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## THESIS ABSTRACT

FUSSELL- MARY ROBERTSON, The Verbal Behavior of the Autistic Child. (1967) Directed by: Dr. Lawrence M. Vanella. pp. 177

Procedures were employed over a period of six months to develop communication in three non-verbal, emotionally-disturbed children who displayed autistic types of behavior as described by Kanner. The children were institutionalized, and, at the beginning of therapy, ranged in age from five years three months to eleven years seven months. The oldest was a girl with a hearing impairment who had been diagnosed at age four as schizophrenic (autistic type), and the two younger subjects were boys.

The basic therapeutic method utilized was operant conditioning using food and social reinforcement. Negative reinforcement was a firm "No," or immediate cessation of an activity.

The largest acquisition of speech was by the seven year old boy, a vocabulary of almost 100 words including some phrases. The oldest subject made some limited progress in speech-reading, and improved in her ability to communicate in writing. The youngest child learned, through operant conditioning, to tolerate the tactual method of speech stimulation. This method was employed when he failed to respond to visual and auditory stimulation. He acquired one consonant and several vowel sounds.

All of the children responded positively to conditioning for improved eye contact. It was the consensus of staff members that all of the children made gains in relating to other people.

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Mary Robertson Russell

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The Faculty of the Graduate School of  
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in Partial Fulfillment  
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Master of Arts

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Approved by

*James H. Hunt*  
*James H. Hunt*

THE VERBAL BEHAVIOR OF THE AUTISTIC CHILD

by

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Approved by

*Lawrence H. Conant*

*Lawrence H. Conant*  
Director

APPROVAL SHEET

This thesis has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Thesis  
Director

William E. Canella

Oral Examination  
Committee Members

Lawrence J. Cox

Ernest E. McDowell

Thomas L. Tedford

Hermon Whittleton

August 23, 1967  
Date of Examination

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## CHAPTER I

### INTRODUCTION

Language has been described as "the most momentous and at the same time the most mysterious product of the human mind."<sup>1</sup> The acquisition of speech is an orderly process in the development of language. Speech is the tool with which an individual may chisel out for himself a niche in his milieu. Sometimes the tool is dull, inadequately employed or even missing, and the individual, failing to obtain a secure footing, shrivels and shrinks from human contact.

Major causes of absent or deviant speech are mental retardation, deafness, developmental lag, organic problems and psychological disturbances.<sup>2</sup> Frequently more than one problem may contribute to the language disturbance creating the problem of differential diagnosis.<sup>3</sup> Failure to

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<sup>1</sup>Susanne K. Langer, Philosophy in a New Key (Cambridge: Harvard University Press, 1951), p. 103.

<sup>2</sup>Sol Adler, The Non-Verbal Child (Springfield, Ill.: Charles C. Thomas, 1964), p. 50; J. V. Klein, "Speech and Hearing Behavior as an Aid in Differential Diagnosis," Canadian Psychiatric Association Journal, 8:320, 1963; Charles Van Riper, Speech Correction Principles and Methods (Englewood Cliffs, N.J.: Prentice-Hall, Inc. 4th ed., 1963), p. 109.

<sup>3</sup>Helmer Myklebust, Auditory Disorders in Children (New York: Grune and Stratton) 1954; Lee Edward Travis, Handbook of Speech Pathology (New York: Appleton-Century-Crofts, Inc., 1957), pp. 28-30.

develop language or to use speech meaningfully is a striking characteristic of the child suffering from early infantile autism.<sup>4</sup> Indeed, there is evidence that speech is the most retarded of the developmental sequences in the autistic child.<sup>5</sup> Only about half of these children learn to speak.

The syndrome of early infantile autism was first described by Leo Kanner who, in 1943, established criteria for its diagnosis from the study and observation of eleven children whose pattern of behavior was unique. Kanner explains his efforts to find a suitable name:

In my search for an appropriate designation, I decided in 1944, after much groping, on the term early infantile autism, thus accentuating the time of the first manifestations and the children's limited accessibility.<sup>6</sup>

Kanner quotes Eugen Bleuler as introducing the term "autism" . . . a definite withdrawal from the external world."<sup>6a</sup> Kanner borrowed the term for want of a more pre-

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<sup>4</sup>L. Kanner, "Autistic Disturbance of Affective Contact," Nervous Child, 1943, 2:215-250; "Irrelevant and Metaphorical Language in Early Infantile Autism," American Journal of Psychiatry, 103: 242-246, 1946.

<sup>5</sup>T. F. Ward, "A Study of Childhood Schizophrenia and Early Infantile Autism," Canadian Psychiatric Association Journal, 10:377-386, 1965; J. L. Weber, "The Speech and Language Abilities of Emotionally Disturbed Children," Canadian Psychiatric Association Journal, 10: 417-420.

<sup>6</sup>L. Kanner, "Infantile Autism and the Schizophrenias," Behavioral Science, 10: 412, 1965. <sup>6a</sup>Ibid., p. 412.

cise descriptive word, recognizing that his little group of children did not quite fit the term as their relationship with the world was rather a specific kind of contact.

Because early infantile autism is a relatively rare disorder, it was some time before literature from similar diagnoses became available, but from 1951 to 1959 there appeared fifty-two articles and one book dealing with the subject of autism. During this period the syndrome was diagnosed in Holland and in France. The abundance of literature on the "autistic" child, much of which presented ambiguities in the area of diagnosis, brought forth a plea from Kanner in 1957 for adherence to the specific criteria for early infantile autism.

As the literature increased it became obvious that opinions varied as to the nosology of early infantile autism particularly with regard to its relation to schizophrenia.<sup>7</sup> Another source of divergent points of view is

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<sup>7</sup>J. Anthony, "An experimental Approach to the Psychopathology of Childhood Autism," British Journal Med. Psychology, 31: 211-225, 1958; Lauretta Bender, "Schizophrenia in Childhood: its Recognition, Description and Treatment," American Journal of Orthopsychiatry, 26:499-506, 1956; Kanner, "Problems of Nosology and Psychodynamics of Early Infantile Autism," American Journal of Orthopsychiatry, 19: 416-426, 1949; Kanner, op. cit., 1965; David E. Reiser, "Psychosis of Infancy and Early Childhood," New England Journal of Medicine, 269:845, 1963; Michael Rutter, "Influence of Organic and Emotional Factors on Origins, Nature and Outcome of Childhood Psychosis," Dev. Medicine and Child Neurology, 7:518-528, 1965.

the etiology of early infantile autism.<sup>8</sup>

With regard to the verbal behavior of these children, however, there is consistency in the literature.<sup>9</sup> Speech, when present, is of a non-communicative nature and irrelevant to the situation or to what the child may be doing. Longitudinal studies show that prognosis is closely linked to the child's ability to use speech. Those who do not acquire speech by age five or six have a poor prognosis.<sup>10</sup>

As a background against which to view the absence and/or retardation of the development of language in the autistic child, hierarchies of experience in normal development are noted from earliest recorded response, and theories of language learning are presented as described

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<sup>8</sup>L. Kanner, op. cit., 1949, 1965; Hilda Knobloch and Donald Kerr Grant, "Etiologic Factors in Early Infantile Autism and Childhood Schizophrenia," Am. Journal of Diseases of Children, 102:535-6, 1961; Bernard Rimland, Infantile Autism (New York: Appleton-Century-Crofts, 1964); H. Elden Sutton and John H. Read, "Abnormal Amino Acid Metabolism in a Case Suggesting Autism," Journal of Diseases of Children, 96:23-28, 1958.

<sup>9</sup>L. Kanner, op. cit., 1946; Rimland, op. cit., Weber, op. cit.

<sup>10</sup>J. Brown, "Prognosis from Presenting Symptoms of Preschool Children with Atypical Development," American Journal of Orthopsychiatry, 30, 382-390, 1960; Leon Eisenberg, "The Autistic Child in Adolescence," American Journal of Psychiatry, 112:607-612, 1956.

by Skinner, Allport and Mowrer. Emphasis is given to an operant view of language development because of the many experiments which have been undertaken to shape behavior in the autistic child through operant conditioning.

With the accumulation of knowledge from reported research, it was decided, rather than postulate theoretical procedures in establishing language, to experiment with selected procedures utilizing selected children as subjects. The objective of this study was to establish procedures for the development of language in the non-verbal, emotionally-disturbed child. The children chosen for this therapeutic procedure displayed autistic types of behavior as described by Kanner.

## CHAPTER II

### NORMAL LANGUAGE DEVELOPMENT

Basic to recognition of the abnormal is knowledge of the range of normal development. This chapter will begin with the earliest recorded response in the human organism and trace the hierarchies of experience leading to acquisition of speech. Various theories of language learning will be presented.

Against this background of normal language development will be viewed major causes of deviant speech or lack of speech development. Specifically detailed will be verbal characteristics of children suffering from early infantile autism.

The earliest fetal response, which has been obtained at seven and one-half weeks, is in the perioral area. Stimulation of the lower lip at nine and one-half weeks results in the response of opening of the mouth. Three weeks later stimulation of the lips and/or tongue results in closing of the lips. By fourteen weeks the tongue responds by retraction.<sup>1</sup>

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<sup>1</sup>Thomas Twitchell, "Normal Motor Development," in The Child with CNS Deficit, (U.S. Department of Health, Education and Welfare, 1965) pp. 85-89; also in film Early Human Fetal Activity, University of Alabama Medical Center, Pittsburgh Motion Picture Lab., Pittsburgh (22), Pa.

