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# Review of theories and research related to prelinguistic speech

M. Isabelle Walsh

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REVIEW OF  
THEORIES AND RESEARCH  
RELATED TO  
PRELINGUISTIC SPEECH

by

Sister M. Isabelle Walsh, C.P.P.S.

A RESEARCH PAPER  
SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF  
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approved for the Graduate Committee  
of the Cardinal Stritch College by

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## INTRODUCTION

The purpose of this paper was to study the speech development of a child with the emphasis on the various prelinguistic experiences in the child's speech development. This was accomplished by using Carroll's <sup>1</sup> definition of language and then narrowing that definition to one facet of language--speech.

Speech has been defined by various writers. Each of their definitions has been examined, but the one that this writer preferred is Eisenson's.<sup>2</sup>

The beginnings of speech go back to the moment of birth and the cry with which the infant hailed his own arrival. From the birth cry to the utterance of the first conventional, adult-like word, the infant progresses through a series of essential developmental stages as he learns to speak. Each child will pass from stage to stage according to a rate in general keeping with his physical and mental development. Ill health may retard

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<sup>1</sup> J.B. Carroll, The Study of Language: A Survey of Linguistics and Related Disciplines in America (Cambridge, Mass.: Harvard University Press, 1953), 10.

<sup>2</sup> J. Eisenson, The Psychology of Speech (New York: F. S. Crofts and Company, 1940), 5.

the progress, but unless the illness brings with it permanent physical or mental injury directly related to the functioning of the speech mechanism, the retardation is likely to be only temporary. The five areas of speech development are:

1. Reflexive vocalization.
2. Babbling.
3. Lalling.
4. Echolalia.
5. True Speech.<sup>3</sup>

The thinking and work of Vygotsky<sup>4</sup> in the Institute of Defectology in Moscow have influenced many of his pupils. Of these pupils, Luria<sup>5</sup> has become one of the most famous. The research of these pupils follows Vygotsky's stages of speech development:

1. Impellant or initiating function.
2. Inhibitory function.
3. Regulatory function.<sup>6</sup>

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<sup>3</sup> Mildred Freburg Berry and J. Eisenson, The Defective in Speech (New York: F. S. Crofts and Co., 1945), 1ff.

<sup>4</sup> L.S. Vygotsky, Thought and Language, edited and translated by Eugenia Hanfmann and Gertrude Vakar (Cambridge, Mass.: The Mit Press, 1962), 1ff.

<sup>5</sup> A. R. Luria, The Role of Speech in the Regulation of Normal and Abnormal Behavior, edited by J. Tizard (New York: Liveright Publishing Corporation, 1961), 52ff/

<sup>6</sup> L.S. Vygotsky, Thought and Speech, as quoted by Sylvia O. Richardson, "Language Training for Mentally Retarded Children," Language and Mental Retardation, ed. R.L. Schiefelbusch, R.H. Copeland, and J.O. Smith (Chicago: Holt, Rinehart and Winston, Inc., 1967), 150.

Piaget's observations of his children gave rise to his theory of sensori-motor growth. In his study of reflexes Piaget stressed the adaptation, accommodation and assimilation that affect the growth of the child.<sup>7</sup>

Various American thoughts on the development of speech through use of the senses are expressed by recordings of Irwin and associates,<sup>8</sup> the prelinguistic vocalization studies of Spradlin,<sup>9</sup> Berko and Brown,<sup>10</sup> the auditory and visual stimuli studies of Miller,<sup>11</sup>

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<sup>7</sup> J. Piaget, The Origins of Intelligence in Children, translated by Margaret Cook (New York: International Universities Press, Inc., 1952), 29ff.

<sup>8</sup> O.C. Irwin, "Language and Communication," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 511.

<sup>9</sup> J.E. Spradlin, "Procedures for Evaluating Processes Associated with Receptive and Expressive Language," Language and Mental Retardation, ed. R. L. Schiefelbusch, R. H. Copeland, and J.O. Smith (Chicago: Holt, Rinehart and Winston, Inc., 1967), 129.

<sup>10</sup> Jean Berko and R. Brown, "Psycholinguistic Research Methods," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 52.

<sup>11</sup> D.R. Miller, "Motivation and Affect," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 691.



Washburn,<sup>12</sup> Byers,<sup>13</sup> and the sensory stimuli studies of Spitz and Wolf,<sup>14</sup> and Spiker.<sup>15</sup>

In summary, this paper has reviewed the findings of the Russians, French, and the American researchers in the development of speech. The literature that has been included studied both the "normal" child's speech development; as well as that of the "retarded" child's development. Research has also compared the speech development of children living in institutional settings with that of children reared in a home environment. Evaluations and recommendations for further research have been included in the present paper.

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<sup>12</sup> Ruth W. Washburn, "A Study of the Smiling and Laughing of Infants in the First Year of Life," as quoted by D. R. Miller, "Motivation and Affect," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 691.

<sup>13</sup> V.W. Byers, "Speech Therapy for the Learning Disabled Child," Journal of Learning Disabilities, II (July, 1969), 25-28.

<sup>14</sup> R. A. Spitz and Catherine M. Wolf, "Anaclitic Depression: An Inquiry into the Genesis of Psychiatric Conditions in Early Childhood," as quoted by D.R. Miller, "Motivation and Affect," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 691.

<sup>15</sup> C.E. Spiker, "Research Methods in Children's Learning," Handbook of Research Methods in Child Development, ed. P.H. Mussen (New York: John Wiley and Sons, Inc., 1960), 379.

## REVIEW OF LITERATURE

In 1953 Carroll described language as a structured system of arbitrary vocal sounds and sequences of sounds which is used or can be used in interpersonal communication by an aggregation of human beings and which rather exhaustively catalogues those things, events, and processes in the human environment.<sup>16</sup> Carroll, when talking about language, has referred to the system including sounds, words, and grammatical patterns that are employed in speech communication.

Speech is considered, therefore, as only one of the many facets in the pattern of language construction. Speech is defined by many writers, each viewing it in a little different light. Bronstein and Jacoby state that "speech is a form of language that consists of sounds produced by utilizing the flow of air exhaled from the lungs."<sup>17</sup> Bangs sees speech as, "the functioning of the breathing, phonating, resonating, and articulating systems to produce the verbal symbols."<sup>18</sup> Borchers and Wise have

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<sup>16</sup> Carroll, Study of Language, p. 10.

<sup>17</sup> A. J. Bronstein and Beatrice F. Jacoby, Your Speech and Voice (New York: Random House, 1967), 14.

<sup>18</sup> T. E. Bangs, "Evaluation of Children with Language Delay," Journal of Speech and Hearing Disorders, XXVI (1961), 48-53.

still another view of speech as a code of audible signs made with the muscles and other tissues producing voice, and of visible signs made with other muscles and tissues of the body, both codes being used for the purpose of communication.<sup>19</sup>

The simplest definition of speech, the one that this writer prefers is that used by Eisenson. "Speech is that form of language which man produces without resorting to agencies outside his own organism."<sup>20</sup>

One of the basic facts that helps one to appreciate the hazards to which speech is subject is that there are no organs of speech as such. Each of the organs used for speech serves other functions with which speech has to compete. The vocal folds also serve to keep foreign matter out of the lungs. That is why one cannot speak and swallow at the same time. What is true of the vocal folds is true also of the organs of breathing; the lungs, diaphragm, muscles of the chest walls, and nasal passages. Breathing and the vitalizing functions which it serves are more important than talking, insofar as the life processes of the human body are concerned. Moreover, the lips, tongue, teeth, cheek muscles, soft palate, and muscles of the throat were not designed primarily for

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<sup>19</sup> Gladys Borchers and C. Wise, Modern Speech (New York: Harcourt, Brace and Co., 1947), 2.

