

A socio-perceptual/ecological approach to lexical development: Affordances of the communicative context

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Título: Un enfoque socio-perceptivo/ecológico del desarrollo léxico: *Affordances* del contexto comunicativo.

Resumen: Los supuestos básicos cruciales de la posición innatista influyen en los investigadores hasta hacerles ignorar la fuente del *input* lingüístico, sus características y su impacto sobre el desarrollo del lenguaje. Sin embargo, un supuesto fundamental del enfoque socio-perceptivo/ecológico es que la aparición del lenguaje depende de la estructura dinámica del ambiente socio-interactivo en el que se desarrolla el niño. Para apoyar e ilustrar esta perspectiva se presentan datos de una serie de estudios que examinan las bases sociales y perceptivas de la aparición del léxico. Para explicar otros aspectos del desarrollo del lenguaje se pueden y deben construir argumentos semejantes.

Palabras clave: Desarrollo del lenguaje; dirigir la atención; ecológico; *affordances* sociales; primer léxico.

Abstract: Basic assumptions crucial to the innatist position influence researchers to ignore the source of language input, its characteristics, and its impact on language development. However, a key assumption of the socio-perceptual/ecological approach is the idea that the emergence of language depends on the dynamic structure of the social-interactive environment in which the infant develops. To support and illustrate this perspective, evidence from a series of studies examining the social and perceptual bases of the emergence of the lexicon is marshalled to support and illustrate this perspective. Parallel arguments can and ought to be constructed to explain other aspects of language learning.

Key words: Language development; attention-directing; ecological; social affordances; early lexicon.

The relation between words and world must be learned. No theoretical position claims otherwise. However, the process by which infants achieve this milestone remains an enigma and its relation to later language learning is unresolved.

Some theories of linguistic development posit mechanisms that make innate linguistic knowledge available when triggered by the environment in the form of linguistic input (Chomsky, 1965, 1967, 1990). This knowledge, however, is not formed by that input (Chomsky, 1967). Given the very limited role of input within Chomsky's conceptualization of language ac-

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quisition, it is not surprising that his position has directly and indirectly influenced many researchers to ignore input. These scholars propose innate biases that constrain the number of hypotheses that infants might entertain regarding word meanings (Baldwin & Markman, 1989; Markman, 1989, in press; Woodward & Markman, in press). Others with a more cognitive and/or functional orientation explicitly or implicitly rely on spatio-temporal contiguity to explain how infants actively discover links between words and what they represent (Bates, 1979; Braunwald, 1978; Stemmer, 1983). Two recent articles discuss inconsistencies and weaknesses inherent in these approaches to language development (Dent, 1990) and to lexical development in particular (Zukow, 1990). In their stead, we presented an ecological approach to language development.

From a socio-perceptual/ecological position the emergence of the early lexicon depends on caregivers guiding infants to notice the relation between what is said and what is done, so they can comprehend speech. While the matrix within which cultural knowledge is transmitted by caregivers is SOCIAL, the process through which children detect this knowledge is PERCEPTUAL. In other papers I have elaborated the role of social interaction in this process from a Vygotskian perspective (Zukow, 1989; Zukow, 1990a). In the present article the interactional underpinnings of the emergence of the early lexicon are discussed as a means to understand how caregivers provide detectable perceptual information that links aspects of ongoing events and lexical items. For example, the saying of *ball* in the utterance *Look at the ball!* co-occurs with the ball being waggled directly in the infant's line of sight. In other situations, where and what to notice may not be so simply achieved. Imagine a toddler whose sweeping is causing great, choking billows of dust. A caregiver may tell her/him to move to a location several yards away by pointing and saying *Look, sweep over there!* However, finding just where "there" might be from this conventional gesture to a particular spot in an expanse of dirt may prove too difficult for the infant. Whereas the point for the message sender is virtually placing the fingertip on the exact place in the scene, for the message receiver the trajectory of the point is traced only as far as the fingertip is extended. The trajectory from fingertip to location must be inferred by the receiver. The full trajectory from hand to location will have to be traced by the toss of an object, such as a rock or seed pod, to clearly mark the spot for many infants during the second year of life. The main point is that caregivers educate the natural attentional abilities of their infants by marking the relation between world and word. Children are *not* faced with infinite possibilities when attempting to relate what is said to what is happening. Instead, caregivers continuously provide information that limits the number of alternatives, so that children can eventually detect the conventional relation between world and words. A shared focus of attention that is necessary for successful communication is established by perceptually specifying information about daily activities (Zukow 1990a, 1990b; Zukow & Duncan, in press; Zukow & Schmidt, 1988).

