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The Interactive Origin and the Aesthetic Modelling of Image-Schemas and Primary Metaphors

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11 The Interactive Origin and the Aesthetic Modelling of Image-Schemas and Primary
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13 Metaphors
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Abstract

According to the theory of conceptual metaphor, image-schemas and primary metaphors are preconceptual structures configured in human cognition, based on sensory-motor environmental activity. Focusing on the way both non-conceptual structures are embedded in early social interaction, we provide empirical evidence for the interactive and intersubjective ontogenesis of image-schemas and primary metaphors. We present the results of a multimodal image-schematic microanalysis of three interactive infant-directed performances (the composition of movement, touch, speech, and vocalization that adults produce for-and-with the infants). The microanalyses show that adults aesthetically highlight the image-schematic structures embedded in the multimodal composition of the performance, and that primary metaphors are also lived as embedded in these inter-enactive experiences. The findings allow corroborating that the psychological domains of cognition and affection are not in rivalry or conflict but rather intertwined in meaningful experiences.

Keywords: image-schemas, primary metaphors, early infancy, infant directed performance, multimodal interaction

INTRODUCTION

The theory of conceptual metaphor posits certain cognitive structures, called image-schemas, which are located at the foundation of our conceptual abstract domain. Image-schemas are characterized as pre-conceptual structures; they are dynamic and recurrent patterns of our sensory-motor experience (visual, aural, tactile, kinetic) stored in our cognitive system. On the other hand, primary metaphors are experiential states where an overlapping or co-activation of neural patterns will later in development be conceptually differentiated but nevertheless remain bound at the neural level (Lakoff & Johnson, 1980, 1999; Johnson, 2007). Affective components are included in primary metaphors, and through them, in the cognitive system (Lakoff & Johnson, 1999). In this paper, we adopt an interactionist (Gallagher, 2001) or second-person (Gomila, 2003, Reddy, 2008) perspective in order to show the role of adult-infant interactions in the formation of primitive image-schemas and primary metaphors.

Interactions between adults and infants are shaped in very different ways. One frequent mode of early interaction is infant directed performance. Unlike protoconversations -which imply an active infant participation in turn-taking (Bateson, 1979)- infant directed performances are vocal, tactile, and kinetic phrases unfolded mainly through the adult's on-line composition. The structure of these performances contains minor unities or motifs -formed by rhythmic patterns, shapes of body movements, and/or vocal melodic contours- that are repeated in varied modes, including changes in intensity, shape and/or dynamics (Stern, 1974; Stern, Beebe, Jafe & Bennet, 1977; Beebe y Gertsman, 1980; Español, 2014; Martínez, 2014; Español, 2014; Español & Shifres, 2015; Carretero & Español 2016). Performances are body-to-body phrases of movement and sound with dynamic, affective, multimodal and aesthetic features, formed by the constitutive elements of the temporal arts (Dissanayake, 2000; Español & Shifres, 2015; Gratier

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4 & Apter-Danon, 2009; Miall & Dissanayake, 2003). In this paper we will focus on these
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6 performances in order to highlight the presence of both image-schemas and primary metaphors
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8 in their basic structure.
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12 Through identification -by observation and feature description- of image-schemas and
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14 primary metaphors embedded in ecological contexts, we aim to provide an account of the first
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16 instances where both primitive structures emerge in the infant's life throughout the activity that
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18 the adult performs to-and-with the infant.
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23 Image-schemas are preconceptual structures that are instantiated and stored in cognition
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25 as a result of the activity of our bodies in the environment. As Lakoff & Johnson (1999) point
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27 out, these basic structures form a pre-verbal and non-conscious emergent level of meaning that
28
29 links our sensory-motor experience to conceptualization and language. Our embodied experience
30
31 of motion gives rise to inferences that we draw on reality. Among their relevant features, recent
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33 research identifies the following ones: (i) their relation to motor programs, (ii) the emergence of
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35 dynamic patterns through perceptual and emotional interactions with others, (iii) the direct
36
37 significance derived from recurrent movements as a result of object manipulation, (iv) their
38
39 grouping in multimodal Gestalts with a simple internal structure flexible enough to allow
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41 transformations in different experiential contexts where they become active, (v) their existence
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43 as continuous and analogue unconscious patterns, previous to other concepts, and (vi) a binding
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45 function between the concrete-imaginistic domains, and the more abstract-non-imaginistic ones
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47 in metaphorical projections (Hampe, 2005).
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56 Different groups of image-schemas can be found in the literature; there are those
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58 grounding spatial concepts, such as SOURCE-PATH-GOAL, CONTAINER, WHOLE-PART, and CENTER-
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4 PERIPHERY; others structuring orientational concepts, i.e. NEAR-FAR, FRONT-BACK, and UP-DOWN.

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6 Some image-schemas shape the dynamic concepts of effort in movement: BLOCKAGE,
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Some image-schemas shape the dynamic concepts of effort in movement: BLOCKAGE, ATTRACTION, COUNTERFORCE and IMPULSE, among others. The SOURCE-PATH-GOAL image-schema structures spatial experiences containing movement trajectories with identifiable departure and arrival points, as well as the path between them. The UP-DOWN image-schema organizes spatial orientational experiences with displacements along the vertical axis.

20 In the classic canonic analysis of an image-schematic structure of action (Johnson, 1987)
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22 the following components can be identified: a spatial location that corresponds to the initial state
23
24 of the action (A); a spatial location that corresponds to the final state of the action (B); and a
25
26 movement that takes place between A and B, and that may eventually originate a sequence of
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28 intermediate actions (pp.114-115). Thus, for example, in the SOURCE-PATH-GOAL image-schema,
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30 understood here as the abstract structure of the recurrent experiences of intended or purposeful
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32 movement, we identify: (A) as the initial location of movement; (B) as the movement's final
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34 location or arrival point; and a lineal movement trajectory that begins in (A) and finishes in (B).
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39 In the VERTICALITY image-schema, consisting on the abstract structure of recurrent experiences
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41 of ascending and/or descending movements, we identify: (A) either DOWN or UP initial spatial
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43 locations; (B) the final spatial location contrary to the first one; and the upwards and/or
44
45 downwards movement that links (A) and (B).
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50 The dynamic character of image-schematic structures is their characteristic feature (Gibbs
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52 2005). Image-schemas are dynamic in two senses: they correspond to structures of ongoing
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54 activity, and they are flexible. That is, within the limitations of their basic conformation, image-
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56 schemas can be modified to capture the specifics of the contexts where they are activated. Image-
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58 schemas are best understood as embodied simulations at the time of their occurrence. They
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4 emerge from a fully embodied activity that brings a kinesthetic felt-sense of tridimensional depth
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6 to human experience (Gibbs, 2005, p. 119). From this point of view, image-schemas are
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8 psychologically real experiential *Gestalts*, not because they are a part of the mind but because
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10 they are stable and meaningful states of embodied experiences.
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15 Lakoff & Johnson (1999) also include primary metaphors at the foundation of subsequent
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17 cognitive meaningful structures. Primary metaphors are basic structures that are not constituted
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19 by more metaphors. We are interested in highlighting the kind of primary metaphors originated
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21 by an overlapping or coactivation of neural patterns that later in development will be
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23 conceptually distinguished but that remain bound at the neuronal level (Lakoff, 2008, pp.26-8,
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25 gathering up the ideas of Johnson, Narayanan, and Grady). When Lakoff and Johnson refer to
26
27 these metaphors they make explicit the possibility of incorporating affective elements into
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29 cognition; and many examples they give include actions in contexts of social interaction. Some
30
31 examples of primary metaphors are MORE IS UP, AFFECTION IS WARM, and INTIMACY IS
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33 CLOSENESS.¹ For example, in an early developmental stage, the primary metaphor AFFECTION IS
34
35 WARM co-activates the subjective-emotional state of affection with the sense of temperature,
36
37 conflating the state of feeling warm while being held/embraced with affection. This situation is
38
39 exemplified in a later stage of development by means of metaphoric linguistic expressions such
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41 as “I was greeted warmly” (Lakoff & Johnson, 1999, p. 50).
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58 ¹ See Lakoff & Johnson (1999) pp. 50-54 for a list of primary metaphors.
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4 As far as we know, systematic observations of the links between primary metaphors and
5
6 image-schemas in early interactions have not been pursued from this perspective. Moreover, the
7
8 question regarding the evolutionary origin of image-schemas has always been made from an
9
10 individualistic point of view on development. It is assumed that image-schemas emerge during
11
12 the infant's sensory-motor activity (ascending, descending, standing up, and so on, without
13
14 paying attention to the role of the caregiver in these experiences) (Johnson, 1987; Mandler,
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19 2005).

