ABSTRACT
        The three basic language learning models are the
rote-memory model (prescriptive), the abilities model
(behavioristic), and the critical age model. If this last model, a
deterministic one based on observable facts about the human
condition, becomes as popular in American schools as it is in British
schools, language will become an important aspect of every subject
area. Both a biological explanation of language learning and a
cognitive explanation of language development are crucial in
understanding the critical age model. Once it is recognized that the
critical age model is limited by the learner's own biological and
psychological development, a different approach to teaching the
mother language and its uses may be realized. Since many questions
concerning this model remain to be answered, neither the rote-memory
model nor the abilities model should be discarded. (JM)

A. Critical Age Model of Language Learning

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> All the world's a stage
> And all the men and women merely players:
> They have their exists and their entrances;
> And one man in his time plays many parts,
> His act being seven ages.

Shakespeare, <u>As You Like It</u>,
Act II, Scene VII.

Shakespeare then points out the critical ages of language develop-
ment and disintegration. (1) "the infant, mewling and puking", (2)
"the whining school-boy", (3) "the lover, sighing like furnance, with
a woful ballad", (4) "a soldier, full of strange oaths, . . . sudden
and quick in quarrel", (5) the justice . . . full of wise saws and
modern instances", (6) "the lean and slipper'd pantaloon . . . his big
manly voice, turning again toward childish treble, pipes and whistles in
his sound", and (7) "second childhood . . . sans teeth, sans eyes, sans
taste, sans everything".

Shakespeare's astute eye captures, with a figurative pen, some very
agonizing principles of man's human condition: (1) that man passes through
a number of ages, (2) that each age has its own particular linguistic,
behavioral, and thought patterns, (3) that each age is governed by its
accompanying biological state attached to the great, monolithic time machine,
and (4) that behavior and thought are conveyed by language. In these few
lines Shakespeare presents a learning model which has gone in and out of
vogue in the past three thousand years of Western civilization and is now
creeping back into fashion.

Language Learning Models. The: are basically three language learning models. The first model is the prescriptive, rote-memory model. The theory behind this model assumes that there is a correct language, and that if the right mixture of rules is memorized and applied, then beautiful and proper language will unfold. These language rules are recorded in textbooks as some sort of metalanguage; then by going through a recitation ritual on these rules, the teacher assumes that the language learner will have been taught language.

Most of us recall instances of language teaching based on this language learning model. We have read and recited grammar rules, we have read and recited lines from poets and listened to our teachers explication of literary texts, we have identified topic sentences and memorized transitional words and phrases. This rote-memory language learning model is useful for keeping children in their seats but has dubious educational value.

The second language learning model is the most prevalent in today's American educational scene. This is a behavioristic abilities model. The theory behind this model is: (1) that there are certain linguistic abilities or behaviors which every school educated person should have, and (2) that these behaviors or abilities can be enumerated and consequently taught, provided the teacher writes an objective, prepares a learning activity packet, and puts it in the hands of the learner. This abilities model has gained wide acceptance in contemporary pedagogy. Each ability or behavioral objective which an educator writes is one which he knows everyone can do because he has seen or imagined some ideal person performing that behavior. When the novice learner accomplishes the set of objectives contained in the learning activity packet, he is given his just rewards and sent on to demonstrate the next set of abilities. This learning model, when incorporated in a teaching mode, is called individualized or performance based education. What you do is what you know. All of us have been exposed to this learning model. We have written behavioral objectives, we have given and taken pretests to determine our performance, done activities to strengthen our performance, and then taken a post test to measure how much we have improved our performance.

The third language learning model is basically that described by Shakespeare who was an Anglo, Renaissance man. This is the critical age model and it comes to us as variations on themes by Lennenberg and Piaget.

It is indeed a deterministic model based on observable facts about the human
condition: (1) a person's language learning is determined by his physiological
and psychological development which in term is determined by his chronological
age, (2) man is doomed to pass through each preceding critical age to get to
the next in a particular linear order, (3) belabored teaching of language
is useless since language cannot be taught, it can only be learned in its
prescribed biological and psychological sequence, and (4) the only way for
a person to go through these critical ages is to be put in social environments
which stimulate, energize, and provide the conditions for a person to pass
from one critical age to the next. Instructional procedures based on the
critical age model rely heavily on socialization in an open classroom
environment. It provides for assessment of where a child is in his stage
development for various subject areas. For example, how a child handles the
conservation of matter in science class would put him in a certain critical
age, how he explains the motivation of a character in a story would put him
in another critical age in language arts class, and how he views the moral
actions of a politician or a president in social studies would put the child
in still another critical age of his moral development. For example, "The
President lied," reflects an early stage of moral development which must be
expressed by a child before he can conclude, as an older student, that "a lie
of a certain magnitude by a person in public office will take away that
person's credibility and make for a suspect government."