That conditioning may occur prior to birth was demonstrated in an experiment in which the subjects were pregnant mothers past the seventh month of gestation. The conditioned stimulus was a vibration, followed by the unconditioned stimulus, a loud noise. Receiving tambours taped to the mothers' stomachs recorded movements of the fetus. Fifteen or twenty paired stimuli were required in order for the fetus to give three or four successive conditioned responses to the conditioned stimulus alone. There was agreement in the recorded movement and the mothers' reported movements.<sup>2</sup>

Wide fluctuations have been noted in the immediate postnatal behavior of normal infants. Such activities include outcries of abrupt onset and cessation, sucking, chewing, swallowing, smacking, rooting, tongue protrusion, inspiratory stridor, grimacing, and strained appearance. Close observation was made during the first six hours. The classic startle reaction was exhibited as a response to either external or internal stimuli.<sup>3</sup>

An experiment was conducted in recording reactions of neonates to light, sound, tactile and olfactory stimulation. The galvanic skin reflex was functional in infants

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<sup>2</sup>D.K. Spelt, "The Conditioning of the Human Fetus in Utero," The Journal of Experimental Psychology, 40:716-720, 1950.

<sup>3</sup>Murdina M. Desmond and Robert Franklin, "The Clinical Behavior of the Newly Born," The Journal of Pediatrics, 62: 307-325, 1963.

that ranged in age from twenty to sixty-seven hours.<sup>4</sup>

The sensory modalities of physically and neurologically normal neonates during the first five days after delivery were measured by continuous observation, standard developmental tests and ad hoc experiments to test observations. Auditory stimulation was provided by a rattle, bell, and human voice at high and low pitch. Tactile stimulation included tickling, stroking, and pressing on various body parts. The greatest response was when the infants were awake, inactive but alert, a period which never exceeded thirty minutes in twenty-four hours. During this period they exhibited auditory and visual pursuit movements. When the entire sleep-wake cycle was considered, tactile stimuli were more effective than auditory stimuli in producing responses in these infants.<sup>5</sup>

The effect of social conditioning of vocalizations of twenty-one institutionalized infants was demonstrated by Rheingold. The median age of the infants was three months. A baseline for vocalizations was obtained while the experimenter leaned over the crib with an expressionless face. The main observation took place during two days

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<sup>4</sup>D. H. Crowell, C. M. David, B. J. Chun and F. J. Spellacy, "Galvanic Skin Reflex in Newborn Humans," Science, 148:1108-1111, 1965.

<sup>5</sup>P. H. Wolff, "Observations on Newborn Infants," Psychosomatic Medicine, 21:110-118, 1959.



days of nine 3-minute periods in the morning and afternoon of each day. During these periods the experimenter gave a broad smile, three "tsk" sounds, and lightly touched the infant's abdomen. There were two final days of extinction consisting of an expressionless face and no social act while leaning over the crib. The mean number of vocalizations were greater on the third and fourth days of conditioning than for the other four days. Thus successful training in vocalizing at this very early age was demonstrated in institutionalized infants.<sup>6</sup>

Lewis traces the systematic pattern of speech development from the infant's first cry. The rush of air into the lungs, and the child's struggle to expel the air constitute the first sound as the vocal mechanism begins to work. The first cries are the same all over the world.<sup>7</sup>

. . . as soon as a child cries and someone pays attention to his cry the first step has been taken; the essentials of language are there: one person makes a sound which another interprets.<sup>8</sup>

Important for the development of language is the way in which the mother responds to the baby's sounds. If his cries go unheeded for long periods, the baby may fail to

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<sup>6</sup>H. L. Rheingold, J. L. Gewirtz and H. W. Ross, "Social Conditioning of Vocalizations in the Infant," The Journal of Comparative and Physiological Psychology, 52:68-73, 1959.

<sup>7</sup>M. M. Lewis, How Children Learn to Speak, (London: George G. Harrap), 1957.

<sup>8</sup>Ibid., p. 14.

associate action on the part of the mother with his cries. On the other hand, if his needs are anticipated at the first whimper, or if he is constantly played with, the opportunity for a meaningful association may be delayed.

When the normal baby is two or three weeks old he will turn his head in the direction of a sound. At a month, he may start crying on hearing an intense noise, or the sound of another child crying. At four or five weeks a crying baby may be soothed to silence by the sound of his mother's voice and within another few weeks may smile on hearing the same voice. As early as three months the baby may respond to his mother's voice by uttering comfort sounds, and may show some response to pleasant sounds, such as a smile. By four months the normal baby may show that he can discriminate between a pleasant, friendly voice and an angry voice, responding in kind to pleasure, but puckering and crying at the angry voice.

Some babies begin babbling at three months of age, others as late as six or seven months, according to Lewis.<sup>9</sup> Van Riper maintains that babbling normally begins at about eight weeks.<sup>10</sup> Although authorities may not agree on the time of onset of babbling, there is general agreement that

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<sup>9</sup>Ibid.

<sup>10</sup>Van Riper, p. 78.

babbling is an important stage in the development of language.<sup>11</sup>

Babbling is the beginning of delight in language itself, for its own sake; the rudimentary beginning of the enjoyment of the art of language. It is evident that these twin impulses---the practical use of sound and delight in making them---remain powerful throughout childhood, if not, indeed, throughout life.<sup>12</sup>

Orvis C. Irwin, reporting on detailed observation and study of speech development, credits the average baby with the use of seven phonemes before two months of age.<sup>13</sup> By the time he is two and one-half years he is using twenty more. The course of speech development is orderly; the rate of development of phoneme type is negatively accelerated and phoneme frequency is accelerated.<sup>14</sup> Vowels are more frequently elicited during the first year than consonants, but thereafter consonants take the lead.<sup>15</sup> Templin claims that "By the end of the first year, about three-quarters of the vowels and about one-third of the consonants of English are recognizable."<sup>16</sup>

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<sup>11</sup>Ibid.; Helmer Myklebust, Auditory Disorders in Children (New York: Grune and Stratton) 1954, p. 96.

<sup>12</sup>Lewis, op. cit., p. 45.

<sup>13</sup>Orvis C. Irwin, "Speech Development in the Young Child," Journal of Speech and Hearing Disorders, 17:269-279, 1952.

<sup>14</sup>Ibid., p. 271. <sup>15</sup>Ibid.

<sup>16</sup>M. C. Templin, "Development of Speech," Journal of Pediatrics, 62:11-14, 1963.

There is some diversity of opinion as to when the child learns to say his first true words. Van Riper states that this milestone in speech development is attained between the tenth and eighteenth months.<sup>17</sup> By three years of age the average child should have a vocabulary of about nine hundred words.<sup>18</sup> By this age most children can produce vowels accurately in words, but the correct production of consonants takes longer.<sup>19</sup> By seven or eight years of age mature articulation is attained by most children.<sup>20</sup> The child has not only had to expand his vocabulary and perfect his articulation, but in the mastery of language he has had to learn appropriate forms of syntax and attain fluency.

Language development is based on experience. Myklebust describes experiences as levels or hierarchies. At the lowest level is sensation, then perception, imagery, symbolization and conceptualization, these steps leading from concrete experiences to abstractions. An impairment at any one level effects all the levels that follow.<sup>21</sup> The nervous system activity caused by stimuli impinging on a sense organ is sensation, at the lowest level, and occurs in all forms of animal life. But it is not until

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<sup>17</sup>Van Riper, op. cit., p. 83.      <sup>18</sup>Ibid., p. 94.

<sup>19</sup>Templin, loc. cit.      <sup>20</sup>Ibid.

<sup>21</sup>Helmer Myklebust, The Psychology of Deafness  
(New York: Grune and Stratton, 1964)

the level of perception that integration begins and the organism can attach meaning to sensation.

Nonverbal conceptualization may be possible through the categorization of images, but that normal levels of abstraction are attained thereby seems unlikely. While conceptualization seems not to be limited to verbal symbolic function, it is highly dependent on it.<sup>22</sup>

Conceptualization, a process of abstraction unique in man, consists of classifying experiences according to common principles or properties.

Myklebust describes three basic stages in the acquisition of auditory language. During the first nine months the baby begins to relate experience and symbol which is the basis of inner language. It takes a period of six to nine months before the child can comprehend the spoken word. Then he begins to relate the words he hears to basic experiences which is the basis of receptive language.

After minimal inner and receptive language have been established, the infant begins to use the spoken word expressively. This process begins genetically approximately three months after the initial comprehension. . . . Using the spoken word to relate experience to others is the basis of expressive language of the auditory type.<sup>23</sup>

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<sup>22</sup>Ibid., p. 229.      <sup>23</sup>Ibid., p. 231.

### Allport's Theory of Language Learning

A major theory of language learning was formulated by Allport who described speech development from the viewpoint of a social psychologist. He considers vocal expression which includes inarticulate sounds in addition to actual speech as "the first and most important group of social stimuli."<sup>24</sup>

The pre-linguistic level is comprised of the gesture stage and the laryngeal stage, and these stages develop concurrently. At first the baby uses gestures as the earliest form of communication. These gestures are a natural outgrowth of serviceable movements, such as avoidance and withdrawal. The newborn's cry is "weak, rhythmic, tremulous, and unvaried."<sup>25</sup> Within the first month, however, variations of the cry denote emotional reaction, and further variations develop which serve "the same purpose for the acquisition of objects or ends as the gesture of head-shaking serves in their rejection."<sup>26</sup> The parent learns to respond appropriately to the differentiation of the baby's cry. Laryngeal expressions together with gesturing may thus be regarded as a means of social control.

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<sup>24</sup>Floyd H. Allport, Social Psychology (Boston: Houghton Mifflin Company, 1924), p. 169.