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22 In this work, we adopt an alternative proposal for the genesis of image-schemas and
23
24 primary metaphors, which is genuinely embodied and dynamic, where attention will be devoted
25
26 to the dynamic and embodied coupling between infant and adult. We propose that in contexts of
27
28 body-to-body adult and baby encounters some experiential Gestalts unfold in peculiar and
29
30 striking ways. Those Gestalts are structured under the form of image-schemas (such as SOURCE-
31
32 PATH-GOAL and VERTICALITY) so the baby experiences them in the context of social interaction,
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34 long before her own independent performance. Likewise, we will show how complex exchanges
35
36 between adults and babies prepare the ground for the emergence of some primary metaphors.
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42 **MATERIALS AND METHOD**

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45 We ran a microanalytical study of three interactions during infant directed performances.
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47 Microanalysis is prototypical in the study of early adult-infant interactions (Jaffe et al., 2001;
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49 Carretero & Español, 2016). This method involves a detailed description of filmed interactive
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51 behaviors observed frame-by-frame, extracted from longer interaction scenes. Such detailed
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53 analysis allows the description of social behavioral modes unnoticeable in naturalistic
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58 observation.
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4 The recorded material was observed using Anvil 4.0 -a video-annotation software developed by
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6 Michael Kipp (2004). This software concedes (i) manipulating the video's speed reproduction;
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8 and (ii) watching the video and simultaneously annotate each category of analysis on a time line.
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11 12 **The Multimodal Model Analysis** 13

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16 A multimodal model -created by Martínez (2014)- was used to analyze the infant directed
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18 performances. It consists of three main components useful to describe the ways in which an
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20 image-schematic form is enacted in the adult's performance: (i) the *sequence of actions of an*
21
22 *image-schematic form as performed*; (ii) the adult-infant *expressive sound-linguistic components*
23
24 through which an image-schematic form is composed and enacted; and (iii) *the type and quality*
25
26 (shape and effort) *of the movement* involved in the enaction of the image-schematic form.
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30 Components ii and iii have already been analyzed with similar tools in previous studies (Español
31
32 & Shifres, 2015).
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36 37 **(i) The sequence of actions of an image-schematic form as performed.** 38

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40 An image-schematic form unfolded in a performance is commonly studied following the
41
42 classic canonic analysis of the image-schematic structure of actions usually applied in cognitive
43
44 linguistics (Johnson, 1987; Johnson, 2007; Lakoff & Johnson, 1999). Thus, the image-schematic
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46 forms' components are identified in the first place, and the sequence of actions involved in the
47
48 image-schematic enacting is considered afterwards.
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51 52 **(ii)The adult-infant expressive sound-linguistic components** 53

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55 Sonic expressive features of multimodal performances that unfold image-schemas are
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57 studied using some of the categories that describe expression in music performance, and some of
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59 the categories that are employed in voice analysis. The approach combines audiovisual
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4 observation and aural analysis of sonic-linguistic features, identification of temporal and
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6 dynamic variations -such as *crescendi*, *decrescendi*, *accelerandi*, *ritardandi*-, and sound
7
8 articulations such as *stacatto* or *legato*; likewise, aspects of adult and infant speeches and/or
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10 expressive vocalizations are examined.
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14 15 **(iii) The type and quality of movements.** 16

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18 Movement features of multimodal performances unfolding image-schemas were analyzed
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20 using the “*Effort*” and the “*Shape*” categories of the Laban System of Movement Analysis
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22 (Laban, 1971; Newlove, 2007). *Effort* makes reference to an attitude of fighting or surrendering
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24 to space (direct *versus* flexible), time (sustained *versus* sudden) and weight (light *versus* heavy).
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26 The combination of these factors results in eight basic types of Effort: (1) *pressing* (direct -
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28 sustained - heavy), (2) *gliding* (direct - sustained - light), (3) *punching* (direct - sudden - heavy),
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30 (4) *dabbing* (direct - sudden - light), (5) *wringing* (flexible - sustained - heavy), (6) *floating*
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32 (flexible - sustained - light), (7) *flicking* (flexible - sudden - light), and (8) *slashing* (flexible –
33
34 sudden – heavy). Each of the eight basic types of Effort can be performed in a continuum flow:
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36 from a free flow (difficult to stop) to a bound flow (easy to stop). The theory highlights that each
37
38 Effort leads to specific sentiments. *Shape* involves (i) Body: it refers to the parts of the body
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40 implied in the movement, and their connections; (ii) Space: it refers to the relation of the body
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42 with the surrounding space, the kinesphere being the space limited by the points reached by the
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44 extremities without changing body position. The kinesphere defines three possible Body
45
46 positions in Space: *vertical* (up-down), *horizontal* (left-right) and *sagittal* (front-back); (iii) Form:
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48 understood in terms of the basic opening/closing opposition while breathing in the vertical,
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50 horizontal, and sagittal planes. Thus, three forms are obtained: rising-descending, spreading-
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52 enclosing, and advancing-retiring (Laban, 1971; Newlove, 2007).
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RESULTS

We present the multimodal microanalysis of three adult-infant interactions during infant directed performances. Performance 1 depicts the analysis of an adult-infant dyad interaction occurred in a Western urban setting², Performance 2 presents the microanalysis of an adult-infant dyad interaction from the Guapi Afro-Colombian community, and Performance 3 describes the microanalysis of an historical performance. In each performance, we present an observational account of the scene, a table of multimodal microanalysis, and the data interpretation concerning image-schematic enactions and primary metaphors.

Performance 1: Adult-Infant Dyad of a Western Urban Setting

Scene description.

In this performance, an adult and a seven-month-old baby are seated face-to-face. The adult produces, repeats, and varies sound and movement phrases while playing with the baby by moving a pillow UPWARDS (pushing it away from the baby) and DOWNWARDS (approaching the baby). At the same time, she improvises verbal phrases and sings short *cantilenas*. The third repetition of the phrase ends with the adult approaching the pillow as close to the baby's body as possible. The baby smiles and shows facial gestures and movements denoting engagement. The interaction unfolds with permanent eye-contact, only interrupted by the movement of the pillow.

² A preliminar analysis was done in Martínez (2014)

Multimodal microanalysis.

Table 1 presents the multimodal microanalysis of performance 1. It describes (i) the sequence of actions of the image-schematic form performed by the adult and the infant's response (left column); (ii) the expressive vocal component of the adult-infant interaction, and other sounds and expressive facial gestures (middle column); (iii) and the shape and effort of movements performed by both participants during the performance (right column).

INSERT TABLE 1 HERE

Interpretation

In this performance, the UP-DOWN and SOURCE-PATH-GOAL image-schemas are combined in the adult's enaction. The structure of the image-schematic form is organized according to the repetition-variation form (characteristic of infant directed performances). During the introductory preparation (i-ii in table 1), the enaction of the UP-DOWN image-schema is used by the adult to set the pillow in the UP location; this image-schematic introduction leads to the sound-kinetic actions displayed by the adult when enacting the SOURCE-PATH-GOAL image-schema for the first time (iii to v, in table 1). Next, the whole image-schematic form (including the preparatory section) is once more fully enacted, with performative variations (vi to x, in table 1). The performance ends with a final brief section, the 'Coda'; it takes place after the climax has been achieved at location GOAL. The structure of the image-schematic form also presents similarities with the very familiar formal structures that we find in musical pieces of Western tradition. In the introductory section, the adult seems to be calling the baby's attention towards the spatial location UP (SOURCE), using the multimodal redundancy involved in the performative