<sup>20</sup> Eisenson, Psychology of Speech, p. 5.

speech. We use them for speaking only when they are not otherwise engaged.<sup>21</sup>

### SPEECH DEVELOPMENT

#### 1. Reflexive Vocalization:

The new born infant, on his arrival into the world of buzzing confusion, lacks both the experience and physiological maturation to make order out of chaos. In fact, without the least knowing what it is all about, the infant adds his own voice to the chaos. Yet, in his own way, the infant has begun to speak. Because he is unable to make head or tail out of the environmental stimuli, he cries alike in response to all stimuli, regardless of their particular characteristics. Because the infant does not know that he possesses hands and feet, fingers and toes, and a mechanism peculiarly well adapted for making noise, the entire mass of him participates in his crying. The birth cry, and all the infant's vocalizations during the first two or three weeks of his life, are reflexive, total bodily expressions in response to stimuli within and without him. As such, the expression is innate, and takes place without intent or awareness on the part of the infant.

Vocalization itself arises as a result of a

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<sup>21</sup> W. Johnson, Speech Handicapped School Children (3rd ed.; New York: Harper and Row Publishers, 1967), 36ff.

column of air reflexively expelled from the lungs passing over vocal folds tense enough to produce sound. Though the infant's early sounds are produced without purpose and lack specific meaning, they constitute a response to a word in regard to which the infant has formulated no intentions and from which he has received no meaning.

At the end of the first two or three weeks, the interested observer should be able to detect differences in the infant's cries. The crying is still an expression reflexive to a situation, but the manner of crying indicates that the world has begun to assume form and shape, that there is a bit more order and somewhat less of chaos. The infant has matured enough, physically and mentally, to react with greater differentiation to varying stimuli. His vocal responses, though still on a reflexive level, are more directly related to the nature of the stimulating situation than heretofore. The sensation of hunger, for example which is caused in part by a contraction of the muscles of the stomach walls, is accompanied in the infant by changes in the tonus of many muscles of the body, including those of the speech mechanism. When vocalization occurs, the result is a cry which becomes characteristic of the hunger state. Thus also, thirst, cold, heat, skin irritation, pain, external or internal pressures, give rise because of special muscle pattern sets, to characteristically different cries according to the nature of the stimulating situation. Mother is now able

to recognize the vocalizations of her child.

The different cries, though they are still produced reflexively and without intent on the part of the infant, may in essence be considered a crude vocabulary. The cries tell persons in the child's environment not only that he is responding to a situation, but in a rough way, something about the kind of situation. Without being aware of it, the infant is announcing his reactions to internal stimulation. Though he is not initially aware of the differences in his new manner of crying, he is a dull child indeed who does not soon know that crying makes a difference.<sup>22</sup>

## 2. Babbling.

At about six or seven weeks of age the infant begins to show by his reactions that he is aware of the sounds he is making. He indicates definitely that he enjoys producing sounds, and that he produces sounds when he is enjoying himself. The coos and gurgles and general vocal play that delight the parents as well as the infant, bring the child to a new developmental speech level.

If we listen to an infant's babbling we may note that he is producing a number and variety of sounds that

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<sup>22</sup> Berry and Eisenson, The Defective in Speech, p. 1.

are greater than those contained in any given language or combination of languages. Moreover, the particular racial or linguistic ancestry of the child will in no way determine the sounds he babbles. Babbled sounds are uttered completely at random. By chance some of the sounds may be repeated; most sounds are not repeated. As the child matures, the sounds produced resemble words spoken by older members of the environment. In this respect the babbling stage constitutes a definite advancement in the progression toward the use of a real spoken language.

Although there is no predetermined order of appearance of the various sounds heard in babbling, the likelihood is that the child will produce vowels before consonants. Of the vowels, a variety of (a) repeated at length with variations in pitch and intensity will probably be among the first to be heard. Labial consonants such as (p) and (b) are likely to follow, and then the probable order is gutturals (g), dentals ( $\zeta$ ) and ( $\theta$ ), and final nasals (n). It may be of some interest to note in passing that though the infant crying is nasalized, and though displeasure states in general are accompanied by nasalized vocalization, the production of nasal consonants, which is apparently an enjoyable activity, appears in pleasure states.

The babbling state may be considered a training and preparatory period for later articulate utterances.

The infant, unconsciously of course, is practicing articulations; he is learning to produce sounds which he will soon need in the more advanced states of his speech development.<sup>23</sup>

### 3. Lalling.

Up through the babbling stages of speech development the progress of the normally hearing and congenitally deaf child are the same. After this stage there is a distinct difference in speech development between the deaf and the hearing. As far as we know, a child does not need to hear to babble. Because babbling is essentially reflexive, and is largely a response of internal stimulation, the deaf child babbles quite as well as the hearing child. Beginning with the lalling stage, however, hearing plays an important role.

Lalling, which usually begins during the second six months of the child's life, may be defined as the repetition of "heard" sounds or sound combinations. The deaf child may be heard to repeat selected sounds or combinations of sounds, but these are repeated because of the pleasure derived from oral activity and not as the child's response to his environment. The great significance of lalling is that hearing and sound production have become

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<sup>23</sup> Ibid., p. 3.



associated. The seemingly endless repetition of "ba-ba" or "ma-ma" or "gub-gub" affords the child, if not all listeners, considerable satisfaction. Successful imitation becomes an incentive for repetition, and repetition for further attempts at imitation. Auditory, as well as tactual, and kinesthetic impressions are becoming associated with feelings of pleasure and satisfaction. The hearing child, having learned to imitate his own sounds, is ready himself for the imitation of sounds he will hear other persons produce, sounds which are basic to the language he will be expected to speak.

During the lalling period, the child may be observed to be making practical use of his vocalizations. He may cry, and it will be a special kind of cry, to attract attention. Particular kinds of sounds will accompany the motor responses with which he accepts or refuses favors, or makes demands on his environment. In a way limited by his mental and physical maturation, the child is expressing himself, and in doing so he is controlling the activities and expression of those about him. When the child becomes aware of the potency of his vocalizations, he is well on the way toward true speech.<sup>24</sup>

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<sup>24</sup> Ibid., p.4.

#### 4. Echolalia.

The child, at about nine or ten months of age, may be heard imitating sounds which others have made, and which are prevalent in his environment. Sounds which the child recognizes, such as those he himself made during the lalling stage, and are likely to be imitated first. Thus fortified, the child is now ready to imitate any and all sounds, though he seems to reserve the right to select those which please or amuse him. In the echolalic stage, which the child has now reached, there is no actual comprehension of sounds imitated. It is a distinct advance over lalling, however, in that the child reveals a definite acoustic awareness of other persons. Furthermore, the repertoire of sounds and sound combinations the child is building up is one confined to the sounds of the language of his environment, a repertoire that he will have to be able to produce at will, before speaking, in the adult sense, has been learned.

Some infants demonstrate a remarkable ability to echo sound combinations of extreme intricacy and complexity. The fond parent should not, however, be overhasty in concluding that the infant is showing early signs of genius. Though it is not our intent to deflate proud parents, it may be pointed out that the mongolian idiot, who is an all-round good mimic, possesses an amazing ability to echo long, tongue-twisting sound combinations without

experiencing the slightest intellectual reaction to what he is echoing.<sup>25</sup>

#### 5. True Speech.

Somewhere between twelve and eighteen months of age, the "average child" really begins to talk. Some "real" children may begin to talk somewhat earlier; others seem content to wait awhile longer before they begin. By talking we mean that the child intentionally uses conventionalized sound patterns (words) and that his observable behavior indicates that he anticipates a response appropriate to the situation and words he is uttering. Obviously, before the child can speak, he must himself be able to understand speech. By understanding speech we mean that the child responds with appropriate mental or motor (mostly motor) behavior to the spoken words of other persons. It is highly probable that the child will have considerable verbal understanding before he begins to speak, and that as he matures his verbal understanding will continue to be appreciable in excess of his own verbal utterance.<sup>26</sup>

With the background of the five stages of pre-linguistic speech, the reader will note that speech learning from its very inception is a process of stimulus and

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<sup>25</sup> Ibid., p.5.

