Katherine Nelson
Distinguished Professor Emerita. Ph.D. Program in Psychology. City University of New York Graduate Center

Concept, Word and Meaning in Brief Historical Context

(Commentary to Osman Kingo: The Concept of Concepts)

In the wake of many other psychologists, philosophers, and anthropologists, Osman Kingo in the target article posits that human conceptual thought is essential to our lives as humans and that language is a "defining characteristic" of human kind which enables us to share concepts and ideas (among other important roles) (P. 2). He argues that we need a concept of concepts if we are to understand human cognition as it relates to cognition in other species, but he laments that the concept of concept is unclear, and he seeks clarification by examining how concepts develop from infancy. His insightful critique of contemporary research on the developmental psychology of concepts is organized around a major controversy contrasting perception and conception as bases of infant concept development. In the end he concludes that competing perspectives on the issue of perception vs. conception are better considered as complementary, leading him to a broader, more productive view than is offered in the current literature, emphasizing the place of social interaction and language in the infant's emerging conceptions of objects.

Over many years my work has similarly attempted to explore both the ontogeny and phylogeny of cognition as a basis for understanding the relation of human language and thought in social context. Thus I come to this Comment with a sympathetic mind. Thirty-some years ago I proposed a model of the infant's emerging concepts of objects that incorporated both functional and perceptual components and evoked social as well as embodiment aspects of conceptual meaning (Nelson, 1974; cited by Kingo (P. 12)). It is always a pleasure to see one's early work cited as relevant to contemporary issues. My work has expanded in different ways over the years and has taken up different topics; I have not abandoned earlier positions, but have incorporated them into a larger developmental framework (Nelson, 2007). I therefore begin this comment on Kingo's article with a brief description of that early model and consider how it relates to the issues now prominent in the field.

A word about word use in this area before I begin: *conceptual* is generally contrasted with *perceptual*, which in turn is often contrasted with *functional*; thus functional is often used in parallel with conceptual. *Conceptual* also generally implies meaningful and representational.

The Functional Core Concept (FCC) Model (1974)

The Functional Core Concept (FCC) was proposed originally to resolve a problem of word learning, namely whether infants had concepts that served as the meanings for acquiring first words at the end of the first year of life and early in the second. Piaget's theory – then dominant in developmental psychology - denied this possibility as he placed representational thought only at the end of the second year, and he considered first words as pre-conceptual (Piaget, 1962). I argued against this position that infants must be basing their word learning on concepts and that these concepts came from the infant's experience with what things do and what can be done with them.

My argument was that children were sensitive to the functions and actions of things in their worlds, that they first attributed meaning to the objects on the basis of the events they were part of, and subsequently picked out identifying perceptual features on the basis of which new members of the concept could be identified. Note that an essential part of this argument was that infants were especially attentive to the dynamics of the world – movement, noise, language, and social figures. I proposed that the abstraction of functional and dynamic characteristics based on the child's experience of objects formed a "functional core" of the child's concepts, such that any member of a category assigned to the concept would be held to (i.e., expected to) display aspects of this core. In addition, the core would lead to the extraction of perceptual information used to identify new members of the category (i.e., previously unexperienced). For example, for the concept "ball" throwing and rolling might form the core functions, while spherical shape was an identifying feature.

Three issues incorporated in this model are relevant to current research and to Kingo's paper: the complementarity of conceptual and perceptual information in concepts, the relation of concepts and words, and the role of social experience in concept development. I will consider each of these in turn.

Conceptual vs. Perceptual Foundations of Concepts

Kingo's review reveals that theories of infant concept development became focused on perceptual vs. conceptual categories partly in response to Mandler's (1993) differentiation of perceptual and conceptual categories, and in part from the experimental paradigms used in different research programs. The standard experimental paradigm in infant research for the past 50 years has used habituation of attention, one form of which is the familiarization/preferential looking paradigm (P. 9). The pictorial nature of the presentations in such experiments are static; the only discriminating information available is perceptual – primarily form or shape. Given that there is no "deeper" or more meaningful information available in the experiment, Mandler (2004) rightly views the results of these experiments as evidence of perceptual categorization and as different in kind from conceptual categorization.