<sup>25</sup>Ibid., p. 179.      <sup>26</sup>Ibid., p. 181.

Whereas the laryngeal stage consists of discomfort sounds, the appearance of babbling and cooing, the comfort sounds, mark the initiation of the linguistic level, the first true stage in the development of language. The baby in a pleasant mood repeats and supplements the early sounds. The practising and playing with sounds helps the baby to establish circular reflexes. Thus, when he utters a sound, he comes to recognize certain auditory and kinaesthetic sensations. Allport is chiefly concerned with auditory stimulation. The ear comes to control the muscles of speech. A circular reflex is set up between the sound and the response. This may then be described as a conditioned reflex. Later when the baby hears sound he will respond by repeating.

The congenitally-deaf baby reaches only the stage of babbling. Lacking the vocal-ear circular reflex, other avenues must be used if he is to speak.

Now, with the ear controlling the speech muscles, the social environment assumes an important role in language development. The baby begins to elicit speech sounds that he hears using sounds practised in babbling.

Imitations are converted to true language through conditioning. A tactual, visual stimulus becomes conditioned with a previously conditioned auditory stimulus. In time the object, through conditioning, will evoke the response which was elicited previously only by auditory stimulation.

The process of learning names for objects begins early in the second year. Naming is used by the child in demanding. When the parent promptly provides the desired object, the child is reinforced in the control of his social environment by vocal expression. In time the child reaches the stage of demanding desired unseen objects. When he begins to talk about objects and experiences, language has reached the level of "a vehicle of thought."<sup>27</sup> Language, according to Allport, is thus acquired through social stimulus and control.

#### The Autism Theory of Language Learning

Mowrer formulated a theory of language learning from his experiences in teaching birds to talk. He discovered that "birds learn to talk when and only when the human teacher becomes a love object for them."<sup>28</sup> An important step is that the caretaker should make certain vocalizations consistently while caring for the birds. These become good sounds to the bird since they are associated with the fulfillment of its needs. As the bird vocalizes, he may make approximations of these sounds. Subsequently, when the bird makes somewhat similar sounds there is built-in reinforcement, and the more nearly its

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<sup>27</sup>Ibid., p. 188.

<sup>28</sup>O. H. Mowrer, "Speech Development in the Young Child. I. The Autism Theory of Speech Development and some Clinical Applications," Journal of Speech and Hearing Disorders, 17: 263-268.



imitations approximate the good sounds the greater is the reward of pleasurable feeling. Thus its vocal efforts are reinforced and repeated.

Mowrer relies upon learning theory and the principle of identification to explain how children learn to talk. A crucial difference lies in the fact that, whereas the bird repeats what it has learned, it cannot put words together in a meaningful way. This is the unique ability of the human being.<sup>29</sup>

#### B. F. Skinner's Theory of Language Learning

Skinner explains how the young child acquires language through the process of operant conditioning. The basis of his philosophy is that human behavior is lawful and scientific. He views behavior as a causal chain consisting of three links: 1) an operation performed upon the organism from without, 2) an inner condition, and 3) a kind of behavior. Link 2 is difficult to assess and hence is not readily manipulable. Link 1 is the major controlling factor in human behavior. Link 3 is the dependent variable; therefore, the relationship between 1 and 3 is basic to Skinner's explanation of operant conditioning and language development.<sup>30</sup>

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<sup>29</sup>Ibid.

<sup>30</sup>B. F. Skinner, Science and Human Behavior, (New York: Macmillan Company, 1953), p. 34.

A child acquires verbal behavior when relatively unpatterned vocalizations, selectively reinforced, gradually assume forms which produce appropriate consequences in a given verbal community. . . . In order to reinforce a given response we simply wait until it occurs. Prior stimuli . . . are important because they enter into a three-term contingency of reinforcement which may be stated in this way: in the presence of a given stimulus, a given response is characteristically followed by a given reinforcement. Such a contingency is a property of the environment.<sup>31</sup>

Stimuli which are followed by a specific response come to influence behavior because they have been followed by reinforcement in the past. Thus, by selective reinforcement, a baby's vocalizations progress by gradual successive approximation to the first few speech responses. He learns verbal discrimination, another important process in language development, as he receives reinforcement for matched, imitated sounds, one of which he has produced himself. These discriminated verbal behaviors Skinner calls "echoic" responses.

He learns to say a word as an echoic response, then he must learn to emit the response at the proper time and place. Skinner calls this discriminated speech response a "tact," a term derived from making contact with the environment.

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<sup>31</sup>B. F. Skinner, Verbal Behavior, (New York: Appleton-Century-Crofts, Inc., 1957), p. 31.

A tact is defined as

. . . a verbal operant in which a response of given form is evoked (or at least strengthened) by a particular object or event or property of an object or event.<sup>32</sup>

In a general sense a tact may be said to benefit the listener.

Mand behavior can be seen to exist in the very earliest stages of language learning. The term "mand" is derived from "command" or "demand." Skinner defines a mand as

. . . a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation.<sup>33</sup>

The mand benefits the speaker primarily.

Even after language is acquired the verbal behavior of any individual may be strengthened or extinguished by reinforcing consequences of his verbal community. When a child receives generous reinforcement from his verbal community he talks readily; when there is an absence of such reinforcement he may be disinclined to talk and remain silent.

The normal development of language has been reported from its earliest evidence, through various theories of language learning, to stabilized, adult-type communication.

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<sup>32</sup>Ibid., p. 82.    <sup>33</sup>Ibid., p. 35.

## CHAPTER III

### DEVIANT LANGUAGE OR LACK OF LANGUAGE DEVELOPMENT

#### Causes

Adler describes four basic causes of non-verbalism in children: Brain injury, mental retardation, emotional illness and deafness.<sup>1</sup> Van Riper lists four similar categories for delayed speech, but uses a broad term, "functional cause," in which he includes emotional disturbance, mutism, autism, negativism, poor speech standards and unfavorable environment.<sup>2</sup> Klein states that "major causes of grossly delayed or deviant speech development, barring obvious organic causes, are mental retardation, hearing loss, psychological factors and maturational lags."<sup>3</sup> According to Klein, the most common cause of delayed language is mental retardation.<sup>4</sup>

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<sup>1</sup>Sol Adler, The Non-Verbal Child (Springfield, Illinois: Charles C. Thomas, 1964), p. 50.

<sup>2</sup>Charles Van Riper, Speech Correction Principles and Methods (Englewood Cliffs, N.J.: Prentice-Hall, Inc. 4th edition, 1963), p. 109.

<sup>3</sup>J. V. Klein, "Speech and Hearing Behavior as an Aid in Differential Diagnosis," Canadian Psychiatric Association Journal, 8: 320, 1963.

<sup>4</sup>Ibid.

Abnormalities of the brain considered to be related to lack of speech development result from brain injuries, anomalies of development and metabolism, and endocrine disturbances.<sup>5</sup> Histidinemia, a metabolic disorder first described in 1961, is characterized by retardation in speech development.<sup>6</sup> Although only twenty cases have thus far been reported, the emerging picture is one of difficulties in articulation and in language organization.<sup>7</sup>

Frequently more than one problem may contribute to the language disturbance. "Emotional difficulties not only may contribute to delayed language development; they almost inevitably result from or are accentuated by it."<sup>8</sup> There may be difficulty in distinguishing the organic defective from the primarily psychologically defective:

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<sup>5</sup>R.D. Mercer, "Organic Brain Syndromes and Speech Disorders in Children," Monographs of the Society for Research in Child Development, 25:25-34, 1960.

<sup>6</sup>Bert N. La Du, "Histidinemia," in The Metabolic Basis of Inherited Disease, ed. John Stanbury, James R. Wyngaarden and Donald S. Fredrickson (New York: McGraw-Hill Book Co., 1966), pp.366-375.

<sup>7</sup>H. Ghadimi and M.W. Partington, "Salient Features of Histidinemia," AMA Journal of Diseases of Children, 113:85, 1967.

<sup>8</sup>Jane Beasley, Slow to Talk (New York: Teachers College Bureau of Publications, Columbia University, 1956), p. 4.

Practically every case of severe organic defect can be counted upon to result in an overlay of secondary, but real, emotional difficulty, so that the mere presence of such difficulty cannot signify that no organic defect is present.<sup>9</sup>

Travis states that ". . . seldom, if ever, will any influence appear in isolation and act alone either to retard or accelerate speech."<sup>10</sup>

The conditions of birth quite certainly have a great deal to do with auditory and language difficulties. A precipitous birth requires rapid adjustment from intrauterine pressure to atmospheric pressure and could lead to intracranial hemorrhage and other damage to the central nervous system. Prolonged labor may lead to oxygen want from placental separation, or pressure on the umbilical cord, with consequent brain damage.<sup>11</sup>

Other causes of damage are instrumental deliveries, Caesarian Sections which are classed with precipitous deliveries, prematurity and postmaturity. During life in the uterus the fetus is accustomed to an oxygen poor environment, but "the tissues of the brain do not tolerate an actual oxygen want for longer than about seven minutes."<sup>12</sup> An oxygen want may be caused from infection, or from an obstruction in the air passages such as mucus or fluids.<sup>13</sup>

Kastein and Fowler stress the importance of early language evaluation of children who are brain-injured.

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<sup>9</sup>W. F. Grunes, "Secondary Pseudoautism caused by Physiological Isolation," Journal of Consulting Psychology, 29:455, 1965.

<sup>10</sup>Lee Edward Travis, Handbook of Speech Pathology (New York: Appleton-Century-Crofts, Inc., 1957), p. 28.

<sup>11</sup>Ralph E. White, "Children and Speech---Language Failure in Young Children," Kansas Medical Society, 63:188, 1962.

