Human Development 1996;39:269–276

Human Development

Piagetian and Vygotskian Approaches to Language Acquisition

Michael Tomasello
Emory University, Atlanta, Ga., USA

Key Words
Intention · Language · Piaget · Sensorimotor development · Social cognition · Vygotsky

Abstract
Both Piaget and Vygotsky were centrally concerned with the ontogenetic relationships between language, cognition, and social life. Recently, researchers have drawn on their observations and hypotheses to establish much closer links between these phenomena than either theorist ever imagined. In investigating the cognitive bases of early language, very close links have been established between specific cognitive achievements and the acquisition of certain types of early words, for example between object permanence development and the acquisition of words for disappearance and between means-ends development and the acquisition of words for success/failure. In investigating the social bases of early language, close links have been established between the quantity and quality of joint attentional social interactions in which a child and an adult engage and the child's early word learning skills. Despite their seminal contributions to the study of early language development along these two lines, neither Piaget nor Vygotsky fully appreciated the skills of social cognition that underlie the acqusition of language.

Given the crucial importance of language in human cognition, it is only natural that both Piaget and Vygotsky were centrally concerned with the role of language in cognitive development. This concern is most clearly manifest in the well-known 'debate' between the two theorists on the role of egocentric/private speech in the cognition of preschool children. In general it may be said that Vygotsky accorded to language an active and formative role in intellectual development, as children rallied their cognition around the communicative conventions of mature members of their cultures, whereas Piaget always subordinated language to cognition, especially the operative aspects of cognition that derive from children's physical actions on the physical world (later internalized into logical operations carried out mentally).

KARGER
E-Mail karger@karger.ch
Fax + 41 61 306 12 34
http://www.karger.ch

0018–716X/96/0395–0269$10.00/0

Michael Tomasello
Department of Psychology
Emory University
Atlanta, GA 30322 (USA)

In this brief essay on Piagetian and Vygotskian approaches to language acquisition, however, my concern is not with this disagreement between the two theorists on the role of language in cognition once children have acquired its basic structures. Rather, my concern is with how children acquire the basic structures of language in the first place. Although this is an issue on which neither theorist lavished much research attention, it is the issue on which each has had his most profound influence in the modern study of language acquisition. In the past two decades a number of researchers have extended Piaget's theory in an attempt to investigate the cognitive bases of early language development. A number of other researchers have extended Vygotsky's theory in an attempt to investigate the social and cultural bases of early language. These modern legacies of the two theories, particularly as manifest in empirical research, are my central concern here.

Piaget and the Cognitive Bases of Early Language

In *La Formation du Symbole chez L'enfant* (translated as *Play, Dreams, and Imitation in Childhood*) Piaget [1945/1962] investigated the ontogenetic emergence of human semiotic functioning in his own three children. On the basis of this observational study, and a number of theoretical considerations, he concluded that language is but one manifestation of a single, very general semiotic function that is itself a reflection of more general cognitive developmental processes. In support of this view, Piaget noted that the many different manifestations of the semiotic function – including not only language but also symbolic play, dreams, and deferred imitation – all seen to emerge together during infancy, in general synchrony with the six stages of sensorimotor development as defined by the infant's physical manipulations of objects. Unifying the different manifestations of the semiotic function is the fact that they all involve some kind of 'signifier' in a semiotic relation to something 'signified'. Each particular manifestation embodies this Saussurean distinction in a unique way – dreams employ motivated symbols, deferred imitation relies on an iconic matching of behaviors, and language is based on conventional signs. Yet each is dependent on general cognitive (i.e., sensorimotor) development in the same way. This is so because in all cases the signified is taken directly from the 'operative' structures that define the six stages of sensorimotor development. In all of these different activities, Piaget did not see full-fledged semiosis – in the sense of mental representations relatively independent of perception – until the culmination of the sensorimotor period at approximately 18 months of age.