<sup>26</sup> Ibid., p. 5.

response and strengthening of responses, a process in which associations are formed which are at first unintentional, random and meaningless, but which later become selective, intentional and meaningful.

In the early developmental stages, the child is his own greatest source of stimulation. For the most part his responses are of a reflexive nature. Nevertheless, in these early stages, he learns to produce and control sounds which are basic for his later speech. At this point we might represent the learning process graphically thus:

Reflexive sound activity (stimulus)-->Hearing (response)-->  
Repetitive sound production-->Pleasure of production.

Unless there is some satisfaction of pleasure in sound production, repetition and learning ceases. In the later developmental stages, much of the stimulation for sound production is supplied from without. The child imitates and echoes other persons, and so learns to produce sounds which are prevalent in his environment. Now a graphic representation of the process would be somewhat thus:

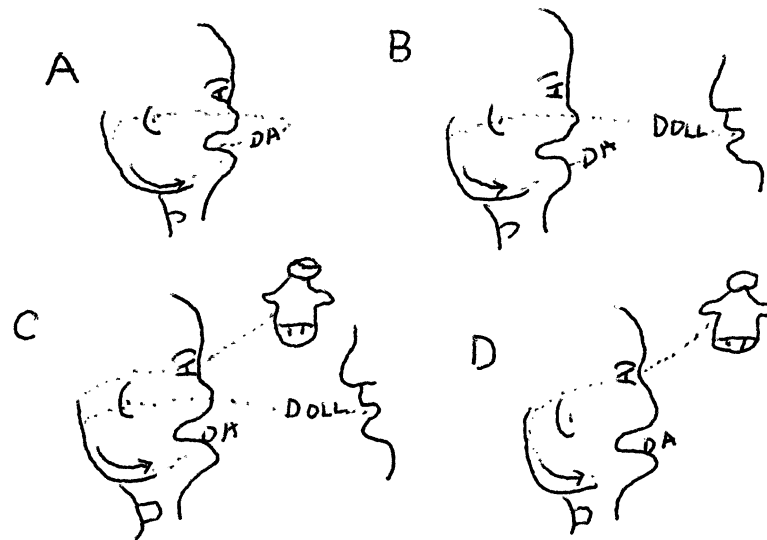
External sound stimulus-->Imitative response-->

Satisfaction of imitation-->Continued repetition.

When meaningful words are learned the graphic representation becomes:

Imitative repetition-->Pleasurable response from environment-->

Intentional repetition-->Continued repetition with glimmer of meaning.



**Fig.1**

A. Stage 1. Random articulation of syllables with fixation of circular responses. Chance articulation of the syllable "da" causes the baby to hear himself say it. The auditory impulse is conveyed to the brain centers where it discharges into the efferent neurons to muscle groups used in pronouncing the same syllable. An ear-vocal habit for "da" is thus established.

B. Stage 2. Evoking the same articulate elements by the speech sounds of others. An adult speaking the word "doll," which is closely similar to "da", causes the auditory excitation again to discharge into the response "da".

C. and D. Stage 3. Conditioning of the articulate elements (evoked by others) by objects. In C the process shown in B is repeated. A doll shown at the same time stimulates the baby's eye, and forms a visual connection with the motor neurons being used in pronouncing the syllable.

There is thus established a conditioned response between the sight of the doll and the speaking of "da". The sight of the doll alone (D) is now sufficient to evoke its name ("da" being as close as the baby can come to the pronunciation of "doll").<sup>27</sup> With the diagram and explanation Allport used it is easier for the reader to interpret the Russian thought.

#### RUSSIAN THEORY AND RESEARCH

The Russians have done fundamental work which is of interest. Berlyne, in a report on current Soviet research on intellectual processes in children, points out

There are in the world today three bodies of work on child psychology, each of about equal volume as far as empirical data and theories are concerned. These are the literature in English, the literature in Russian, and the literature in French. The literature in French includes Piaget's work which, in sheer quantity, is about equal to all the English-language or all the Russian-language literature put together. In other words, if we confine ourselves to English-language literature in child psychology, we are confining ourselves to about a third of the literature of child psychology. If we further restrict ourselves to English-language literature on intellectual processes in children, we shall probably have access to considerably less than a third of the significant work.<sup>28</sup>

The two major currents in Soviet child psychology

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<sup>27</sup> F. H. Allport, Social Psychology (Chicago: Houghton, Mifflin Co., 1924), 184.

<sup>28</sup> D.E. Berlyne, "Soviet Research on Intellectual Processes in Children," as quoted by B. B. Schlinger, "Issues for Speech and Language Training of the Mentally Retarded," Language and Mental Retardation, ed. R. L. Schiefelbusch, R.H. Copeland, and J.O. Smith (Chicago: Holt, Rinehart and Winston, Inc., 1967), 148.

can be traced back to Pavlov<sup>29</sup> and Vygotsky<sup>30</sup>. Pavlov declared that speech introduced a new principle in nervous activity, that of abstracting and generalizing innumerable signals coming in from the external environment.<sup>31</sup>

In his research on the work of the cerebral hemisphere, Pavlov established several basic laws governing the process of creating new temporary links in animals. A new link is formed when a conditioned signal is accompanied by a constant unconditioned reinforcement; the evolution of the link (especially if it is fairly complicated and includes differential excitatory and inhibitory reactions) is gradual, and goes through several successive stages, from an initial generalization to reactions to similar stimuli, to a subsequent differentiation.<sup>32</sup>

Once established, the new link becomes strong only gradually in the earlier stages. Eliminating the constant reinforcement invariable means the extinction and rapid disappearance of the link.

While a system of new temporary links is being,

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29I. Pavlov, Conditioned Reflexes and Psychiatry as quoted by A. R. Luria, The Role of Speech in the Regulation of Normal and Abnormal Behavior, ed. J. Tizard (New York: Liveright Publishing Corporation, 1961), 42.

30 Vygotsky, Thought and Language, p. 1ff.

31 Pavlov, Conditioned Reflexes, p. 42.

32 Ibid., p. 42.

evolved, the animal always orients itself only to concrete signals and their visual relationships; when the signalling property takes on an abstract form, it often experiences insuperable difficulties. These laws are fundamental. However, it is noteworthy that none of them applies in full force when we come to analysis of the process of the formation of new temporary links in human beings.

Toward the end of his life, Pavlov had reservations about the scope of his conditioning principles as applied to human beings. His later writings referred to what he called the "second signal system, the portion of the nervous system concerned with verbal behavior." This system plays a decisive part in establishing new links used as intermediary other links based on speech. These are the links that are incorporated into man's orienting activity, that abstract and systematize the signals acting on the organism, and inhibits its direct-impulse reactions. This process creates a new information-system within which each signal presented to the subject now operates.<sup>33</sup> The fact that a child's mental activities are conditioned from the very beginning by his social relationships with adults is of basic importance.

The works of Vygotsky are based on the idea that

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<sup>33</sup> Luria, The Role of Speech, p. 42.



all the most important mental activities result from the child's social development, in the course of which there arise new functional systems whose sources are to be sought not in the depths of the mind but in the forms of the child's relationships with the adult world.<sup>34</sup>

The child physically linked to his mother when in the womb and still biologically dependent on her during infancy, remains socially bound up with her for a long time. He is linked to her first directly and emotionally, and later through speech; by this means he not only enlarges his experiences but acquires new modes of behavior and then new ways of organizing his mental activities. By naming various surrounding objects and giving the child orders and instructions, his mother shapes his behavior. Having carefully observed the objects named by his mother, and after he acquires the faculty of speech, the child begins to name them actively and thus to organize his acts of perception and his deliberate attention to use Vygotsky's terminology," the process in which functions previously shared between two persons gradually change into the complicated function systems in the mind which forms the essence of higher human mental activities."<sup>35</sup>

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<sup>34</sup> L.S. Vygotsky, "Thought and Speech, as quoted by A. R. Luria, The Role of Speech in the Regulation of Normal and Abnormal Behavior, ed. J. Tizard (New York: Liveright Publishing Corporation, 1961), 16.