At the time that I proposed the FCC no such experimental category research with infants existed. My work was based primarily on observation, supplemented with rather informal experiments carried out in children's homes (e.g., Nelson, 1973a). Later, (in collaboration with William Kessen and Jane Platt) we carried out a series of experiments with 8- to 12-month-old infants that contrasted form (shape and color) and function (manipulables, movements, sounds) very similar in conception to that proposed by Kingo in the last section of his paper. The results were incomplete for a variety of reasons (e.g., lack of adequate statistical analyses); only one of these critical experiments was ever reported in publication (Nelson, 1979). Overall, the results were encouraging in support of function or movement over static perceptual features, but far from definitive, and they were soon overtaken by the active research on perceptual and functional categories taking place in other labs.

The issues in this field were fundamentally re-defined by Mandler's work in the 1980's (see Mandler, 2004 for overviews). She argued that perceptual and conceptual categories are different in kind. Mandler does not assign any youngest age to the formation of conceptual categories, but claims that they are based on substantial experience with handling and watching objects in motion in events wherein members of different categories play specific roles, as shown in experiments in which infants interact directly with objects, as in generalized imitation support her theory (McDonough & Mandler, 1998). Mandler's position on conceptual categories has much in common with my FCC theory, although she downplays the place of perceptual information and views perceptual categories as parallel to but separate from conceptual categories. In this, her position contrasts with that of others in the field such as Rakison (2003) who posits that conceptual categories emerge from perceptual categories. (Note that this sequence is the opposite from that proposed in the FCC of function before perceptual identification features.)

Whereas the original FCC article was widely interpreted as denying the relevance of perceptual features of objects in children's object concepts (and understandably so in view of some of my arguments against the *primacy* of perceptual features), the actual conception of the FC concept included both functional and perceptual information. The point was that dynamic information (function, action, relations) constituted the primary meaning of the concept; perceptual features served as guides to the inclusion of new members (in current terminology, for induction). This concept structure was both complex and dynamic, relating the child and his/her interactions and activities to the things in the world. Contemporary arguments about perception and conception as separate, indivisible, parallel, or stage-like, appear irrelevant when the two are viewed as complementary as they were in the FCC.

Concept-Word Relations

What is remarkable about the recent work in early concept development is an apparent lack of interest in its relation to the development of language, which begins within the same period as the concept research reviewed by Kingo. First words are typically acquired at the end of the first year and the beginning of the second; this is the age range of infants in McDonough and Mandler's (1998) imitation studies and of changes in processing time that are assumed to affect category studies (Rakison & Lupyan, 2008). Yet few researchers of infant categorization have attempted to relate their work to word learning (but see McDonough, 2002).

What is equally remarkable is the reciprocal lack of interest in infant concept development on the part of researchers of early language development, especially in the acquisition of words during late infancy (see Bloom, 2000). Researchers in this area typically assume that words are mapped onto concepts, but how those concepts are formed, or how they are constituted is not specified. What has been studied is what features children use in extending words to new items (termed induction in this research domain). It is generally agreed that shape of the object named is a major dimension of generalization, but this is seen as a factor in the definition of words; whether it is related to how objects are conceptualized is seldom discussed. Meaning is not given a role separate from identification.

The title of the 1974 FCC article was *Concept, Word, and Sentence: Interrelations in Development*, indicative of the presumed indivisibility of concepts and words and their development. This first venture into theorizing infant concepts of objects was in fact undertaken to explain observations of toddlers' first words, many of which (but not all as is often assumed) are labels for objects, such as *ball, dog, cookie.* Research indicated that the words that children learned derived from their experiences with others in activities involving objects and depended on the joint naming of the object of interest to participants. These objects and words were different for different children but their basis was functional within experiential contexts. Children's extensions of words to new items were often off of the mark (e.g., "doggie" for many different kinds of animals), which were taken to indicate differences in the constituents of children's concepts and the categories that are implicit in adults' use of words. Eventually of course,

children learn to constrain their uses to those of the adult language, adapting their meanings to how words are used.

