapt to an ever-increasing number of variations, because repetition becomes predictable and organizes time. Probably, the earliest perception of phenomenological time (Rosa & Travieso, 2002) is found in experiences of repetition-variation: a perception that originates on the borders of change and its counterpart, permanence, as is the case of modes of maternal stimulation combining stability and variation. This primordial experience of time is at the basis of what Ricoeur (1983) calls the temporality of the narrative function. When language appears, it will flow along this pre-existing temporality, producing not only events, but also a narrative with a sense (direction) and a progression created by expectations and tensions.

Movement and Action in Circular Reactions

Circular reaction is a function of living beings. It is the repetition of an acquired cycle whose aim is maintaining or rediscovering a new and interesting result. Fernández, Sánchez, Aivar, and Loredo (2003), following Baldwin's original idea, point out that its logic is that of "try it again," and so it has a continuous dynamic form, being recreated in each trial. This is so because unexpected variations arise in these repetitions and the organism performs corrections that, if successful, integrate novelties into the old structure of the cycle, which therefore becomes modified. Piaget graded the levels of complexity of circular reactions in the distinction between primary, secondary, and tertiary circular reactions.

Primary circular reactions (the infant reproduces interesting results discovered by chance and centered on its own body) are the functional unit in the second stage of sensory-motor development. These variations of movements involve temporal variations of duration, intensity, and rhythm. As Karousou (2003) reviews, in spite of the scarcity of data on the duration and rhythm of early vocalizations, a very early control of pitch has been detected. Infants seem capable of producing variations in pitch.

Secondary circular reactions – or the repetition of interesting results obtained when action befalls on the external environment – appear in the third stage of sensory-motor development. But long before the appearance of secondary circular relations, when infants still cannot control physical objects, adults give contingent temporal responses to infant's actions. Emotional expressions, vocalizations, and movements of the infant are followed by comments and expressive gestures of adults, what make the infant increase its social conducts, and produce the effect of calling for more responses from the adult, and so *social circular reactions* appear. There is no point in distinguishing between primary and secondary social circular reactions, since they always have a secondary character (Rivière, 1986/2003). Most of the dyadic exchanges of the type hitherto described are included in social circular reactions, where a *repetition-variation* pattern leads to a temporarily extended cycle. The *variations introduced in repetition usually involve the quality of movement* (as in the game of tickling the infant's tummy up to the neck), the *speed of movement*, or the *extension of a pattern of expectation* that leads to different *profiles of activation* in each variation. The *synchronization between vocal and kinetic patterns* of maternal stimulation, the *alternation and joint performance of movements*, sounds and expressions in the dyad, the *rhythm* that impregnates them, as well as the possible attunements performed by the mother, make social circular reactions an experience that the infant desires to re-live again and again. They are the privileged

niche for the perception of vitality affects, something that is apparent in the pleasure showed by the performing dyad.

As Piaget (1936, 1945) showed, circular reactions provide the path towards instrumental and intelligent action. Secondary circular reactions emerge during the third stage of sensory-motor development. If we consider that every action assumes movement, then it is possible to think that *some of the variations of action are temporal changes of movement* (such as the intensity with which a rope is pulled, or the duration and amplitude of the movement stamped on the object), in addition to the fact that they are often experienced in social circular reactions. It is also feasible that some of the purposeful modifications of action that appear in *tertiary circular reactions* (in the fifth stage of sensory-motor development) may follow the same pattern. In short, what I am suggesting is the possibility of a genetic implication between social circular reactions and the secondary and tertiary circular reactions of the period of sensory-motor intelligence.

Beyond this hypothesis, the truth is that the infant's experiences aroused in social circular reactions are the basis for the development of intentional communication.

Whether referring to social circular reactions or not, research on pre-verbal communication and on the system of the theory of mind has repeatedly shown that the first anticipations of the infant (which are indispensable for communicative development) and the initial experiences of sharing (a necessary condition for the emergence of protodeclarative communication) emerge in early interactions. These are issues that have attracted a considerable amount of research and need not be explored further here. I rather will concentrate on showing how the components on which social circular reactions get shaped are not only a condition for the possibility of future abilities, but also are continually used in specific activities throughout development. They (1) extend towards the incorporation of objects, and participate in the genesis of pretend play, (2) materialize in the creation of symbolic gestures, and (3) lead to particular activities that I will call "temporal play," which merge in pretend play.

The "Externalization" of the Components of Social Circular Reactions

Ellen Dissanayake (2000a) suggests that in the beginning of human societies the elements of temporal arts that qualify the intimate "you-I" dyadic relationship were started by taking them from "out there." She suggests that the extensive neonatal period of human infancy produced a selective pressure for the development of psychological proximity and cognitive mechanisms that ensure longer and improved maternal care. This was the cause of the specific human adaptation – *elaboration* – of parenting behavior typical of primates, such as facial expressions, gestures, and sounds. Elaboration is nothing more than the dynamic, rhythmic and crossmodal modeling of these conducts, that directly lead to a state of mutuality that is inherently pleasant. Dissanayake's argument is that, throughout human evolution, societies appropriated the capacity to respond to such elaborations – repetitions and exaggerations of rhythms and modes – that, through change and novelty, create an expectation and so generate and shape an emotional trajectory. These abilities were then put into use in collective ritual ceremonies from which temporal arts started to develop. Her work focuses on describing the genesis of art throughout the evolution of societies, starting from the cornerstone of the mother-infant states of mutuality, going into the analysis the proto-aesthetic qualities the mother-infant relationship show during the first six months of life, and then moving to the study of the cultural history of temporal arts. Our attempt here will be to follow the ontogenetic drift of these "elaborations" beyond Dissanayake's contribution. This will be done through the examination of some viodeo-taped observations I carried out in the course of a longitudinal study of a child, Habib, with whom

I interacted for a period of 15 months, when he was aged between 9 and 24 months.