<sup>12</sup>Ibid., p. 189. <sup>13</sup>Ibid.

Such language evaluation may serve as a tool "to determine areas of disfunction which may not otherwise be discernible at an early age."<sup>14</sup> Comprehensive language evaluation of sixty-six two-year-olds of premature birth indicated that thirty-seven had retarded language development. In order that the findings were unbiased, no history was taken and the mother was not questioned prior to evaluation. In addition, there was no communication between team members during evaluation. The evaluation covered response to auditory, visual and tactile stimuli, symbol behavior, perception (spatial, hand-eye co-ordination, body identification, preferred hand) and receptive and expressive language.<sup>15</sup>

In order to ascertain if any specific perinatal factors would be considered a significant cause of behavioral, speech or learning problems, a battery of tests were administered to a group of 203 children. The children were composed of two groups---those whose mothers had perinatal complications, and those whose mothers reported no perinatal difficulties. The results indicate that toxemia, hemorrhaging during pregnancy, and prematurity were the most frequent findings. Twenty-six of the children demon-

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<sup>14</sup>S. Kastein and E.P. Fowler, Jr., "Language Development Among Survivors of Premature Birth," A.M.A. Archives of Otolaryngology, 69: 135, 1959.

<sup>15</sup>Ibid., 131-135.

strated evidence of minimal cerebral damage; of these all but two were from the experimental group. Eight of the twenty-six had speech difficulties.<sup>16</sup>

Studies on mutism as related to amentia reveal that failure of speech to develop can be causally related to amentia only in the case of low grade idiots. In a study of fifty children in the I.Q. range of 15 to 70 there were no cases of mutism in children over six years of age. There were five cases of mutism in the children under six years of age in the I.Q. range 15 to 50. The speech defects in the group of children as a whole were similar to normal children, but the problems were more numerous and severe.<sup>17</sup>

Speech retardation may be genetically determined, according to the results of a study of eighty children in the Speech Clinic of the Royal Hospital for Sick Children in England. All of the children were without mental, emotional, or physical disease. On the Terman Merrill and Wechsler Verbal and Performance tests, two scored less than 80 and seven scored an I.Q. of 120 or higher. In

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<sup>16</sup>Inez Fowler, "The Relationship of Certain Perinatal Factors to Behavior, Speech, or Learning Problems in Children," Southern Medical Journal, 58:1245-48, 1965. (Also see Timmy, Chapter IV, p. 66).

<sup>17</sup>Isaac W. Karlin and Millicent Strazzulla, "Speech and Language Problems of Mentally Deficient Children," Journal of Speech and Hearing Disorders, 17:286-294, 1952.



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<sup>17</sup>Isaac W. Karlin and Millicent Strazzulla, "Speech and Language Problems of Mentally Deficient Children," Journal of Speech and Hearing Disorders, 17:286-294, 1952.

this group, a greater number demonstrated lack of laterality of handedness and footedness than in a control group. The case histories indicated many speech defects among family members.<sup>18</sup>

From France comes support for the hypothesis that heredity plays a contributing role in language disorders. Statistics are presented from numerous historical investigations indicating the prevalence of language retardation and speech defects within family groups.<sup>19</sup>

Verbal behavior may be hindered by excessive punishment. Neurotic symptoms may result, "including the 'repression' of some areas of verbal behavior."<sup>20</sup>

With reference to damaged verbal behavior, Skinner writes:

The symptoms of aphasia are valuable in emphasizing the property of 'difficulty' inherent in all types of operants. Damage is usually most severe in verbal behavior receiving generalized reinforcement. The order of damage seems to follow the order of 'difficulty' deducible from the availability of a minimal repertoire. Textual and echoic behavior often survive (unless relevant sensory defects are involved) while intraverbals and tacts appear to be most vulnerable.<sup>21</sup>

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<sup>18</sup>T.T.S. Ingram, "Specific Developmental Disorders of Speech in Childhood," Brain, 82:450-467, 1959.

<sup>19</sup>Maria Mussafia, "Le role de l'heredite dans les troubles du langage," Folia Phoniatica, 16:228-238, 1964.

<sup>20</sup>Skinner, Verbal Behavior, p. 179

<sup>21</sup>Ibid., p. 219.

Early Evidence of Abnormality

In tracing the normal development of language, particular attention was given to infants' responses to stimuli. This was deemed essential because a lack or deficiency of response may be indicative of abnormality. Observations of immediate postnatal activity have been noted to fluctuate widely in the normal infant, as reported in Chapter II. Frequently found in the histories of children who have perinatal types of brain damage are a deficient or absent sucking reflex, lack of rooting, early vomiting which may be projectile, and rejection of food which requires chewing.<sup>22</sup>

Hyperactivity, hyperirritability, and destructiveness often become suddenly and strikingly evident with the onset of motility . . . . The child responds to discipline with temper tantrums or acts of aggression.<sup>23</sup>

An experiment was undertaken to compare the cry latencies of normal and brain-damaged infants. There were forty-four subjects in each group matched for age and sex. The stimulation used to induce crying was the snapping of a rubber band on the foot. The abnormal babies required a

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<sup>22</sup>Robert J. Decker, "Manifestations of the Brain Damage Syndrome in Historical and Psychological Data," in Childhood Aphasia and Brain Damage: A Definition (Narberth, Pennsylvania: Livingston Publishing Company; ed. Sheldon R. Rappaport, 1964), p. 52.

<sup>23</sup>Ibid.

greater amount of stimulation to induce crying than the normal babies. In addition, the mean latency time for the experimental group was 2.6 seconds whereas for the control group it was 1.6 seconds, a difference that was statistically significant.<sup>24</sup>

The responses of the infant are significant in the histories of those children who suffer from schizophrenia. This disorder has been predicted successfully as early as one month of age.<sup>25</sup> Kanner states that early infantile autism becomes evident in the first months of life. "They have begun their existence without the universal signs of infantile response."<sup>26</sup> In reviewing the course and symptoms of autism, Rimland states that disturbing symptoms begin to appear between the fourth and eighteenth months.

These include prolonged rocking and head-banging in the crib, apathy and disinterest in the surroundings, unusual fear of strangers, obsessive interest in certain toys or mechanical appliances, highly repetitive and ritualistic play, insistence on being left alone and that the physical environment remain unchanged, and very unusual language behavior.<sup>27</sup>

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<sup>24</sup>Vincent R. Fisichelli and Samuel Karelitz, "The Cry Latencies of Normal Infants and Those with Brain Damage," The Journal of Pediatrics, 62: 724-734, 1963.

<sup>25</sup>Barbara Fish, Theodore Shapiro, Florence Halpern and Renee Wile, "The Prediction of Schizophrenia in Infancy: III. A Ten-Year Follow-up Report of Neurological and Psychological Development," American Journal of Psychiatry, 121: 768-775, 1965.

<sup>26</sup>Leo Kanner, "Infantile Autism and the Schizophrenias," Behavioral Science, 10:412, 1965.

<sup>27</sup>Bernard Rimland, Infantile Autism, (New York: Appleton-Century-Crofts, 1964), p. 7.

Empirical studies and clinical observations have provided information indicating that schizophrenic children do not respond to stimuli in the same way as normal children. Four tasks with visual and tactual components were devised to measure receptor preferences of schizophrenic and normal children of the same chronological age. Results indicated that the experimental group spent significantly less time visually than the normal controls, thus confirming Goldfarb's receptor hypothesis.<sup>28</sup> To test if this difference in visual time were a function of mental age, or a function of the schizophrenic reaction, the schizophrenic children were matched in mental age with a group of retardates. Again the schizophrenics scored significantly lower in actual visual time. When the actual tactual time of the schizophrenics was compared to the tactual time of the normals and of the retardates there was not a significant difference.<sup>29</sup>

The tendency of the schizophrenic is to react to immediate stimuli in an unselective way.<sup>30</sup> Thus, on a

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<sup>28</sup>Eric Schopler, "Visual versus Tactual Receptor Preference in Normal and Schizophrenic Children," unpublished dissertation, The University of Chicago, 1964, p.55.

<sup>29</sup>Ibid., p. 63.

<sup>30</sup>Kurt Salzinger, Stephanie Portnoy and Richard S. Feldman, "Verbal Behavior in Schizophrenics and Some Comments Toward a Theory of Schizophrenia," in Psychopathology of Schizophrenia ed. by Paul H. Hock and Joseph Zubin, (New York: Grune and Stratton, 1966).

card-sorting task, the performances of the schizophrenics deteriorated as the number of distracting stimuli increased.<sup>31</sup> The normal controls were not so effected. ". . . we are suggesting that what looks like thought disorder might more generally be viewed as a prepotency of immediate stimuli over remote stimuli."<sup>32</sup> Applying this behavioral deficit to verbal behavior, it is suggested that the schizophrenic shows "poor ability to communicate because language requires that the speaker react to long-range stimuli."<sup>33</sup>

Pearson states that the psychotic infant almost invariably fears sound.<sup>34</sup> Goldfarb describes the typical history of a schizophrenic child who at first is hypersensitive to sound stimuli, and later develops pseudo-deafness as an avoidance or defence. In treating such a child he may become more willing to listen, particularly as he develops an ability for pleasure, and his confusion in inner and outer sensations is decreased. But the chang-

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<sup>31</sup>L. J. Chapman, "Distractability in the Conceptual Performance of Schizophrenics," Journal of Abnormal and Social Psychology, 53:286-291, 1956

<sup>32</sup>Salzinger, Ibid., p. 125. <sup>33</sup>Ibid., p. 126.