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4 actions (ascending movement and verbal signaling). Moreover, the pillow initially moving
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6 through the axes DOWN- UP (i-ii), and the following UP- DOWN (iii-v), might be interpreted as a
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8 playful action to spotlight the contrast (in this case, to make the baby notice the ascending
9
10 pattern followed by the descending one) (Español & Pérez, 2015) (see also primary metaphors
11
12 below). Both presentations of the image schematic forms use performative expressive resources;
13
14 the three components of the SOURCE-PATH-GOAL image-schema are multimodally highlighted by
15
16 the adult, producing temporal and dynamic variations in the vocal emission, and dynamically
17
18 varying the quality of movement (shape and effort). Thus, the UP (SOURCE) location is
19
20 underlined (a) singing at a high vocal register; (b) varying the vocal timbre while repeating
21
22 verbal phrases that underline the UP location; and (c) shaping the body through the position of
23
24 trunk, head, and arms holding the pillow at the UP location. The production of continuous
25
26 upward-backward-expansion-contraction movements on the horizontal plane -that require a
27
28 sustained effort- account for the ways in which body kinesis expressively emphasizes the
29
30 SOURCE location of the image-schematic form. As far as PATH is ‘traveled’ -both in the
31
32 introductory ascent and in the proper descent- a multimodal composition takes place. It includes
33
34 (a) sound vocal phrase articulations performed in ascendant (from low-to-high pitch)-descendant
35
36 (from high-to-low pitch) scaling; together with (b) body shapes composed by head, arms, and
37
38 trunk movements, rising, and/or going down throughout the vertical-sagittal axes. The frequency
39
40 sweep in the vocal register varies according to the performance of the image-schematic
41
42 component: thus, the two-note *cantilena* at the UP location is sung in a constrained, high vocal
43
44 register, using an interval of third minor, while the ascendant-descendant phrase “tu tu tu tu tu”,
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46 and the phrase “It comes to Habibi” are respectively uttered, along a wider vocal scope of an
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48 octave (from Eb3 to Eb2). The GOAL is the moment of closest proximity between the adult and
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4 the baby. After she brings the pillow as close as possible to the baby's body who, in turn, moves
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6 towards the pillow, the adult's head and trunk are close to those of the baby's at the DOWN-GOAL
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8 location. The emotional climax, backgrounded by soft and slipped adult movements, soft head
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10 and pillow contact, and pianissimo (very low) whispered expressive vocal articulations,
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12 including laughs, contributes to generate an atmosphere of intimacy.
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17 If we take a closer look, we will be able to identify two primary metaphors activated in
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19 this multimodal performance: (i) PURPOSES ARE DESIRED OBJECTS and (ii) INTIMACY IS
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21 PROXIMITY. The primary metaphor (i) is linked to the experience of grasping a desired object,
22
23 and the concomitant satisfaction of possessing the physical object (Lakoff & Johnson, 1999, p.
24
25 53). The way in which this primary metaphor is activated in the analyzed scene is as follows: the
26
27 initial moving of the object on the DOWN-UP direction -in which the adult prompts the baby's
28
29 attention to the SOURCE by lifting the pillow high up and signaling to the object's location
30
31 singing the *cantilena* described- seems to fulfill the purpose of calling for attention and
32
33 increasing the baby's expectation for the pillow's return. That is to say, by prompting the
34
35 arousal, attention turns into expectation for. By moving the pillow towards the baby and
36
37 simultaneously saying "And it comes to you", the adult arouses a sense of purpose in the infant
38
39 at the PATH, and a sense of fulfillment at the GOAL location. When the pillow arrives to its
40
41 destination making contact with the infant, it activates the primary experience of physical contact
42
43 as well as the pleasure of possessing the desired object. In sum, the analysis of the primary
44
45 metaphor (i) shows that, during the performance, the adult's enacting of image-schematic forms,
46
47 communicates, invites and encourages the baby -in a multiplicity of expressive ways- to observe
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49 and participate (Bråten, 2007). Regarding the primary metaphor (ii) it relates to the primary
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51 experience of being physically close to the people with whom we have an intimate relationship.
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4 In the climax, when the adult approaches her head to the baby's making contact with the pillow;
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6 both domains (proximity and intimacy) are co-activated, merging the experience of intimacy
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8 with that of feeling physically close with affection (Lakoff & Johnson, 1999, p. 50). The
9
10 conflation of the components intimacy-closeness-contact displays an appropriate affective
11
12 context for the activation of this primary metaphor in experience.
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17 "Forms of vitality" is an expression proposed by Stern (2010) to capture the way in which
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19 the human mind deals with dynamic experiences, crucial to interpersonal encounters and the
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21 temporal arts. A form of vitality is a Gestalt, a spontaneous integration emerging from holistic
22
23 experiences of movement and its "daughters" –time, force, space and directionality/
24
25 intentionality. Forms of vitality can be grasped from our own experience and can be directly
26
27 observed in the behavior of others. They concern the "how", the way in which things are done.
28
29 According to Stern, early social play is a frame where forms of vitality become evident. Playing
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31 with movements and the sensations they bring are amid the earliest entertainments adults offer to
32
33 their babies. Sounds, facial expressions, and movements are all resources used to hold the baby's
34
35 attention, generating expectation, driving him to arousal levels impossible to be achieved in
36
37 solitude. Early social play occurring in the first months involves playing with forms of vitality
38
39 (see also Español et al 2014). The performance described can be understood as a play with the
40
41 forms of vitality, a particular kind of early social play where vitality forms (expressed in the
42
43 adult's movements and sounds) light up its structuring schemas and primary metaphors. The
44
45 baby enters and participates in this dynamic, complex and mysterious flow: he stares, opens his
46
47 mouth and smiles at Preparation; he lightly lifts his arms, vocalizes and smiles at SOURCE (up
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49 location); he softly moves his head, extending contact with the pillow at GOAL (down location).
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Performance 2: Adult-Infant Dyad Belonging To The Guapi Afro-Colombian Community

Scene description.

In this performance, the father is seated holding his five-month-old daughter on his legs. The baby is squatting on the father's legs looking into his eyes. She has a rattle in the right hand. The father improvises a performance by taking the baby up and putting it back on his legs. He accompanies his movement with an aspired, whispered vocalization. The whole action is repeated three times with variations. In the third repetition, the father changes the arriving place: he sets the baby on his legs and, vocalizing, brings his face to the baby's belly. The closeness of the bodies together with the sonority, timbre and tone of the father's vocalizations take the instance to the climax. During the whole scene, the baby engages with smiles, gestures, movement and frequent eye contact.

Multimodal microanalysis.

Table 2 presents the multimodal microanalysis of performance 2. It describes (i) the sequence of actions of the adult's image-schematic form (left column); (ii) the interaction's expressive vocal component, sounds, and expressive facial gestures (middle column); and (iii) the shape and effort of the adult's and the infant's movements during the performance (right column).

INSERT TABLE 2 HERE

Interpretation.

Differently from the previous performance, here the father's action is directly performed on the baby's body. He moves her trunk continuously in the air along the vertical axis unfolding

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3
4 the UP-DOWN image-schema. As in the previous performance, the resulting form is organized
5
6 according to the repetition-variation principle; the form consists on the enaction of a first UP-
7
8 DOWN sound-kinetic unit, and the following enaction of two successive repetitions with small
9
10 variations. The variations take place between the presentation and the first and second
11
12 repetitions; in each boundary, an action is added: the adult opens his mouth and eyes
13
14 exaggeratedly, and vocalizes an aspired sound. It assembles a priming situation that creates
15
16 expectation for the forthcoming UP-DOWN repetition of the moving form. A similar action,
17
18 performed between the first and the second repetition of the image-schematic form, is made with
19
20 increasing expressive content (even more exaggerated opening of the mouth and a louder,
21
22 guttural sound) contributing to the climax's elaboration and preparation. In the end, the climax is
23
24 reached through a change in the baby's body position (leaning back on his father's legs) and a
25
26 closer contact of the father's mouth over the baby's chest. Changes in the father's sonority,
27
28 timbre, and vocalization tone, underline the climactic moment.
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37 The contrasting movements experienced by the baby enable the organization of their personal
38
39 and interpersonal worlds. They undergo synchronic and other kind of movements which differ
40
41 from the experience of seeing movement (when they receive only visual information). They are
42
43 also aware of the contrast between moving and being moved: the sense of volition and
44
45 proprioception that accompanies self-produced movements is strikingly different from the
46
47 feeling of proprioception without volition happening when one is being moved. Under this
48
49 condition, the baby's sense of agency or authorship is also dissimilar (Español, 2014 and 2017).
50
51
52 In this performance, the baby has the predominant experience of being moved. This prolonged
53
54 experience, her body being lifted by her father, together with the perceptual disposition that
55
56 being moved favors, may have been the corporal and psychological support that allowed her to
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4 be the agent of a small and precocious movement: shaking the rattle twice at the DOWN
5
6 location. The movement resembles a request to her father to move and slightly shake her
7
8 (making the rattle sound as an effect of her whole body moving), to which the father
9
10 immediately responds gladly.
11
12
13
14