The components which constitute social circular reactions (which we may understand here as synonymous to elaborations) go through a gradual process of "externalization" and appropriation by the child. This process is initiated in games of the repetition-variation type that include the use of objects, and where the infant takes an increasingly active role. For example, when Habib was 0; 9 (11), both of us initiated "the game of the little cloud," based on a behavior he frequently repeats and finds pleasant. From some time earlier, Habib enjoyed rubbing his face softly on his pillow (or on any soft object within his reach). I started the game making a series of movements with the pillow while singing; when I changed the rhythm, I also changed the amplitude, speed, and form of my movements with the pillow, which I always finished by placing the pillow on the floor near Habib. Then, he joyfully scuffled his face in the pillow. Together, the intensity of sound and movement went in crescendo and declined towards the end. When he wanted to re-start the game, he pushed the pillow towards me. When he was 0; 9 (25), Habib started to move the pillow when he wanted the game to be repeated. When he turned 1; 0 (13), he moved the pillow from one side to another and shook it; I joined his movements by singing a song. In these kinds of games, frequently played by infants and adults together, the qualities of movement prevail over the actions performed. The temporal organization of sounds and movements and their musical features configure a unity. They will soon be combined with pretend play, but not from the beginning.

Movement in the Genesis of Pretend Play

Development of fictional play implies, fundamentally, the transformation of earlier forms of action. Research on the process of ritualization of action (reviewed above) coincide in pointing out that around twelve months of age, infants learn, in collaboration with adults, the use of objects related to their basic activities (such as eating with a spoon, or drinking from a glass), and that almost at the same time, they start to play functional games with the same objects, but using them in a decontextualized fashion, so their actions do not have the same effects as if they were performed effectively. In this manner, the infant begins to understand the grammar of action, a grammar that underlies the use of instruments. The first decontextualized use of instruments appear briefly and in isolation. But rapidly, the addressee of their actions begin to change (they take the empty spoon up to their doll's mouth or to the adult's mouth; they put the telephone receiver near to the other's ear, etc.).

This is a very interesting moment in development, placed between the first decontextualized use of objects and the beginning of the production of fiction, or in Leslie's (1987) terms, "decoupling." It corresponds with what McCune and Agayoff (2002) call the beginning of fiction, which they distinguish from decoupling or fiction as such. In non-human primates, conducts of deception and simulated actions, such as eating, may be observed in the absence of the objects that support them (Savage-Rumbaugh, 1986), as well as decontextualized uses of objects, such as drinking from an empty cup (Byrne, 1995). But the latter does not seem to be a clear sign of symbolic substitution (Gómez & Martín-Andrade, 2002). Fiction, as I am treating it here, does not only "simulate" something through a decontextualized use of objects, or by performing an empty action, it also implies a breach in what is being learned, producing a profound transformation of the conventional meanings of actions, as well as of the modes of using objects, pretending something to be something else. It is precisely at this transitional moment when the temporal components of social circular reactions, or elaborations, are clearly incorporated.

Soon after the emergence of the decontextualized use of objects, a process of *ritualization* starts, via the expansion of the possible addressees and through the combination of various schemes of action. Around the second half of the second year of life,

"scenes" that involve various objects (spoons, plates, cups) and actors (the infant, the adult, dolls, which can play the role of agent or addressee of action), begin to take shape. It is within these scenes that the temporal and dynamic shaping of actions starts. *This is a shaping of the qualities of movement involved in action, through the elements of the temporal arts that characterize primitive social circular reactions; this is an "elaboration" of movement in which the infant actively participates.* When a decontextualized use of objects starts (still with no substitution in their function) sound begins to be included in the action performed (such as "shhhh" when serving from an empty teapot, or "aaammm" when bringing an empty spoon towards the mouth). These sounds, usually incorporated by the adult but rapidly appropriated by the infant, go together with the motor action and resemble the matching of temporal patterns; that is, they can be conceived as attunements. There are also changes in the dynamics of movements (accelerated or delayed, abbreviated or exaggerated) included in the on-going action. Likewise, the repetition-variation form seems to hold the combinations of schemes of action that begin to be performed in a fixed and repetitive manner, that nevertheless allow small variations; for example, combing and perfuming a doll always in the same manner, until (imitating adult behavior) an exaggerated inspiration in a precise moment of the sequence is incorporated, which is then repeated over and over again.