<sup>34</sup>G. H. J. Pearson, "A Survey of Learning Difficulties in Children," Psychoanalytic Studies of the Child (New York: International University Press, 1952) 7:324.

ing pattern is accompanied with periods of avoidance of sound.<sup>35</sup>

Presentation of a sudden loud pure tone (3000 c.p.s. at 100 decibels) through earphones to a group of schizophrenic children and normal controls resulted in distinctly different responses. Most of the schizophrenic children gave no overt response; this was interpreted as auditory exclusion. The remainder of the schizophrenic children responded with irritability and discomfort. The control group responded to the sound, but did not become fearful or display undue discomfort.<sup>36</sup>

Freud writes of the living organism's protective shield against external stimuli. Thus, external stimuli may be sampled in small quantities. There is no similar shield, however, to protect the organism from internal stimuli. When internal excitation becomes too stressful, it is treated as though it came from the outside.

The situation of the system between the outside and the inside and the difference between the conditions governing the reception of excitations in the two cases have a decisive effect on the functioning of the system and of the whole mental apparatus.<sup>37</sup>

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<sup>35</sup>William Goldfarb, Childhood Schizophrenia (Cambridge: Harvard University Press, 1961), p. 99.

<sup>36</sup>Ibid.

<sup>37</sup>Sigmund Freud, Beyond the Pleasure Principle (New York: Liveright Publishing Corporation, 1950) Translated by James Strachey, p. 34.

This explanation, when applied to the schizophrenic child who experiences inner and outer confusion of sensations, has implications in the diagnosis of auditory exclusion or selective hearing.

Many questions have been raised as to the adequacy of the schizophrenic's reception and interpretation of speech. Pure tone thresholds for a group of schizophrenic children diagnosed according to criteria established by Kanner, Bender and Mahler were similar to pure tone thresholds of a normal control group. There was a distinct difference, however, when speech reception thresholds were established; the experimental group had higher thresholds than the control group.<sup>38</sup> Myklebust suggests that the autistic child may reject the human voice whereas pure tone audiometry does not have this threat.<sup>39</sup>

A group of 104 emotionally-disturbed children (age range 4 to 12 years) was divided into two categories for language assessment. The procedures carried out included formal testing using the Templin-Darley Screening Test of Articulation, a description of ten pictures, and informal evaluation of the children's speech while at play. Results indicated that the autistic-schizophrenic group demonstrated

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<sup>38</sup>Shirley E. Hoberman and William Goldfarb, "Speech Reception Thresholds in Schizophrenic Children," Journal of Speech and Hearing Research, 6:101, 1963.

<sup>39</sup>Helmer Myklebust, Auditory Disorders in Children, p. 212.



bizarre or non-communicative language. The non-autistic-schizophrenic, neurotic and minimally brain-damaged group had speech and language problems similar to normal children but the problems were more frequent and more severe.<sup>40</sup>

In the classification of childhood schizophrenia, Bender considers time of onset the most important factor. In the first two years uneven development may be evident. The child may not develop speech, and if he does, it may be "lost again or misused as a play pattern."<sup>41</sup>

The most obvious delay of developmental sequences in the autistic schizophrenic is language.<sup>42</sup> This was the conclusion of a research team which studied thirty-nine children (age range 2 to 11 years) diagnosed by a psychiatrist as autistic schizophrenic. The research team confirmed the diagnosis before admission to the program. Of this group fourteen were non-verbal, thirteen had imperfectly developed speech, and twelve had normal speech.<sup>43</sup> Psychometric testing, using a large number of intelligence tests, indicated that thirty-five had average intelligence or better. A number of the non-verbal children were in the superior range.<sup>44</sup>

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<sup>40</sup>Jack L. Weber, "The Speech and Language Abilities of Emotionally-Disturbed Children," Canadian Psychiatric Association Journal, 10:417-420, 1965.

<sup>41</sup>Lauretta Bender, "Childhood Schizophrenia," American Journal of Orthopsychiatry, 17:53, 1947.

<sup>42</sup>T. F. Ward, "A Study of Childhood Schizophrenia and Early Infantile Autism," Canadian Psychiatric Association Journal, 10:377-386, 1965.

<sup>43</sup>Ibid.

<sup>44</sup>Ibid.

Verbal Behavior of Early Infantile Autism

Although the verbal behavior of children afflicted with early infantile autism ranges widely, a review of the literature indicates some specific patterns. Kanner provides detailed descriptions of these patterns of verbalization which were first identified in the original group of eleven children.<sup>45</sup> Succeeding diagnoses of early infantile autism confirmed these descriptions of speech.

In the original group eight of the children learned to speak, but their speech was non-communicative. With the exception of only one, they had good articulation.

Naming of objects presented no difficulty; even long and unusual words were learned and retained with remarkable facility. Almost all the parents reported, usually with much pride, that the children had learned at an early age to repeat an inordinate number of nursery rhymes, prayers, lists of animals, the roster of presidents, the alphabet forward and backward, even foreign-language (French lullabies . . . .) It took a long time for them to put words together. Other than that, language consisted mainly of naming, of nouns identifying objects, adjectives indicating colors, and numbers indicating nothing specific.<sup>46</sup>

The children's speech was notably echolalic. Although this is a normal stage of speech development, "it is seldom observed in the normal child after two and a half years."<sup>47</sup>

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<sup>45</sup>Leo Kanner, "Autistic Disturbances of Affective Contact," Nervous Child, 2:243, 1943.

<sup>46</sup>Ibid., p. 243.

<sup>47</sup>Charles Van Riper, Speech Correction: Principles and Methods (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1964), p. 92.

Sometimes the echoic response is uttered at a later date, a phenomenon which Kanner refers to as "delayed echolalia." One autistic child was noted as saying, "Don't throw the dog off the balcony," a comment which the mother recalled making to him several years earlier after he had thrown a toy dog off the balcony of a hotel.<sup>48</sup>

By 1944 the number of autistic children studied by Kanner had increased to twenty. Observations of the verbal behavior of this larger group confirmed Kanner's first report. Those children who acquired the ability to speak did not use language to convey meaning to others.<sup>49</sup> In this group of twenty, seven remained typically mute. Some were heard to use an occasional word, however, such as "marshmallow," "chocolate," and "good-night."<sup>50</sup>

Autistic children have difficulty in use of the personal pronoun, repeating the pronoun as heard. Thus he tends to speak of himself as "you," and the person addressed as "I." Kanner speaks of this as pronomial reversal, a characteristic in these children until about six years of age. Use of "yes" is also a difficult concept;

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<sup>48</sup>Leo Kanner, "Irrelevant and Metaphorical Language in Early Infantile Autism," American Journal of Psychiatry, 103: 242-246, 1946.

<sup>49</sup>Kanner, "Early Infantile Autism," Journal of Pediatrics, 25:211-217, 1944.

<sup>50</sup>Ibid.

Autistic speech is notable in use of irrelevant and metaphorical language. When it is possible to identify the source of a comment, what appears as non-sensical speech may assume relevancy. As an illustration of this characteristic, Kanner describes how a five-year-old autistic child kept repeating, "Annette and Cecile make purple."<sup>51</sup> When it was discovered that the child had named five bottles of paint after the Dionne quintuplets, and that Annette was "red" and Cecile "blue," the chant then assumed meaning.

Kanner relates incidents of emergency speech in mute children. A non-verbal five-year-old, frantic when a prune skin stuck in his mouth, exclaimed, "Take it out of there." A mute four-year-old, annoyed by physical contact in a pediatrician's office, demanded, "Want to go home." According to Kanner, this is evidence that these children do not suffer from a motor or sensory aphasia.<sup>52</sup>

Kanner and Eisenberg, in reporting on follow-up studies of 120 autistic children, made the observation that "The vicissitudes of language development, often the most striking and challenging of the presenting phenomena,

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<sup>51</sup>Kanner, 1946, p. 243.

<sup>52</sup>Kanner, "Problems of Nosology and Psychodynamics of Early Infantile Autism," American Journal of Orthopsychiatry, 19:416-426, 1949.

may be seen as derivatives of the basic disturbance in human relatedness."<sup>53</sup>

Cappon reported on five autistic children whom he studied in a child guidance setting in Ontario, Canada, for periods of over one year each. The following condensed report on the speech behavior of these children agrees with Kanner's observations:

Speech behavior: Echolalia; idioglossia; speech is not used primarily for communication; it is mechanical and affectless; literalness involves most words and prepositions; there may be mutism. Compulsive phenomena: Marked repetition of words and activity, consequently excellent rote memory.<sup>54</sup>

Detailed descriptions of speech behavior were obtained from a two-year study of fourteen children diagnosed as atypical or autistic.<sup>55</sup> The children ranged in age from five to fifteen years. They were divided into two groups: the vocalization group, whose sounds did not resemble words, and the talking group, whose sounds could be identified as words. The vocalization group consisted of eight children. They elicited consonant-vowel combinations, in a monotonous voice, at extremely high and low

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<sup>53</sup>Leon Eisenberg and Leo Kanner, "Early Infantile Autism 1943-1955," American Journal of Orthopsychiatry, 26:556, 1956.

<sup>54</sup>Daniel Cappon, "Clinical Manifestations of Autism and Schizophrenia in Childhood," Canadian Medical Association Journal, 69:44, 1953.

<sup>55</sup>Wilbert Pronovost, M. Phillip Wakstein and D. Joyce Wakstein, "A Longitudinal Study of the Speech Behavior and Language Comprehension of Fourteen Children Diagnosed Atypical or Autistic," Exceptional Children, Sept. 1966, p. 23.

pitch. Voice quality was characterized by hoarseness, harshness, hypernasality, and at times a normal phonation. Intensity levels varied from whispered to excessively loud phonation.