Socio-perceptual/ecological approach to language development. In this section a brief overview of key ideas from the ecological perspective are presented that can serve as a basis for investigating language development. The application of ecological principles to the problem of lexical development is based on perceptual information that is made available during social interaction. Empirical evidence and implications from investigations of the emergence of the lexicon bearing on this enterprise are discussed. (See Dent, 1990; Zukow, 1990a, 1990b; Zukow & Duncan, in press) for a fuller discussion of these ideas and empirical evidence in support of this position).

Central tenants of James J. Gibson's ecological approach to perception (1979) are taken from the perspective of a creature in its environment. Gibson asserted that perceptual information specifies its source in the environment and is detectable. According to Gibson, there is a complementarity between an organism and its niche, such that the animate and inanimate elements in the environment afford or offer unique advantages and disadvantages to each creature. For instance, a glass of water offers grasping, drinking, and/or dropping to a person and is a candidate crawl-on-able, float-on-able, or drown-in-able for a variety of insects. Opportunities for action are perceived by dynamic creatures as they continuously monitor and ascertain what the environment affords. From this perspective, development may depend on or be facilitated by directing a child to attend to the affordances of socio-cultural relations, including language.

Dent (1990) proposes a realist approach to the emergence of language "that focuses our attention on how language is connected to the world and is, thereby, learnable". She appeals to Millikan's arguments (1984) that workable, adaptive language devices, such as tonal inflections, words, surface syntactic forms, must correspond to stable patterns in the environment. Dent discusses how children might come to detect the relation between language devices and stable patterns occurring during everyday life. Her theorizing is solidly grounded in an ecological approach to perception (Dent & Rader, 1979; Gibson, 1966, 1979; Rader & Dent, 1979; Reed 1985a; 1987). According to ecological theory meaningful information is directly perceived and need not be cognitively constructed. People perceive what the physical world affords, be it object, organism, or event, by the detection of invariance in the perceptual (visual, auditory, tactile, kinesthetic) array. It follows, then, that language devices and their relation to the world are detectable. Dent argues that because the structure in the environment emerges and is detectable while interacting with it, the positing of innate language mechanisms is not required.

Ecological theory and research has for the most part been restricted to investigating the processes by which information about the physical world is detected. Further, the ecological approach sketched above implicitly assumes an experienced, competent member. How a less experienced member, a child, might become similarly attuned to what the physical world offers has been examined by Eleanor Gibson and her colleagues (1969; 1984). They have investigated perceptual learning, the refinement of perceptual abilities, as a function of experience with the environment. New patterns or regularities in perceiving, abilities to detect information more effectively or efficiently, and enlarging the range of meaningful information that can be picked-up are not learned in the classical sense or caused by changes in concepts of objects and events (Dent, 1990; Reed, 1985a, 1987). Rather, the orderliness is lived and emergent, hypothesized to be the result of dynamic self-organizing processes during which certain states emerge and induce others. Differentiation/development is guided by local interactions rather than autonomous executives under the control of plans/codes designed to achieve particular end-points. (For discussions of self-organizing systems related to (language) development, see Fogel & Thelen, 1987; Oyama, 1985; Turvey, 1980; Wolff, 1987). This approach holds promise for the investigation of complex organism-environment systems. One problem to be considered is how social interaction might be what Oyama (1985) calls in-formation, how interactants continuously inform each other, displaying/conveying information that precipitates qualitative changes in functioning. This approach suggests that "the nature of interaction precipitates development" (Zukow, 1989, p. 82) by making emergent structure prominent and available to the infant. The question is how.

Educating attention. Gibson (1966, pp. 51-52) argued that for differentiation of perceptual abilities to take place attention must be educated. An ecological perspective assumes an individual must interact continuously with her/his environment to detect the structure in the perceptual array. This interaction is bi-directional in nature. The environment or niche is seen to shape the organism as well as be shaped by it (Dent, 1990; Gibson, 1979). From this perspective, a question for language development is how the environment affects the education of attention. While Gibson (1979) acknowledged the importance of the social environment, neither of the Gibsons investigated the means by which social affordances, including language, are displayed and detected. Only recently have ecological psychologists begun to discuss what the social world might afford (Good, Still, & Valenti, 1989; Loveland 1989; McArthur & Baron, 1983; Noble, 1981, 1987; Reed, 1985b, 1987, in press; Still & Costall, 1989; Van Acker & Valenti, 1988; Verbrugge, 1985; Zukow, 1989; Zukow, Reilly, & Greenfield, 1982). The consensus is that as more competent, highly perceptually-differentiated members of society, caregivers can display what the environment affords to infant novices (Zukow, 1989). During the course of the most mundane, routine activities, caregivers unceasingly and unwittingly provide infant's with perceptual information relating speech to events as they unfold. Let's turn from caregivers as a resource to what the infant needs to know. Is there a good match?