It is within the framework of these "small narrations-in-action" where the first prototypical substitutions of pretend play emerge. Elsewhere (Español, 2004) I suggest that it is possible to sketch the development of pretend play, using a grammar of cases: observing the action (the verb) and the cases where substitutions appear. Such analysis shows that the first substitutions appear in the case of instrument (i.e. combing with a spoon), followed by substitutions in the case of object (a ball of wool replaces food), These are later – at the end of the second year of life – accompanied by the appearance of the first substitutions in the case of agent and in the case of receiver. The child makes the doll and can speak with or hit another doll. I believe that the elaboration of movement promotes and facilitates the separation between each case and its "adequate object." I suspect that each case of substitution is preceded and surrounded by a dynamic and temporal moulding of the elements involved. Elaboration also has the virtue of introducing temporality in the sequences of actions, providing them with the tension and directionality typical of the narrative function. This temporal modeling of action can also explain why pretend play is so pleasant, since it allows a constant flow of the vitality affects.

Movement in the Creation of Gestures

The gradual externalization and appropriation of elements that shape social circular reactions can also be observed in some of the child's creation of gestures. At the beginning of this chapter, I pointed out that deictic gestures are generally taken to evolve from the ritualization of common actions. In contrast, conventional gestures (such as waving goodbye with the hand) and representative gestures (i.e., moving the arms when referring to a bird) are signs that are modeled by adults and imitated by children. These gestures are active and creative re-productions by the child but none of these are either original nor novel signs. In general, the capacity for creating significant novel forms is thought to emerge with pretend play. However, there can also be creation and novelty in the production of gestures. Rivière (1984/2003, 1990) observed that children, when wanting to communicate with others about absent objects or events, construct new gestures by modifying their actions. For example, by blowing on an unlit lighter when calling on the adult's attention, so the adult would light the lighter for the child to blow the flame out; or by placing a semi-closed fist in front of his face, blowing and gently hitting the mouth with an open hand, saying "puff!" as a way of asking for a balloon. In these enactive symbols, the link between signifier and signified is not arbitrary, but motivated, as

is the case of Piaget's symbolic play. But, unlike the Piagetian symbol, these do not involve any type of deforming assimilation. They are small enactive metonymies, where a part of a complex action is selected in order to refer to another part or component of the action, created with a communicative aim.

There are also other ways in which children create original symbolic gestures. For example; Habib, at 1; 6 (24), when seeing his father walking into the room, points to the floor and stamps his feet loudly on the floor while he continues pointing. His father laughs and says "Last night I killed a cockroach in the garage." The gesture of pointing to the floor, where there is nothing, and the stepping (probably an imitation of his father's movements, or of his own excitement when seeing with the fleeting bug) form together a new, motivated gesture, through which the child evokes a past event, an absent cockroach.

The same child, at 1; 7 (25), creates a symbol clearly linked to dance. In numerous occasions, Habib has seen a video in which a flamenco dancer, Joaquín Cortéz, dances accompanied by other dancers. He has frequently imitated the movements of the legs and arms, varying the speeds, passing one hand through the opposite arm, turning his head, going round in circles, and tapping his feet in different directions. On one occasion when he saw the video-player was off, Habib looked at me and moved his arms and hands over his head in a waving manner, imitating the movements of flamenco dancing. My immediate response was: "Do you want to see Joaquin Cortez's video?" The arm movement performed by Habib is not a "natural" movement, but rather a cultural, conventional movement. It forms part of the repertoire of resources that culture offers him for symbolic formation: in the same way as the word "papa"; the patterns of movement "are out there" prepared be appropriated by the child. And Habib does so. And by doing it, he gives a new twist to the relation between movement and action. Because *movement becomes a mediator for action*. The child *transforms movement into a symbolic action*, by using it with a communicative *intention*.

A few days later, Habib performs, with gestures, not a petition but a subtly different act: an invitation. He is 1; 08 (02) and invites his father "to dance." And he does this through peculiar movements that in themselves carry the features of the flamenco dance. While the infant is looking at the video, he turns his head around and looks at his father. The movement is exaggerated (the back of his neck is almost bent) and he extends his neck even more, but his father is not paying attention. The infant stands up straight and, still looking at his father, moves his arm and hand in a perfect sinuous wave, and then, keeps still. His father, standing two meters away, has now seen him and responds with the same "*flamenco-like* movement." Habib taps his feet, in a percussion-like manner, watching his father's feet. His father imitates him. Habib keeps looking at his father's feet for a while, and then comes to where I am and hugs me. He leaves me, looks at his father, and, once again, taps his feet twice. His father responds moving his feet and arms, and the infant runs towards him and hugs his legs.

Habib's invitation shows a clear realization that dancing flows through the dynamics and shape of movements. It has to be noted that the first thing he does is to extend his neck backwards, in a delayed and expanded movement that denotes the dynamics (the mode of feeling) of the observed dance, but not its design. He doesn't find an answer and insists on his invitation, now performing a *flamenco-like* movement. He then goes on with movements which are not global and un-differentiated, but which follow with his arms the soft and extended dynamics of the movements of the flamenco dance, and with his feet, the characteristic percussion-like movement that characterizes this type of dance.