Although the talking group used words, sentences and phrases, their vocalizations were characteristically echolalic. The echolalic speech tended to be correctly articulated, whereas other vocalizations were indistinctly articulated and at times unintelligible.

These children's usage of language together with their atypical response to auditory and visual stimuli resulted in the conclusion that

The perceptual problems of the children studied are the most significant factors contributing to the child's speech and language behavior. This conclusion provides some substantiating data for Rimland's (1964) hypothesis of cognitive dysfunction as a critical disability in children designated as autistic.<sup>56</sup>

Early evidence suggested that autistic children's comprehension of the spoken language of others greatly exceeded the level of their own use of speech. Schain made the following statement after a study of fifty institutionalized children from three to thirteen years of age who were diagnosed as autistic: "In contrast to the lack of speech and apparent unrelatedness, it was often surprising to note how much these children really understood as evidenced by their ability to follow simple directions."<sup>57</sup>

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<sup>56</sup>Ibid., p. 24.

<sup>57</sup>Richard J. Schain and Herman Yannet, "Infantile Autism," The Journal of Pediatrics, 57:562, 1960.

Pronovost made a similar conclusion from clinical observations and the application of a scale which included awareness and comprehension of spoken language of others.<sup>58</sup>

In a more recent two-year study of children diagnosed as autistic or atypical, the conclusion was reached that the subjects "were seriously impaired in their capacity to comprehend language stimuli."<sup>59</sup> The children in both the vocalization and the talking group appeared to understand the context of what was said to them, but testing showed that they were responding to situational clues---their reactions were largely a form of conditioned response.<sup>60</sup>

#### E.I.A.: Instruments for Evaluating Communication

Because no scales were available to rate the language comprehension of autistic children, Pronovost undertook a pilot study on institutionalized autistic children to determine a method of objective measurement.<sup>61</sup>

Speech samples were obtained by continuous tape recording of daily sessions with three different therapists, an educational therapist, an occupational therapist and a

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<sup>58</sup>Wilbert Pronovost, "The Speech Behavior and Language Comprehension of Autistic Children," Journal of Chronic Diseases, 13:228-233, 1961.

<sup>59</sup>Pronovost, 1966, p. 23.   <sup>60</sup>Ibid.

<sup>61</sup>Pronovost, 1961.

music therapist. The speech varied from extremely infantile vocalizations, and repetitious rhythmic patterns of several vowels and consonants, to some meaningful use of speech, and correct articulation in complete sentences but irrelevant in meaning.

The scale covered the following aspects: 1) discrimination of sounds, 2) awareness and comprehension of spoken language of others, 3) awareness and comprehension of certain aspects of visual language, and 4) response to music.

Results indicated that these children were able to discriminate environmental sounds and voices of adults. They recognized names of people, objects and actions. Comprehension of visual language was extremely limited. All but one child responded to music.<sup>62</sup>

An instrument for evaluating autistic children was developed at the Day-Care Unit for Autistic Children of the Department of Psychiatry, University of Pennsylvania.<sup>63</sup> The instrument consists of four core Scales delineating levels of behavior in the areas of relationship to an adult

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<sup>62</sup>Ibid.

<sup>63</sup>Bertram A. Rutenberg, Mitchell L. Dratman, Julia Fraknoi and Charles Wenar, "An Instrument for Evaluating Autistic Children," Journal of the American Academy of Child Psychiatry, 5:453-478, 1966.



or person, communication, mastery, and psychosexual development. The lowest level describes the most severe autistic behavior and progresses to behavior that is somewhat comparable to a normal six-year-old. The scale can thus be used to evaluate a child's level of functioning, and to measure his progress toward more adequate behavior. As an illustration of the descriptive terminology of this instrument, level one on Scale III, Communication, reads:

No communication. There is undirected, indiscriminate expression of affect, motor tension, and anxiety for the sake of lowering inner discomfort, with apparently no "audience" in mind. The repertoire of expression is meager with much repetitiveness; e.g., the child repetitively jumps up and down, whirls or rocks, or monotonously vocalizes.<sup>64</sup>

In undertaking a reliability study of this instrument, four students were given a week of training. Thirty-one children from four institutions were then observed and rated independently. The scores indicated a reliability of .85 or higher for all scales.<sup>65</sup>

#### Speech as a Prognostic Indicator

"The degree of disturbance in language function emerges clearly as an important guide to prognosis."<sup>66</sup> So wrote Eisenberg at the conclusion of a re-evaluation of sixty-three autistic children after a follow-up period of

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<sup>64</sup>Ibid., p. 459.    <sup>65</sup>Ibid., p. 470.

<sup>66</sup>Leon Eisenberg, "The Autistic Child in Adolescence," American Journal of Psychiatry, 112:610, 1956.

nine years. When those who had useful speech at the age of five were identified, it was found that thirty-two could be so classified. Sixteen of the "speaking" children achieved a fair to good adjustment. Only one "non-speaking" child reached even a fair level of adjustment.<sup>67</sup>

A study was planned to determine which symptoms are the best indicators of a child's progress in therapy. From a group of 188 children diagnosed as having atypical development (childhood autism or schizophrenia) seventy-three were closed cases. From this latter group were chosen twenty who had made the best adjustment and twenty who had made the poorest adjustment. The mean age of the children at time of entry into therapy was 3.6 years. At the time of the study the age range was from six to seventeen years. The study concluded that autistic children who had no speech by age three remained severely withdrawn and showed little improvement.<sup>68</sup>

Bender clearly states the importance of language and the urgency of providing therapy during early childhood:

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<sup>67</sup>Ibid.

<sup>68</sup>J. Brown, "Prognosis from Presenting Symptoms of Preschool Children with Atypical Development," American Journal of Orthopsychiatry, 30:382-390, 1960.

. . . if the child passes from this period into latency without having patterned his infantile behavior, without some better defense against anxiety than autism, without language especially, the prognosis is not favorable.<sup>69</sup>

The analyses of verbatim records of therapy for psychotic children led Frostig and Horne to agree with earlier researchers that the speech pattern of the schizophrenic child is "a sensitive indicator of changes in the organism as a whole."<sup>70</sup>

Speech observation is an effective way to study ego functions because speech is clearly dependent on learning of externally determined fashions.<sup>71</sup>

Dr. Barbara Fish contends that "speech is the key to judging the severity of autism."<sup>72</sup> A dissenting voice maintains that lack of speech alone should not be the basis for a poor prognosis:

A definitely poor prognosis is associated with strong autoerotic activity, exclusion of sensory stimuli, lack of speech, complete lack of contact with other people and self-directed aggression.<sup>73</sup>

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<sup>69</sup>Lauretta Bender, "Schizophrenia in Childhood: its Recognition, Description and Treatment," American Journal of Orthopsychiatry, 26:503, 1956.

<sup>70</sup>Marianne Frostig and David Horne, "Changes in Language and Behavior in Psychotic Children during Successful Therapy: Method of evaluation and findings," American Journal of Orthopsychiatry, 33: 734-7, 1963.

<sup>71</sup>W. Goldfarb, Patricia Braunstein and Hannah Scholl, "An Approach to the Investigation of Childhood Schizophrenia: The Speech of Schizophrenic Children and their Mothers," American Journal of Orthopsychiatry, 29:481-86, 1959.

<sup>72</sup>"Breaking through to the Autistic Child," Medical World News, Oct. 28, 1966, p. 92.

<sup>73</sup>Hjalmar Wergeland, "Autistic Children," The Child Who Does Not Talk, ed. C. Renfrew and K. Murphy (London: William Hernemann Medical Books, Ltd., 1964), p. 145.

## CHAPTER IV

### TECHNIQUES IN THE DEVELOPMENT OF COMMUNICATION IN AUTISTIC CHILDREN

In general the prognosis for psychotic children is not encouraging. One can expect some limited improvement in social conformity and adaptability, but one inevitably feels that much of the child's potential has been wasted.<sup>1</sup>

An equally pessimistic view was voiced by Kanner who observed that intensive psychotherapy did not seem to be the answer for children suffering from early infantile autism.<sup>2</sup> A follow-up study of eighty autistic children revealed no relationship between psychotherapy and improvement.<sup>3</sup>

#### Treatment to provide a need-satisfying relationship

The value of providing treatment through a need-satisfying relationship has been explored in various studies. For the most beneficial therapy, Anna Freud recommends that the schizophrenic child should be provided with a "truly

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<sup>1</sup>Jane W. Kessler, Psychopathology of Childhood (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), p. 290.

<sup>2</sup>Leo Kanner, "General Concept of Schizophrenia at Different Ages," Proceedings of the Association for Research in Nervous and Mental Diseases, 33:451-453, 1954.

<sup>3</sup>L. Eisenberg, "The Autistic Child in Adolescence," American Journal of Psychiatry, 112: 607-612, 1956.

need-satisfying person" without pressure and for a long period of time.<sup>4</sup>

Bettelheim describes the conditions which set in motion the psychotic processes as "extreme situations," and draws an analogy between the reactions of prisoners in German concentration camps and emotionally-ill children.<sup>5</sup> The prisoners displayed all types of schizophrenic reaction. Bettelheim concludes that "the psychological cause of childhood schizophrenia is the child's subjective feeling of living permanently in an extreme situation . . . of being deprived of any interpersonal, need-satisfying relationship."<sup>6</sup>

Weiland and Rudnik emphasize the importance of the therapist gratifying the ill child in a concrete way that he can appreciate. This conclusion was based on their experience with thirty autistic children.<sup>7</sup>

A group of eight psychotic children receiving therapy over a period of several years at Children's Psychiatric Hospital, University of Michigan, made so

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<sup>4</sup>Anna Freud, "The Widening Scope of Indications for Psychoanalysis," Journal of the American Psychoanalytic Association, 2: 1954.