Modern research on the relation between sensorimotor development and early language has taken two forms, reflecting Piaget's theoretical distinction between the two fundamental aspects of sensorimotor schemes, their organization and their content. Thus, on the one hand are children's abilities to apply their schemes to outside objects, to embed one scheme within another hierarchically, to use alternate schemes toward the same end, and to use a tool in pursuit of an end. This is the organizational aspect of sensorimotor cognition as investigated in *The Origins of Intelligence in Children* [Piaget, 1935/1952]. On the other hand is the actual epistemological content of sensorimotor schemes, or what Piaget called the 'real categories' of cognition during this same period – the Kantian categories of space, time, causality, and objects. This is the aspect of cognition investigated in *The Construction of Reality in the Child* [Piaget, 1937/1954].

From the point of view of sensorimotor organization, Bates [1976; 1979] noted that children typically learn their first devices for intentional communication – including both

intentional gestures and linguistic symbols – during sensorimotor stage 5. (Piaget [1945/1962] noted this same timing but focused on the fact that these early communicative schemes were not fully stable and representational semiotic devices.) This developmental synchrony is significant because, in Bates' analysis, the use of intentional gestures and words is similar in many ways to the use of tools – the prototypical tertiary circular reaction of stage 5 when children are experimenting with objects. Intentional communication is simply social tool use, both when children use a gesture/word to obtain a desired object or activity from an adult (imperative) or when they use a gesture/word to secure the adult's attention to some outside entity (declarative). Bates [1979] provided some evidence for this relationship in a naturalistic correlational study, and Harding and Golinkoff [1979] provided further evidence in an experimental study. Bates et al. [1989] and Shore et al. [1984] also found a strong correlation during the second and third years of life between children's abilities to combine sensorimotor schemes in creative ways in their symbolic object play and their skills at combining words into complex utterances.

From the point of view of the 'real categories' of sensorimotor cognition, modern research has focused on the relation of early language to the development of object permanence. Despite the seemingly obvious fact that children must have some conception of a stable world of objects before they can name them, the earliest studies found no significant relation between children's passage through the stages of object permanence development and various measures of their language, such as the number of words in their vocabulary or the length of utterances they typically produced [Corrigan, 1979]. McCune-Nicolich [1981], however, provided a new analysis arguing that quantitative measures such as vocabulary size are not the most appropriate language measures to be used since they are dependent on many non-cognitive factors. More appropriate are the types of word meanings that children can learn, since these meanings should be composed of the same sensorimotor content the child uses to physically interact with the world of objects and their spatial-temporal-causal relations. Specifically, McCune-Nicholich proposed that what should be related to infants' ability to track the location of objects moving about in space is their ability to learn words for 'the dynamic states of objects'. These are the so-called relational words such as *more, gone, up, move,* and *out,* so well known to language acquisition researchers [Bloom, 1973].

Support for McCune-Nicolich's proposal comes from two studies by Tomasello and Farrar, who at the same time made it more specific. If children's ability to follow the spatial displacement of objects in search tasks is to be related to the meanings of their early words, there should be a distinction between words for visible displacements, such as *move* and *up,* and words for invisible displacements, such as *gone* and *bye-bye.* The former should be related to stage 5 of object permanence development, which involves tracking visible object movements, and the latter to stage 6, which involves tracking invisible object movements. Tomasello and Farrar [1984] found precisely this relationship in the early language and cognitive development of six nascent language learners [see also Gopnik, 1984]. Tomasello and Farrar [1986a] corroborated this result in a training study in which they found that children at stage 6 of object permanence development learned words for both visible and invisible movements, whereas children at stage 5 learned words for visible movements only.

These two lines of research – the relation of language to sensorimotor organization and to sensorimotor content – have been brought together beautifully in work by Gopnik and Meltzoff [1984, 1986a]. They found that within a sample of children, different correlational patterns held between early language and the two aspects of sensorimotor

cognition. That is, whereas children's early object permanence development was related to the semantics of their early words for the disappearance of objects (consonant with the findings of Tomasello and Farrar), their words for success and failure were related to their skills with means-ends organization in physical problem-solving tasks (consonant with Bates' findings, although focusing on a different aspect of language). Based on these findings, Gopnik and Meltzoff [1986b, 1993] argued that, as Piaget hypothesized, strong relations exist between language and sensorimotor cognition. However, these relations are much more specific than the general stage-like correspondences Piaget considered [see also Uzgiris and Hunt, 1987]. Taking a cue from Bates' [1979] 'local homology' model, they argued for what they called the 'specificity hypothesis', which holds that language is dependent on cognition in a Piagetian fashion (although it may also contribute to cognitive development in some instances as well), but the relations between the two exist at a much more specific and detailed level than Piaget proposed.