The gesture of demand to see a particular videotape, as well as his invitation to dance, are illustrative of the easiness with which the infant incorporates the movements of a culturally patterned dance. His previous experience with the movements

that precede temporal arts and the number of times he has been exposed to the varied and ornamented regularity of flamenco dancing allow him to recognize the prototypical movements of this cultural form of expression, and to perform it with such mastery that it is immediately recognized by the observer. The infant's movements make apparent his embodiment of the culture in which he develops. The infant incorporates a form of movement that is distilled in its culture, a way of moving. The *style of movement*, which varies radically from culture to culture, becomes in this manner a *means for communicative action*.

Temporal Play

So far we focused on the gradual externalization of the antecedents of the temporal arts that make up social circular reactions and how they get transformed into play activities and gestures. My next move will be to show how, towards the end of the second year of life, this externalization goes through a qualitative change. At this time of life a new mode of play emerges, that I will call "temporal play," in which the child and the adult adjust to a *third party* and by doing so, the child reaches a new form of behavior that shows artistic qualities.

Bjorn Merker (2002) distinguished among three basic mechanisms of *timing* or temporal regulation: (1) based on reaction time; (2) based on familiarity; (3) based on the underlying pulsation. The temporal regulation of interactive behaviors between mother and infant, from his point of view, is restricted to reaction time and familiarity. But music employs a special mode of *timing*: the equal subdivision of time through musical pulse. Timing based on an underlying pulsation is the fundamental mechanism of sophisticated musical performance. What is specific to music in the domain of time is its capacity to serve as a vehicle for the temporal synchronization of simultaneous and parallel conducts with extraordinary accuracy, irrespectively of whether they arise from identical or different behavioral patterns.

Even though Merker does not claim that the *timing* of early interactions follow a musical pattern, he suggests that, around the end of the second year of life, infants develop a new mechanism of behavioral *timing* based on the underlying pulse mediated through *musical play* in which, through his/her mother's actions, the infant adjusts his/her timing to a third party: the metric structure of the song or game.

When looking at corporal movements, it is also possible to observe a change from the mutual adjustment that characterized early dyad exchanges towards the joint adjustment of infant and adult with respect to a third party. We have witnessed it in the small flamenco choreography performed by Habib and his father. But it can also be observed in other modalities of interaction.

When Habib is 22 months old, he and I performed a sequence of interactions using a plastic toy spring, in which we do nothing more than perform unison movements with contrasting intensity and speed. Each one of these movements – pressing, stretching, and shaking the spring – is associated with a speed – fast or slow – and intensity – soft, strong, or brusque. This alternated dynamics of movements is accompanied by sounds that adhere to a particular form of movement. Together we settled different spatial lines of performance:

a. some are opposed in their direction (extension-contraction of the spring), that are linked to an expression of seriousness and attention, and the quality of the movement (its slowness and softness) is associated with the sound "shhhhh";
b. others (shaking the spring, which draws vertical waves) are made with sharp and strong movements, and are accompanied by different emotional expressions (Habib's guffaws) and with the sound "taka-taka."

What we do is looking for a stabilized form through the establishment of regularities linked to the movements of the bodies, the direction of the gaze, the transformations

undergone by the spring, and the sounds made. And the point of the game seems to be the repetition of the achieved form. In fact, my intentions to transform it into something else, granting it fictional features (for example, my attempts to use the spring as if it were a bracelet) are rejected by the infant. As the sequence goes on, the initial regularities are conserved, but variations are added during their repetition. Strikingly, most of the new movements are introduced by Habib (such as guiding the spring to the back of his neck, rubbing our foreheads with it, etc.). The infant and I jointly perform slow and soft movements, rapid and explosive movements that transport different vitality affects. But the sounds I include in the sequence, which the infant immediately incorporates, can also be seen as attunements of the profile of intensity and duration of the conduct. These attunements grant a feeling of communion, and make interaction go on at another level. The contrast of movement becomes accentuated, and the sequence comes to an end, presenting features of a spatial design (manifested in the form and symmetry of our movements and in the visual lines that create spatial directions) and of a temporal design (the phrase formed by the sequence of spatial designs). That design is repeated over and over again, allowing the incorporation of small variations to the sequence (for an expanded analysis of this observations, see Español, 2005).

This scene recalls earlier experiences, but it is not the case of a dyad that adjusts each other's movements in a non-conscious manner. Quite the contrary, child and adult consciously and deliberately adjust their movements to the physical properties of the object, and the "mode of use" of the spring gets defined by the composition of the movement itself. And at the same time, they both consciously and deliberately adjust to the symmetric and equilibrated form shaped by movements, visual lines, sounds and attunements they have created, as well as to the small variations they incorporate now and then. Thus, movement becomes a fixed unit of behavior that the repetition-variation form has made susceptible of elaboration and embellishment. Infant and adult constrained themselves to the dynamic and design of the movement that they have *objectified* together. The composition of movement is therefore transformed into a third party, to whom both adjust, and therefore, in each performance they keep to its rules, respecting the achieved design. *Movement* has changed into "*temporal play*," at the same time that it has become a *means for action* in a particular manner. In this case, it is the regulated nature of movement, the consciousness of its design, which makes it possible to install in the dyad the *intention* of recreating over and over again the unit they have created.