<sup>5</sup>Bruno Bettelheim, "Schizophrenia as a reaction to Extreme Situations," American Journal of Orthopsychiatry, 26: 511, 1956.

<sup>6</sup>Ibid., p. 513.

<sup>7</sup>I. H. Weiland and R. Rudnik, "Consideration of the Development and Treatment of Autistic Childhood Psychosis," Psychoanalytic Study of the Child, (New York: International University Press), 16:549-563, 1961.

little progress that a new program was planned to overcome some of the weaknesses in the old methods. Four children, selected according to Kanner's description of early infantile autism and to Mahler's symbiotic psychosis syndrome, were placed in an experimental program. To overcome the discouragement of the therapists, and to check detrimental countertransference, meetings were scheduled regularly to exchange information, to co-ordinate the program and to provide group catharsis of the workers. An improvement over the earlier, unsuccessful method was the use of long-term therapists. An important consideration in the treatment of these children was need-gratification. Gradually these non-verbal children began to talk and to participate in a classroom situation.<sup>8</sup>

#### Treatment to Induce Forced Dependency

In the summer of 1966, in an experiment with psychotic children, an endeavor was made to establish therapeutic relationships through forced dependency. Four psychotic children were taken into a swimming-pool daily for a period of two months. A therapist was in charge of each child. The objective was to discover if the threatening environment of water would cause the child to make contact with

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<sup>8</sup>John Kempf and Albert Cain, "New Directions in the Inpatient Treatment of Psychotic Children in a Training Center," American Journal of Psychiatry, 119:934-939, 1963.

the therapist and possibly establish a need-relationship with him. Although the findings were not conclusive from the small number of children participating in this program, the general impression was that this technique was a possible approach in helping psychotic children to establish contact. It was concluded that this treatment merited further experimentation. A valuable observation was the increase of vocalizations and verbalizations of two of these children during the hydrotherapy.<sup>9</sup>

#### Treatment Emphasizing Teacher-Child Relationship

Fenishel, Freedman and Klapper report that the teacher's relationship with the child is basic to the program at the League School (a day school facility for schizophrenic children).<sup>10</sup> A teacher is provided for every two or three children, and often a teacher must give exclusive attention to one child for weeks, and sometimes months. The teacher accepts the child on whatever level he is functioning; at first she may simply play a non-verbal role of comforting, holding, rocking and feeding the child. Response to the outside world often begins with body contact.

After the child is relieved of stress and anxiety,

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<sup>9</sup>Charles H. Chambers and Lawrence F. Conant, "Establishing Contact with Psychotic Children by Using Water as a Threatening Environment," unpublished paper. (This study is included in a training film.)

<sup>10</sup>Carl Fenishel, Alfred Freedman and Zelda Klapper, "A Day School for Schizophrenic Children," American Journal of Orthopsychiatry, 80: 130-143, 1960.

the rehabilitative phase begins. Play, group, music and dance therapies are employed. The materials which seem to get the attention of these children are balls, balloons, rocking boats, water, sand and musical instruments. They have a preference for mobile objects and may convert any object into a mobile one by throwing it.<sup>11</sup>

#### Treatment through Massage

Characteristic techniques are seen in the following report by Waal: The patient's ". . . main problem seemed to be an overwhelming aggression and fear of revenge, so he had to flee into autism."<sup>12</sup> He babbled at nine months, but at three years of age when he entered therapy he had not developed any speech.

Reduction of anxiety was achieved by gentle massage of the solar plexus, neck, whole length of the spine, then the chest, chin, hands, and palms. After this the massage became provocative. This caused outbursts which were accepted. Han's first words, "You go there," were directed to the therapist when she put him to bed for his afternoon nap. This mand was accompanied by a gesture as to where he wanted her to remain while he slept.

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<sup>11</sup>Ibid.

<sup>12</sup>Nic Waal, "A Special Technique of Psychotherapy with an Autistic Child," in Emotional Problems of Early Childhood, ed. by Gerald Caplan (New York: Basic Books, 1955), p. 438.



### Treatment through Imitation

Goldfarb describes a simple method for encouraging interaction as "a conscious echoing and imitation of the schizophrenic child's unique vocal and motor behavior."<sup>13</sup> This method is sometimes successful in making contact with such a child.

### Coordinated Treatment of Parent and Child

There is lack of evidence to support long-term residential treatment. Shulman reports on eight cases that improved when the following procedure was employed. The parents were helped to understand manifestations of the autistic syndrome, and relieved of guilt feelings as far as possible. The female parent was advised to obtain relief for several hours each day. Firm limits were established for the ill child. It was recommended that the ritualistic behavior of the child should be interfered with gently, and that socialization with other children should be encouraged. The child was rewarded for any vocalization.<sup>14</sup>

Similarly, the Putnam Center recognizes the importance of coordinated treatment of parent and child. These chil-

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<sup>13</sup>W. Goldfarb, P. Braunstein and I. Lorge, "A Study of Speech Patterns in a Group of Schizophrenic Children," American Journal of Orthopsychiatry, 26:555, 1956.

<sup>14</sup>J. L. Shulman, "Management of the Child with Early Infantile Autism," American Journal of Psychiatry, 20:250-254, 1963.

dren receive treatment as out-patients. The mothers are seen weekly, and the fathers receive counselling and individual or group psychotherapy.

The question of the need for psychotherapy arises with these children. Whether or not they are given specific psychiatric treatment, there is no question that their parents always need guidance, encouragement and support. Parents tend to feel guilty, discouraged and frustrated.<sup>15</sup>

#### Treatment through Stimulation

Mahler recommends that the autistic child be approached gradually, using inanimate objects, rhythmic activities, and other stimulation of the sense organs to establish contact.<sup>16</sup>

#### Treatment through Group Therapy

The use of group therapy was based on the postulation that support for defective egos may be provided through formation of a "group ego." Group therapy was provided over a period of two years for four children all of whom had been given the diagnosis of "childhood psychosis with autistic features." The children ranged in age from

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<sup>15</sup>Milton J. E. Senn, "Autism: A Medical Mystery," McCall's, April, 1966, p. 46.

<sup>16</sup>Margaret S. Mahler, "On Child Psychosis and Schizophrenia: Autistic and Symbiotic Infantile Psychoses," Psychoanalytic Studies of the Child, (New York: International University Press, 1952), pp. 286-305.

three and one-half to four and one-half at the time therapy was begun. Defective language was listed as one of the behavioral symptoms most prominent in the subjects:

Total absence of speech in one child; incomprehensible gibberish in two; stereotyped phrases devoid of communicative content in one. One had infantile speech with misuse of pronouns (example: "You want a cookie," rather than "I want a cookie."<sup>17</sup>

The response of the children to group therapy was an increase of autistic withdrawal, followed by a stormy period caused by reactions of panic when one child interrupted the behavior of another. Aggression required forceful control. At the end of ten sessions the children began to interact. When a fifth child was added there was at first great anxiety, then followed the first evidence of group formation as the original children "ganged up" against the new-comer. It was only after eighteen months of therapy that group formation was consistently possible.

During this two-year study, play activities were introduced with music, and vigorous rhythmical activity was used to discharge tensions. Eventually sedentary games were introduced, but whenever tensions began to rise, there would be a return to active games. The cookies and

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<sup>17</sup>Rex W. Speers and Cornelius Lansing, "Group Therapy with Preschool Psychotic Children and Collateral Group Therapy of their Parents," American Journal of Orthopsychiatry, 34:660, 1964.

milk period prompted verbalizations which included self-reference, mention of family, identification of sexes, and so on. It was during this eating period that the children displayed the most obvious group orientation.

Each child was helped to learn the names of parts of his own body, and as this ability progressed, the children began to use pronouns correctly.

By the end of the first year communicative speech had developed in all the children, but it was not until eighteen months of therapy that the children began to speak to each other.

The report of this group therapy experiment was made after the original four subjects had been seen twice weekly for two years---a total of 435 hours. Therapy was provided for the mothers and fathers in separate groups. As one of the requirements for participation, each mother obtained a nursemaid who devoted full time to the child during the day.

This study raises many questions as to the variables which contributed to the success of this technique; namely, the parents' therapy sessions, the full attention of a mother substitute in the home, the carefully-planned staffing sessions, the ages of the children at the time of group therapy, the fact that the children were not institutionalized, the effect of maturation on the development of speech, and the group therapy plan itself.

Treatment in conjunction with Normal Children

A Canadian experiment in the treatment of autistic children was carried out over a five-year period, and at the end of the experimental period, it was urged by the psychiatric advisors that the plan be continued, and a provincial-federal grant was secured making this possible.<sup>18</sup>

The unusual feature of this program is that the treatment of the children takes place in conjunction with a nursery for normal children "where the very gradual integration of the ill child into the normal group can be used as a treatment tool and in some instances as a means of motivating the child toward growth."<sup>19</sup>

Ten autistic children participated in the program, five in the morning and five in the afternoon, two hours daily four days a week. Each child is assigned his own teacher-therapist, and his own playroom.

The psychiatrist who directs the total treatment program meets regularly with the teachers and the parents to review the child's progress. A caseworker is assigned to the parents. Two staff conferences are held weekly for

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<sup>18</sup>Margaret Lovatt, "Autistic Children in a Day Nursery," Children, May-June, 1962, 103-108.