Vygotsky and the Social Bases of Early Language

Although Vygotsky was very interested in language, he was mostly interested in the linguistic symbol as a pre-existing cultural artifact that served to channel children's cognition into forms previously created by members of their communities [Vygotsky 1934/1962]. On occasion he proposed his own version of the tool analogy to describe this process. Like Piaget and Bates, he noted that both tools and symbols are external elements that children incorporate into their interactions with the world as they develop. But, unlike Piagetians, he emphasized the fact that tools and symbols embody the cognition of other persons (i.e., those who designed them); this cognition of others serves to mediate and structure children's interactions with the world as they use the tools and symbols. In addition, as is well known, Vygotsky was interested in how young children 'internalize' the speech of others that is directed to them.

Children first come into meaningful contact with linguistic symbols through direct interactions with mature members of their culture. Vygotsky never actually studied the kinds of social interactions within which children are first exposed to language and how these might affect language and cognitive development, nor did he study directly the nature of particular languages and how different languages might shape children's cognition in different ways. Recent research taking a broadly Vygotskian perspective has addressed both of these issues in some detail. Analogous to Piagetian research on language development, this research is consonant with the broad outlines of Vygotsky's theory, but it has documented relations with much more specificity than Vygotsky envisioned.

First, Bruner [1975;1983] provided an essentially Vygotskian account of how infants and young children gain entry into the language of those around them. Bruner emphasized the logical point that the only way young children can learn how to use some 'arbitrary' linguistic convention is to understand *independent of that linguistic convention* what the other intends. One of Bruner's great discoveries was that virtually all children's earliest language is learned in cultural routines such as those involved in eating, traveling, and hygiene. In these routines the infant gradually learns non-linguistically what the adult will do next, what the adult wishes the child to do, what objects will be involved at which points in the routine, and so forth. When the adult uses particular language in such routines repeatedly, the child comes to understand how it fits with the adult's intentions in that situation [Ratner and Bruner, 1978; Ninio and Bruner, 1978].

Interactive routines thus serve to 'scaffold' the child's entry into linguistic communication. Although differences clearly exist in the kinds of routines within which adults of different cultures interact with children, as well as differences in the ways adults use language in these interactions [Schieffelin and Ochs, 1986], all children experience caregivers who perform certain activities with them on a regular basis. It is thus very likely that routine interactions of one sort or another play an important role in the language development of children of all cultures [Peters and Boggs, 1986].

Even after they have learned some initial language within these routine interactions, children continue to acquire the vast majority of their new linguistic skills inside non-linguistically understood joint attentional episodes. Joint attentional episodes are social interactions that are not necessarily routine but in which adult and child still manage to focus their attention on the same thing at the same time. Tomasello and Todd [1983] found that Western middle-class 12- to 18-month-old infants who participated in more and longer joint attentional episodes with their mothers, using toys provided by researchers, had the largest vocabularies at the end of that period. Tomasello and Farrar [1986b] corroborated and extended that result with a larger sample of children, finding that mothers who tended to follow their child's already established attentional focus had children with the largest vocabularies 6 months later – but only if that following behavior took place inside a structured joint attentional episode [see also Dunham et al., 1993]. Tomasello [1988;1992], in reviewing this line of research, concluded that early language acquisition is a process in which (1) children find ways to tune into the communicative conventions of their culture (in the form of a joint attentional focus with an adult), and (2) adults do a number of things to scaffold the process by structuring the interaction and being sensitive to the child's focus of attention and interest.