Temporal Play and Pretend Play

When the dynamic sequence with the spring finished, Habib performed an advanced pretend play with it. He grabbed, with some difficulty, one of its extremes, leaving one part sticking out from his hand (since the spring tends to roll back, it is not easy for him to hold it in this position, but he insists). Held this way, he supports the tip of the spring on a dish and makes the noise "shhhhh," while he points to a cup that I bring him. Habib keeps sounding "shhhhh" while he pretends he is serving something with the spring. He uses the tip of the spring as a substitute for a recipient from which to serve a liquid, and accompanies his action with the sound that, since a few months ago, he associates with serving a liquid. The child has not chosen the substituted object due to its physical properties because this object would allow or facilitate him to perform the gesture of serving. On the contrary, he must force his movements, since the spring rolls back and tends to get tangled, and is difficult for him to keep the tip straight. However, he insists. This is the only "physically forced" substitution that I have observed in the child. He had the intention of using the spring for "serving liquid," and insists on his intention, in spite of the object's resistance. The infant goes from an action where an esthetical value predominates, to an action where a pretend action predominates, and in this transition, the

tendency to ignore the affordances of substitute objects is already anticipated.

During the third year of life, the above-mentioned substitutions of pretend play become more complicated, and double substitutions emerge within the same case, or simultaneous substitutions in different cases (Español, Valdéz, Gómez, Jiménez, Martínez, Cevasco, & Pérez Vilar, 2003). In parallel, the tendency to ignore the affordances of the substitute objects appears. That is, the tendency towards a full substitution, in which anything may be "instead of something else," or representing anything else, becomes strengthened. These substitutions assume the breach of some element of the action, since some elements of action have been radically altered, to the extreme of representing or being acted upon as if they were something different from what they actually are (such as when a peg is fed with plastic chips). It may very well be that temporal play is involved in these radical breaches of the elements of action that allow the infant to take off from his/her immediate reality.

Favio Shifres (a professional musician) and I have observed that during the third year of life musical play appears sometimes in isolation and sometimes in contexts of pretend play. When the latter occurs, it tends to follow the following sequence: "pretend play-musical play-pretend play." In the fictional scene, a triggering element appears, which makes the dyad's attention shift from the *pretended theme* to the *musical component* (for example, the repetition of a rhythmic pattern using an object for percussion). In these cases, the object that provokes musical play *loses the function* it was serving during pretend play, and becomes a simple agency for the musical game. When the musical play dies out, the dyad returns to the pretend play theme, that now incorporates some attributes of the previous musical play. For example, the rhythmic pattern of musical play – thematically abstract – is adhered to the pretended action of dialing a wooden box as if it were a telephone. Musical play irrupts in pretend play, displacing its thematic content, as if it were replaced by semantically vague actions that leave a sort of "floating meaning" in the infant (Cross, 2003), which may later support the temporal organization and the thematic display of the fictional scene (Shifres & Español, 2004).

Pretended play involves toying with the grammar of action, which can be linked with what Bruner (1990) called the predisposition to a narrative organization of experience. But when it is taken into account that pretend play merges with social circular reactions and combines with temporal play, it can also be said that temporal modeling *ornaments* action. It favors its transformation and the detachment of the immediate reality; a temporal modeling that evokes dynamic experiences, that transcends verbal categorization, and that genetically links pretend play with the temporal arts.

Having come to this point, we may trace the route of movement in ontogenesis and its connection with the development of action. In the beginning movement is pure exteriorized emotion, and it becomes temporally modeled, dynamically and cross-modally elaborated in the social circular reactions that predominate during the first half of the first year of the infant's life. Later on, a progressive externalization of the elaboration of movement begins. From the second half of the first year of life onwards, movement elaboration is extended beyond the dyad, incorporating objects and granting them a certain mode of use. About the middle of the second year of life, the dynamic and cross-modal elaboration of movement is linked with the ritualization of action that underlies the genesis of pretend play. This connection, on the one hand, promotes and facilitates the gradual separation between each exemplar of action and its adequate object; and, on the other hand, introduces temporality into the sequences of action, providing expectations and tensions similar to those of the narrative function. In parallel, movement becomes cultured movement, which makes the child embody the manner of moving characteristic of the culture in which s/he develops.

And, recursively, it becomes one of many resources that culture offers for the formation of symbols: culturally-patterned movement, when used with a communicative intention, transforms itself into symbolic action. Later on, towards the end of the second year of life, the composition of movement gets objectified and transformed into a third party, which the dyad adjusts to, and so temporal play appears. Finally, during the third year of life, temporal play (particularly, musical play) is intertwined with pretend play, favoring the taking-off from immediate reality. Each of these moments of the extension of movement beyond the dyad is an occasion for the elaboration of movement "out there," that generates and channels the multiple modes of feeling the vitality affects.

Conclusion

In this chapter, I proposed a new way to approach the ontogenesis of symbol formation: the analysis of movement and its relation to the development of action.

First, I highlighted some of the essential traits of movement, both during the early adult-child dyad as well as in temporal arts. Among others, I discussed the capacity that movement has to express vital affections and modes of temporal organization of movements: alternation, synchrony, and the repetition-variation form.