<sup>35</sup> Ibid., p. 18.

Vygotsky in 1939 distinguished the role of speech in affecting the behavior of other people from its role as a means of affecting one's own behavior. Vygotsky said that the properties and structure of inner speech and outer speech are different. The child first allows his behavior to be directed by the speech of others, and much later he uses speech to direct his own behavior as a by-product of his responsiveness to what others have said to him. Vygotsky's work led to much experimentation on relations between thought and language and on ways in which both thought and language regulate overt behavior.<sup>36</sup> Of those who belong to his school, Luria is probably the best known in this country.

Luria found that words have different ways of influencing a child's behavior at different ages. Very simple impellant or initiating function of speech may appear to develop as early as the beginning of the child's second year; it is indeed quite easy to get the required movements from a child of eighteen months by verbal instructions only, such as "Give me your hands" or "Clap hands." Careful analysis, however, shows that the influence of this speech is quite useless when it conflicts with an action already begun. Try, for example, giving a child twenty months or two years verbal instruc-

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<sup>36</sup> Vygotsky, Thought and Language, p. 1ff.

tions to take its stockings off while it is pulling them on. You will see that your verbal instructions are useless to alter the action already begun; on the contrary, the words merely intensify the action. Thus at this stage of development the child's action still predominates; although the adult's speech has already assumed an initiating function, it cannot yet inhibit an action once started, much less switch from one action to another.<sup>37</sup>

At a later stage, verbal instruction seems to have the primary effect of simply making the child do what he was already going to do, the inhibitory function. Give a child of eighteen months or two years a rubber balloon with the instructions to squeeze it. The instructions readily bring about the required movement, but once having started, the child cannot stop the movement; the continual kinesthetic stimulation of the palm by the balloon will intensify the child's diffuse nervous excitation, and will induce further pressing movements. Though we have started the action by verbal instructions, we cannot similarly inhibit it; the added verbal instruction, "That's enough" will not serve to discontinue the widely irradiating excitation process, but in many cases still further intensifies the now dominant motor-reaction system.<sup>38</sup>

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<sup>37</sup> Luria, The Role of Speech, p. 52.

<sup>38</sup> Ibid., p. 53.

The third or preparatory function of speech, i.e., its regulatory function proper, is of a still more complex kind, and develops at a still later age. This function is best illustrated by a very ordinary experiment with a "simple reaction." It might seem that when we say to a child, "When you see the light squeeze the balloon" we do not demand any complex form of activity. This is not so however. In actual fact such a verbal instruction is a good deal more complex than was the previous direct instruction just to squeeze the balloon. To carry it out the child has to be able to link the symbol of the future stimulus (i.e., the light) with that of the consequent response (the movement); but this movement must not be made at once but only after the real stimulus (the light) has appeared. Thus in this case the verbal stimulus inhibits both the direct search for the signal, and the actual movement. The essence of the instruction is that it demands a synthesis of the two verbal elements; it is this creation of a preliminary system regulating a subsequent course of action that is the principle distinguishing feature of such verbal instructions.<sup>39</sup>

Soviet psychology has made a thorough investigation into many facts relating to the readjusting of

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<sup>39</sup> Ibid., p. 54.

perception and attention, the memorizing and imagining, to thinking and doing. The work of Zaporozhets and Galperin,<sup>40</sup> Vygotsky and Leontiev,<sup>41</sup> Luria and the research of Lyublinskaya<sup>42</sup> provide a wealth of material for analysis in the formation and structure of functional systems. One vital fact distinguishes all these phenomena; the readjusting of mental processes under the influence of speech, and the creating of complicated forms of activity do not happen suddenly; they are products of a long process of development and pass through a series of stages terminating at different points according to the type of mental activity and the complexity of the functional formations.

Zaporozhets, a student of Vygotsky, suggests that the essence of voluntary behavior is in feedback.<sup>43</sup> He points out that there is a difference between primitive behavior and complex voluntary behavior with respect to how much feedback occurs and at what stages, and he feels that in order to achieve the stage of voluntary behavior we must be able to receive feedback en route. Zaporozhets combines emphasis on orienting reactions ( the objective

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<sup>40</sup> Zaporozhets and Galperin, as quoted by A. R. Luria, The Role of Speech, p. 28.

<sup>41</sup> Vygotsky and Leontiev, as quoted by A. R. Luria, The Role of Speech, p. 28.

<sup>42</sup> Luria and Lyublinskaya, as quoted by A. R. Luria, The Role of Speech, p. 29.

<sup>43</sup> Berlyne, "Soviet Research," p. 151.

equivalent of a conscious attentive process) and this emphasis on feedback in order to evolve a theory of the nature and development of voluntary action in the child. His experiments involve various motor tasks such as pushing a toy car around the correct path in a maze, knocking in a nail with a hammer, and performing gymnastic exercises.

Important experiments in regard to forming simple temporary links under the influence of the naming function of speech have been made in Leningrad by Lyublinskaya. Children aged twelve and thirty months were given small red and green boxes, the green empty and the red containing sweets. It proved very difficult for the child to select the right boxes. If a correct choice-reaction was established, after numerous attempts, it was easily extinguished and had to be worked out afresh next day. The picture changed completely, however, when speech was brought into the experiment, that is, when the experimenter named the colors of the two boxes. The significant cue stood out boldly; the process of working out the new link was nearly three times as quick as before; once worked out the link proved immeasurably stronger not being extinguished even after an interval of five days or a week; and not interestingly, it was readily transferred to other objects (such as cups or bricks), which the child began to classify similarly.<sup>44</sup>

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<sup>44</sup> Luria and Lyublinskaya, The Role of Speech, p. 28.

FRENCH THEORY AND RESEARCH

In this country we stress the importance of the implicit verbal response; and although the Russians acknowledge the importance of the verbal response as a result of their interest in Pavlov's second signal system,<sup>45</sup> they give major prominence to the orienting responses, which they relate to the functions of attention. Piaget stresses the implicit executive responses, responses that act to modify the environment.<sup>46</sup>

If Piaget's observations are correct, spoken language--that is, the motor side of a language skill--comes only after images, or the central processes representing objects and events, have been developed out of repeated encounters with those objects and events. Piaget has conceived of looking and listening, both of which are typically viewed as sensory input channels, as existing among the schemata ready made at birth. Almost since birth, therefore, there is "behavior" in the sense of the individual's total reaction and not only a setting in motion of particular or local automatizations only interrelated from within. In other words, the sequential manifestations of a reflex such as sucking are not comparable to the periodic starting up of a motor used

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<sup>45</sup> Luria, The Role of Speech, p. 33.

<sup>46</sup> Piaget, Origins, p. 24.

intermittently, but constitute an historical development so that each episode depends on preceding episodes and conditions those that follow in a truly organic evolution.<sup>47</sup>

The problem then arises in connection with reactions in the first weeks in only this: How do the sensori-motor, postular, and other reactions, inherent in the hereditary equipment of the newborn child, prepare him to adapt himself to his external environment and to acquire subsequent behavior distinguished by the progressive use of experience?

The psychological problem begins to pose itself as soon as the reflexes, postures, etc. are considered no longer in connection with the internal mechanism of the living organism, but rather in their relationships to the external environment as it is subjected to the individual's activity.