If the critical age model of language learning catches on in the American
schools, which it seems to be doing in the British schools, language will
become an important aspect of every subject area since how a child progresses
through his critical ages will be determined by the way he expresses his
concepts. Assessment of a student's progress will be different since it will
take into account concept formation, moral development, and ability to
differentiate, categorize, and generalize. The role of the teacher in this
model is that of a person who helps set conditions for social interaction
in the learning environment and who assesses the children's concept formation.
The teacher sets the conditions for moral development while the child grows in
differentiation, categorization, and generalization ability at critical
ages. The balance of this paper will focus on the critical age model of
language learning.

A biological explanation of language learning. Lennenberg (1967) is
the principle disciple of a critical age theory of language learning based
upon biological and chronological development. Lennenberg's main concern
is the development of language in children which he observes as: (1) a
form of behavior present in all cultures of the world, (2) the age of onset
is the same for all children in all world cultures, (3) the acquisition
strategy is the same in all cultures, (4) the formal operating character-
istics of language are universal, (5) the formal operating characteristics
have remained the same in recorded history, and (6) language behavior can
be impaired by brain lesions which can leave other mental and motor skills
unaffected (Lennenberg, 1969, p. 645).

Certain features of language acquisition appear to follow hard on the
heels of features of motor development. At six months a child will sit up
using hands for support at the same time his cooing sound changes to babbling
by introduction of consonantal sounds. At one year, a child stands and walks
when held by one hand; at the same time he is able to duplicate syllables,
understands some words and utters what might be interpreted as first words.
At a year and a half a child can creep downstairs backwards and has a pro-
pulsive gait; at the same time he has a repertoire of not more than fifty
words not joined in phrases, uses intonation patterns that resembles
connected discourse, and shows good progress in understanding. At two years,
a child runs with falls and walks downstairs with one foot forward; at the
same time he owns more than fifty words, utters two-word nucleus phrases,
and no longer babbles. At two and a half, the child jumps with both feet,
stands on one foot for a second and builds a tower of six blocks while
uttering new words every day, using three word nucleus sentences and seems
to understand everything even though he makes some grammatical deviations
in speech. At three, the child can tiptoe three yards and walks downstairs
with alternating feet, he has a vocabulary of 1000 words, his grammar is
close to colloquial adult language, his grammatical deviations are systematic
and predictable. By four and a half years, a child can jump rope, hop on
one foot, walk a line, and his language is well established with grammatical
deviations restricted to dialect or literary aspects of discourse.

A recent study by Kidder (1974), attempts to trace the syntactic density and vocabulary intensity of children's writing through the elementary school years. Kidder's analysis of children's writing included grades 1 through 6. When samples of children's writing were analyzed for syntactic density, there was a clear trend for the mean score to increase at each grade level and a general trend for an increase by age. These findings were consistent with results of earlier studies which reveal trends for continuing development in children's abilities to manipulate more and more complex structures (Hunt, 1965, 1970; O'Donnell, 1967). The computerized Syntactic Density Score (Golub & Kidder, 1974) was sensitive to significant spurts of syntactic development at about nine years of age. Kidder's study also shows that the syntactic density of children's writing at a grade level lags behind about one year of the syntactic density of reading materials at that grade level. The pattern of syntactic development by age is generally one of increasing density in syntax with one noted regression at about age 10 and then another significant spurt at about age 11. Two year intervals are needed to obtain significant growth changes in syntactic density.

Kidder's analysis of vocabulary intensity of children's writing by age shows that vocabulary development fluctuates more than syntactic development. There was evidence of increases in vocabulary intensity in early years, plateaus or regressions in middle years, and then an upward curve again in the upper elementary grades.

The comparison of mean syntactic density scores of the samples of graded reading and of children's writing indicates that after initial reading experiences, the syntax of what children are expected to read is more complex than the syntax of their writing, but only on the average of one grade level difference. This steady difference of one year between what children are expected to read and what they write continues with age. A different pattern emerges for vocabulary. The vocabulary intensity of reading materials continues to increase with grade level, but the vocabulary intensity of children's writing tends to level off. In children's writing syntactic density increases with age, vocabulary intensity does not seem to increase so steadily after about age nine.