A second line of research relevant to Vygotsky's perspective on language concerns the influence of particular types of linguistic conventions on children's cognition. In one version of this research, reflecting a traditional anthropological approach, Lucy [1992] examined the language spoken in two very different cultures (Yucatec Mayan and American English). He found a number of different ways the two languages grammaticized reference to objects and their substance, shape, and number. When he gave adults and children non-linguistic tests to diagnose the way they understood objects in various situations, he found that the two groups of subjects interacted with objects in ways that were consistent with the way their languages structured the relations among objects generally.

This basically Whorfian approach has been transformed in other recent research focusing on the nature of language as a cognitive system. In this research the focus is not on how language affects the child's manipulative skills with objects, but on how the actual speaking of different languages requires speakers to focus their attention on different aspects of their physical and social environments. For example, Choi and Bowerman [1991] have found striking differences in the way American and Korean children talk about a variety of static and dynamic spatial relationships. In this more cognitive view of language, no particular importance is attached to non-linguistic tests of the children's spatial understandings, as their use of language *is* a form of cognition that reflects their different ways of viewing things. Similarly, in a very large cross-linguistic project, Berman and Slobin [1994] found that when children learning different languages are asked to tell a story based on the same set of pictures, they conceptualize the story in very different ways. In 'thinking for language', these children must learn to pay attention to some things and to ignore others, in accordance with the linguistic conventions of the particular languages they are learning. These studies have documented a number of ef-

fects of language on cognition – the ways languages influence how children attend to specific types of spatial, causal, and social relations – with much more specificity than Vygotsky could ever have imagined.

The Social-Cognitive Bases of Early Language

It seems, then, that language acquisition is constituted by both Piagetian and Vygotskian processes, that is, by both cognitive and social processes. Thus, it is clear that children cannot get off the ground in the process of language acquisition until they are able to understand something of those aspects of the world that the adults around them choose to talk about and to incorporate outside elements such as tools and symbols into their sensorimotor schemes. But cognitive skills such as these are not by themselves sufficient. A language is composed of social conventions that no amount of individual intelligence can give to a child. Children must also be exposed to linguistic conventions in circumstances that allow them to comprehend their communicative significance. This social process may even in some cases stimulate children to marshal their cognitive resources in new ways that would never happen without the social-cultural environment.

But I would argue that even these two aspects of the process are not fully sufficient for language acquisition. Still another cognitive capacity infants must have is the social-cognitive capacity to understand adults in ways sufficient for full participation with them in cultural interactions and routines. The first glimmer of this ability emerges in the months immediately preceding the child's first birthday, as children begin for the first time to follow the adult's gaze to outside objects, to follow the adult's behavior in imitating their actions, and to check the adult's attitude toward novelty as a social reference point. All these processes herald the infant's emerging understanding of other persons as intentional agents possessing mental capacities such as intention and attention [Tomasello, 1995]. This understanding forms the social-cognitive foundation for language acquisition. It allows the child to understand the adult's acts of linguistic reference to the outside world, because children's understanding of linguistic reference consists of their understanding that the adult intends for them to attend to some aspect of their shared environment. This recognition comes out most clearly when children disregard their own focus of attention in favor of the adult's as they learn new words, using as cues to the adult's attentional focus a whole array of behaviors including the adult's line of visual regard [Baldwin, 1991; 1993] as well as more complex behaviors such as the adult's indications of satisfaction and dissatisfaction as he or she searches through a collection of objects for the one being sought [Tomasello and Barton, 1994; Tomasello and Akhtar, 1995].

This period of cognitive development is one that neither Piaget nor Vygotsky fully appreciated. Piaget wrote in many places about the basic social-cognitive ability of decentration, by which he meant taking the perspective of another person. Decentration is closely related to the understanding of intentional agents, of course. But in terms of specifics, Piaget did not appear to see that a major change in this ability occurs at 1 year of age as infants begin to tune into adults, by following into their attention and behavior, and to get adults to tune into them, through various acts of intentional communication. Similarly, Vygotsky recognized a specifically 'cultural line' of development, by which he meant that line of development resulting from children's participation in cultural activities. Since this line of development only begins after a certain age – Vygotsky never seriously studied children under 2 or 3 years of age – he presumably understood that some skill needed to

develop before full participation in cultural activities could commence. But there is no indication that Vygotsky saw something interesting happening in the cultural line at 1 year of age in particular, nor that he appreciated this developmental period as key to the later acquisition of cultural conventions of all types, including those of language.