15 Concerning the primary metaphors identified when observing this scene, the first one is
16
17 AFFECTION IS WARMTH; it consists on the primary experience of feeling warm by the lovely
18
19 physical proximity of the other person's body; this primary metaphor takes place at the climax,
20
21 during eye-contact and body's closest proximity in which the father continuously kisses the
22
23 baby's chest; she senses the warmth of the father's face in contact with her own body (Lakoff &
24
25 Johnson, 1999, p.50). The second primary metaphor coactivated at that moment is AFFECTION IS
26
27 SMOOTHNESS, given that the baby feels the smooth contact of the father's lips while he is kissing
28
29 her with love (Lakoff & Johnson, 1999, p.50). The third and last coactivated primary metaphor
30
31 at that very moment is INTIMACY IS PROXIMITY. It consists on the primary experience of being
32
33 physically close to the people with whom we intimate, in this case the father-infant proximity at
34
35 the climactic moment (Lakoff & Johnson, 1999, p.50). With this analysis we assume that this
36
37 moment's emotional strength is a by-product of the conflation of the three primary metaphors.
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49 **Performance 3: Historical Performance. Adult-Infant Dyad Of A Western Urban Setting**

50 51 52 **Scene description.**

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54
55 In this performance, the mother is standing in front of her five-month-old son, and the
56
57 infant is lying on his back on a table. The mother makes contact with the baby by sliding her
58
59 hands down the baby's body describing a different path with each repetition: from the head to the
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4 trunk to both legs ending at baby's feet; from the shoulders to the arms ending at both hands.

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6
7 While the embodied enaction takes place, the adult simultaneously vocalizes the phrase

8
9 "stingueshen, stingueshen, stingueshen, stingueshen" (which has no linguistic meaning in

10
11 Spanish). The scene unfolds with almost permanent eye-contact. The baby smiles and shows

12
13 facial gestures and movements denoting engagement. The performance is repeated six times

14
15 along the observed developmental period (from the 2nd to the 9th month) This kind of repetitive

16
17 performance is called historical performance (Carretero, 2016). This performance was first

18
19 described in previous articles of infant directed performances.
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23

24 25 **Multimodal microanalysis.**

26
27 Table 3 presents the multimodal microanalysis of performance 3. It describes: (i) the
28 adult sequence of actions of the image-schematic form performed by the adult (left column); (ii)
29 the expressive vocal component of the adult-infant interaction, and other sounds and expressive
30 facial gestures (middle column); and (iii) the shape and effort of the adult's and the infant's
31 movements during performance (right column).
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44 INSERT TABLE 3 HERE
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47 48 **Interpretation**

49
50 The enaction of the PATH image-schema takes place in a performative context that
51 prompts a strong proprioceptive baby involvement. The enaction's multimodal characteristic
52 features consist on the embodied attunement between the adult's corporal action over the baby's
53 body and the adult's vocal emission of the word "stingueshen" in ostinato-stream style. The high
54 degree of contact provided by the adult's hand movement over the baby's body shapes the
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4 expressive quality of this performance. The beginning and the end of the PATH image-schema
5
6 are underlined by the adult's different actions: at the beginning of the gliding movement, the
7
8 mother invites the baby to play in every repetition of the image schematic form, originating the
9
10 infant's emotional engagement; in the baby's response, arousal and pleasure get noticed in an
11
12 increasing dynamic curve that goes from smiles and guttural warbles to louder laughs. The end
13
14 of the PATH image-schema is also highlighted by different sound-kinetic adult actions: from the
15
16 "aaahjjjj" at the first ending, the socks's taking off, to the synchronous "aahhhjjjj" vocal
17
18 emission and the adult fingers pressuring the baby's feet while sliding her hands through the
19
20 baby's toes.
21
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27 The primary metaphor identified in this historical performance is STATES ARE LOCATIONS,
28
29 consisting on experiencing a state that correlates with a location. In this case locations are
30
31 placed in the baby's body. The initial preparation state that emerges as a result of the invitation
32
33 follows the proprioceptive state that unfolds during contact enaction, leading to a different final
34
35 state reached when the toes strengthen -anchored in the sound-kinetic quality of the adult's
36
37 enaction- at the climax.
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43 The interaction seems to fit quite well in those described by Stern (1985) as facilitators
44
45 and consolidators of the infant's core self, an initial mode of self-awareness (set between the 2nd
46
47 and 7th month) that allows the baby to establish clear physical and sensory distinctions between
48
49 his and the other's self. In this performance, the adult repeatedly touches the baby's body
50
51 inducing him to perceive it and get involved with it. The baby not only "receives" the adult's
52
53 enacted contact but also actively participates: he smiles and shows facial gestures in sign of
54
55 engagement; while the mother touches the legs, he stretches them showing postural and tonic
56
57 involvement. The experience of agency and the forms of vitality perceived when he stretches in
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4 tension, accompanying the mother's sliding hands over his body, facilitate and consolidate his
5
6 core self. In addition, the baby stretches out his body and vocalizes with joy during the PATH
7
8 image-schema: image -schema and infant's core self are intermingled.
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11
12 To sum up, the analysis shows a mother-infant co-construction, during enaction, of the
13
14 PATH image-schema, in which the mother primes the baby's engagement, and encourages the
15
16 development of the infant's core self. In the SOURCE-PATH-GOAL image-schema, the SOURCE and
17
18 GOAL components are distinguished in the performance by the type of adult-infant participation,
19
20 the kind of vocalization, and the quality of *effort* in the mother's movement.
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33 DISCUSSION

34
35 The theory of conceptual metaphor postulates image schemas as basic structures
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37 emerging from the infant's coupling with the physical world. The three microanalyses presented
38
39 show how image-schemas organize adult performances, and are presumably frequently
40
41 experienced in early adult-infant interactions. Therefore, we propose that image schemas arise
42
43 not only from the infant's coupling with the physical world but also with their social world.
44
45 Moreover, some of the most basic primary metaphors that underline the affective components of
46
47 experience are sometimes embedded at the core of such intersubjective adult-infant encounters.
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49 Hence, primary metaphors add an affective dimension to the construction of meaning in adult-
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51 infant interactions; in this way, image-schemas emerge accompanied by, and embedded with, all
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53 the traces of affective sociality.
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4 In the three microanalyses carried out we found that:

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7 a) The performance of the image-schematic form follows the principle of repetition-
8 variation;
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11 b) The primary metaphors are embedded in the specifics of the image-schematic form.
12 The affective dimension activated during the image-schematic unfolding, contributes to highlight
13 the image-schematic structure as it is performed by the adult. For example, at the climax
14 (performance 1, 2 and 3) or at the end (performance 1 and 2).
15