Attempts to modify language development through laborious instruction in grammar, vocabulary, or how to compose correct sentences is inconclusive.

Measures of children's language development are usually measures of how well they understand the listening and reading materials given them. Children who have not developed to a stage in which they use certain grammatical rules spontaneously, cannot be taught to repeat a sentence that is formed by rules not in the children's repertoire (Lennenberg, 1969). This is a good indication that the child abstracts regularities and relations from the language he hears; he then attempts to generalize for himself a set of principles. This building up of syntactic principles is a constant process so that significant growth intervals can be measured every two years (Kidder, 1974).

A Cognitive Explanation of Language Development. It is not possible to get an animal to name a specific object the way a child learns to name objects. Dogs can point and chimpanzees can arrange differently colored and shaped blocks or other objects, but this is not naming in the human sense. Cognition in humans is the process of naming.

A child shows evidence of his understanding of concepts by the way he uses words and these words label cognitive processes. In the process of cognitive development, a child goes from open classes of words, for example, "Daddy" to include all men, to closed classes, "Daddy," to include only one man. Concept formation is the primary cognitive process, naming is the secondary cognitive process which imprints the concept. Words "tag" the environment so that humans can deal effectively with the environment.

A concept, then, is a word which carries with it a meaning. A principle is a series of two or more concepts which when strung together deliver even more meaning. Horse is a concept as is livingroom. There is a horse in the livingroom creates an even more bizarre meaning than does horse or livingroom alone. Concepts are not the thing which they describe but rather they are psychologically in the mind of the organism as a representation of the referent in the environment. Some concepts are abstractions unto themselves, whereas others are classificatory because they seem to have attributes. Horse and livingroom are both classificatory concepts since they each have subordinate and supraordinate attributes. A horse is a kind of animal; animal is supraordinate to horse. A pony is a kind of horse; pony is subordinate to horse. Classificatory concepts are of particular interest in a critical age model of language learning. The use of these concepts allows

a child to discriminate and to classif . The teacher can then indicate the
child's critical age of development and can understand whether a child
really understands a concept. It is with language that a child indicates
his understanding of a concept and how he can manipulate or use a concept
in order to form principles. Thinking is the metaphorical process of
connecting concepts and forming principles.

Persons who do not link concepts into principles are using concrete
forms of thinking. Those who can, metaphorically, link concepts into
principles, are using abstract cognition.

A very young child's concepts tend to be concrete. When asked to
define a word, the child will point to an object which it denotes or will
define a thing by its uses, such as, "a doll is for playing house" or "a
mother is for cooking dinner." By the age of seven or eight the first
logical or abstract definitions appear such as "a doll is a toy that looks
like a girl" or "a mother is a person who has children." The earlier
responses are perfectly reasonable and relate to the child's needs. The
later responses relate to the child's response to events in the environment
which are principles formed in metaphorical ways.

The abstract attitude is based on the ability to: (1) assume a mental
set, (2) to shift from one aspect of a situation to another, (3) recall many
of the aspects of a situation, (4) grasp the many parts of a situation and
perceive them as a whole, (5) abstract common or dissimilar properties,
(6) plan ahead ideationally, (7) assume an attitude of possibility or
probability, (8) think and perform symbolically, and (9) detach the ego
from the outer world.

At about eighteen months, during the first and second years of a child's
life, language appears, as Lennenberg tells us, as biologically governed
behavior. At the same time, Piaget (1950, 1953) tells us that during the
second year sensori-motor intelligence seems to become complete. New means
to solving problems which need sensori-motor development happen so fast that
they appear to be sudden insight. At that age, a child, interrupted in his
attempt at opening a box will return to the task without any randominess of
behavior.

Language will appear immediately after sensori-motor development. From
the time that language appears to the age of four years, the child generalizes
his response according to iconic signs, the child assimilates reality to his
own actions alone so that the child will say "the door pinched my finger" or
"the wall hit the ball."

Between the ages of four and eight, intuitive thought starts to emerge. The child will relate referents in the outer world back to his own ego-centric experience. His shadow will get the child's name. The outline of a dog will get the name of a dog in the child's experience. At this age, there is no recognition of what unites the shadow with the person, the dog with a name.