In the second place, I noted that the social circular reactions – characteristic of the first six months of the infant's life – are, to a great extent, a product of dynamic and cross-modal modeled movement. I suggested that the variations in the quality of movement, the attunements, and the repetition-variation forms that constitute the social circular reactions are elaborations, in the Dissanayake sense, which have the virtue to drive an ongoing flow of the vitality affects. I also suggested a possible genetic implication between the social circular reactions and the secondary and tertiary circular reactions of the sensory-motor intelligence.

Finally, I proposed that the elaborations that compose the social circular reactions undergo a gradual externalization process beyond the dyad. Also, that these elaborations contribute to the symbol formation of the child in various ways:

1. In pretend play: the elaboration of movement is linked to the ritualization of action that starts in the second year of life. The elaboration of movement promotes and facilitates a gradual separation between the exemplar of action and its adequate object, while it provides expectations and tensions similar to those of the narrative function
2. In the creation of gesture: the culturally patterned movement, through which the child embodies the manner of movement characteristic of the culture in which s/he develops, is used with a communicative intention and becomes symbolic action.
3. In temporal play: towards the end of the second year of life, the dynamic and pattern of the movement get objectified and transformed into a third party "out there" to which the dyad adjusts. The movement acquires artistic qualities and becomes action with the dyad's intention of maintaining and recreating it. During the third year of life, temporal play is intertwined with pretend play, which favors an increasingly significant detachment from immediate reality.

All these considerations argue that the process of symbol formation is genetically linked to temporal arts and the vitality affect that the latter bring about.

Acknowledgment

Alberto Rosa has known how to "read" in my writings various ideas that I was not yet able to shape. He has generously made comments and suggestions, both general and specific, without which this paper would not have its present theoretical scope.

References

Baron-Cohen, S. (1991). Precursors to a theory of mind: Understanding attention in others. In A. Whiten (Ed.), *Natural Theories of Mind: Evolution, Development and Simulation of Everyday Mindreading* (pp. 233–225). Oxford: Blackwell.

Bates, E. (1979) (Ed.), *The emergence of symbols: Cognition and communication in infancy* (pp. 69–140). New York: Academic Press.

Bruner, J. (1990). *Acts of meaning.* Cambridge, MA: Harvard University Press.

Byrne, R. W. (1995). *The thinking ape.* Oxford: Oxford University Press.

Clark, R. A. (1978). The transition from action to gesture. In A. Lock (Ed.), *Action, gesture and symbol: The emergence of language* (pp. 231–257). London: Academic Press.

Cross, I. (2000). Music in human evolution. In S. O'Neill (Ed.), *Abstracts of the Sixth International Conference on Music Perception and Cognition.* Keele – UK. 180.

Cross, I. (2003). Music and biocultural evolution. In M. Clayton, T. Herbert and R. Middleton (Eds.), *The cultural study of music: A critical introduction* (pp. 19–30). New York and London: Routledge.

Dissanayake, E. (2000a). Antecedents of the temporal arts in early mother-infant interaction. In N. L. Wallin, B. Merker and S. Brown (Eds.), *The origins of music* (pp. 389–410). Cambridge, MA: The MIT Press.

Dissanayake, E. (2000b). *Art and intimacy: How the arts began.* Seattle: University of Washington Press.

Ekman, P., & Oster, H. (1979). Facial expressions of emotion. *Annual Review of Psychology,* 30, 527–554.

Español, S. (2001). Creación de símbolos y ficción durante el segundo año de vida [Symbols and Fiction in the second year of life]. *Estudios de Psicología* 22 (2), 207–226.

Español, S. (2004). *Cómo hacer cosas sin palabras. Gesto y ficción en la infancia temprana* [How to do things without words. Gestures and Fiction in early infancy]. Madrid: Antonio Machado.

Español, S. (2005). Ontogénesis de la experiencia estética. La actitud contemplativa y las artes temporales en la infancia. [Ontogenesis of aesthetic experience: Contemplative attitude and temporal arts in infancy] *Estudios de Psicología,* 26 (2), 139–171.

Español, S., & RivièreA. (2000). Gestos comunicativos y contextos interpersonales: Un estudio con niños de 10 a 16 meses [Communicative gestures and interpersonal contexts: A study with 10 to 16 months old infants]. *Estudios de Psicología* 65–66, 225–245.

Español, S, Valdez, D., Gómez, E., Jiménez, M., Martínez, A., Cevasco, M., & Pérez Vilar, P. (2003). Casos de sustitución en el juego de ficción [Case-studies of substitution in pretend play]. *Memorias de las X Jornadas de Investigación.* Facultad de Psicología. Universidad de Buenos Aires. II 129–131.

Fassbender, C. (1996). Infants' auditory sensitivity towards acoustic parameters of speech and music. In I. Deliège & J. Sloboda (Eds.), *Musical beginnings: Origins and development of musical competence* (pp.56–87). New York: Oxford University Press.

Fernández, T. R., Snchez, J. C., Aivar, P., & J. C. Loredo (2003). Representación y significado en psicología cognitiva: una reflexión constructivista [Representation and meaning in cognitive psychology: a constructivist reflection]. *Estudios de Psicología,* 24 (1) 5–32.

Gómez, J. C. (1998). Do concepts of intersubjectivity apply to non-human primates? In S. Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (pp. 245–259). Cambridge: University Press.