16
17 c) The components of the image-schematic structures are aesthetically underlined using
18 expressive resources and multimodal redundancy. The simultaneous and-or synchronous
19 production of temporal and dynamic variations in the vocal emissions, and the changes in the
20 quality (shape and effort) of the movement match the spatial components of the image-schema.
21 For example, we identified multimodal redundancy (i) at the UP (SOURCE) location, that is
22 underlined by singing and/or vocalizations produced at a high vocal register (performance 1); (ii)
23 along the PATH, underlined by the ascendant and or descendant body movements and the
24 simultaneous vocalization using ascendant/descendant contours (performance 1); (iii) at the
25 climax of the image-schematic form, prepared by the exaggeration through repetitions in the
26 shape and effort of movement of trunk, head, and arms, and by simultaneous expressive
27 modifications of the vocal timbre, contributing to create a growing expectation towards the
28 climax (performance 2); and (iv) at the end of the PATH (GOAL), that is highlighted by sound-
29 kinetic actions such as the synchronized production of vocal interjections, and the contact
30 embodied actions on the baby's body (performance 3).
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4 Our observations provide empirical evidence to the hypothesis of an interactive and
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6 intersubjective ontogenesis of image-schemas and primary metaphors. Image-schemas are early
7
8 lived in inter-enactive embodied experiences. The embodied experience linked to both, the
9
10 VERTICALITY and the SOURCE-PATH-GOAL image-schemas, shape specific features in the infant's
11
12 social cognition, as long as they are experienced in enactive contexts of early interaction. Those
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14 embodied features are shaped in the context of seeing the image-schema unfolded in the adult's
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16 movement, or from proprioceptively sensing the image-schema in her own body, despite not yet
17
18 being accompanied by the intended self-propelled movement that will characterize the later
19
20 action of standing up, or of crawling a path from a source on to a goal. Image schemas are very
21
22 frequently experienced when we sense our own body being fully held in the arms of another
23
24 person, or when our body is laying on the floor.
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32 The development of such diverse image schemas will acquire different profiles, depending on the
33
34 general state of our organism while involving in activities with others; they will continue to be
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36 present, at least for some time, invigorating and supporting the shaping of image-schemas in the
37
38 progress of motor development. Therefore, long before the image-schema VERTICALITY is
39
40 autonomously experienced, and the body is erected on the reduced surface of the feet,
41
42 VERTICALITY was already experienced by the infant thanks to some other's lovely touch over her
43
44 body, or by feeling the verticality while being held in the arms of the adult. The slow process of
45
46 bipedestation will allow image-schemas to become enriched with the functioning and continuous
47
48 transformation of embodied experiences acquired by the infant. We suggest that image-schemas
49
50 are experiential Gestalts that emerge from the meaningful and stable states of inter-enactive
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52 embodied experiences. In that sense, they seem to be psychologically present throughout the
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54 enactive interaction.
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4 Studies in infant directed performance suggest that the expressive ways of music performance,
5
6 an essential part of intuitive parenting, open a door for the infants' understanding, enjoyment and
7
8 contemplation of the Arts in her culture (Español & Shifres, 2015). In the same way, infant
9
10 directed performances might be opening the way to Gestaltic experiences of image-schemas in
11
12 inter-enactive contexts that will feed posterior individual experiences.
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17 Finally, the analysis of the sensorial, motor and affective experiential richness that is present in
18
19 the interactive contexts of early infancy, allows us to properly understand certain aspects of the
20
21 emergence of human conceptual capacities. The observation of these contexts exposes the ways
22
23 in which human cognition develops by means of social interaction and affective engagement. In
24
25 the three microanalyses performed, the fact that cognition (reason) and affects (passions or
26
27 emotions) are not two separate psychological domains in competition and conflict, but are
28
29 instead intertwined with attunement, to form our conceptual scheme, and to provide meaning to
30
31 experience, has been verified. Characterizing the embodied structures that emerge in the socio-
32
33 cultural environments during early infancy contributes to a better understanding of the embodied,
34
35 affective, and imaginative basis of human cognition.
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46 47 REFERENCES

48
49 Bateson, M. C. (1979). The epigenesis of conversational interaction: a personal account of
50
51 research development. In M. Bullowa (Ed.), *Before speech. The beginning of*
52
53 *interpersonal communication* (pp. 63-78). Cambridge, MA: Cambridge University Press.
54
55
56
57
58
59
60
61
62
63
64
65

1
2
3
4 Beebe, B., Stern, D. & Jaffe, J. (1979). The kinesic rhythm of mother-infant interactions. In A.
5
6 W. Siegnan, & S. Feldstein (Eds.), *Of speech and time: temporal patterns in interpersonal*
7
8 *contexts* (pp. 23-34). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
9

10
11 Beebe, B., & Gerstman, L. J. (1980). The “Packaging” of maternal stimulation in relation to
12
13 infant facial-visual engagement: A Case study at four months, *Merrill-Palmer Quarterly of*
14
15 *Behavior and Development*, 26 (4), 321-339.
16
17

18
19 Bråten, S. (2007). *On being moved. From mirror neurons to empathy*. Amsterdam and
20
21 Philadelphia: Johns Benjamin.
22

23
24 Carretero, S. (2016). El contacto corporal en la musicalidad comunicativa durante el período de
25
26 intersubjetividad primaria. [The body contact in communicative musicality during the
27
28 period of primary intersubjectivity]. Unpublished Doctoral Thesis. Universidad Nacional
29
30 de Córdoba, Argentina.
31
32

33
34 Carretero, S. & Español, S. A. (2016). Multimodal Study of Adult-Infant Interaction: A Review
35
36 of Its Origins and Its Current Status. *Paidéia (Ribeirão Preto)*, 26(65), 377-385.
37
38

39
40
41 Dissanayake, E. (2000). *Art and intimacy*. Seattle, WA: Washington University Press.
42
43

44
45 Español, S. (2014). La forma repetición variación. Una estrategia para la reciprocidad. In S.
46
47 Español (Ed.), *Psicología de la música y del desarrollo. Una exploración*
48
49 *interdisciplinaria sobre la musicalidad humana* (pp. 157-192). [Psychology of Music and
50
51 development. An interdisciplinary exploration on human musicality]. Buenos Aires:
52
53 Paidós.
54
55
56
57
58
59
60
61
62
63
64
65

- 1
2
3
4 Español, S. (2017). Si queremos saber cómo sopla el viento podemos mirar la arena. Pensar el
5
6 desarrollo psicológico observando el movimiento. [If we want to know how the wind
7
8 blows we can watch the sand. Thinking psychological development observing the
9
10 movement.] In Pérez, D. & Lawler, D. *La segunda persona y las emociones* [*The second*
11
12 *person and the emotions*] (pp. 45-86). Buenos Aires: Editorial SADAFA.
13
14
15
16
17 Español, S. & Shifres, F. (2015). The artistic infant directed performance: A microanalysis of
18
19 the adult's movements and sounds. *Integrative Psychological and Behavioral Science*, 49
20
21 (3) 371-397.
22
23
24
25
26 Gallagher, S. (2001). The practice of mind: theory, simulation, or interaction? *Journal of*
27
28 *Consciousness Studies*, 8(5-7), 83-108.
29
30
31
32 Gibbs, R. W. (2005). The psychological status of image-schemas. In Hampe, B. (Ed.), *From*
33
34 *Perception to Meaning: Image Schemas in Cognitive Linguistics* (pp. 113-136). Berlin:
35
36 Mouton de Gruyter.
37
38
39
40 Gomila, A. (2003). La perspectiva de la segunda persona de atribución mental. [The second
41
42 person perspective of mental attribution]. In A. Duarte and E. Rabosi (Eds.), *Psicología*
43
44 *cognitiva y filosofía de la mente* [Cognitive psychology and the philosophy of mind]
45
46 (pp.195-218). Buenos Aires: Alianza.
47
48
49
50
51 Gratier, M., & Apter-Danon, G. (2009). The improvised musicality of belonging: Repetition and
52
53 variation in mother-infant vocal interaction. In S. Malloch & C. Trevarthen (Eds.),
54
55 *Communicative musicality: Exploring the basis of human companionship* (301-327).
56
57 Oxford: Oxford University Press.
58
59
60
61
62
63
64
65

1
2
3
4 Hampe, B. (Ed.) (2005). *From Perception to Meaning: Image Schemas in Cognitive Linguistics*.
5
6 Berlin: Mouton de Gruyter.

7
8
9
10 Johnson, M. (1987). *The Body in the Mind*. Chicago: University of Chicago Press.

11
12
13 Johnson, M. (2007). *The meaning of the body*. Chicago: University of Chicago Press.

14
15
16
17 Kipp, M. (2004). Anvil – a video annotation research tool. Retrieved from
18
19 <http://www.dfki.de/~kipp/anvil>.

20
21
22
23 Laban, R. (1971). *The mastery of movement*. Boston: Plays.

24
25
26 Lakoff, G. (2008). The neural theory of metaphor. In R. Gibbs (Ed.), *The Cambridge Handbook*
27
28 *of Metaphor and Thought* (pp. 17-38). Cambridge: Cambridge University Press.

29
30
31
32 Lakoff, G. & Johnson, M. (1980-2003). *Metaphors we live by*. Chicago: University of Chicago
33
34 Press.

35
36
37
38 Lakoff, G. & Johnson, M. (1999). *Philosophy in the Flesh*. New York: Basic Books.