Piaget proposes three major periods of intellectual development. The first period, that of sensorimotor intelligence, deals with the child's learning to coordinate various perceptions and overt movements. The child learns to perform a wide variety of successful responses, i.e., responses which produce practical satisfactions, but there is nothing approaching representational thought during this period. The second major period, that of

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<sup>47</sup> Piaget, Origins, p. 24.



preparation for and organization of concrete operations, is concerned with the child's acquisition of language and his ability to think representationally and logically about the world. The third period, that of formal operations, deals with the individual's development of highly abstract and formal logical systems. He becomes capable of forming true theories about the nature of the world and of utilizing hypothetical-deductive reasoning.<sup>48</sup>

Piaget states, while speaking of the use of the reflexes in regard to adaptation, it is interesting to note that the reflex, no matter how well endowed with hereditary physiological mechanism, and no matter how stable its automatization, nevertheless needs to be used in order truly to adapt itself, and that it is capable of gradual accommodation to external reality.<sup>49</sup>

Let us first stress this element of accommodation. The sucking reflex is hereditary and functions from birth, influenced wither by diffuse impulsive movements or by external excitant; this is the point of departure. In order that a useful function may result, that is to say, swallowing, it often suffices to put the nipple in the mouth of the newborn child, but as we know, it sometimes happens that the child does not adapt at the first attempt.

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<sup>48</sup> H.B. Robinson and Nancy M. Robinson, The Mentally Retarded Child (St. Louis: McGraw-Hill Book Company, 1965), 25.

<sup>49</sup> Piaget, Origins, p. 25.

Only practice will lead to normal functioning. That is the first aspect of accommodation: contact with the object modifies, in a way, the activity of the reflex, and even if this activity were oriented hereditarily to such contact the latter is no less necessary to the consolidation of the former.<sup>50</sup>

But if, in reflex adaptation, allowances must be made for accommodation, accommodation cannot be dissociated from progressive assimilation, inherent in the very use of the reflex. In a general way, one can say that the reflex is consolidated and strengthened by virtue of its own functioning. Such a fact is the most direct expression of the mechanism of assimilation. Assimilation is revealed, in the first place, by a growing need for repetition which characterizes the use of reflex (functional assimilation) and, in the second place, by this sort of entirely practical or sensorimotor recognition which enables the child to adapt himself to the different objects with which his lips come in contact (recognitory and generalized assimilations).<sup>51</sup>

Piaget describes six stages within his large period of sensory motor development. The fifth of these stages (the Tertiary Circular Reaction) is especially relevant

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<sup>50</sup> Ibid., p.29.

<sup>51</sup> Ibid., p. 32.

to the study of word acquisition. This is a stage for children from twelve to eighteen months. The core of the concept is still the repetitive application of behavioral sequences, but whereas the younger child repeats only response patterns that he has met unexpectedly, the Stage-5 child actively seeks to discover or invent new response patterns which will bring about a novel effect. He seems to want to explore the potentialities of each situation. Assimilation and accommodation are now clearly differentiated. Accommodations are no longer merely forced upon the child; he actively seeks new accommodational experiences by experimenting with the environment. This is, of course, an extremely important development. It marks the beginning of a type of adaptation to the environment which, as Piaget has pointed out, anyone would admit to have the character of true intelligence.<sup>52</sup>

Two of the principle functions the child engages in during this time are imitation and what Piaget calls elaboration of the object. During this period, too, the child reaches a level of physical independence. The new objects become coherent and ordered. Spatial, temporal, and causal relationships are perceived, and verbal communications becomes important as a means of closing

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<sup>52</sup> Robinson and Robinson, The Mentally Retarded Child, p. 347.

the spatial gap between himself and others. It is significant, perhaps, that at this time the child has mastered the ability to imitate speech responses of adult models. He also has some words and word approximations to use as a handy means for attracting attention of these adult figures. During the word acquisition phase, then, the child is likely to use word responses which eventually come to resemble closely the verbal units used by the parent. The responses are also seen used purposefully in communication contexts.<sup>53</sup>

#### AMERICAN THEORY AND RESEARCH

Various American researchers express their views of linguistics stressing the importance of the implicit verbal response. Irwin states that the problems of evaluating methods in speech and language research is neither easy nor simple. The advantages and disadvantages of particular methods have been indicated by the same writer. The adoption of a method, and in turn a judgment of it, depends in large measure on the purpose the experimenter has in mind. The efficiency of a method is determined by the nature of the hypothesis he wishes to test, the degree of precision to be attained, the nature of information wanted, and the cost of conducting the research. The

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<sup>53</sup> R. L. Schiefelbusch, "The Development of Communication Skills," Language and Mental Retardation, ed. R. L. Schiefelbusch, R.H. Copeland, and J.O. Smith (Chicago: Holt, Rinehart and Winston, Inc., 1967), 99.

cost of conducting an experiment is an important factor in its design. There is a vast difference between the expense involved in doing a job with a small centralized group and with a state or nationwide sample. Both may be meticulously controlled, one with precision instruments, the other with non-instrumental comparative methods.<sup>54</sup>

Irwin and his associates have developed techniques for recording and evaluating the vocalization of infants.<sup>55</sup> The procedures involve having a trained phonetician record by use of the International Phonetic Alphabet the sounds made by the subject in a thirty breath unit. A variation of this procedure is to record the sound by tape recording and then having trained phoneticians transcribe the sounds into the IEA. Through the use of this technique, the same vocalizations may be transcribed by different phoneticians and the reliability of transcription evaluated at a later time. While the transcription of infants would seem to be an extremely difficult task, Irwin and his associates report high agreement among trained phoneticians for transcriptions of both live and taped vocalizations.<sup>56</sup>

The exact relationship between prelinguistic

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<sup>54</sup> Irwin, "Language," p. 511.

<sup>55</sup> Ibid., p. 488.

<sup>56</sup> Ibid., p. 490.

vocalization and later language expression has not been specified; however, Spiker and Irwin did find a low positive correlation between early phonetic development of an infant and Kuhlmann Test of Mental Development scores. Moreover, as the infant becomes older the distribution of phones (the individual vowels and consonants) emitted comes to more closely approximate the distribution of phonemes used in adult speech.<sup>57</sup>

Every child, in learning his first language, does much the same thing. He is not, in his first few years, exposed to all possible utterances belonging to the community language but only to that small sample brought to him by his family and their friends. As Berko and Brown have states, "The child may begin as a parrot imitating what others say, but he will end as a poet able to say things that have not been said before but will be grammatical and meaningful in his community."<sup>58</sup>

It has been shown in the readings and words of the Russians, as well as the French, that auditory, visual and sensory stimulation is necessary in the development

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<sup>57</sup> G.C. Spiker and O.C. Irwin, "The Relationship Between IQ and Indices of Infant Speech Sound Development," as quoted by J.E. Spradlin, "Procedures for Evaluating Processes Associated with Receptive and Expressive Language", Language and Mental Retardation, ed. R. L. Schiefelbusch, R. H. Copeland, and J.O. Smith (Chicago: Holt, Rinehart and Winston, Inc., 1967). 129.

<sup>58</sup> Berko and Brown, "Psycholinguistics," p.52.

of speech. Washburn in 1929 elicited smiling in young infants by such methods as smiling and simultaneously making "Chirruping" sounds, lowering her head to the infant's body and saying "ah-boo", suddenly emerging from a cupboard, clapping her hands in rhythm, playing peek-a-boo by first pulling a cloth over the infant's face and later holding a cloth in front of him, and sud only presenting him with a mirror in which he saw himself.<sup>59</sup>

In 1946 Spitz and Wolf<sup>60</sup> made a sophisticated attempt to analyse some properties of the adult's smile which elicit smiling in infants. In different sessions the experimenter first smiled, then grimaced, and finally wore a mask. Then a life-sized puppet and various inanimate objects were presented to the subject. Between the ages of roughly two and six months the infants smiled, laughed, and gurgled when they saw the smiling, grimacing, and masked man or the puppet. None of the responses was forthcoming on presentation of such inanimate objects as a flashlight, a bell, a block, and bells. In Spitz and Wolf's opinion the infant smiles on perceiving a configuration of certain static elements within the human face.