Gómez, J. C., & Martín-Andrade, B. (2002). Possible precursors of pretend play in non pretend action of captive gorillas. In R. W Mitchell (Ed.), *Pretending and imagination in animals and children.* (pp. 255–268). Cambridge: Cambridge University Press.

Gratier, M. (1999/2000). Expressions of belonging: Effect of acculturation on the rhythm and harmony of mother-infant vocal interaction. *Musicæ Scientiæ, Special Issue,* 93–122.

Hobson, R. P. (1993). *Autism and the development of mind.* Hillsdale, NJ: Erlbaum.

Imberty, M. (1997). Formes de la répétition et formes des affects du tems dans léxpression musicale. [Forms of repetition and forms of affects of time in musical expresion]. *Musicæ Scientiæ,* 1 (1), 33–62.

Imberty, M. (2000). The question of innate competencies in musical communication. In N. L. Wallin, B. Merkerdr y S. Brown (Eds.), *The Origins of Music* (pp. 449–462). Cambridge MA: The MIT Press

Imberty, M. (2002). La musica e il bambino. [Music and the child] En J. J. Nattiez (Dir.), *Enciclopedia della Musica* (pp. 477–495). Torino: Giulio Einaudi Editore.

Iverson, M., Capirci, O., & Caselli, M. (1994). From communication to language in two modalities. *Cognitive Development*, 9, 23–43.

Izard, C. E. (1979). *The maximally discriminative facial movement coding system*. Newark, DE: University of Delaware Instructional Resource Center.

Johnson, C. O., Clinton, D. N., Fahrman, M., Mazzaglia, G., Novak, S., & Soerhus, K. (2001). How do mothers signal shared feeling-states to their infants? An investigation of affect attunement and imitation during the first year of life. *Scandinavian Journal of Psychology*, 42, (4) 377–381.

Karousou, A. (2003). *Análisis de las vocalizaciones tempranas: Su patrón evolutivo y su función determinante en la emergencia de la palabra* [Análisis of early vocalisations: developmental patterns and their function in the emergence of the word]. Doctoral Dissertation. Universidad Complutense de Madrid.

Kavanaugh, R. (2002). Caregiver-child social pretend play: what transpires? In R.W Mitchell (Ed.), *Pretending and imagination in animals and children* (pp. 91–101). Cambridge: Cambridge University Press.

Kugiumutzakis, G. (1998). Neonatal imitation in the intersubjective companion space. In S. Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (pp. 63–88). Cambridge: Cambridge University Press.

Leslie, A. M. (1987). Pretense and representation: the origins of "theory of mind". *Psychological Review*, 94, 412–26.

Lillard, A. (1993). Pretend play skills and the child's theory of mind. *Child Development*, 64, 348–71.

Lock, A. (1978). The emergence of language. In A. Lock (Ed.), *Action, gesture and symbol: The emergence of language* (pp. 3–18). London: Academic Press.

Maratos, O. (1998). Neonatal, early and later imitation: Same order phenomena? In F. Simion and G. Butterworth (Eds.), *The development of sensory, motor and cognitive capacities in early infancy: From perception to cognition* (pp. 145–160). East Sussex: Psychology Press.

Mc Cune-Nicolich, L. (1977). Beyond sensorimotor intelligence: Assessment of symbolic maturity through analysis pretend play. *Merrill-Palmer Quaterly*, 23, 89–99.

Mc Cune, L., & Agayoff, J. (2002). Pretending as representation: A developmental and comparative view. In R.W Mitchell (Ed.), *Pretending and imagination in animals and children* (pp. 43–55). Cambridge: Cambridge University Press.

Meltzoff, A. N., & Moore, M. K. (1998). Infant intersubjectivity: Broadening the dialogue to include imitation, identity and intention. In S. Bråten (Ed.), *Intersubjective communication and emotion in early ontogeny* (pp. 47–62). Cambridge: Cambridge University Press.

Merker, B. (2002). Principles of interactive behavioral timing. In C. Stevens, D. Burham, G. McPherson, E. Schubert and J. Renwick (Eds.), *Proceedings of the 7th International Conference of Music Perception and Cognition*. Sydney: University of Western Sydney. 149–152.

Murray, L., & Trevarthen, C. (1984). Emotional regulation of interactions between two-month-olds and their mothers. In T. Field y N. Fox (Eds.), *Social perception in infants* (pp. 177–197). Norwood, NJ: Albex.

Papôusek, M. (1996). Intuitive parenting: a hidden source of musical stimulation in infancy. In I. Deliege y J. Sloboda. (Eds.), *Musical beginnings. Origins and development of musical competence* (88–112). Oxford: Oxford University

Piaget, J. (1936). *La naissance de l'intelligence chez l'enfant*. [The origins of intelligence in children] Paris: Delachaux et Niestlé.

Piaget, J. (1945/1962). *Play, dreams and imitation in childhood* [Trans. C. Gattegno & F. M. Hodgson]. New York: Norton. (Original work: J. Piaget (1945). *La formation du symbole chez l'enfant*.)

Pouthas, V. (1996). The development of the perception of time and temporal regulation of action in infants and children. In I. Deliege and J. Sloboda (Eds.), *Musical beginnings. Origins and development of musical competence* (pp. 115–141). Oxford: Oxford University Press.