39
40
41
42 Mandler, J. M. (2005). How to build a baby III: Image-schemas and the transition to verbal
43
44 thought. In B. Hampe (Ed.), *From Perception to Meaning: Image Schemas in Cognitive*
45
46 *Linguistics* (pp. 137 - 163). Berlin: Mouton de Gruyter.

47
48
49
50 Martínez, I. C. (2014). La base corporeizada del significado musical. [The embodied foundation
51
52 of musical meaning.] In S. Español (Ed.), *Psicología de la música y del desarrollo. Una*
53
54 *exploración interdisciplinaria sobre la musicalidad humana* [Psychology of Music and
55
56 development. An interdisciplinary exploration on human musicality.] (pp. 71-110).
57
58 Buenos Aires: Paidós.
59
60
61
62
63
64
65

1
2
3
4 Miall, D. S., & Dissanayake, E. (2003). The poetics of babytalk. *Human nature*, 14(4), 337-364.

5
6
7
8 Newlove, J. (2007). *Laban for Actor and Dancers. Putting Laban's Movement Theory into*
9
10 *Practice: A Step-by-Step Guide*. New York: Routledge.

11
12
13
14 Reddy, V. (2008). *How infants know minds*. Cambridge: Harvard University Press.

15
16
17 Stern, D. N. (1974). Mother and infant at play: The dyadic interaction involving facial, vocal,
18
19 and gaze behaviors. In M. Lewis, L. A. Rosenblum (Org.), *The effect of the infant on its*
20
21 *caregiver* (pp. 402-421). Oxford, England: Wiley-Interscience.

22
23
24
25 Stern, D. N. (2010). *Forms of vitality. Exploring dynamic experience in psychology, the arts,*
26
27 *psychotherapy and development*. New York, NY: Oxford University Press.

28
29
30
31 Stern, D. N. (1985). *The interpersonal world of the infant: A view from psychoanalysis and*
32
33 *developmental psychology*. Karnac Books.

34
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TABLES

Table 1

Multimodal microanalysis of the enaction of the image-schematic form in performance 1

Sequence of actions	Expressive facial-vocal components	Shape and effort of movement
Preparation 1		
ADULT (i) The adult is seated in front of the baby, with a pillow in her hands, remaining at DOWN location. She gently taps the baby's leg.	The adult calls for baby's attention saying to the baby: "Habibi... look!" and using whispered vocal emission at high register.	The adult gently taps the baby's legs with rising-descending form, with dabbing effort (direct - sudden - light).
BABY The baby -who was looking to one side- looks at the hand of the adult, until it rests on the pillow.		The baby gently rotates his head and trunk, with a gliding effort (direct - sustained - light).
ADULT (ii) Seated in front of the baby as in (i), the adult performs a movement from DOWN location to UP location, raising the pillow with both arms until the object reaches a location above her head.	In synch with the pillows' movement, the adult says to the baby: "Look, look, look" with vocal emission in ascendant pitch contour. Once the pillow reached the UP location she says: "Look where it is", using whispering high voice.	The adult raises the pillow with both arms, shaping a raising form with gliding effort (direct - sustained - light).
BABY The baby raises his head directing to and holding his gaze on the pillow.	The baby opens his mouth and smiles.	The baby gently raises his head with gliding effort (direct - sustained - light) and then opens his mouth with dubbing effort (direct-sudden-light).

Performance of the SOURCE-PATH-GOAL image-schema

SOURCE

ADULT

(iii) The adult is seated in front of the baby, holding the pillow with her raised arms above her head at UP location.

The adult sings a melodic motive with the verbal phrase: "It is Up here, Habib". The motive uses two pitches that are separated by an interval of minor third. The two pitches are alternated rhythmically during singing. Vocal emission is produced at high register.

The adult sustains her arms raised at up location, remaining frozen for an instant while she says the first part of the verbal phrase: "It is Up here, Habib". The adult head's movement shapes the form advancing-retiring, with punching effort (direct - sudden - strong). The phrase concludes with a small movement, always at the top location- advancing the pillow with gliding effort (direct - sustained - light).

BABY

The baby raises his arms onto the pillow.

The baby keeps on smiling and looking to the pillow with expectation.

The baby gently raises his arms with floating effort (direct-sustained-light).

PATH

ADULT

(iv) The adult moves the pillow from UP location to DOWN location, approaching the pillow to the baby.

While moving the pillow the adult pronounces the verbal phrase: "And it comes to Habibi". The descendant vocal emission encompasses an interval of an octave.

The adult's movement of the pillow from UP location to DOWN location shapes a descending form, with gliding effort (direct - sustained - light).

BABY

The baby grasps the pillow and leans on it, establishing a broad contact.

The movement when grasping the pillow is done with an enclosing form and gliding effort (direct-sustained-light).

GOAL

ADULT

(v) The adult is seated in front of the baby at DOWN location; she approaches the pillow as closest as possible to the baby's body who, in turn,

The adult stands still for a moment at DOWN location.

moves himself towards the pillow.

BABY

The baby remains in contact with the pillow.

Repetition of the SOURCE-PATH-GOAL image-schema with performative variations.

Preparation 2

ADULT

(i) The adult is seated close to the baby. She puts a hand on the pillow, pressing it lightly and sinking, while remaining at DOWN location. She wants to reestablish eye-contact with the baby, that had been interrupted due to the previous descent of the pillow. Then, the adult drops her head until adult's and baby's heads are almost in contact.

While with the sunken pillow at DOWN location the adult drops his head, she calls for baby's attention saying: "Shall we do it again?" "Yes?", using whispered high voice.

Both the adult's hand movement while pressing the pillow, and the head's movement that accompanies the emission of the verbal phrase, shape a descending form, with gliding effort (direct - sustained - light).

BABY

The baby raises his head, smiles, and puts his head back on the pillow.

The baby drops his head with dubbing effort (direct-sudden-light).

ADULT

(ii) Seated in front of the baby, the adult raises the pillow again with both arms until the object reaches a location above her head.

Coordinated with the pillow's movement, the adult says to the baby: "Let's go, eh? Tu-tu- tu-tú". Vocal emission in ascendant contour.

The adult raises the pillow with an initial movement that shapes a retiring form; the movement continues shaping a rising form, with gliding effort (direct - sustained - light).

BABY

The baby raises his head and his trunk, looking at the adult and the pillow.

The baby opens his mouth, smiling and looking expectantly at the pillow.

The baby's arms movement is realized with gliding effort (direct-sustained-light). The trunk and the head spread up.

Repetition of the SOURCE-PATH-GOAL image-schema with performative variations

SOURCE

ADULT

(iii) The adult remains seated in front of the baby, holding the pillow with both arms at UP location; she looks towards the pillow for a moment and then she begins to move the pillow to both sides always at UP location.

Holding the pillow at the top, the adult says to the baby “Up here it is” (whispered voice), [“Ahj”, (Habibi’s voice)]. Then, looking at the baby, and synchronizing her voice and head’s movement she says: “Up here” (whispered voice). Then, moving the pillow to both sides, she says “Up here” (singing voice) “Here it is this!” (vocal emission while sort of laughing...). In this passage, while addressing the baby, the vocal production presents changes in timbre and in sound articulation: exclamation and laugh articulation are perceived when “this” is vocalized; singing intonation is performed at high vocal register.

The adult remains frozen with the pillow at UP location. While she talks to the baby for the first time she moves the pillow, shaping a rising-descending form, with dabbing effort (direct - sudden - light). After that, she calls for the baby’s attention again, moving her trunk and arms always at UP location - coordinated with her singing-, and also moving the pillow in the horizontal plane-from left to right-, with floating effort (flexible - sustained - light).

BABY

The baby holds the erect position of trunk and head. At the end of the vocal exchanges the baby raises his arms.

The baby says “Ahi” twice. For reasons of clarity the description is separated, but it is a vocal exchange of the dyad.

The baby raises his arms with gliding effort (direct-sustained-light).

PATH

ADULT

(iv) The adult starts the movement of the pillow towards the baby's arms, which are extended upwards (as if wanting to receive the pillow); the pillow's descent from up to down continues approaching the pillow to the baby. While descending the pillow, the adult flex her trunk approaching her head to the baby's head.

While moving the pillow downwards and approaching the baby the adult pronounces the verbal phrase "You have it here!", with vocal (sort of laughing emission) in descendant contour.