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<sup>59</sup> Washburn, "A Study of Smiling," p. 691.

<sup>60</sup> Spitz and Wolf, "Anacletic," p. 691.

at the University of Iowa.<sup>61</sup> This work followed Pavlov's principles.<sup>62</sup> Presentation of food to the infant elicits salivation, chewing motions, lip and mouth movements, swallowing and sucking. It may also bring about a reduction in the frequency and intensity of crying, general bodily activity and orienting behavior. Piaget also made use of such studies while working on his theory of intelligence.<sup>63</sup>

As a summation of the work and theories thus far presented it is this writer's belief that the speech system could be described best in Fairbank's theory of speech mechanism as a servosystem. This system has four inter-related units: the input unit, the motor unit, the control unit, and the sensor unit.<sup>64</sup>

The input unit, essentially the brain and neural system, is the executor of the speech system. It originates the message and initiates the instructions. The motor unit, essentially the component of the vocal mechanism, is the effector of the speech system. Through the shaping and adjustment of the vocal tract and rapid movement of the articulators, it produces the acoustic message. The control

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61 Spiker, "Research," p. 379.

62 Pavlov, Conditioned Reflex, as quoted by Luria, The Role of Speech, p. 42.

63 Piaget, Origins, p. 24.

64 G. Fairbanks, "Systematic Research in Experimental Phonetics," as quoted by V. W. Myers, "Speech Therapy for the Learning Disabled Child," Journal of Learning Disabilities, II (July, 1969), 25.



unit, anatomically undifferentiated, is the coordinator of the speech system. It coordinates and synchronizes the executor and effector units to insure that the acoustic output of the message has the same functional form as the neural input. The sensor units, the auditory pathways, the tactile, and proprioceptive end organs, are the servo-mechanisms.<sup>65</sup> This may sound rather technical, but what is said is the same as what has been stated, that speech is developed by many systems within the human body. Information fed into the human mechanism through the senses, is returned to the environment by imitation; and that this pattern then reinforces itself in an ever spiraling act of stimulation and response.

In order to understand research that has been undertaken and studies that have been made of the mentally retarded and their speech, it is necessary to know the speech patterns of the "normal" child. Poole has established a sequential table for consonant development.

<u>Age*</u>		
3½	b, p, m, h, w, (r-n)**	*These are the ages at which every normally developing child has established consonants in words that he uses.
4½	d, t, n, g, k, D, j	**These do not remain here. <sup>66</sup>
5	f, (z, s)**	
6	v, ʒ, ʃ, ʒ, θ, h	
7½	z, s, r	

<sup>65</sup> Ibid., p. 27.

<sup>66</sup> Irene Poole, "Genetic Development of Articulation of Consonant Sounds in Speech," Elementary English Review, II (1934), 159-161.

According to Poole,<sup>67</sup> a mentally retarded child is not yet in trouble if the vegetative consonants have become established in words he uses by the fifth year of his life, and if the progression has been orderly with typical baby talk sound substitutions. His retardation may not interfere with further establishment of consonants. The degree of retardation may well prevent him from learning, with cortical intention, to make the later developing consonants and to put them appropriately in words. If he has slowed up the process of establishing the vegetative consonants, or if he stalls at the fifth year level, or if his pattern of substitutions is aberrant, he is likely not to progress further, either to remain as is or to regress.

#### RESEARCH ON "MENTALLY RETARDED" CHILDREN

Development denotes changes which occur in the organism due to neural growth and environment. We know that the mentality of a six year old mind in a six year old body is different from a six year old mind in a sixteen year old body. Our knowledge of the conceptualization process of persons who are so different, however, is scanty. Some factors which contribute to the less effective utilization of the basic potential of the mentally retarded, as regards language, are socio-

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<sup>67</sup> Irene Poole, Genetic Development of Consonant Sounds in Children, as quoted by Irene Blanchard, "Diagnostic Patterns of Articulation," Differential Diagnosis of Speech and Hearing Problems of Mental Retardation, ed. E. Waldon (Washington, D.C.: Catholic University of American Press, 1968), 210-211.

economic in nature. It has been observed that two children with the same MA who come from homes of different socio-economic levels can show great differences in language performance. Since the 1950's there has been an increased interest in the problems of speech and language development of the mentally retarded child.

Research in speech and language development of the mentally retarded child has been accomplished primarily in terms of:

1. Incidence of classification of speech defects, particularly of defects of articulation.
2. Instruments designed for evaluation of speech and language skills.
3. Description of therapeutic programs and results.
4. Functional language measurements such as extent of vocabulary, sentence length, and frequency of use of grammatical parts of speech. 68

1. Comparison of Mentally Retarded and Normal Children.

In researching the literature in regard to speech of the mentally retarded this writer has noted that many of the research projects relate to speech and behavior with reference to motor ability. Jenkins and Lohr<sup>69</sup> compared forty "severe" articulation defective children with a

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68 S. Harrison, "A Review of Research in Speech and Language Development of the Mentally Retarded Child," American Journal of Mental Deficiency, LXIII (1958), 236.

69 Edna Jenkins and Frances E. Lohr, "Severe Articulation Disorder and Motor Ability," Journal of Speech and Hearing Disorder, XXIX (Aug., 1964), 286-292.

control group of forty children who had no history of speech defects. Conclusions of the study seem to indicate that children with severe articulation defects do on the average have more difficulty in motor proficiency than do children without severe articulation disorders.

Another area that has been researched is concept development with reference to verbalization. Milgram<sup>70</sup> studied normal children, educable retardates and trainable retardates of approximately mental age six years for a comparison of two conceptual tasks. The first required recognition of pictured objects which constitute a conceptual class. The second task presented the conceptual sorting in any given set and required a verbal formulation of the basis for sorting. There were no differences between groups on the conceptual sorting tasks, but the trainable retardates were poorer than the other two groups on concept verbalization.

In a similar study Sievers<sup>71</sup> compared thirty brain-injured retarded children, thirty-three non-brain-injured retarded children and 100 normal children on a test of differential language facility. All three groups

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<sup>70</sup> N. A. Milgram, "Verbalization and Conceptual Classification in Trainable Mentally Retarded Children," American Journal of Mental Deficiency LXX(1966), 763-765.

<sup>71</sup> Dorothy J. Sievers, "A Study to Compare the Performance of Brain-Injured and Non-Brain-Injured Mentally Retarded Children on the Differential Language Facility Test," American Journal of Mental Deficiency LXIII (1959), 839-847.

had similar mental ages, but the normal children were superior in their overall use of language. On subtests which involved making a verbal connection between visually perceived objects, the brain-injured children did especially poorly.

## 2. Studies on Institutionalized Mentally Retarded:

In any investigation of children in an institutional setting, one must keep in mind the fact that institutions as a whole and wards within a given institution differ widely. Even an institution with an excellent reputation for its academic and vocational program may contain custodial wards in which moderately and severely retarded children receive little attention and a total absence of schooling. Excellent programs within an institution, in fact, are sometimes developed at the budgetary expense of other programs. Obviously, it would be unwise to make sweeping generalizations about the effects of institutional living without specifying precisely the sort of environments involved.

Two studies were made at the Fort Wayne State School. Nigrodsky and Steer<sup>72</sup> attempted to create an articulation development program based on Mowrer's Autistic Language Development Theory.<sup>73</sup> Basically, the aspect of

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<sup>72</sup> S. Nigrodsky and M. D. Steer, "Mowrer's Theory Applied to Speech Rehabilitation of the Mentally Retarded," Journal of Speech and Hearing Disorders, XXVI (Aug., 1961), 237-242.

<sup>73</sup> O. H. Mowrer, Learning Theory and the Symbolic Process (New York: John Wiley and Sons, Inc., 1960), 19-21.