Between the ages of eight and fifteen the child's thought is in a period of social concrete operations. Although some logical and abstract concepts arise, they cannot be manipulated in the abstract. The child at this period of thought will find it difficult to deal with an object that is not available. He cannot describe the angle of a ball bouncing off a wall if he cannot see it happen. He cannot say much, if anything, about the shadow of a tree unless he has one at hand to observe. Verbalizing principles in the abstract is very difficult for a child at this age.

From time of puberty, about thirteen, and on, generalized language development becomes fixed and formal language learning seems to take over. At this point in a child's thought process, the child shows true formal operations of logical and abstract concepts. The child can now reason in the abstract, arriving at accurate conclusions from purely verbal, abstract propositions, a shadow is cast in a certain direction depending upon the position of the light source, a ball bounces off a wall at a certain angle depending upon how it is thrown up against the wall.

Concrete thought operations are needed for generalizing about language, formal thought operations are needed for abstract principle-formation with language. These two activities are well distinguished by critical ages in the child's development. Both Lennenberg and Piaget do not see these biologically and psychologically determined ages as a time span an individual goes through, but as definite steps toward linguistic maturity and logical ways of thinking. These critical ages are cumulative and not simply sloughed off as one advances along his biological time line. All of the critical ages move from the cooing sounds to logical thought. No stage can be passed or overlooked as unimportant. A missed age will serve as a block to progress to a new age. It is often necessary to go back to a know critical age of development before progress forward can be made. Language is the key vehicle for taking a child through the critical ages of language and thought. The teacher of elementary school children should focus on conceptual development.

## Implications of a critical age model ... language learning.

A critical age model of language learning has some attractive and some not so attractive elements. The most obvious unattractive aspect is that the model admits to being limited by the learners own biological and psychological development. However, once this fact is accepted, a different approach to teaching the mother language and its uses in the teaching of subject matter seems in order:

(1) Formal instruction in the grammar or structure of the mother tongue is probably an unproductive activity between the ages of four and eight. Inductive or generalizing approaches to the understanding and decoding of oral and written language is appropriate for this age level.

(2) Between the ages of 8 and 13, identifying, naming, and categorizing of nonabstract concepts can be carefully and successfully carried out in the elementary school classroom.

(3) At thirteen and after the onset of puberty, a whole new type of education is needed. Students, from this point on, must be given every opportunity to learn how to think and to use language in abstracting principles from concepts. There is no reason to assume that students will learn to do the following abstracting behaviors without some outside assistance:

  (a) To assume a mental set for abstract thought.

  (b) To shift from one concept to another within a principle.

  (c) To recall most or all of the concepts from which a principle is derived.

  (d) To grasp the many concepts comprising a principle and to perceive them as a whole.

  (e) To abstract similar or dissimilar attributes of a concept.

  (f) To plan ahead ideationally.

  (g) To assume an attitude of "mere possible" or probability.

  (h) To think and perform symbolically.

  (i) To detatch the ego from the outer world.

(4) Moral development should accompany abstract thinking during language development.

(5) Oral and written language of literature serve as exceptionally
useful vehicles for observing and directing abstract language
development and moral development.

(6) Socializing environments such as open classroom procedures,
creative dramatics, learning activities which allow for oral and
written communication between pupils and teachers, are useful
environments for language and concept learning.

(7) A whole new method of assessing children's progress through the
critical ages as measured by concept attainment is essential for
proving or disproving the validity of this language learning model.
Initial attempts at testing concept in the language arts are avail-
able (Golub, Fredrick and Harris, 1971).

Research in language learning and concept formation based upon this
model is lacking. Some questions which can be investigated are: (1) Can
children ages 5 - 8, generalize oral and written language concepts from
direct experience with the sounds and forms of language as well as children
given formal instruction? (2) Can children who have had socialized concrete
operations instruction in distinguishing, naming, categorizing, and dis-
criminating similar and dissimilar attribute in language concepts do as well
in concept attainment as those having skills or ability oriented instruction
in language concepts? (3) Can students be taught abstracting or metaphorical
language behavior? (4) Is a skills approach or an abstracting approach most
satisfactory in teaching moral development?

Until some of these questions can be answered, it would be foolish for
any of us to discard either the rote-memory model or the ability model in
favor of the critical age model of language learning. Language learning
research of the future will be exciting since it should tell us how children
form and use concepts with the linguistic structures at their disposal.

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