Both the descendant movement of the pillow and the flex movement of the trunk shape an advancing-descending form, with gliding effort (direct - sustained - light).

BABY

The baby drops himself on the pillow by tilting his trunk and resting his head on it.

The dropping movement has an enclosing down shape. The scrubbing-on-the-pillow movement is performed in the horizontal axis. Both movements are realized with dubbing effort (direct-sudden-light).

GOAL

ADULT

(v) The adult leaves the pillow at DOWN location, close to the front of the baby, who approaches the object burying his head in the pillow. The adult retires to the center of her kinesphere (seated/vertical body posture), separating her head from the baby's head; then she approaches the baby again.

Once reaching DOWN location the adult pronounces the phrase: "It does come".

After saying "It comes", the adult separates herself from the baby towards the center of her kinesphere, and then she approaches the baby again with a movement of the trunk shaping the form retiring-advancing, with gliding effort (direct - sustained - light).

Coda

ADULT

(i) The adult remains seated in front of the baby at DOWN location. Softly she begins to

While releasing the pillow from the baby's body, she says to the baby: "It is coming

The movement of withdrawing the pillow is realized in the horizontal

withdraw the pillow while returning to the center of the kinesphere.

towards Habibi” with singing voice, pianissimo and rallentando vocal emission.

plane with the shape retiring. The trunk movement shapes the form rising. Both movements are realized with gliding effort (direct - sustained - light).

(ii)The adult moves the pillow switching sides (always at Down position at the floor) and the baby moves his head again in smooth contact with it. In the end, she lines *again* approaching her head to the baby’s and withdraws.

While approaching heads: “Uh” [may be Habibi] / “Uh je je je je” (Adult’s laugh articulation in ascendant-descendant contour).

The adult moves the pillow switching sides to the pillow and moving the object with gliding effort (direct - sustained - light). She flexes her trunk towards the baby, approaching her head to the baby’s head (and laughing); then, she withdraws, and her movement shapes a composed advancing-retiring and descending-rising form, with gliding effort (direct - sustained - light).

BABY

The baby moves his head again softly, making contact with the pillow.

The scrubbing-on-the-pillow movement is performed in the horizontal axis with dubbing effort (direct-sudden-light).

Note. (i)-(x) correspond to the sequence of actions. Numbering restarts in each part of the structure of the enacted image-schematic form.

Table 2

Multimodal microanalysis of the enaction of the image-schematic form in performance 2

Sequence of actions	Expressive facial-vocal components	Shape and Effort of movement
Preparation 1 at DOWN location		
ADULT		
(i) The adult is seated facing the baby who, in turn, is squatting on his legs. He holds the baby firmly with his hands around her waist and ribs.		
BABY		
The baby is squatting on the father's legs looking into his eyes. She has a rattle in the right hand.		
Performance of the UP-DOWN image-schema		
From DOWN to UP		
ADULT		
(ii) Holding the baby, the adult raises her upwards with a rolling motion (from DOWN location to UP location). While he raises her up, he leans back, holding eye contact with the baby's face.	The adult moves the baby upwards with both arms, shaping a raising form with gliding effort (direct - sustained - light).	
BABY		
When lifted, she takes the rattle with both hands and brings it to her mouth.	The movement of the baby is realized with gliding effort (direct -sustained- light).	
At UP		
ADULT		

<p>(iii) The adult keeps on making eye contact with the baby. Holding her at UP location, he shakes her trunk continuously, hanging her body upside down in the air, remaining always at UP location.</p>	<p>While shaking the baby, the adult vocalizes the syllables “da da da da da da da” with an aspired, whispered voice.</p>	<p>The adult holds the baby with her arms at the top, shaking her by the trunk in a mild mode. The movement shapes a horizontal- sustained-on-the-top form with punching effort (direct - sudden - light).</p>
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BABY

<p>The whole body of the baby is moved by the shaking of the father and as an effect of this movement the rattle moves and sounds accordingly.</p>	<p>As an effect of the movement of the baby’s body the rattle moves and sounds.</p>	<p>The baby’s movement on-the-top has a punching effort (direct - sudden - light).</p>
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From UP to DOWN

ADULT

<p>(iv) Always holding the baby, the adult moves her down from UP to DOWN location with a rolling motion, until her legs squat on his legs.</p>	<p>The adult’s movement of the baby from UP location to DOWN location shapes a descending form, with gliding effort (direct - sustained - light).</p>
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BABY

<p>The baby is moved downwards until she squats on his father's legs. At DOWN location, the adult leans back the baby slightly, and at the same time he bends approaching his face to hers, in order not to lose eye contact.</p>	<p>The baby’s downward movement is with gliding effort (direct - light - up).</p>
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At DOWN location

BABY

<p>(i) Looking at her father, the baby shakes the rattle twice.</p>	<p>The rattle sounds twice.</p>	<p>The rattle’s shaking is with dabbling effort (direct-sudden-light).</p>
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ADULT

<p>The adult opens his mouth and his eyes widely and steadily looking fixedly to the baby.</p>	<p>The adult vocalizes a long, aspired, high pitch sound.</p>	<p>The mouth’s movement is realized with gliding effort (sustained-direct-light).</p>
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First Repetition of the UP-DOWN image-schema with performative variations

From DOWN to UP

ADULT

(ii) Always holding the baby firmly with his arms, the adult raises her upwards with a rolling motion (from DOWN location to UP location). While he raises her up, he leans back, keeping eye contact to her.	Synchronizing with the baby's raising movement, the adult adjoins to the aspired previous sound the vocalization of the repeated syllables "da da da da da da da da" with an aspired, whispered voice.	The adult moves the baby upwards with both arms, shaping a raising form with gliding effort (direct - sustained - light).
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BABY

The entire body of the baby is moved; the baby is in a horizontal position and held up by the father.

At UP

ADULT

(iii) The adult continues looking to the baby, holding her UP there; he shakes her trunk continuously, her body hanging upside down in the air, remaining at UP location.	Synchronizing with the baby's shaking movement, the adult continues vocalizing the syllables "da da da da da da da da" with an aspired, whispered voice.	The adult holds the baby with her arms on the top, and mildly shakes her trunk while he vocalizes the syllables "da da da da da da da da". The movement shapes a horizontal-sustained-on-the-top form with punching effort (direct - sudden - light).
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BABY

The whole body of the baby is moved by the shaking of the father and as a result of this movement the rattle moves. Then the baby carries the rattle to her mouth.	As an effect of the movement of the body of the baby the rattle moves and sounds.	The baby's movement on-the-top has a punching effort (direct - sudden - light).
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From UP to DOWN

ADULT

(iv) Always holding the baby, the adult moves her down (from UP to DOWN location), with a rolling motion, until her body	The adult's movement of the baby from UP location to DOWN location shapes a descending
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and bent legs reach the seated position on his legs.

form, with gliding effort (direct - sustained - light).

BABY

The baby is moved downwards until she squats on his father's legs. At DOWN location, the adult leans back the baby slightly, and at the same time he bends approaching his face to hers, in order not to lose eye contact.

The downwards movement is realized with gliding effort (direct - sustained - light).

At DOWN location

ADULT

(i) The adult remains at DOWN location making continuous eye contact with the baby, and holding her seated on his legs, with her legs bent and her trunk slightly leaned back.

While holding the baby at DOWN location, the adult bends, approaching his face to hers. Looking her fixedly, he opens his mouth bigger, and vocalizes a long, aspired, higher in pitch, very loud sound.

The adult opens his mouth a lot, and remaining in that expression he looks fixedly to his baby.

BABY

The baby takes the rattle out of his mouth and moves it twice.

The rattle's sound is low.

The rattle's movement is realized with floating effort (flexible-sustained-light).

Second Repetition of the UP-DOWN image-schema with performative variations

From DOWN to UP

ADULT

(ii) Holding the baby with his arms and leaning himself back for a while, the adult then moves the baby upwards with a rolling motion (from DOWN location to UP location). While he raises her, he leans back, holding his gaze face to face to the baby's.

The adult moves the baby upwards with both arms, shaping a raising form with gliding effort (direct - sustained - light).

BABY

The baby's movement is identical to the one in the previous repetition.

At UP

ADULT

(iii) Remaining at UP location, the adult keeps holding and continuously shaking the baby's body. Her body is hanging upside down in the air, remaining at UP location.