I would argue that the social-cognitive revolution that occurs at approximately the first birthday in human ontogeny is the key biological adaptation that, building on their existing cognitive and social skills, allows individual children to become cultural beings [Tomasello, et al., 1993]. The importance of this adaptation for culture is manifest in the fact that even our nearest primate relatives in their natural habitats do not appear to possess the adaptation nor the resulting cultural structures, including language [Tomasello, in press]. Furthermore, many of the problems of autistic children lie precisely in their inability to understand others as intentional agents with whom they can share experience [Hobson, 1993]. It also seems that humans learn to turn this ability on themselves to reflect on their own cognition (Piaget's 'reflective abstraction') – as if they were another person with an outside point of view – and so construct the kinds of representational redescriptions that seem to be such an important aspect of human cognitive development [Karmiloff-Smith, 1992]. When the importance of the 1-year-old social-cognitive revolution is added to the insights provided by Piaget, Vygotsky, and their modern interpreters, we are well on our way to constructing a theory that can explain how children are able to acquire (and perhaps how early humans were able to invent) the linguistic conventions that play such an important role in human cognitive and social development.

Conclusion

Two major lines of progress in study of language acquisition have come from the inspiring formulations of Piaget and Vygotsky. Following their leads, we have come to appreciate in some detail how it is that children's cognitive skills and the cultural context within which they develop interact to enable language acquisition. An argument can be made that in fact the majority of our advances in the study of language acquisition have come as we stand on the shoulders of these two giants. From that lofty perspective, however, we can also see things they did not see – both more detailed observations consonant with their theories and a new appreciation for the role of early social cognition in the acquisition of language. The fact that we have used Piaget's and Vygotsky's ideas to go further than they were able to go by themselves serves to highlight the generativity that is latent in these two most powerful of developmental theories.

Acknowledgment

Thanks to Philippe Rochat for helpful comments on a previous draft of this article.

References

Baldwin D (1991). Infants' contributions to the achievement of joint reference. *Child Development, 62,* 875–890.

Baldwin D (1993). Infants' ability to consult the speaker for clues to word reference. *Journal of Child Language, 2,* 395–418.

Bates E (1976). *Language and context: The acquisition of pragmatics.* New York: Academic Press.

Bates E (1979). *The emergence of symbols: Cognition and communication in infancy.* New York: Academic Press.
Bates E, Thal D, Whitesell K, Fenson L & Oakes L (1989). Integrating language and gesture in infancy. *Developmental Psychology, 25,* 1004–1019.
Berman R & Slobin D (1994). *Relating events in narrative: A cross-linguistic developmental study.* Hillsdale NJ: Erlbaum.
Bloom L (1973). *One word at a time.* The Hague: Mouton.
Bruner J (1975). From communication to language: A psychological perspective. *Cognition, 3,* 255–287.
Bruner J (1983). *Child's talk*. New York: Norton.
Choi S & Bowerman M (1991). Learning to express motion events in English and Korean: The influence of language-specific lexicalization patterns. *Cognition, 41,* 83–121.
Corrigan R (1979). Cognitive correlates of language: Differential criteria yield different results. *Child Development, 50,* 617–631.
Dunham PJ, Dunham FS & Curwin A (1993). Joint attentional states and lexical acquisition at 18 months. *Developmental Psychology, 29,* 827–831.
Gopnik A (1984). The acquisition of *gone* and the development of the object concept. *Journal of Child Language, 11,* 273–292.
Gopnik A & Meltzoff A (1984). Semantic and cognitive development in 15- to 21-month-old children. *Journal of Child Language, 11,* 495–513.
Gopnik A & Meltzoff A (1986a). Relations between semantic and cognitive development in the one word stage: The specificity hypothesis. *Child Development, 57,* 1040–1053.
Gopnik A & Meltzoff A (1986b). Words, plans, things, and locations: Interactions between semantic and cognitive development in the one-word stage. In Kuszaj S & Barrett M (Eds.), *The development of word meaning.* Berlin: Springer.
Gopnik A & Meltzoff A (1993). Words and thoughts in infancy: The specificity hypothesis and the development of categorization and naming. In Rovee-Collier C & Lipsett L (Eds.), *Advances in infancy research* (Vol. 8). Norwood NJ: Ablex.
Harding C & Golinkoff R (1979). The origins of intentional vocalizations in prelinguistic infants. *Child Development, 50,* 33–40.
Hobson P (1993). *Autism and the development of mind.* Hillsdale NJ: Erlbaum.
Karmiloff-Smith A (1992). *Beyond modularity: A developmental perspective on cognitive science.* Cambridge MA: MIT Press.
Lucy J (1992). *Grammatical categories and cognition.* New York: Cambridge University Press.
McCune-Nicolich L (1981). The cognitive basis of relational words in the single word period. *Journal of Child Language, 8,* 15–34.
Ninio A & Bruner J (1978). The antecedents of labelling. *Journal of Child Language, 5,* 1–16.
Peters A & Boggs S (1986). Interactional routines as cultural influences on language acquisition. In Schiefflein B & Ochs E (Eds.), *Language socialization across cultures.* Cambridge: Cambridge University Press.
Piaget J (1952). *The origins of intelligence in children.* New York: Norton. (Originally published 1935.)
Piaget J (1954). *The construction of reality in the child.* New York: Basic Books. (Originally published 1937.)
Piaget J (1962). *Play, dreams, and imitation in childhood*. New York: Norton. (Originally published 1945.)
Ratner N & Bruner J (1978). Games, social exchange, and the acquisition of language. *Journal of Child Language, 5,* 391–402.
Schieffelin B & Ochs E (1986). *Language socialization across cultures.* Cambridge: Cambridge University Press.
Shore C, O'Connell C & Bates E (1984). First sentences in language and symbolic play. *Developmental Psychology, 20,* 872–880.
Tomasello M (1988). The role of joint attention in early language development. *Language Sciences, 10,* 69–88.
Tomasello M (1992). The social bases of language acquisition. *Social Development, 1,* 67–87.
Tomasello M (1995). Joint attention as social cognition. In Moore C & Dunham P (Eds.), *Joint attention: Its origins and role in development.* Hillsdale NJ: Erlbaum.
Tomasello M (in press). Social cognition and the evolution of culture. In Langer J & Killen M (Eds.), *The evolution of cognition.* Hillsdale NJ: Erlbaum.
Tomasello M & Akhtar N (1995). Two-year-olds use pragmatic cues to differentiate reference to objects and actions. *Cognitive Development, 10,* 201–224.
Tomasello M & Barton M (1994). Learning words in non-ostensive contexts. *Developmental Psychology, 30,* 639–650.
Tomasello M & Farrar J (1984). Cognitive bases of lexical development: Object permanence and relational words. *Journal of Child Language, 11,* 477–493.
Tomasello M & Farrar J (1986a). Object permanence and relational words: A lexical training study. *Journal of Child Language, 13,* 495–506.
Tomasello M & Farrar J (1986b). Joint attention and early language. *Child Development, 57,* 1454–1463.
Tomasello M & Todd J (1983). Joint attention and lexical acquisition style. *First Language, 4,* 197–212.
Tomasello M, Kruger A, & Ratner H (1993). Culture, biology, and human ontogeny. *Behavioral and Brain Sciences, 16,* 540–552.
Uzgiris I & Hunt JM (1987). *Assessment in infancy: Ordinal scales of psychological development.* Chicago: University of Illinois Press.
Vygotsky L (1962). *Thought and language.* Cambridge MA: MIT Press. (Originally published 1934.)