In contemporary work on word learning, it is taken for granted that children have concepts necessary for attributing meaning in their acquisition of word forms (Bloom, 2000). But infant concepts and word learning are now very different research enterprises, despite the overlap in their theoretical structures. What is lacking is a conception of the infant and child as a whole developing person for whom social interactions, objects, events, words, language uses and conceptions of the world are all interrelated. To take them apart for studying cannot divorce them from each other in the developmental process (Nelson, 2007).

Kingo's discussion of Xu's work on individuation (P. 10), while relevant to both of these now separate enterprises, identifies still a third area that exists almost independently of the others. In experiments 9-month-old infants may respond to the use of word labels for objects to successfully individuate the objects, although they are unable to individuate items without labels until between 10 and 12 months. This work points importantly to one role of language in early cognitive development, as well as to the critical role of social interaction as the source of language and its effect. The effect is dependent on the infant's interpretation of the word as intended to refer to the object, thus dependent on the infant's prior experience with social uses of words. Providing a label first indicates to the child that this is a meaningful object within the social interaction, or in the view of the social companion. The label may then stabilize the object concept and confines it to those contexts that can be labeled as the same. Concepts not labeled are likely to be unstable, shifting from use to use. The label supports the object's inclusion in a conceptual category that can be accessed independently by use of its label alone on different occasions and in different contexts. Language thus both stabilizes and enables sharing concepts with others. In so doing it takes on meanings from others that were not included in the child's own understanding. The word enables mental reflection on the object category as well as social talk of the object even in its absence. (For other cognitive uses of language see Nelson, 1996 and 2007.)

In recent years a new interest in the functional basis of children's word meanings has emerged (e.g., Kemler-Nelson, 1998). Still, some of the same resistance to this idea has been expressed, with a flurry of research on word learning among 2- and 3-year-olds, as well as older children and even adults employed to argue the shape of objects against function as the basis for naming. The return to function is a welcome trend, and it has relatively good support. Whether it will make contact with the study of infant concepts is not yet certain; the problem of connection is in large part the result of different research traditions.

Forming concepts and learning words in social context

The influence of Piagetian constructivism on the study of infant categorization theories was noted by Kingo (p. 12). The neglect of the social dimension in such study also reflects this influence. Piaget's (1962) infant work notoriously omits any social interaction or influence on the child's cognition of any kind, and in his view language plays a secondary, strictly representational, role in later cognitive development. In contrast, although Vygotsky's (1986) view of concept development was quite similar to Piaget's, he viewed the transition in the later preschool years from primarily social uses of language to private "inner" language as multiply transformative, responsible for the entry into "higher level" cognitive functions. His emphasis throughout his work was on the social, cultural and historical context of children's experience and development. In this perspective the adult social world scaffolds the relevant environment so that the child can make sense of it and gain access to relevant knowledge about it.

Kingo also pointed out (P. 12) that the FCC implicated a social role in concept formation in terms of the context of social interactions with things. An emphasis on social context was present even more explicitly in my 1973 SRCD Monograph on children's acquisition of first words. In that work I examined the different ways in which mothers and children interacted around objects and words, and related these patterns of interaction to the children's speed and style of word learning, where style was dichotomized into referential learning (mostly nouns) and expressive learning (other word types such as pronouns, verbs, or social phrases).

Since this early work I have stressed that to understand the child's development from infancy to pre-school we must begin by recognizing that the child's world is from the beginning a dynamic social world, one in which the child is both totally dependent on social caregiving and the recipient of massive social interaction, including in most cases, a great deal of talk (Nelson, 2007). The child's understanding of her world must not only involve social constituents but must also be tightly bound to the interactions with social figures who draw out and make salient to her the significant objects and events of that world. As Kingo emphasizes, (p. 13) the human object world is "incomprehensible without genuine social learning and shared attention."