Synchronizing with the baby's shaking movement, the adult vocalizes the syllables "da da da da da da da da" with an aspired, whispered voice.

The adult holds the baby with her arms on the top, and mildly shakes her trunk while he vocalizes the syllables "da da da da da da da da". The movement shapes a horizontal-sustained-on-the-top form with punching effort (direct - sudden - light).

BABY

The baby's movement is identical to the one in the previous repetition.

From UP to DOWN

ADULT

(iv) Always holding the baby, the adult moves her down (from UP to DOWN location), with a rolling motion, until her body and bent legs reach the seated position on his legs. Just before reaching DOWN location, the adult bends, approaching his face to hers.

Just before reaching DOWN location, the adult bends, approaching his face to the baby's and vocalizing a loud, high pitched, shouted, guttural sound.

The adult's movement of the baby from UP location to DOWN location shapes a descending form, with gliding effort (direct - sustained - light).

Coda

ADULT

(i) The adult remains with the baby at DOWN location. Holding the baby with his hands, he leans her back, laying her back on his legs; at the same time, he bends towards the baby until his face contacts the baby's

Once the adult's face contacts the baby chest, the adult goes on vocalizing a stream of loud, high pitched, shouted, guttural sounds. When he finishes the vocalization and after returning the baby to the

The adult leans the baby back with an initial movement that shapes a retiring form in the sagittal axis, with gliding effort (direct - sustained - light). When the adult returns the baby back to the seated position the movement

chest. In the end, he returns the baby to the seated position.

seated position, he laughs with pleasure.

shapes an advancing form in the sagittal axis with gliding effort (direct - sustained - light).

BABY

The baby is allowed to fall backwards. Her head hanging, and her arms open in an attitude of reception or delivery.

The baby's movement is realized with a gliding effort (direct-sustained-light).

Note. (i)-(x) correspond to the sequence of actions. Numbering restarts in each part of the structure of the enacted image-schematic form.

Table 3.

Multimodal microanalysis of the enaction of the image-schematic form in performance 3

Sequence of actions	Expressive facial-vocal components	Shape and Effort of movement
Preparation 1		
ADULT		
(i)The baby is laying on a table. The adult is bent in front of him. Separating his arms and rotating his body slightly, the mother invites him to begin the play.	While bending in front of the baby, the adult cheers him saying: “Let’s play stinguishen, shall we?”	The movement of the mother when separating the arms of the baby is dabbing (direct-sudden-light).
BABY		
The baby rotates his head onto the right.	The baby vocalizes “ah”.	The rotation movement of the head has a gliding effort (direct-light-weight).
Performance of the PATH image-schema		
ADULT		
(ii) The adult slides both hands all over the whole body of the baby, beginning the PATH at the shoulders and finishing the movement on the feet.	In synchrony with the embodied enaction, the adult vocalizes the phrase: “stinguishen, stinguishen, stinguishen, stinguishen”. At the end of the embodied per course she finishes with the vocal articulation of “aahhhjjjj”, that is produced with a strong and aspired voice accompanied by the grand opening of her mouth. The baby looks at her mother and smiles in the end.	The adult hands contact the baby chest, and move continuously all over the baby’s body on the vertical path from the shoulder to the feet, shaping a descending form, with gliding effort (direct - sustained - light).
BABY		
The baby makes eye-contact, looking continuously at her		The final smile of the baby is synchronized with the final

mother and smiling more and more until he gives her a great smile in the end.

vocal articulation of the mother.

Preparation 2

(i) The mother bends, making continuous eye- contact with the baby, and invites him to continue playing.

While bending in front of the baby the adult cheers him saying: "Let's play stinguishen again?"

First Repetition of the PATH image-schema with performative variations

ADULT

(ii) The adult slides both hands all over the whole body of the baby, beginning the path at the shoulders and finishing on the feet, pressing them with all the fingers as a pin.

In synchrony with the embodied enaction the adult vocalizes the phrase: "Stinguishen, stinguishen, stinguishen, stinguishen ... aahhhjjjj", and immediately adding "Stretch, stretch, stretch ... aahhhjjjj". The last vocal end is more aspired, higher in pitch, and with even bigger opening mouth. The baby laughs during the path and in the end.

The adult hands contact the baby chest, and then move continuously all over the baby's body on the vertical path from the shoulder to the feet, shaping a descending form, with gliding effort (direct- sustained - light). During the "stretch phrase" the movement becomes slower, with more pressure along the path over the baby legs; the final pressure on the feet is realized with flicking (flexible - sudden - light) effort.

BABY

The baby smiles as the mother slides her hands over her torso and legs.

The baby vocalizes "ah" with joy.

Preparation 3

(i) The mother bends, making continuous eye- contact with the baby, and invites him to continue playing.

Again, while bending in front of the baby the adult cheers him saying: "Let's play stingueshen again, shall we?"

Second Repetition of the PATH image-schema with performative variations

ADULT

(ii)The adult slides both hands all over the whole body of the baby, beginning the path at the shoulders and finishing on the feet. At the end of the embodied enaction the adult takes the baby socks off his feet.

At the beginning of the embodied enaction the baby produces a loud warble “Ahh”. In synchrony with the embodied enaction the adult vocalizes the phrase “stinguishen, stinguishen, stinguishen, stinguishen” “stretch, stretch, stretch ... aahhhjjjjj”. The vocal end is aspirated, higher in pitch, and with even bigger opening mouth. Loud laughs and warbles of the baby, both during the PATH and in the end.

The adult hands again contact the baby chest, and move continuously all over the baby’s body on the vertical path from the shoulder to the feet, shaping a descending form, with gliding effort (direct- sustained - light).; the final pressure on the feet is realized with flicking (flexible - sudden - light) effort, and then the mum takes the baby socks off his feet with a smooth movement.

BABY

The baby stretches the body without losing eye contact and smiling with his mother. Then he touches the hands of his mother.

The baby performs several vocalizations while smiling.

The repeated movement of stretching of the baby has a punching effort (direct-sudden-heavy).

Preparation 4

(i)The baby continues laying on a table, and the adult standing in front of him. She bends, making continuous eye- contact with the baby, and invites him to continue the play.

While bending in front of the baby the adult cheers him saying: “Once more? Yes? Let’s play stinguishen again, shall we?”

The movement of removing the stockings has a punching effort (direct-sudden-heavy).

Third Repetition of the PATH image-schema with performative variations

ADULT

(ii)The enaction of the PATH image-schema begins making pressure on the baby chest. The adult remains an instant while the baby is warbling loudly, and then begins the performance of the PATH image schema sliding both hands all over the whole body

At the beginning of the embodied enaction the baby produces a loud warble “Ahh”. In synchrony with the embodied enaction the adult vocalizes the phrase: “stinguishen, stinguishen, stinguishen, stinguishen, stretch, stretch,

The adult hands again contact the baby chest, and then move continuously all over the baby’s body on the vertical path from the shoulder to the feet, shaping a descending form, with gliding effort (direct- sustained - light); the final pressure on the feet is

of the baby, from the shoulders to the feet. She finishes pressing the naked feet with all the fingers as a pin.

strechaahhhjjjjj”. This time the vocal end is more aspired, higher in pitch, and with even bigger opening mouth. In the end, the adult exerts smooth pressure with her fingers over the baby feet synchronizing with the vocal emission of a final “aaaajjjj”. More loud laughs and warbles of the baby both during the path and in the end.

realized with pressing (direct - sustained - strong) effort, and then the mum pull apart her hands of the feet with dabbing (direct - sudden - light) effort.

BABY

At the beginning of the enactive performance the baby begins warbling loudly and moving his legs and arms. Then, while the mother slides her arms, he twists his trunk, raises his legs, moves his head to both sides, and stretches his whole body.

The initial baby’s warbles have long duration, loud voice, and high pitch. At the end he warbles softly when the mother touches his feet.

The movements of the legs have punching effort (direct-sudden-heavy). The stretch of the body is like pressing (direct and sustained). The movement of the hands when taking the breast is gliding (direct-light-light).

Coda

The baby puts his hands to his mouth. The mother takes the baby's hands and leans toward the baby.

Broad sagittal movement of advance. Lightweight (sustained- direct- glide).

Note. (i)-(x) correspond to the sequence of actions. Numbering restarts in each part of the structure of the enacted image-schematic form.