Repp, B. H. (1993). Music as motion: A synopsis of Alexander Truslit's (1938) 'Gestaltung und Bewegung in der Musik', *Psychology of Music*, 21/1, 48–72.

Ricoeur, P. (1983). *Time and narrative*. Chicago. University of Chicago Press.

Rivière, A. (1984/2003). Acción e interacción en el origen del símbolo. [Action and interaction in the origin of symbol] En M. Belinchón, A. Rosa, M. Sotillo & I. Marichalar (comp.) *Ángel Rivière. Obras Escogidas*, Vol II, pp. 77–108 Madrid: Panamericana.

Rivière, A. (1986/2003). Interacción precoz. Una perspectiva vygotskiana a partir de los esquemas de Piaget. [Early interaction. A vygotskian perspective from Piaget's schemas]. En M. Belinchón, A. Rosa, M. Sotillo & I. Marichalar

(comp.) *Ángel Rivière. Obras Escogidas*, Vol II, pp. 109–142. Madrid: Panamericana.

Rivière, A. (1990). Origen y desarrollo de la función simbólica en el niño. [Origin and development of the symbolic funtion in the child] En J. Palacios, A. Marchesi & C. Coll (Comps.), *Desarrollo psicológico y educación* (pp. 113–130). Madrid: Alianza.

Rivière, A. (1997/2003). Teoria de la mente y metarrepresentación. [Theory of mind and metarrepresentation] En M. Belinchón, A. Rosa, M. Sotillo & I. Marichalar (comp.) *Ángel Rivière. Obras Escogidas*, Vol I, pp. 191–231. Madrid: Panamericana

Rosa, A., & Travieso, D. (2002). El tiempo del reloj y el tiempo de la acción. Introducción al número monogrfico sobre Tiempo y Explicación Psicológica [A time for the clock and a time for action. Introduction to the special issue on 'Time and Psychological Explanation']. *Estudios de Psicologia*, 23 (1), 7–15

Savage-Rumbaugh, E. S. (1986). *Ape language*. New York: Columbia University Press.

Shifres, F. (2002). De la fuente de la expresión musical al contenido de la experiencia del oyente [From the source of musical expression to the content of the listener's experience]. En Martinez, I. & Musumeci, O. (Eds.), *Actas de la Segunda Reunión Anual de SACCoM (Sociedad Argentina para las Ciencias Cognitivas de la Música)*. Buenos Aires: Universidad Nacional de Quilmes y SACCoM.

Shifres, F. y Español, S. (2004). Interplay between pretend and music play. *Proceedings of the 8th International Conference on Music Perception & Cognition*, Evanston, IL.

Smith, P. (2002). Pretend play, metarepresentation and theory of mind. In R.W Mitchell (Ed.), *Pretending and Imagination in animals and children* (pp. 255–268). Cambridge University Press.

Stern, D. (1985). *The interpersonal World of the Infant: A view from Psychoanalysis and Developmental Psychology*. New York: Basic Books.

Stern, D. (1995). *The motherhood constellation: A unified view of aren't-infant psychotherapy*. New York: Basic Books.

Tomasello, M., & Camaioni, L. (1997). A comparison of the gestural communication of apes and human infants. *Human Development*, 40, 7–24.

Treuhb, S. (2000). Human processing predispositions and musical universals. In N. L. Wallin; B. Merkerdr y S. Brown. (Eds.), *The Origins of Music* (pp. 427–448). Cambridge MA: The MIT Press.

Trevarthen, C. (1982). The primary motives for cooperative understanding. In G. Butterworth & P. Light. (Eds.), *Social Cognition* (pp. 77–109). Brighton: Harverster.

Trevarthen, C. (1998). The concept and foundations of infant intersubjectivity. In S. Bråten. (Ed.), *Intersubjective Communication and Emotion in Early Ontogeny* (pp. 15–46). Cambridge: Cambridge University Press.

Trevarthen, C. (1999/2000). Musicality and the intrinsic motive pulse: evidence from human psychobiology and infant communication. *Musicæ Scientiæ*, Special Issue, 155–215.

Valsiner, J. (1992). Making of the future: Temporality and the constructive nature of human development. In G. Turkewitz y D. Devenney. (Eds.), *Time and Timing in Development*. Hillsdale, NJ: Lawrence Erlbaum.

Vila, I. (1986). *Introducción a la obra de Henry Wallon* [Introduction to Henry Wallon's production]. Barcelona: Anthropos.

Von Hofsten, C. (2003). On the development of perception and action. In J. Valsiner y K. Connolly (Eds.), *Handbook of Developmental Psychology* 114–171. London: Sage.

Vygotsky, L. S. (1931/1997). The History of the Development of Higher mental Functions. In R.W. Rieber. (Ed.), *The Collected Works of L.S. Vygotsky*. Volume 4. New York: Plenum Press.

Wallon, H. (1956). La psychologie génétique. [Genetic psychology]. *Bulletin de Psychologie*, 10 (1), 3–10.

Wallon, H. (1982). *La vie mentale*. [Mental life] Messidor/ Editions Sociales, Paris.

Werner, H. & Kaplan, B. (1963/1984). *Symbol formation*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc.