

Teacher–Children Interaction and Concept Development in Kindergarten

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This article analyzes the interaction between teachers and children in kindergarten classrooms in order to identify and describe the discursive strategies of teachers that retrieve children's previous expressions to clarify and specify concepts represented in them. Data analyzed include 90 situations of teacher–children exchanges in 7 kindergarten classrooms located in marginal urban neighborhoods in the outskirts of the city of Buenos Aires, Argentina. The analysis followed a qualitative procedure: the constant comparative method (Glaser & Strauss, 1967; Strauss & Corbin, 1991). This allowed the authors to identify and describe the various ways in which teachers reconceptualize information offered by the children in ways that allow them to gradually specify, define, and characterize concepts underlying the words they use, albeit with a limited meaning. It also leads children to develop a finer differentiation and integration between concepts. Such development promotes processes of generalization and construction of hierarchical taxonomies.

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specify concepts represented in them. Theoretical grounding of this aim is found in the current convergence (Frawley, 1997) between sociocultural theories on teaching and learning (Bruner, 1977, 1986; P. Del Río & Álvarez, 1997; Nelson, 1996; Rogoff, 1993; Vygotsky, 1964, 1978; Wertsch, 1991, 1998) and developments in cognitive psychology (Erickson & Kintsch, 1995; Kintsch, 1998; Van Dijk, 1997). Within this perspective, discourse assumes a crucial role in human cognition (Nelson, 1996). Concept acquisition is precisely one of the aspects in child development where the connection between language and cognition is most obvious. From this perspective, we assume that language is one of the semiotic systems that, within the texture of social interactions, contributes to the process of conceptual elaboration that children undergo in their development.

Research by Mandler and associates (Mandler, 2000; Mandler, Bauer, & McDonough, 1991; Mandler & McDonough, 1993) showed that conceptual development begins at a very early stage, well before language becomes a means of representation. In fact, by 7 or 8 months of age, babies already respond selectively to stimuli corresponding to categories such as animate and inanimate. These global categories represent the first steps taken by the child in its quest for meaning—its first attempts to make sense of the world around it. The abstract basis of these categories has to do with the role of objects in each situation: Animate objects do not fulfil the same functions in daily events as inanimate ones. Children strive to understand these events that constitute their physical and social surroundings in order to predict them and participate in them (Nelson, 1996).

When they begin to take part in these situations, the first global categories they have built become differentiated around the type of specific functions fulfilled by objects in these events. Although in these basic-level concepts function is related to perceptual characteristics (Liu, Michnick Golinkoff, & Sack, 2001; Lucariello, Kyratzis, & Nelson, 1992; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976), the main focus is the functional connection of the object within the framework of the full representation of that particular context of activity and of that event (Nelson & Ware, 2000). The way adults use words to indicate objects refines and reorganizes those first concepts formed by the children. As the child begins to use language, she or he can assign names to objects and establish spatial-temporal relations, subject matter and functional connections among them (Lucariello et al., 1992), and incorporate them into a mental representation of the event or script (Nelson, 1996). The referential function, therefore, fulfills a very important role in concept development.

As children interact with adults and, jointly with them, use language to refer to objects, the categories initially included in the events are removed from their original contextual boundaries, generalized, and reincorporated in higher level systems in taxonomies based on abstract functions. The logic of inclusive relations typical of taxonomies is not obvious in real-world classifications;

actually, it is the result of a symbolic abstraction not with empirical, but with linguistic, reality. That is why the construction of such categories basically depends on the interaction with adults and, consequently, begins later (Rosch et al., 1976) and is probably more sensitive to the speech of those adults with whom the children interact.

Adults' speech in their interaction with children in the home has mostly been studied in connection with the linguistic development of children. Research by Snow (1972, 1983), Bruner (1977), and Nelson (1977) has shown that it is not interaction *per se* that has a positive impact on development, but some specific interaction strategies that promote understanding between the child and its mother. Within the learning matrix of a dialogue, an adult produces semantically contingent assertions that retrieve the issue of the comment previously made by the child and tunes to his or her discourse, thus facilitating the creation of a context of shared understanding. Among these assertions, which vary according to their strategic use, research has especially focused in mothers' expansions of their children's production, as well as restructuring that keeps the issue of the child's assertion, albeit introducing structural changes. They do so both in the syntagmatic level—that is, in the sequence of the language—and in the paradigmatic level, paying attention to the choice of each component. Expansions and restructuring are discursive adjustments in adult speech, and they provide the child with new information, which he or she can codify in connection with his or her own speech within the framework of shared understanding (Brown & Bellugi, 1964; Cazden, 1972; Nelson, 1977; Nelson, Carskaddon, & Bonvillian, 1973; Snow & Ferguson, 1977).

Coinciding with studies in the home, research on conversations in the classroom as a learning matrix has identified some strategies used by teachers to retrieve, expand, and give new formulation to the children's statements. Within the school, however, the impact of these strategies has been studied mainly in connection with the process of concept construction. Along this line, Lemke (1997) noticed in teachers' speech some type of semantically contingent assertions that he called retroactive contextualization. In Lemke's view, recontextualization—retrieving what the child says, reformulating it, and including it in a different context—may constitute an interaction strategy of a general kind, which aims to proceed with the dialogue process. In other words, it permits the evolution and flow of the issues taken up in the classroom discourse.

In their analysis of the relative participation of the teacher and children in building the contents of the assertions that go public in interaction, Sánchez, Rosales, and Suárez (1999); I. Del Río, Sánchez, & García (2000); and Sánchez (2001) identified similar strategies whereby teachers retrieve the information contributed by students in order to collaborate with them in building knowledge.

Rosemberg and Borzone (2001), on their part, showed that these “weaving” strategies of teachers' intervention based on information provided in the

child's statements can take two complementary directions: contextualization and de-contextualization. The former strategy tries to "draw" the new knowledge nearer by creating new intermediate levels of representation in order to link the introduced concepts to others that children build in direct experiences. The second one aims at de-contextualizing the children's spontaneous concepts by "distancing" their thoughts from their immediate context.

Although Rosemberg and Borzone (2001) began to focus more specifically on the way teachers' interventions retrieve the concepts presented by the children, they have not done a detailed analysis of the characteristics such reconceptualizations can take. Along this line, Gülich and Kotschit's (1985, 1996) Theory of Discursive Production provides a linguistic framework for this analysis, to the extent that it analyzes linguistic procedures used by speakers in any exchange to solve communicative problems caused by maladjustments between their own conceptual frameworks and those of their listeners. Thus, speakers promote mutual understanding through these strategic procedures that retrieve, expand, or correct a previous formulation that was insufficiently clear or specific. These formulation strategies occur in the superficial structure of interaction. Therefore, they provide linguistic signs from which to infer the cognitive processes involved in the process of shared construction of meaning.

This work analyzes from such cognitive and linguistic perspectives the exchanges that unfold in kindergarten classrooms, with the aim of identifying the strategies employed by teachers to reconceptualize previous assertions of the children. Upon the basis of this analysis, we weight the contribution of such strategies to the process of differentiation, generalization, and integration of concepts the children must go through to make some progress in the process of concept elaboration.

METHOD

Participants

The situations of children-teacher exchanges analyzed in this article took place in six kindergarten groups of 3-, 4-, and 5-year-old children from marginal suburban neighborhoods of the Province of Buenos Aires, in the outskirts of the city of Buenos Aires, Argentina.

Data Collection Procedures for Empirical Information

The corpus analyzed covers 90 teaching situations. During the process of collecting the corpus, the teachers in charge of the groups of children were visited every week. All the situations were recorded and then written down.

Analysis Procedures of Empirical Information

Within the context of exchange situations, our analysis focused on the strategies used by teachers to retrieve and reconceptualize the information provided by the children. We identified 140 cases of such strategies following a qualitative procedure: the constant comparative method (Glaser & Strauss, 1967; Strauss & Corbin, 1991). Within the framework of concepts developed in previous research (Rosemberg & Borzone, 2004; Rosemberg, Borzone, & Diuk, 2003; Silva, 2004, 2006), we devised categories to describe the various ways in which these strategies were enacted in the course of interaction with the children.

The categories of strategies devised on the basis of data analysis were the following:

1. Denomination strategy: In the course of a verbal exchange, when a child alludes to a given concept using a vague or general term or he or she indicates it with a deictic expression or a gesture, the teacher offers a precise linguistic term to refer to that particular concept.
2. Correction strategy: When a child mentions a specific concept using a term that does not coincide with the scope or relation such a concept has in that social group. In those cases, the teacher offers an alternative name that coincides with the one used within that community.
3. Expansion strategy: The teacher retrieves and widens the child's speech by focusing on the perceptual and functional characteristics of the given concept, as well as on the subject matter connections between that concept and others.
4. Generalization strategy: The teacher mentions the superordinate concept in which the concept mentioned by the child may be included.
5. Exemplary strategy: This category includes interventions where the teacher mentions concepts that are subordinate to the one referred to by the child.

RESULTS

The registered linguistic exchanges happened in the course of the various activities shared by teachers and children: symbolic games, stories of personal experiences, collaborative reconstruction of stories, and riddle games. All these activities share a common trait: They require a shared mental text in order to be carried out. Eventually, in the process of joint construction of meanings there are communication problems, probably due to the fact that children find it hard to define concepts linguistically or to some difficulty in specifying the conceptual representations involved. In such cases, teachers' interventions retrieve previous contributions of the children and draw inferences from them

in the hope of grasping the meaning the child is trying to communicate. These inferences launch different types of reformulation of the concepts represented in the children's speech.

In some interventions, teachers provide words to name objects of which the children already have a pre-linguistic conceptual representation. In such cases, teachers build on various clues that are present in the child's speech in order to retrieve the underlying representation. Through a denomination strategy, they make it linguistically explicit with the appropriate word. Clues used by the teachers in these strategies may be semantic or syntactic-grammatical. The exchanges presented later show that semantic clues refer to the lexical meaning of the items chosen by the children. The syntactic-grammatical clues, on the other hand, enable the teacher's reformulation to recover the same kind of word or syntactic organization that was present in the child's speech. (In all exchanges that follow, T = teacher and C = child.):

Exchange 1: Children and teacher pretend they are traveling by train. They make a train with the chairs in the room.

- 1.1. C: *una parte de un tren* 'a part of a train'.
- 1.2. T: *claro, un vagón. Es un vagón de un tren.* 'yes, a carriage. It is a railway carriage'.

Exchange 2: The children and the teacher recall a past activity during which the children modeled different figures with plasticine.

- 2.1. T: *pero, ¿con qué prepararon esas estrellitas?* 'but, what did you prepare those little stars with?'
- 2.2. C: *con la cosa de estrellita.* 'with the little star thing'.
- 2.3. T: *¿qué son las cosas de estrellitas?* 'what are the little star things?'
- 2.4. C: *esas cositas que se marcan.* 'those little things that make the shapes'.
- 2.5. T: *moldes se llaman esos.* 'they are called molds'.
- 2.6. C: *moldes.* 'molds'.
- 2.7. T: *que sirven para marcar y cortar ¿no?, ¿usaron moldes?* 'they are used to shape and cut, aren't they? Did you use molds?'

In Exchange 1, we notice that, although the child cannot name the concept he or she wants to refer to ("carriage"), the child actually formulates it by establishing a part-whole link (i.e., "a part of a . . .") and chooses the term *train* whose meaning—vehicle that runs on rails—is familiar to every participant. The child, therefore, offers semantic clues—the conceptual connection and the lexical information of a frequent term—from which the teacher can infer the meaning the child wants to indicate.

Furthermore, both in this exchange and in the one that follows it, we notice, on one hand, how the teachers' reformulation recovers the grammatical clues. In fact, the nouns "railway carriage" (Turn 1.2) and "molds" (Turn 2.5) replace nouns "part" (Turn 1.1) and "little things" (Turn 2.4) in the children's speech.

On the other hand, teachers appeal to a syntactic organization of the statement to infer and reformulate the meaning of the children's words. Thus, whereas in Turn 1.1 the complement "of + name" permits the expression of the connection part-whole and, thus, transmits the child's meaning, in Turn 2.2, the complement "of + name" does not constitute (in Spanish) a syntactic structure allowing for the codification of the function of an object. On account of that, as well as of the high lexical indeterminacy of the chosen noun—Turn 2.4, "little things"—when the teacher requires more information (Turn 2.3, "what are the little star things?"), the child introduces a relative clause that enables the child to specify the connection of that item with the child's statement—Turn 2.4, "those little things that shape." Insofar as this structure allows the connection of an object with a statement, it eliminates the ambiguous character of the expression and enables the teacher and the other children to infer the meaning that the speaker was referring to. The teacher's inference is seen in Turn 2.7, when she introduces a verb and a preposition—"used to"—which further specifies the function of the object. Thus, building on the structure contributed by the child, the teacher expands the functional description—Turn 2.7, "they are used to shape and cut." Therefore, by making the children's expressions less ambiguous and expanding them, the teacher also leads the children to use more complex syntactic structures.

In other cases (e.g., Exchanges 3 and 4), teachers have to make use of the situation context when semantic or syntactic-grammatical clues are not enough to generate inferences that may retrieve the meaning alluded to by the child:

Exchange 3: Children and teacher plan a game that the children will later play in different parts of the room in small groups.

- 3.1. C: *el de las vacas, las gallinas*. 'the one with cows, hens'.
 3.2. T: *la granja, el juego se llama la granja*. 'the farm, the game is called the farm'.

Exchange 4: After playing the game in small groups in different parts of the room, the children and the teacher chat together.¹

¹Games with children in small groups in different "corners" or sections of the room and conversations between the teacher and the children in the "circle" at the start of the school day are typical routines in kindergartens in Argentina.

- 4.1. C: *le pegué a un cocodrilo con un . . . (el niño mueve los brazos como si remara)*. ‘I hit a crocodile with a . . . (the child moves his arms as if he were rowing)’.
- 4.2. T: *con el remo*. ‘with an oar’.
- 4.3. C: *con el remo a un cocodrilo*. ‘a crocodile with the oar’.

Exchange 5: Children and teacher talk in “the circle.”

- 5.1. C: *Cumplo así (el niño muestra seis dedos)*. ‘I’m turning this (the child shows six fingers)’.
- 5.2. T: *Sí, próximamente cumplirás seis*. ‘Yes, you will soon turn six’.

In Exchange 3, we notice the absence of the main noun in the child’s contribution—Turn 3.1, “the one with cows, hens.” Out of the actual context, it is impossible to determine whether the child refers to an event that includes cows and hens or to an object (a pen, some part both animals have in common, a toy, etc.). Despite that, the teacher can identify the conceptual meaning the child is trying to refer to—Turn 3.2, “the game is called the farm”—because it was spoken when asked to plan a game situation to be carried out later in small groups.

In Exchange 4, we notice the omission of the subject of the complement in the child’s contribution—Turn 4.1, “I hit a crocodile with a . . .” Despite the fact that there are not any semantic or syntactic clues, the teacher can infer the meaning because the child dramatizes it in that situation with gestures that respond to the function of the object the child alluded to: an oar. Exchange 5 combines the use of gestures—the child shows six fingers—with the use of a deictic expression—Turn 5.1. “. . . this”—which the teacher interprets by referring to the gesture.

In other exchanges that we registered, the teachers’ reconceptualizations are actually corrections aimed at modifying the words in the children’s statements. It is interesting to note that, in many of their interventions, the teachers question the children’s lexical usage and offer an alternative, but they do not repress the children’s previous formulation:

Exchange 6: The children and the teacher retell different personal experiences while in the circle.

- 6.1. C: *y le ponemos víboras*. ‘and we put snakes’.
- 6.2. T: *¿víboras o lombrices?* ‘snakes or worms’?
- 6.3. C: *lombrices*. ‘worms’.
- 6.4. T: *lombrices*. ‘worms’.
- 6.5. C: *las lombrices son chiquitas*. ‘worms are small’.

Exchange 7

- 7.1. T: *vos estabas corriendo y tu mamá, ¿con qué se lastimó?* ‘you were running, and what did your mother get hurt with?’
- 7.2. C: *con la luz.* ‘with the light’.
- 7.3. T: *¿con la luz?, ¿con la lamparita?* ‘with the light?, or with the light bulb?’

In these examples, the teachers’ corrections are done through a question. These corrections, which include conceptual distinctions, are presented as disjunctions between the previous assertion of the child and of the teacher. It is important to point out some aspects connected to the structure of these correction strategies—these aspects could simplify conceptual distinctions on the part of the child. In the first place, teachers present both terms—the inadequate and the adequate one—in a series that allows for the comparison and the establishment of differences between concepts.

Also in these interventions, teachers strategically introduce reconceptualizations in the syntactic structure of the child’s production. Isomorphism between both assertions (i.e., the fact that one part of the structure remains stable) prompts children to pay attention to the new information in the adult’s statement. This phenomenon can be seen in Turns 7.2 and 7.3, “with the light” and “with the light?, or with the light bulb?,” respectively, and in Exchange 8:

Exchange 8: The children and the teacher retell different personal experiences while in the circle.

- 8.1. C: *me ponía debajo de la mesa.* ‘I got under the table’.
- 8.2. T: *te escondías debajo de la mesa.* ‘you hid under the table’.

In Exchange 8, the teacher’s assertion repeats part of the child’s: “. . . under the table.” Within that framework of isomorphism between both assertions, the teacher introduces new meaning to the child’s contribution. In fact, in the child’s statement, the verb phrase, “I got” (Turn 8.1), conceptualizes the spatial relation of the agent (i.e., the child) and an object (i.e., the table). Instead, the teacher’s utterance adds the intentional meaning of the action by offering the verb phrase, “you hid” (Turn 8.2). In this way, the teacher implicitly includes other actors the child hid from. In this exchange, and in the next one, strategies of reconceptualization, through the introduction of the agents’ motives, prompt the children to make conceptual distinctions that allow them to move beyond the perceptual structure of the world:

Exchange 9

- 9.1. C: *a mi hermanito lo tenía a upa y se iba para el otro lado ... entonces yo le digo "no, veni" y se me iba más lejos.* 'my little brother, I had him on my lap and he went to the other side ... so I tell him, "no, come" and he went further away'.
- 9.2. T: *ya anda haciendo travesuras, se escapa.* 'he's already playing pranks, he runs away'.

In Exchange 9, the teacher's conceptual reformulation not only introduces new meanings connected to the presumed intentions of the little brother (Turn 9.2, "he's already playing pranks"), but it also differs from the other reformulation strategies insofar as it summarizes the sequence of events mentioned (Turn 9.1, "... I had him on my lap and he went to the other side ... and he went further away") and the retelling of the words used by the child in that occasion (Turn 9.1, "... I tell him, 'no, come'...").

The children's linguistic development is fostered through this process of conceptual organization that occurs in classroom interaction. Such development covers various levels: discursive, semantic, syntactic, lexical, and phonological. These interaction situations also promote cognitive development to the extent that children are led along a gradually finer discrimination definition and characterization of concepts. This process of conceptual and linguistic organization is structured in the exchange on the basis of successive lexical "calibrations" that simultaneously consider the categorization and the linguistic system. Thus, in Exchange 10, the sequence of calibration in the course of the exchange between the teacher and the children leads to conceptual and linguistic distinctions:

Exchange 10: The teacher and the children talk before reading a story.

- 10.1. T: *¿qué es una arruga?* 'what is a wrinkle'?
- 10.2. C: *una pluma.* 'a feather'.
- 10.3. C: *una ruga que se lleva a los autos.* 'A tow truck that takes cars away'.
- 10.4. T: *no, eso es una grúa, una arruga, ¿qué es?* 'no, that's a tow truck, a wrinkle, what is it'?
- 10.5. C: *lo que usan los viejos.* 'what old people wear'.
- 10.6. T: *cuando nos ponemos viejos se nos hacen arrugas en la piel. Ven estas rayitas en la piel, se nos hacen arrugas ¿ustedes tienen abuelos?* 'when we grow old our skin becomes wrinkled. Can you see these lines on the skin, we get wrinkles. Do you have grandparents'?
- 10.7. C: *mi abuela tiene toda verrugas.* 'my grandma is full of warts'.
- 10.8. T: *tu abuela tiene arrugas, arrugas, verrugas es otra cosa.* 'your grandma has wrinkles, wrinkles, warts are something different'.
- 10.9. C: *arrugas.* 'Wrinkles'.²

As we may notice in this exchange, vocabulary acquisition—linguistic form and conceptual meaning—requires considerable work on the part of the child. Not only do they have to fix the phonological structure of the word, distinguishing it from others (*arruga* ‘wrinkle’ is a concept whose phonological representation cannot be assimilated to other lexemes in the Spanish language: Turn 10.2, *pluma* ‘feather’ and Turn 10.7, *verrugas* ‘warts’; or to nonwords: Turn 10.3, *ruga* ‘tow’), they also must establish a connection between this form and a meaning implying properties and different types of relations. In this exchange fragment, for example, a connection is established between wrinkles and beings that can become wrinkled: Turn 10.6, “when we grow old our skin becomes wrinkled,” and Turn 10.8, “your grandma has wrinkles.” Also, perceptual characteristics of the subject referred to are mentioned (i.e., wrinkles are a visible sign): Turn 10.6, “can you see these lines on the skin?” At the end of the exchange, the children spontaneously repeat the word. This fact may indicate that the interaction has produced a change in their vocabulary and, therefore, in their capacity to represent the world to themselves.

Teachers contribute to the process of conceptual definition—limits and scope of concepts—through a variety of strategies. In the exchanges analyzed, we registered *expansions*, *generalizations*, and *examples* that, jointly with *denominations* and *corrections*, favor the organization of children’s systems of categories. By means of these strategies, the teachers establish equivalences between the concept indicated by the child and an unknown one. They list salient perceptual traits; point at the function of the concept; and mention the thematic, spatial-temporal, and hierarchical relations they hold with other concepts. The intensive job of categorization that the teachers aim at with these strategies can be seen in the following exchange:

Exchange 11: The children and the teacher are looking at a poster with animals, and they must describe a humming bird.

- 11.1. T: *¿Qué vemos?* ‘What can we see?’
 11.2. C: *un loro.* ‘a parrot’.
 11.3. C: *un pajarito.* ‘a little bird’.

²In Spanish, the word *grúa* means ‘tow truck’. The child did not have a precise mental phonological representation of that lexical item. When the teacher said *arruga*, he said *ruga* because he understood that the student was referring to a tow truck (*grúa*). In this exchange, we can appreciate the relation between phonological and conceptual development. The nonword (*ruga*), as well as the words mentioned by the children (*grúa*, *pluma*, and *verrugas*), shares a phonological sequence whose structure is delimited by vowel phonemes /u/ and /a/ (*arr-uga* ‘wrinkle’, *pl-uma* ‘feather’, *r-uga* ‘tow’, and *verr-ugas* ‘warts’). In this sense, and due to the prominence of terminal sequences in sound perception and in the acquisition and constitution of mental lexicon, it is evident that the reaffirmation of the adequate phonological representations should be crucial in the constitution and development of the conceptual system.

- 11.4. T: *es un pájaro, muy bien. ¿Es grande?* ‘it’s a bird, very good. Is it big’?
- 11.5. C: *no, chiquito.* ‘no, tiny’.
- 11.6. T: *es chiquito pero el pico es largo. Tiene un pico que es largo porque le sirve para comer adentro de las flores. El otro día vimos cómo se llamaba: colibrí.* ‘it is tiny but the beak is long. He has a long beak because it allows him to eat inside flowers. The other day we heard what it was called: humming bird’.
- 11.7. C: *colibrí.* ‘humming bird’.

In Exchange 11, the teacher leaves out the term that refers to a subordinate category (i.e., *parrot*, Turn 11.2), which does not represent the connoted referent. Through a generalization strategy, the teacher underscores the term that represents the basic category (i.e., *bird*, Turn 11.4) contributed by one of the children. The teacher retrieves the semantic clue contributed through the diminutive used by one of the children (i.e., “little bird,” Turn 11.3). After that, the teacher asks for an expression that will specify the size (Turn 11.4, “it’s a bird, very good. Is it big?”). By comparison with other birds, this expression focuses on a conspicuous trait of humming birds.

As the teacher expects to conceptually build the subordinate category, *humming bird*, she proceeds with the process of definition by gradually referring to the other salient perceptual properties of that category of birds. Thus, she covers the part-whole relation between the bird and its beak, and expands on the information contributed by the child about the size—Turn 11.6, “it is tiny but the beak is long.”; in the same statement, this perceptual information is connected with functional information—Turn 11.6, “. . . because it allows him to eat inside flowers—thereby establishing thematic connections between a couple of concepts (i.e., *beak* and *flowers*), which allows her to introduce, once again, the term, *humming bird*, which had been mentioned in a previous activity.

These exchanges help the children progress through in the process of knowledge elaboration by establishing conceptual distinctions and the hierarchical connections that lead to building categories. In the following exchange fragment, the teacher describes other birds, strategically using the previous description of the humming bird:

Exchange 12

- 12.1. T: *¿cómo son los picos?* ‘how are the beaks’?
- 12.2. C: *largos.* ‘long’.
- 12.3. C: *grandes.* ‘big’.
- 12.4. C: *gordos.* ‘fat’.
- 12.5. T: *gordos, son grandes, son gruesos, ¿son como el del colibrí?* ‘fat, they are big, they are wide, are they like the humming bird’s’?

12.6. C: *no*. 'no'.

12.7. T: *no, el del colibrí es más finito y es más largo y los picos del loro y del tucán no son más finitos son más gruesos*. 'no, the humming bird's is narrower and longer and the beaks of the parrot and the toucan are not narrower, they are wider'.

Upon the teacher's request to describe the characteristics of beaks, the children mention three properties describing their size: Two of them are lexically appropriate—*long* (Turn 12.2) and *big* (Turn 12.3)—because they apply to inanimate entities; that is not the case with Turn 12.4 (i.e., *fat*). However, the teacher does not include the descriptor connected to length (i.e., *long*, in Turn 12.2) because as she selects and retrieves from the children's words the sequence of the two properties that are functional for comparing the beaks of the toucan and the parrot with that of the humming bird and establishes a difference within the basic category: *bird*.

The teacher retrieves the properties mentioned by the children (i.e., *fat* and *big*). Upon retrieving them, she accepts them and presents the term *wide* next to it. She sees it as a more adequate descriptor because *big* can refer both to width and length, and *fat* does not apply to inanimate objects. By joining *wide*, *fat*, and *big*, the teacher delineates a syntactic structure within which the children can compare the terms listed and infer which is the most appropriate. In fact, the teacher places in the top of the list the inappropriate term *fat* and deprives it of the state status of the other two descriptors: Turn 12.5, "fat, they are big, they are wide." Besides, the teacher makes use of tone traits and of the syntactic position in the comparative structure so that the children may infer the salient term she chose.

Following the comparison between the thick beak of these two birds and the beak of the humming bird, the teacher applies a strategy of examples that allows her to establish the scope of the newly introduced terms, she underscores the conceptual limits of the representation of each one of the birds—humming bird, toucan, and parrot—and she fosters the establishment of taxonomic links between these subordinate concepts and the basic category, *bird*.

These processes of differentiation and integration lead the children to build hierarchical taxonomies. The following example shows how the exchange turns into a matrix for such processes:

Exchange 14: Before reading a story, the children and the teacher talk about fruit.

14.1. C: *uvas ... frutas*. 'grapes ... fruit'.

14.2. C: *uvas*. 'grapes'.

14.3. T: *diferentes frutas ... son comida ... ¿qué frutas conocen ustedes?* 'different fruits ... they are food ... which fruits do you know'?

14.4. C: *frutas, yo*. ‘me, fruits’.

14.5. C: *uva*. ‘grape’.

14.6. C: *banana*. ‘banana’.

As we see in this example, the teacher connects the category “grapes” (subordinate category) with “fruits” (basic category) and with the concept of “food” (superordinate category). She implicitly establishes connections of hierarchical inclusion among them. It is important to keep in mind that, although the children mention both the subordinate category (Turn 14.2, “grapes”) and the basic category (Turn 14.4, “fruits”), it may happen that they do not grasp the hierarchical connection between them. That notwithstanding, even if processes of differentiation and integration that lead children to build hierarchical taxonomies are complex and are carried out over all the school years, the process of connecting terms with categories and relating categories between each other begins early within the framework of these types of verbal exchanges.

DISCUSSION

The results of this work contribute to the description of linguistic strategies whereby kindergarten teachers promote the children’s conceptual development. Teachers apply these strategies when, within the framework of conversations that include teaching–learning situations, there are problems of adjustment between their own representations and the children’s. Starting with the interpretation of actual clues either in the children’s statements or within the context of the situation, teachers infer the meanings the children refer to, and they display strategies that bridge the children’s representations with the meanings that are typical of their particular community and social group.

In this way, the strategic framework the teachers contribute solves two problems simultaneously: In the short term, there is a shared mental text to appropriately carry out the activity (Overstreet & Yule, 1997). In the long term, these adult strategies allow the child to gradually start taking part in the conceptual framework of the community (Nelson, 1996).

As Nelson (1986) pointed out, children discover early the analytic power of language—namely, its power as an instrument that permits the partitioning of experience, its re-elaboration, as well as its communication to others in conversation. That explains why, from an early age, children focus their attention on the linguistic terms strategically provided by adults in the course of verbal exchange, and they make a functional use of them to retell their experience, both to themselves and others.

Data analyzed in this work has allowed us to identify several linguistic strategies in the conversational exchanges that unfold in the classroom—denomi-

nations, corrections, expansions, generalizations, and examples—whereby teachers re-elaborate, specify, limit, integrate, and expand the children's conceptual world.

Teachers display strategies of denomination when in the course of verbal exchange they notice that the children do not know the exact linguistic term to refer to a given concept—when they refer to it with a vague or general term, or when they indicate it through a deictic expression or a gesture. In such cases, teachers infer, by means of the lexical and contextual clues mentioned earlier, the characteristics of the semantic representation and strategically offer the appropriate term to the child.

We have also observed that when children refer to specific concepts in the communication process, they often make use of terms that do not coincide with the scope or the connections these concepts actually have within their social context. Through correction strategies, teachers offer them alternative denominations that are similar to those used within the community.

Both strategies—denomination and correction—widen the limits of perception insofar as they lead the children to pay attention to the traits that separate an object or event from another with regards to which they show differences; and, due to the very same reason, they also contribute to conceptual organization. In fact, there is evidence showing that knowledge of denomination is a factor that has an early and productive influence on object categorization (Hollich, Hirsh-Pasek, & Golinkoff, 2000; Nazzi & Gopnik, 2001; Schafer & Plunkett, 1998; Werker, Cohen, Lloyd, Casacola, & Stager, 1998; Woodward, Markman, & Fitzsimmons, 1994).

Frequently, the teachers' correction strategies focus on the phonological form of the word: They simultaneously present the conventional and altered denomination used by the child. They underscore, with prosodic resources or gestures, the fragments that originated the mistake and confront the different phonologic forms with their corresponding conceptual contents. Thus, they contribute to prevent altered phonologic representations to cause confusion between one concept and another. In fact, there is evidence that there is a close interrelation among the development of mechanisms to process language, the lexical heritage, and the development of systems of conceptual categories (Nazzi & Gopnik, 2001).

The joint presentation or juxtaposition of the altered denomination used by the child and the correct alternative denomination in teachers' correction strategies discursively operates as a syntactic mold that is equivalent to a comparative structure. By presuming the existence of a ground of comparison between the terms offered, it promotes the cognitive mechanism that is essential for conceptualization. In fact, contiguous presentation, insofar as it requires a comparison, helps children to more easily infer similarities and differences between the alternatives offered. This is because, as Boroditsky (2002) affirmed, comparison exposes the characteristics in which objects or events are similar or different, making

similar things seem more similar and dissimilar things seem less similar. In this way, comparison helps sharpen conceptual boundaries, form new categories that segment the world, and develop taxonomies.

Whereas the strategies of denomination and correction lead the child to discriminate and limit a concept or a conceptual area through establishing a connection with a specific term, the other strategies identified in this article—expansions, generalizations, and examples—presume that the delimitation of the conceptual entity to which the child refers is socially adequate; and they focus in helping the child to expand the characterization and definition of that entity and to find more complex links—taxonomic and thematic—between that conceptual entity and others.

Teachers' expansions of children's statements lead the latter to pay attention to the perceptual and functional characteristics of the concepts, as well as to thematic connections between that concept and others. Whereas perceptual traits are very important for the definition and characterization of animate objects, functional traits are crucial in the case of inanimate objects (Marques, 2002). The productivity of these strategies that operate simultaneously with different types of information lies in the fact that, as Markman and Hunt Stilwell (2001) held, functional and perceptual representations must work jointly in order for the cognitive systems to use categories effectively.

Through generalization strategies, which imply mentioning the superordinate concept that covers the concept mentioned by the child, teachers gradually lead the children toward the development of abstract concepts. By appealing to strategies of exemplification—that is, mentioning subordinate concepts to the one referred to by the child—teachers aid the children to limit the scope of a concept, establishing the subordinate items over which the concept mentioned may be projected (Lucariello et al., 1992). Both strategies—generalization and exemplification—promote the establishment of hierarchical connections in the children, integration between concepts, and building conceptual taxonomies.

In the strategies identified, teachers usually retrieve the properties mentioned by the children in their contributions. This inclusion of children's words in the teacher's discourse has simultaneous echoes in various levels. At the semantic level, including the children's words in the teacher's discourse implies accepting their relevance as descriptions of the concept mentioned. At the pragmatic-interaction level, it implies valuing the children's participation and invites them to continue to participate in the future. On the cognitive level, the teacher underscores the intersubjective character of the activity and of the knowledge-building process.

Despite the fact that each one of the linguistic strategies mentioned helps the children to work with a particular cognitive operation and different kinds of information, the observed exchanges show that all these strategies operate simultaneously, setting limits to the concepts used on the basis of their linguistic

denomination, expanding their perceptual and functional characteristics, and establishing thematic and taxonomic connections.

It is important to note that the conclusions of other works on concept learning (Deák, Ray, & Pick, 2002; Mandler & McDonough, 1993; Sloutsky, Fen Lo, & Fisher, 2001; Welder & Graham, 2001) do not establish which of the dimensions under analysis has the greatest weight in the concept-learning process—the perceptual characteristics of the object, its role in the functional organization, or its linguistic denomination. Coinciding with the analysis offered in this work, nevertheless, they do ascertain that verbal interaction is the matrix within which children gradually access these various conceptual dimensions.

Nevertheless, it has been acknowledged that all types of exchanges have identical impact. It is not interaction, per se, but certain interaction strategies that foster the child's linguistic and cognitive development (Snow, 1983). In fact, correlated research in the home has shown that parents' style of interaction influences the discursive development of the child and his or her memory skills (Fivush & Fromhoff, 1988; Fivush & Haden, 1997; Nelson, 1996; Nelson & Ware, 2000; Tessler & Nelson, 1994). It also impacts the organization of children's conceptual systems, as witnessed by the amount and kind of vocabulary acquired (Goldfield, 1986; Gopnik & Choi, 1990; Gopnik, Choi, & Baumberger, 1996; Nelson, Hampson, & Kessler Shaw, 1993). Within this framework that closely connects interaction, language, and cognition, it is possible to weight the importance of the reconceptualization strategies identified in this work. They bring about conversation routines in children's classrooms that bridge the gap between children's denomination and the community's. By focusing on defining the limits to concepts and organizing them on a hierarchical and thematic structure, teachers offer a framework that guides the conceptual changes that children must go through in order to operate with socially shared categories. That is why these strategies may create learning opportunities that may help to explain the conceptual differences often noticed among children in kindergarten and primary school.

REFERENCES

- Boroditsky, L. (2002). Comparison and the development of knowledge. *Proceedings of the 24th annual meeting of the Cognitive Science Society*. Retrieved May 3, 2006, from <http://www-psych.stanford.edu/~lera/papers/comparison.pdf>
- Brown, R., & Bellugi, U. (1964). Three processes in the child's acquisition of syntax. *Harvard Educational Review*, 34, 133–151.
- Bruner, J. (1977). Early social interaction and language development. In H. R. Schaffer (Ed.), *Studies in mother-child interaction* (pp. 271–289). London: Academic.
- Bruner, J. (1986). *El habla del niño* [Child's talk]. Barcelona, Spain: Paidós.
- Cazden, C. (1972). *Child language and education*. New York: Holt, Rinehart, & Winston.

- Deák, G. O, Ray, S. D., & Pick, A. D. (2002). Matching and naming objects by shape and function: Age and context effects in preschool children. *Developmental Psychology, 38*, 503–518.
- Del Río, I., Sánchez, E., & García, R. (2000). Análisis de la interacción maestro-alumnos durante la resolución de problemas aritméticos [Analysis of teacher-student interactions during arithmetic problem solving]. *Cultura y Educación, 17/18*, 41–61.
- Del Río, P., & Álvarez, A. (1997). ¿Saber o comportarse? El desarrollo y la construcción de la directividad [Knowledge or behavior? Development and construction of directivity]. In A. Álvarez (Ed.), *Hacia un currículo cultural. La vigencia de Vigotski en la educación* (pp. 101–131). Madrid, Spain: Infancia y Aprendizaje.
- Erickson, K. A., & Kintsch, W. (1995). Long term working memory. *Psychological Review, 102*, 211–245.
- Fivush, R., & Fromhoff, F. A. (1988). Style and structure in mother-child conversations about the past. *Discourse Processes, 11*, 337–355.
- Fivush, R., & Haden, C. A. (1997). Narrating and representing experience: Preschooler's developing autobiographical accounts. In P. W. Van den Broek & P. J. Bauer (Eds.), *Developmental spans in event comprehension and representation* (pp. 169–198). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Frawley, W. (1997). *Vygotsky and cognitive science. Language and the unification of the social and computational mind*. Cambridge, MA: Harvard University Press.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. Chicago: Aldine.
- Goldfield, B. A. (1986). Referential and expressive language: A study of two mother-child dyads. *First Language, 6*, 119–131.
- Gopnik, A., & Choi, S. (1990). Do linguistic differences lead to cognitive differences? A cross-linguistic study of semantic and cognitive development. *First Language, 10*, 199–215.
- Gopnik, A., Choi, S., & Baumberger, T. (1996). Cross-linguistic differences in early semantic and cognitive development. *Cognitive Development, 11*, 197–227.
- Güllich, E., & Kotschi, T. (1985). Les actes de reformulation dans la consultation La Dame de Caluire [Reformulation actions in the consultation of Lady Caluire]. In P. Bange (Ed.), *L'analyse des interactions verbales. La dame de Caluire: Une consultation. Actes du Colloque tenu a l'Université Lyon 2 du 13 au 15 Décembre 1985* (pp. 15–81). Paris: Université Lyon.
- Güllich, E., & Kotschi, T. (1996). Discourse production in oral communication: A study based on French. In U. Quastoff (Ed.), *Aspects of oral communication* (pp. 31–66). Berlin: de Gruyter.
- Hollich, G. J., Hirsh-Pasek, K., & Golinkoff, R. M. (2000). Breaking the language barrier: An emergentist coalition model for the origins of word learning. *Monographs of the Society for Research in Child Development, 65*(3, Serial No. 262).
- Kintsch, W. (1998). *Comprehension. A paradigm for cognition*. Cambridge, England: Cambridge University Press.
- Lenke, J. (1997). *Aprender a hablar ciencia* [Talking science: language, learning and values]. Barcelona, Spain: Paidós.
- Liu, J., Michnick Golinkoff, R., & Sack, K. (2001). One cow does not an animal make: Young children can extend novel words at the superordinate level. *Child Development, 72*, 1674–1694.
- Lucariello, J., Kyrtzias, A., & Nelson, K. (1992). Taxonomic knowledge: What kind and when. *Child Development, 13*, 272–282.
- Mandler, J. M. (2000). Perceptual and conceptual process in infancy. *Journal of Cognition and Development, 1*, 3–36.
- Mandler, J. M., Bauer, P., & McDonough, L. (1991). Separating the sheep from the goats: Differentiating global categories. *Cognitive Psychology, 23*, 263–298.
- Mandler, J. M., & McDonough, L. (1993). Concept formation in infancy. *Cognitive Development, 8*, 291–318.
- Markman, A. M., & Hunt Stilwell, C. (2001). Role governed categories. *Journal of Experimental Psychology & Theoretical Artificial Intelligence, 13*, 329–358.

- Marques, F. (2002). Names, concepts, features and the living/nonliving things dissociation. *Cognition*, *85*, 251–275.
- Nazzi, T., & Gopnik, A. (2001). Linguistic and cognitive abilities in infancy: When does language become a tool for categorization? *Cognition*, *80*, B11–B20.
- Nelson, K. (1977). Facilitating children's syntax acquisition. *Developmental Psychology*, *13*, 101–107.
- Nelson, K. (1986). *Event knowledge: Structure and function in development*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Nelson, K. (1996). *Language in cognitive development: Emergence of mediated mind*. Cambridge, England: Cambridge University Press.
- Nelson, K., Carskaddon, G., & Bonvillian, J. (1973). Syntax acquisition: Impact of experimental variation in adult verbal interaction with the child. *Child Development*, *44*, 497–504.
- Nelson, K., Hampson, J., & Kessler Shaw, L. (1993). Nouns in early lexicons: Evidence, explanations and implications. *Journal of Child Language*, *20*, 61–84.
- Nelson, K., & Ware, A. (2000). The reemergence of function. In J. Mandler, N. Stein, P. Bauer, & M. Rabinowitz (Eds.), *Representation, memory and development: Essays in honor of Jean Mandler* (pp. 160–184). Mahwah, NJ: Erlbaum.
- Overstreet, M., & Yule, G. (1997). Locally contingent categorization in discourse. *Discourse Processes*, *23*, 83–97.
- Rogoff, B. (1993). *Aprendices del pensamiento* [Apprenticeship in thinking: Cognitive development in social context]. Barcelona, Spain: Paidós.
- Rosch, E. H., Mervis, C. B., Gray, W. D., Johnson, D. M., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, *8*, 382–439.
- Rosemberg, C. R., & Borzone, A. M. (2001). La enseñanza a través del discurso: Estrategias de contextualización y descontextualización de significados [Teaching through discourse: Strategies for contextualizing and decontextualizing meanings]. *Cultura y Educación*, *13*, 407–424.
- Rosemberg, C. R., & Borzone, A. M. (2004). Del jardín de infantes a la escuela primaria ¿Continuidad o ruptura en las matrices interactivas de la enseñanza y aprendizaje? [From kindergarten to primary school: Is there a continuity or a break in the interactional matrixes of teaching and learning?]. *Infancia y Aprendizaje*, *27*, 211–246.
- Rosemberg, C. R., Borzone, A. M., & Diuk, B. (2003). El diálogo intercultural en el aula. Un análisis de situaciones de interacción con niños de barrios urbano marginales del conurbano de Buenos Aires, Argentina [Intercultural dialogue in the classroom. An analysis of verbal interactions in instructional situations with children from poor suburban communities]. *Cultura y Educación*, *15*, 399–423.
- Sánchez, E. (2001). Ayudando a ayudar: El reto de la investigación educativa [Helping to help: The goal of educational research]. *Cultura y Educación*, *13*, 249–266.
- Sánchez, E., Rosales, J., & Suárez, S. (1999). Interacción profesor/alumnos y comprensión de textos. Qué se hace y qué se puede hacer [Teacher-student interaction and text comprehension. What are we doing and what can we do?]. *Cultura y Educación*, *14/15*, 71–89.
- Schafer, G., & Plunkett, K. (1998). Rapid word learning by fifteen-month-olds under tightly controlled conditions. *Child Development*, *69*, 309–320.
- Silva, M. L. (2004). La reformulación en los intercambios adulto–niño: Un estudio de caso [Reformulation in adult-child exchanges: A case study]. *Proceedings from the 7th Congreso Nacional de Hispanistas*. Sociedad Hispanoamericana de Hispanistas, Tucumán, Argentina.
- Silva, M. L. (2007). *Hacia una sistematización de la formulación lingüística en función de la Teoría Sociogenética* [Toward a linguistic formulation system following Socio-Genetic Theory Principles]. *Estudios de Psicología*, *28*, 33–49.

- Sloutsky, V. M., Fen Lo, Y., & Fisher, A. V. (2001). How much does a shared name make things similar? Linguistic labels, similarity, and the development of inductive inference. *Child Development, 72*, 1695–1709.
- Snow, C. E. (1972). Mothers speech to children learning language. *Child Development, 43*, 549–565.
- Snow, C. E. (1983). Literacy and language: relationships during the preschool years. *Harvard Educational Review, 53*, 2, 165–189.
- Snow, C. E., & Ferguson, C. A. (1977). *Talking to children: Language input and acquisition*. Cambridge, MA: Cambridge University Press.
- Strauss, A., & Corbin, J. (1991). *Basics of qualitative research. Grounded theory. Procedures and Techniques*. London: Sage.
- Tessler, M., & Nelson, K. (1994). Making memories: The influence of joint encoding. *Consciousness and Cognition, 3*, 307–326.
- Van Dijk, T. (1997). Towards a theory of context and experience models in discourse processing. In H. van Oostendorp (Ed.), *The construction of mental models during reading* (pp. 123–148). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Vygotsky, L. S. (1964). *Pensamiento y lenguaje* [Language and thought]. Buenos Aires, Argentina: Fausto.
- Vygotsky, L. S. (1978). *Mind in society. The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Welder, A. N., & Graham, S. A. (2001). The influence of shape similarity and shared labels on infants' inductive inferences about non-obvious object properties. *Child Development, 27*, 1653–1673.
- Werker, J. F., Cohen, L. B., Lloyd, V. L., Casacola, M., & Stager, C. L. (1998). Acquisition of word-object associations by 14-month-old-infants. *Developmental Psychology, 34*, 1289–1309.
- Wertsch, J. V. (1991). *Voces de la mente. Un enfoque sociocultural para el estudio de la acción mediada* [Voices of the mind: A sociocultural approach to mediated action]. Madrid, Spain: Visor.
- Wertsch, J. V. (1998). *La mente en acción* [Mind as action]. Buenos Aires, Argentina: Aique.
- Woodward, A. L., Markman, E. M., & Fitzsimmons, C. M. (1994). Rapid word learning in 13- and 18-month-olds. *Developmental Psychology, 30*, 553–566.