Reflection on the social conditions of the infant's ecology leads to a set of propositions that I presume to be part of the human bio-cultural heritage:

- Social figures surround the infant from birth and are essential to its survival
- The social world is dynamic by nature; what is processed and enters memory from early life is also dynamic.
- Inborn attentional biases ensure that infants focus on specific aspects of the world; social aspects are primary targets of the infant's visual and aural attention
- The social world and its stimuli are deeply meaningful to the infant, first for biological reasons (e.g., feeding,

sleeping). Second for their social and cultural meanings that are passed on with mother's milk (!). Third for attentional biases based on the establishment of oral and/or gestural language as communicative systems.

The implication from these reflections on the social worlds of infants and children and their struggles to make sense of it all is that *meaning comes first*. The social world is meaningful to the infant in itself (for survival) and in what it offers through social interactions throughout infancy and early childhood. Meaning does not need to be added to the infants' categories to construct concepts. Rather, meaningful concepts emerge from interactions. This conclusion includes but goes beyond Mandler's (2004) claims of meaning derived from the infant's sensori-motor activities. The young infant has private interests and meanings, as well as social ones, but the social world gradually pulls the child into its network where language is a major force in accomplishing this.

Conclusion

This Comment has focused on parallels between my early work on concepts, categories and words, and the recent research reviewed in the target article, but even more on what is still missing from this work, in agreement with Kingo's conclusion. In my view the truly dramatic developments in cognitive development take place during the later pre-school years, with the emergence of "cultural minds" as children enter into the "community of minds" by virtue of sharing language, its powers and potentials, with others in the human world. It is essential that our understanding of conceptual development in infancy becomes adequate to bridging these developments. At this point there are many lacks and barriers to this achievement, especially the separation of interests and goals among researchers who work on different ages and problem areas.

References

Bloom, P. (2000). *How Children Learn the Meaning of Words*. Cambridge MA: MIT Press.

Kemler Nelson, D. G. (1999). Attention to functional properties in toddlers' naming and problem-solving. *Cognitive Development, 14*, 77-100.

Mandler, J. (1993). On concepts. *Cognitive Development, 8*, 141-148.

Mandler, J. M. (2004). *The Foundations of Mind: Origins of Conceptual Thought*. New York: Oxford University Press.

McDonough, L. (2002). Early concepts and early language acquisition: What does similarity have to do with either? In N. Stein, P. Bauer & M. Rabinowitz (Eds.), *Representation, Memory, and Development* (pp. 115-144). Mahwah, NJ: Erlbaum.

McDonough, L., & Mandler, J. M. (1998). Inductive generalizations in 9- and 11-month-olds. *Developmental Science, 1*, 227-232.

Nelson, K. (1973a). Some evidence for the cognitive primacy of categorization and its functional basis. *Merrill-Palmer Quarterly, 19*, 21-39.

Nelson, K. (1973b). Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development, 38 (1-2, Serial No. 149)*.

Nelson, K. (1974). Concept, word, and sentence: Interrelations in acquisition and development. *Psychological Review, 81*, 267-285.

Nelson, K. (1979). Explorations in the development of a functional semantic system. In W. Collins (Ed.), *Children's language and communication: Minnesota symposium on child psychology* (Vol. 12). Hillsdale, NJ: Lawrence Erlbaum Assoc.

Nelson, K. (1996). *Language in cognitive development: The emergence of the mediated mind*. New York: Cambridge University Press.

Nelson, K. (2007). *Young Minds in Social Worlds: Experience, Meaning, and Memory*. Cambridge, MA: Harvard University Press.

Piaget, J. (1962). *Play, dreams, and imitation in childhood*. New York: Norton.

Rakison, D. H. (2003). Parts, categorization and the animate-inanimate distinction in infancy. In D. H. Rakison & L. M. Oakes (Eds.), *Early Category and Concept Development: Making Sense of the Blooming, Buzzing Confusion* (pp. 159-192). New York: Oxford University Press.

Rakison, D. H., & Lupyan, G. (2008). Developing Object Concepts in Infancy: An Associative Learning Perspective. *Monographs of the Society for Research in Child Development, 73*(1), 1-109.

Vygotsky, L. (1986). *Thought and Language* (translation revised and edited by A. Kozulin ed.). Cambridge MA: MIT Press.

Xu, F. (2002). The role of language in acquiring object kind concepts in infancy. *Cognition, 85*(3), 223-250.