Mowrer's theory that appeared to make it applicable as a speech therapy technique for mentally retarded individuals was the emphasis placed on growth of language related to positive identification and secondary reinforcement. The principle of applying sound while providing good and gentle care is the foundation of the theory. The subjects for this study were institutionalized mentally retarded children ranging in chronological age from 6-0 to 16-11 capable of communicative language insofar as subjects could be identified verbally either by visual inspection or auditory stimulation. The 124 subjects were assigned to one of two intelligence levels based on individual IQ scores derived from standard tests as furnished by the Psychology Department of the Fort Wayne State School. Level I consisted of those subjects with IQ scores ranging from 12 to 44, and Level II, IQ scores from 45 to 79. Using a series of random numbers for both IQ levels, 72 subjects were finally selected for the study and assigned to one of four groups consisting of two therapy conditions and two control conditions.

Significant differences at the conclusion of speech training indicated that for certain tests (objects and picture articulation test) mentally retarded children of the upper intellectual group achieved better scores than did children of the lower intellectual group.<sup>74</sup>

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<sup>74</sup> Nigrotsky and Steer, "Mowrer's Theory," p.242.

The second study performed at Fort Wayne State Hospital and Training Center was conducted by Shubert, Jansen and Fulton. Three experimental and three control groups were selected for academic classes. The twenty experimental students had a CA range from 10-8 to 17-7 months with an IQ range of 36-73. The twenty students within the control groups had a CA range from 10-6 to 17-5 months with an IQ range of 30 - 70.

The program was administered twenty minutes daily, five days per week, for three weeks, per sounding of nine consonants. The program stressed consonantal presentation in initial, final, and medial positions. The results of this study indicated that the presentation of a speech improvement program to institutionalized groups of retardates did not provide significant treatment effects.<sup>75</sup>

Another study was made at the Pacific State Hospital by Blanchard who compared articulation growth patterns of a population of 350 mentally retarded children in the institution that has a population of 3,000. For purpose of this study the age range selected was from 8-6 to 15-0, with an IQ range from 27 to 68, and length of residency from two months to eight years. The summary of the research was that few children enrolled in the school.

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<sup>75</sup> O.W. Shubert, Barbara C. Jansen, and R. T. Fulton, "Effects of Speech Improvement on Articulation Skills in Institutionalized Retardates:II," American Journal of Mental Deficiency, LXXII (Sept., 1967), 212.

progressed beyond the level of communication found in four year olds in a non-institutionalized population, regardless of the conditions that are responsible for their intellectual limitations.<sup>76</sup>

In a similar study at the Neward State School, Sirkin and Lyons found that 60% of the patients who talked had speech defects, while 17% of the total population had no speech.<sup>77</sup>

### 3. Comparisons of State Institutions and Day School Groups.

There is a dearth of reliable information about the effects of institutional living, although this lack has not noticeably dampened the enthusiasm or conviction of either those who advocate continued development of institutional programs or those who champion home-care programs. As a matter of fact, few researchers have ever observed exactly how the environment of a typical institution differs from that of a typical home.

Sievers and Essa<sup>78</sup> noted language development patterns of 7½ children from Columbus State School, Columbus, Ohio,

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<sup>76</sup> Irene Blanchard, "Speech Pattern and Etymology in Mental Retardation," American Journal of Mental Deficiency, LXVIII (March, 1964), 612-617.

<sup>77</sup> J. Sirkin and W.F. Lyons, "A Study of Speech Defects in Mentally Deficient," American Journal of Mental Deficiency, XLVI (1941), 74-80.

<sup>78</sup> Dorothy J. Sievers and Shirley H. Essa, "Language Development in Institutionalized and Community Mentally Retarded Children," American Journal of Mental Deficiency, LXVI (1961), 413-420.



and 74 children from Franklin County Council for Retarded Children, Columbus, Ohio. The groups were comparable:

State School MA 3-0 to 5-11 Mean 4-5  
County Group MA same range Mean 4-7

State School CA 6-11 to 16-11 Mean 11-9  
County Group CA 7-7 to 16-4 Mean 11-3

The results of this study indicated that the community group showed superior performances on the total score and five subtests of the DLFT tests (Differential Language Facility Test) of Sievers<sup>79</sup>; all these subjects required the child to express himself in a verbal meaningful way to the given item. It can be inferred from the performance of both groups on the DLFT and the speech evaluation, that language development appears to follow the same pattern of growth in the mentally retarded as that of normal children.<sup>80</sup>

Lyle conducted two studies on imbecile children in an institution compared to imbeciles of similar non-verbal IQ living at home with parents and attending day school. In the first study Lyle reported that imbecile children in an institution were retarded in verbal intelligence compared with the day school group. The reason suggested for this retardation was that the ability of the institution children to use and to comprehend speech, or to think in verbal terms was severely impaired as a

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<sup>79</sup> Sievers, "A Study to Compare," p. 840.

<sup>80</sup> Ibid., p. 846.

function of long residence in the institution.<sup>81</sup> The second study was carried out to compare the same two groups of imbecile children on a number of ad hoc verbal tests designed to measure different aspects of speech and language.<sup>82</sup>

Institution Number 77  
Day School Number 117

Institution Mongols / Non-Mongols 34/43  
Day School Mongols / Non-Mongols 76/41

Institution Boys/ Girls 44/33  
Day School Boys/ Girls 59/58

Institution CA range  $6\frac{1}{2}$  - 14 years  
Day School CA range  $6\frac{1}{2}$  -  $13\frac{1}{2}$  years

Institution MA range nonverbal  $2\frac{1}{2}$  -  $5\frac{1}{2}$  years  
Day School MA range nonverbal  $2\frac{1}{2}$  -  $5\frac{1}{2}$  years

Institution IQ range nonverbal 20 - 54 Mean 35.05  
Day School IQ range nonverbal 29-49 Mean  $35\frac{1}{4}$

Some of the conclusions drawn from this study were that mongols were lower in verbal skills than non-mongols whether in a day school or in an institution. Imbecile children in the institution were lower in verbal ability than those in a day school, whether they were mongols or non-mongols. From the correlation matrix it was shown that

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<sup>81</sup> J.G. Lyle, "The Effect of an Institution Environment upon the Verbal Development of Imbecile Children," Journal of Mental Deficiency Research, IV (June, 1960), 1-13.

<sup>82</sup> J.G. Lyle, "Some Personality Characteristics of 'Trainable' Children in Relation to Verbal Ability," American Journal of Mental Deficiency, LXVK (1961), 69-75.

the day school children were superior to institution children on all verbal tests. Sex did not have a significant effect upon the criterion for verbal activity or ability, though girls tended to have higher scores than boys. It was seen that in testing, even those children who could speak on entry into institutions were found to be significantly retarded in present verbal function when compared with a matched group of day school imbeciles. It would seem that there are causes of retardation of verbal development within the institution itself. Some explanation given for this was the restricted opportunity for learning or using speech both in classroom and in informal situations. The restricted motivation to learn or to use language as a means of communication was given as another reason for lower performance in the institutionalized children.

Schlanger<sup>83</sup> tends to draw the same conclusions as Lyle. Schlanger in his study proposed to investigate the effects institutional residence has on the mental retardate's verbal output as opposed to a home environment in the city. The population for this study was two groups of 21 mentally retarded children--one group from St. Colette School for Exceptional Children in Jefferson, Wisconsin, and the other group from speech therapy

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<sup>83</sup> E.B. Schlanger, "Environmental Influence on the Verbal Output of Mentally Retarded Children," Journal of Speech and Hearing Disorders, XIX (Sept., 1954), 339-343.

classes of the Madison, Wisconsin, School System.

Two word-count measures were used for comparing verbalization. One was to obtain the mean length of sentences; the other measure aimed at finding the average number of words used in a minute. The results indicated the superiority of the city children in language development. The city children achieved a mean sentence length of 5.26 words as compared to the institutionalized children's mean of 4.18 words. The former also achieved 64.9 words per minute score and the latter a mean 49.7 words per minute score.