The problem for the child is to relate words to world. The emergence of the lexicon depends on the child detecting *conventional* relations between the continuous streams of linguistic and perceptual input. Simple spatio-temporal contiguity will not serve as a satisfactory explanation. The mere co-presence of a perceptually sensitive infant and the availability of detectable information in the perceptual array do not guarantee their convergence in conventional ways. Given a spatio-temporal explanation, any aspect of co-occurring perceptual events might be paired with the utterance of a particular lexical item. A "super-abundance" of candidate referents are usually available. For instance, on being awakened from a nap, what prevents a child from relating a word such as *bark* to dog, sleeping, waking-up, crib, window, clouds, tree or any of the numerous other elements sharing this brief event (Braunwald, 1978; Stemmer, 1983)? A child might relate a word, *dog*, to a property of it, *furry*, a part, *tail*, or its location, *floor* rather than the animal (Baldwin & Markman, 1989; Golinkoff, Bailey, Wenger, & Hirsh-Pasek, 1989; Markman, 1989, in press; Woodward & Markman, in press; but c.f. Quine, 1960)⁽¹⁾. In fact, relations are noticed that are not conventional (for examples, see Bowerman 1976; Braunwald, 1978). Obviously, a preponderance of vague messages would make getting through the day quite difficult. The resolution of this dilemma from a socio-perceptual/ecological perspective is that caregivers as competent members of their culture educate infants' or novice members' attention to important (cultural) relations as a routine matter while conducting everyday life. From this perspective, caregiver messages would be expected to make some possibilities very prominent, while reflexively eliminating others. The result would be less ambiguity than has been suggested.

Investigation of how the social environment, embodied as caregivers, might shape perceptual and linguistic development from an ecological perspective, for the most part, has just begun. Work conducted to investigate the emergence of the early lexicon supports Dent's hypothesis that language devices corresponding to stable patterns in the environment are detectable. My research has explored how the relation between linguistic devices and the perception of their relation to ongoing events is achieved among members of the traditional culture of Central Mexico in rural and urban settings and among middle-class caregivers in the U. S. (Zukow, 1989, 1990a, 1990b).

In Central Mexico the use of *Mira!* (*Look!*) is ubiquitous, occurring on the average once a minute. A brief ethnography of its occasions of use with infants at the one-word period disclosed that *Mira!* usually accompanied interactions in which caregivers were directing attention to new topics of interest and/or refocusing infants during an ongoing activity (Zukow, 1989). (The specific gestures used to direct attention and the topics of that attention are discussed in detail in Zukow, 1989, 1990a)⁽²⁾. For instance, an infant might be carried to see something novel such as a flower. As the caregiver would place the child about 8" from the blossom or rotate it into the infant's line of sight, (s)he would often say *Mira la flor!* (*Look at the flower!*). On other occasions, an infant's interest might flag while tossing a ball back and forth. In this situation, a caregiver might repeatedly say *Mira, avientalo!* (*Look, toss it!*) while his/her out-reaching arms and hands were being retracted, describing the direction of the requested action. These early observations of the relation between gesture, speech, and ongoing events have led to a series of studies of attention-directing. Results from these cross-sectional studies have demonstrated that caregivers in Mexico and in the U. S. use the same set of gestures to direct attention to a range of similar topics during the one-word period. Caregiver messages paralleled the infant's growing general ability to comprehend conventions, both nonverbally in gesture as well as verbally in speech. The increasing complexity of topics introduced by caregivers preceded the expression of the same ordered sequence of semantic functions later produced by the infants. To elaborate briefly the empirical and theoretical underpinnings of these findings as they relate to an ecological approach, I have sketched a short summary of my work on attention-directing. (See Zukow, 1989, 1990a, 1990b; Zukow & Duncan, in press for a fuller discussion).