Causes suggested by Schlanger for the lower language output of the institutionalized children included the loss of speech motivation, complete association with peers and overstimulation from such continual contact, and the severance of familial ties. These were felt to have caused blocked language development.<sup>84</sup>

The ideas expressed by Schlanger have influenced the thinking of and testing hypothesis of many researchers since 1954. In 1963 Mueller and Weaver conducted research from the Peabody College with just these thoughts in mind. The population for this study was drawn from three sources: Day school children from Nashville Public Schools for the Severely Retarded; Orange Grove School for Retarded

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<sup>84</sup> Ibid., p. 343.

Children, Chattanooga, Tennessee; and the Institutional group from Cloverbottom Hospital and School, a state institute for retarded, Donelson, Tennessee.

Forty pairs of individuals were matched on IQ, CA, sex, and race. CA for the group was 9-0 to 19-0 years. IQ range was from 20 to 56. Three examiners administered the ITPA to all members. Each tester examined the paired subjects. The most striking result was the superiority of the institutional trainable mentally retarded in virtually all aspects of language studied. This was contrary to the major prediction of the study.

In a post hoc investigation focusing upon variables, all three examiners found they had independently arrived at a rather vague, but perhaps pertinent, generalization regarding the differences in the school experiences. A more structured, routinized atmosphere as well as greater stress upon achievement in more conventional academic material seemed to characterize the institutional school. On the other hand, a greater emphasis on social and emotional adjustment appeared present in the day school.<sup>85</sup>

The researchers made a recommendation at the conclusion of the study," The fact that all the institutional trainable mentally retarded subjects were obtained from a

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<sup>85</sup> M.W. Mueller and S.J. Weaver, "Psycholinguistic Ability of Institutionalized and Non-Institutionalized Trainable Mental Retardates," American Journal of Mental Deficiency, LXVIII (July, 1963), 775-783.

single institution indicates the desirability of replicating the study in another location.<sup>86</sup>

#### RECOMMENDATIONS

Perhaps the "Standards for State Residential Institutions for the Mentally Retarded"<sup>87</sup> that were established in 1964 will eliminate some of the discrepancies noted in the above studies. According to the standards, "Based upon current data and expert opinion, any residential facility with a population over 1,000 is considered 'large' ...The increase in community programs tends to decrease residential facilities. Those multi-purpose facilities currently having populations below 1,000 and over 500 should not be increased in size."<sup>88</sup> Three recommendations were made in this regard:

a) Multi-purpose residential facilities established in the future should not exceed a residence population of 1,000.

b) Special purpose, short-term and long-term care facilities established in the future should not exceed a resident population of 500.

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<sup>86</sup> Ibid., p. 783.

<sup>87</sup> Standards for State Residential Institutions for the Mentally Retarded, American Journal of Mental Deficiency, Monograph Supplement, LXVIII (January, 1964), 1-101.

<sup>88</sup> Ibid., p. 15.

c) Present multi-purpose residential facilities over a residence population of 1,000 should plan administrative (homogenous) groupings of residents within the facility based upon their specialized needs.<sup>89</sup>

These recommendations follow the directives set down by the President's panel on Mental Retardation.<sup>90</sup> The position taken by the panel was that:

1) Institutions for the retarded should not exceed 1,000 beds and those whose population presently exceeds this number should take steps, as soon as possible, to provide small living units within the facility to provide individual care.

2) Residential facilities now being planned, and those to be built in the future, should not exceed 500 beds, in general, and for certain specific purposes any number under that might well be regarded as advantageous.<sup>91</sup>

Besides the emphasis that has been placed upon the population of state institutions, increasing attention is being given to institutional programming in speech pathology, audiology and research (SPAR) because of the multiplicity of speech and hearing problems found in

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<sup>89</sup> Ibid., p. 10.

<sup>90</sup> A Proposed Program for National Action to Combat Mental Retardation; President's Panel on Mental Retardation (Washington, D.C.: Government Printing Office, (October, 1962), 131-147.

<sup>91</sup> Ibid., p. 143.

the retarded population. The proposed therapeutic training, not included in education and training programs, is as follows:

- a) Speech programming, including speech correction, speech(lip) reading, auditory training and hearing aid utilization offered individually or in small groups.
- b) Speech training and speech education, individually or in small groups.
- c) Language development and speech stimulation offered in group therapy, to infirm, non-ambulatory, or nursery living care areas.<sup>92</sup>

Perhaps research involving the mentally retarded in the future, if the above recommendations are observed, will not reflect serious differences in the institutionalized mentally retarded as compared with the mentally retarded child reared at home. Harrison has listed areas of speech development that have not been adequately researched. It will be interesting to see what the future will bring in these categories:

1. Effect of perceptual dysfunction on speech and language development.
2. Development of abstract and conceptual thinking.
3. Scales for diagnosis and for evaluation of growth in speech and language.
4. Analysis of speech and language performance as part of the differential diagnostic process.

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<sup>92</sup> Standards for State Residential Institutions, p.46.



5. Methods and techniques of value in the developmental language, and therapeutic speech programs.

6. Language and speech development during the pre-school period. 93

## SUMMARY

In summary, this paper has presented a definition of language and then narrowed that definition to one facet of language--speech. Speech was then examined in the five stages of prelinguistic speech. The theories and works of Russian researchers were next examined. Piaget presented the thought of the French philosophy of speech. Various American writers contributed to the development of speech and speech patterns. Diverse research projects that have been conducted both on institutionalized and non-institutionalized populations of "normal" and "mentally retarded" children were presented.

The findings of research indicate a variety of thought. In regard to defects of articulation, Jenkins and Lohr<sup>94</sup> related articulation and motor proficiency to find that the more severe the articulation defect, the less proficient was the motor skill. Milgram<sup>95</sup> found that the trainable mentally retarded were less able to sort pictures. Nigrodsky and Steer<sup>96</sup> stated that the higher

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<sup>94</sup> Jenkins and Lohr, "Severe Articulation," p. 292.

<sup>95</sup> Milgram, "Verbalization," p. 765.

<sup>96</sup> Nigrodsky and Steer, "Mowrer's Theory," p. 242.

the ability, the better the articulation. Blanchard<sup>97</sup> claims that articulation of institutionalized mentally retarded was not beyond a four-year-old level. These studies were not conducted over a very long period of time and were undertaken in environments that appeared not to be overstimulated. Most of the other research reviewed was of the same nature in findings. This does not indicate that this is the whole truth of the speech development programs for the mentally retarded. With the help of the President's Panel<sup>98</sup> and the recommendations made for state residential institutions<sup>99</sup> of the future, these research findings may be made to appear as a matter of ancient history.

The greatest obstacle to research into the effects of institutionalization on language and speech development is the selection of truly comparable groups of children living under different conditions. Simply taking a random sample of retarded children in an institution and retarded children living at home obviously is not a suitable procedure, since the groups from which the samples would be chosen are not comparable on a number of important

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<sup>97</sup> Blanchard, "Speech Pattern," p. 617.

<sup>98</sup> A Proposed Program for National Action, p. 131-147.

<sup>99</sup> Standards for State Residential Institutions, p. 1-101.

variables. One approach to the problems is the study of children before and after their admission to institutions, the children thus serving as their own control group. Another possibility is the comparison of home-reared retarded children with those who have been institutionalized during infancy because of routine medical advice or family emergencies.

It is this writer's hope that more constructive programs of speech therapy be included in the education and training programs of many of the institutions for the mentally retarded. Also it would be desirable to have speech stimulated in these same institutions by means of more personal contact with adults who are "normal." Closer "outside" community ties, enabling children to experience varied, normal activities, should be introduced into the curriculum of institutions.

As has been shown throughout this paper, speech develops in a spiraling pattern from stimulus to response, to further stimulus and further response. There is a constant reinforcement of activities. The speech of retarded children would and does develop in the same manner as that of normal children, provided that the former group is given comparable opportunities for stimulus--response--and reinforcement activities.

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