I selected attention-directing interactions based on their hypothesized importance to ecological theory as the basis for perceptual differentiation, their importance for successful interaction and communication, their observed relation to the emergence of language, and their very frequent occurrence in both cultures. Many researchers (Bates, 1976; Shweder, 1982) have hypothesized that successful communication depends on cultural knowledge that is shared by all competent members. In conversation this knowledge is embodied as a shared focus of attention (Zukow, 1990b). While the establishment and/or negotiation of joint attention among competent members is a necessary precondition for a information to be exchanged (Atkinson, 1982) or for a working consensus to be reached (Schegloff, 1972), this knowledge and the methods by which mutuality is achieved are often taken for granted and only noticed in the breach. The opposite is true for infants. The infant's or novice member's knowledge base cannot be assumed: it is limited and the detecting of information confined to the "here and now". Therefore, the methods used by the caregiver-expert to continuously establish a shared focus of interaction are especially critical to the transmission and emergence of cultural knowledge, including linguistic knowledge (Zukow, 1989; see Bruner, 1983; Wells, 1981 for related arguments). Recent investigations (Adamson, Bakeman, & Smith, in press; Bruner, 1983; Goldfield, 1987; Tamis-LeMonda & Bornstein, 1989; Tomasello & Farrar, 1986; Tomasello & Todd, 1983; Vibbert & Bornstein, 1989) conducted for somewhat different ends have demonstrated a relation between promoting shared attention and the emergence of the lexicon. In a variety of settings, using diverse observational techniques, and somewhat different criteria for assessing joint attention, these researchers have reported that the frequency of joint attentional episodes is significantly related to the size of the early lexicon. In some cases, caregivers clearly regulated the infants line of sight to the object of joint attention. For instance, a bright red ball or attractive rattle might be wagged or shaken in front of an infant directly in her/his line of sight. In other inter-

actions, caregivers "followed in" to the infant's current focus of attention. For example, a caregiver might manipulate the part of a busy box that the infant was currently fingering to display its function. Regardless of the approach and the observed consistency among the findings, the processes underlying the relation between joint attention and lexical development have not been specified.

From the ecological approach, to make the transition to linguistic representation, children must *perceive/notice* conventional lexical relations (Schmidt & Dent, 1985, 1986) before they can comprehend and produce them (Zukow, 1989). In the process I have called socializing attention, caregivers specify culturally relevant and socially shared topics perceptually for the child's benefit (Zukow, 1989, 1990a, 1990b; Zukow & Duncan, in press). In socializing attention caregivers use gesture to disambiguate speech. During these interactions a linguistic device co-occurs with some stable pattern in the environment. For instance, the saying of "*Look at the doggy*", the linguistic frame, is coincident with the topic, a toy dog, being waggled in the child's line of sight. Without this wagging gesture, *dog* might be any of the multitude of possibilities available to the infant perceptually. If gestures are key in linking word to world, what types of perceptual information might they make prominent?

The effectiveness of socializing attention may be due to the perceptual properties of the gestures used to direct attention to topics of the interactional situation (Zukow, 1990b; Zukow & Duncan, in press; Zukow & Schmidt, 1988). Extrapolating from Gibson (1979, pp. 102-110), during attention-directing interactions the availability of perceptual information to the infant is undergoing change. Some aspects of the situation are made more prominent while others are diminished. Note that Gibson (1979, pp. 107) rejected using the term "motion" to describe changes in the optic array. He argued instead that "what happens in the optic array when something happens in the world is *a disturbance of its structure*". In the subsequent qualitative analysis components of the SHOW gesture are discussed in terms of changes in the availability of perceptual information to the infant. The following interaction was selected because of its common occurrence among infants and their caregivers. *SHOWing an object*. (AB10, 6:48)

Andrea, aged 10 months, and Lisa, her mother, were seated on the living room floor facing each other. Andrea was tossing a plastic container in the air and retrieving it. While Lisa reached for Andrea's favorite stuffed animal, Snuggle Bunny, she called out her daughter's name. As Andrea oriented toward her mother, Lisa brought the toy into her line of sight and rotated the bunny around its vertical axis from one side to the other repeatedly while saying *Look at the bu.:ny*. Andrea watched her mother, put the container aside, and crawled to the bunny.

Most SHOW gestures maximize the display of objects as unitary wholes. For example, in this SHOW gesture the topic is moved through space by the caregiver, bringing it into the child's line of sight. From the perspective of the perceiving infant, during *translation* the topic of attention remains constant while the background information shifts. Background surface texture in the optic array was deleted along the leading edge of the bunny. Correspondingly there was an accretion of background surface texture at the trailing edge. Translation perceptually specified both the bunny and the trajectory or direction of the bunny. The bunny was a relatively stable pattern in the visual array presented against a background of shifting information. The trajectory of the bunny was specified by the continuous deletion of surface texture in the background at the leading edge of the bunny along with a similar rate of accretion of surface texture at the trailing edge. In SHOWing, attention was gathered by the magnification or rotation of the topic as well. Infant and caregiver are constrained to jointly attend to the same topic of attention and to monitor each other's gaze since the object is usually placed along the line of

sight of both coparticipants. In this instance, the bunny is simultaneously being magnified and being brought closer to Andrea along this line. Visually, for Andrea *magnification* of the bunny involves an increase in the density of its surface texture and its expansion in the visual array. As the bunny is brought toward Andrea, there is a corresponding occlusion and diminishing of background information. Often the topic is rotated about an axis at the apex of the SHOW. *Rotation* reveals changes in the alignment of textural units across the topic surface. As the surface turns about an axis, information along one side is brought into view while information on the other is taken from view. In this example, the bunny is rotated around the vertical axis, 180° one way and 180° the other, displaying the entire bunny. This SHOW gesture was accompanied by saying *Look at the bu::ny!*. The rotation of the bunny accompanied the exaggerated vowel lengthening. This simultaneous bimodal stretching of visual and auditory information may facilitate the infant's detection of equivalence between word and object (Zukow, 1990). Andrea's subsequent crawling toward the bunny displays the effectiveness of the gesture to engage her attention.

Caregivers also ACTON by putting a child through the motions of some activity, DEMONSTRATE by giving a child an opportunity to act, POINT with head, hand, or index finger, and LOOK (with no accompanying gesture) when saying "Look!" (For perceptual analyses of these gestures, see Zukow & Duncan, in press).

I am currently conducting a longitudinal study of 12 infant-caregiver pairs seen at monthly intervals from 6 to 30 months of age⁽³⁾. In part, the study was designed to confirm developmental findings from the cross-sectional studies and to investigate the relatively unexplored area of caregiver input directed to infants of 6 to 11 months. Preliminary evidence (Zukow & Duncan, in press) suggests that distinctive gestures are used to display different information for different sets of semantic functions or linguistic devices, e.g. parts of objects are traced with the index finger (an ear or limb, rim or handle), a finger traveling over the texture of a fabric displays the regularities/irregularities of corduroy or tweed, the resistance of fingers pulling apart illustrate the stickiness of egg white, while a rock toss specifies a location in an undifferentiated expanse of terrain. These examples, taken from naturalistic videotapes of caregivers and infants interacting at home suggest that when attention is guided, specificity of interpretation of verbal messages appears quite likely with a concomitant reduction in ambiguity.

Does this characterization of the effectiveness of attention and caregiver gestures have any "psychological reality" for caregivers? Does this approach relate to methods or practices that members/caregivers might recognize or use to characterize their own conduct? To answer this question, caregivers in the present longitudinal study of attention-directing were asked to respond to a vignette describing a babysitter who could not make the infant understand her and who requested help in communicating more effectively⁽⁴⁾. The hypothetical babysitter was advised to *be sure she has Carol's attention first*. She would need to say *Carol, look here!*. More specifically, it was suggested that she pick Carol up and physically demonstrate on the child what she wanted her to do (ACTON). Others suggested making an object noticeable by bringing it to the child's attention (SHOW), demonstrating what she is trying to communicate or *tell him what you're doing as you do it* (DEMONSTRATION), and point to objects (POINT). One mother said *if the babysitter is not using gestures to help communicate, I'd tell her to use more gestures*. Clearly these caregivers were aware that gestures are extremely effective in resolving ambiguity when communicating with an infant just beginning to talk.

⁽³⁾ (For details see footnote 3)

To summarize, three aspects of interaction with the caregiver provide a correspondence between lexical items and stable patterns in the environment. There is evidence that caregivers continuously educate their infant's attention, that they provide tangible, perceptual translations of speech, and specific activities are regularly accompanied by specific linguistic accompaniments, such as "Look!" while directing attention.

These findings suggest that there is promise in the ecological approach to the emergence of the lexicon. Sufficient information may be available during interaction across contexts to specify language devices in enough detail for the early lexicon to develop. Perhaps, a great deal of socio-perceptual bootstrapping underlies the more complex aspects of language development that proceeds from this foundation.

Footnotes

1. For a discussion of persistent misinterpretations of Quine regarding these issues, see Zukow, 1990, footnote 8.
2. Zukow (1990a) has argued that the former caregiver practice provides more appropriate guidance for developmentally less advanced infants, while the latter is more suitable for more advanced infants.
3. *Method:* We have drawn examples from a series of intra- and inter-cultural studies in the U.S. and Mexico (Zukow, 1989, 1990b; Zukow & Schmidt, 1987) to illustrate the generality of our findings. While there appear to be culture-specific differences in caregiving practices related to folk theories of child-rearing and child development among some of these families (Zukow, 1984), the similarities in practices used to direct attention between cultures is very striking (Zukow & Schmidt, 1987). Naturalistic videotapes of everyday interaction were collected in the home, because it is generally agreed that this is the context in which language development occurs. Great care was taken in preserving the ecological validity of these interactional settings. (For a more detailed description of the complete methodology, see Zukow, 1989, 1990b).

Sample: Caregivers. The Mexican caregivers came from the traditional rural culture of Central Mexico. Five families lived in Colonias Populares in Mexico City or on the outskirts in the Estado de Mexico; 7 families lived in a rural area (Ejido de Santa Ana y Lobos) in the state of Guanajuato some 175 miles northwest of the Federal District. Of the 12 families who participated in the study, only one mother had completed more than 4 years of primary schooling. Videotapings were made at 6-week intervals over a 9- to 12-month period. The 6 Anglo middle-class families resided in Santa Monica, California. All had attended at least a few years of junior college; some were professionals. Videotapings were made at one month intervals during a 2-year longitudinal study from 6 to 30 months of age.

Procedure. Each caregiver-child pair was videotaped for thirty minutes interacting in their home. Simultaneous audio-recordings were made of each videotaped session. These audio-recordings were transcribed by a native speaker according to the conventions established by Sachs, Schegloff, and Jefferson (1974) and Zukow (1982). In order to ensure that the researcher's interpretation of the activities was in agreement with that of the caregiver, the videotapes were reviewed with the caregiver immediately following each videotaped session. In cases of disagreement, precedence was given to the caregiver-expert's interpretation of events and utterances. The videotapes were then viewed and reviewed by independent coders to identify attention-directing interactions. The coders used protocols developed to differentiate various aspects of attention-directing in conjunction with the transcripts of the videotaped interactions. (See Zukow, 1989, 1990b.)

Attention-directing interactions. Attention-directing presentations have been defined here as a message directing the other interactant to coordinate her/his attention to that of the message-initiator for the duration of the specified activity (Zukow 1989, 1990b). To operationalize this definition, all instances of the perceptual imperatives, such as *Look!* or *Listen*, initiated by caregivers and directed to the target child were collected along with any accompanying attention-directing gestures. This collection provided an ethnographic basis for determining the range or scope of attention-directing gestures and topics. In addition to utterances such as *Look at the cat!*, *Look, get down!*, *Look, sweep over there!*, occurrences of attention-directing gestures in nonlinguistic and in other linguistic environments were collected as well, e.g. pointing while saying *Over there!*.

Attention-directing gestures. All actions associated with utterances accompanied by perceptual imperatives fell along a continuum of perceptual regulation that ranged from complete guidance or "other-regulation" by the caregiver

to complete self-regulation by the child (extrapolated from Wertsch, McNamee, McLane, & Budwig's [1980] analysis of problem-solving.) Secondly, this dimension roughly describes a transition from nonconventional to conventional gestures. During attention-directing interactions the child's task is to determine which aspects of the ongoing interaction are being foregrounded. The difficulty of the task depends on the perceptual support provided by the gesture used. In the first, SHOWING, the child's perception is controlled by the caregiver. For instance, some object of attention is rotated, loomed, waggled in(to) the child's line of sight. In the second, ACT-ON, the child is put through the motions of an activity or the child is positioned to experience the perceptual information, such as looming the child toward her/his own reflection in a mirror. In the third, DEMONSTRATING, an aspect of the ongoing activity is highlighted for an already attending child who is given an opportunity to participate. The fourth, POINTING, depends upon the child's ability to follow a trajectory of an object or the trajectory traced by a head nod or hand point to the place where it intersects with the object of attention. In the fifth, LOOK (i.e. uttering 'look' without an accompanying gesture), words direct the child to coordinate her/his attention to that of the caregiver.

4. This vignette was adapted from a set of vignettes designed to assess communicative mismatches between a variety of caregivers and developmentally delayed children (Hecht, 1989).

The caregivers were blind to the narrow focus of the study. They were advised very globally that they were participating in a study of the emergence of language, especially how cognitive development might relate to language development. Only responses from the 6 Anglo caregivers have been collected. Data collection for the Latino phase of the study is in progress.

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