<sup>19</sup>Ibid., p. 104.

the integration of the program.

During the initial period, the teacher keeps the child in his own playroom to reduce his anxiety with acceptance and reassurance, and to help him gain some satisfaction from use of toys. After the child begins to be aware of the therapist and to relate to her, he is gradually led into the playroom. If his behavior becomes disruptive, he is removed immediately. Some of the children who learned behavior adequate to remain in the nursery gradually progressed so that it was possible for them to enter the public school kindergarten. At the time of the report, four of the children had progressed to second and third grades.<sup>20</sup>

#### Treatment through speech therapy

A pilot study was undertaken to determine the effect of speech therapy on the non-verbal autistic child.<sup>21</sup> Therapy was conducted over a period of five months with eight children ranging in age from five years two months to nine years six months. It was requested that no speech training be given at home. The same psychologist, psychiatrist and speech pathologist examined the children prior to and

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<sup>20</sup>Ibid., p. 107.

<sup>21</sup>John B. Scanlan, Doris T. Leberfeld and Robert Freiburn, "Language Training in the Treatment of the Autistic Child Functioning on a Retarded Level," Mental Retardation, 1:305-310, 1963.

following treatment using the same procedures. By the end of therapy, all of the children had made a significant gain in verbal comprehension, but this was not matched in verbal expression.

Many of the studies reported thus far do not deal specifically with the development of communication, but with the basic need of helping the autistic child establish contact with others. That speech has resulted, at times, from these techniques indicates the importance of the social context in the development of communication. It is not surprising that the studies cover such a gamut of techniques since there is not agreement on the etiology of early infantile autism. Treatment, theoretically, is based on etiology. The above studies indicate some success in helping the autistic child to establish contact, and to develop speech in some cases; however, the general impression is that "even those individuals who make the best recoveries still tend to be emotionally somewhat barren."<sup>22</sup> "They are unable to see themselves as others see them; they lack tact and poise; they cannot join a group; they remain socially isolated."<sup>23</sup>

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<sup>22</sup>L. Joseph Stone and Joseph Church, Childhood and Adolescence (New York: Random House, 1957), p. 358.

<sup>23</sup>Kessler, Ibid., p. 271.

### Operant Conditioning

Until the recent application of operant conditioning techniques in shaping the behavior of autistic children, progress was slow and discouraging, and reports of success were sporadic.

The first reported use of operant conditioning in teaching autistic children was by a Dutch nun, Sister Gaudia, over ten years ago. She used bits of cornflakes and chocolate as rewards for giving attention.<sup>24</sup>

The use of operant conditioning in this country to shape the behavior of the emotionally-disturbed has been more recent. Weiland and Rudnik (1961) describe how Nelson, an eight-year old, non-verbal, severely withdrawn boy who had made no progress in three years of psychotherapy, was induced to develop speech. His favorite toy, a ball, was withheld from him. Several times a day the ball would be held out to him with the requirement that he could have it when he said "ball." After twelve weeks of such presentation Nelson said "ball." Within eleven days "doughnut," a favorite food of Nelson's, was similarly elicited. Within a week one or two words were being added to his vocabulary each day, and at the time of the report, Nelson was using several dozen nouns

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<sup>24</sup>Bernard Rimland, "Breakthrough in the Treatment of Mentally Ill Children," an address given at the inaugural meetings of the National Society for Autistic Children, in New York and Washington, November 14 and 17, 1965), p. 4.



and verbs to express his needs and desires.<sup>25</sup>

Rimland admits that he was frankly skeptical when he was informed of Nelson's verbal achievement. "It was only after evidence from other sources began to mount that I recognized that Nelson's improvement might be more than a freak occurrence."<sup>26</sup>

In 1965 Rimland stated:

My own belief is that the ultimate answer to the problem of severe behavior disturbance in children ---and adults---will come from the biochemistry laboratory, in the form of a drug or a special diet, like the one for phenylketonuria (PKU).<sup>27</sup>

Although he admitted that a dietary cure was not probable in the immediate future, he added an optimistic note for the meantime:

I want to make it clear that it is far too early to become jubilant [sic] but I do feel that there is a recent development which will dramatically change the outlook for many, perhaps most, mentally ill children. This development, which in its present form is just a few years old, is called "Operant conditioning."<sup>28</sup>

Many of the projects involving the use of operant conditioning for autistic children reported on single cases,

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<sup>25</sup>I. H. Weiland and R. Rudnik, "Consideration of the Development and Treatment of Autistic Childhood Psychosis," *Psychoanalytic Studies of the Child* (New York: International University Press, 1961), 16:549-563.

<sup>26</sup>Rimland, op. cit., p. 5.    <sup>27</sup>Ibid., p. 1.

<sup>28</sup>Ibid.

and these cases gave dramatic results.

Wolf, Risley and Mees report on a three and one-half year old boy, Dicky, whose diagnosis was childhood schizophrenia with autistic features.<sup>29</sup> The parents had been advised to institutionalize him because of his extreme behavior. He could mimic speech, but did not use speech appropriately. Operant conditioning procedures were applied to eliminate his undesirable and self-destructive behavior, and to generate desirable behavior, including development of a verbal repertoire. Candy and fruit were unsuccessful as reinforcers. When breakfast and lunch were used as training sessions he began to make rapid progress. The therapist used pictures as verbal stimuli and when Dicky gave an acceptable response he would get a bite of his meal. Later, adult attention and approval were adequate reinforcers. This study includes graphs which depict the extinction of the following undesirable behavior---tantrums, self-destructive acts, bedtime disturbances, and refusal to wear glasses. At the end of six months Dicky was discharged from the hospital and returned to his home.

The authors comment that Dicky's ability to mimic made the acquiring of an increased repertoire much more rapid than in the case of children who have not attained

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<sup>29</sup>M. Wolf, T. Ridley and H. Mees, "Application of operant conditioning procedures to the Behavior Problems of an Autistic Child," Behavior Research and Therapy, 1: 305-312, 1964.

echolalia. This latter group, according to their experience, require "a long and arduous handshaping procedure . . . to establish responses."<sup>30</sup>

An instructive study utilizing operant conditioning in teaching speech to an autistic child is reported by Frank Hewett.<sup>31</sup> A novel feature in his program was the use of a booth to reduce extraneous stimuli, and to control behavior by aversive stimuli of darkness and isolation. Positive reinforcers were candy, light, music, ride on a revolving chair, color cartoon movies, and a number matching game.

Peter, the boy in this study, had learned to say "mama" and "dada" during his first year and then all speech ceased. He was described as a good baby, preferred being left alone, resisted being picked up, but became hyperactive and aggressive by two years of age. He had superior fine motor control, and he was interested in mechanical devices. Neurological and laboratory tests were normal, and hearing was normal.

The booth in which the speech training took place was divided into two sections with a movable shutter sep-

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<sup>30</sup>Ibid.

<sup>31</sup>Frank Hewett, "Teaching Speech to an Autistic Child through Operant Conditioning," American Journal of Orthopsychiatry, 35: 927-36, 1965.

arating Peter and the teacher. The shutter could be raised or lowered by the teacher. The only light was on the teacher's side and was directed on her face. Peter learned to drop a ball into a device to have the shutter opened.

There were four phases in Peter's training to develop speech. At first he was taken to the booth only at mealtime and had to learn to use the bell-drop device to obtain each mouthful of food. Eye contact was established by withholding food. In the second phase Peter learned social imitation. In the third phase efforts to get an approximation of "go" based on spontaneous vocalization of vowel sounds resulted in marked resistance, but was mastered. "My" was then introduced using an alternate reinforcer to aid in discrimination.

At the end of six months Peter had a repertoire of thirty-two words. Speech training was then continued three times weekly on an out-patient basis. He learned to express needs such as "I want water."

Richards reports on techniques applied to four autistic children who had no verbal or non-verbal communication.<sup>32</sup> New methods of treatment were developed because of discouraging results after two years of treating a larger group with emphasis on psychotherapy and

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<sup>32</sup>Joan Elicker Richards, "Techniques used in a School Program for Children Emerging from Early Infantile Autism," Exceptional Children, 29:348-357, 1963.

ward activities. The four girls in the new program were hyperactive, inattentive and destructive. To overcome this undesirable behavior, a child would be removed to a quiet room with only a bed and a window. The smaller room helped the teacher to focus the child's attention. Auditory stimulation was used in developing speech, and situations were set up in the classroom requiring need to communicate and to promote polite ways of dealing with each other. Reinforcement for development of speech was by handshake, hug, star, pretzel, or opportunity to display work on the wall. The progress of one child's speech is outlined. This little girl had no speech when admitted at age five. After a severe regression at age eight she began to make progress. She began using short sentences and all pronouns but "you" correctly. She referred to another person as "it" or "that" as though referring to an object. She had difficulty in articulation and phonation. Oral gratification was very helpful in stimulating her speech development. As reported by Ferster, food is one of the best reinforcers for these children.<sup>33</sup>

Richards made a significant observation as a result of this study:

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<sup>33</sup>C. B. Ferster, "Positive Reinforcement and Behavioral Deficits of Autistic Children," Child Development, 32:437-456, 1961.

Increased verbal communication by the children has given us many more clues about their particular distortions of reality and has helped us to approach the children with greater understanding and more definite goals.<sup>34</sup>

Wetzel and Baker report the outpatient treatment of David described as "a case of childhood autism."<sup>35</sup> At the age of one year David was withdrawn and had been diagnosed as retarded. At three years of age he had severe temper tantrums with head banging, was still withdrawn, and had no communicative speech. At six he was described as "autistic," continued to be tantrumous, but by now had some echolalic speech. By this time he displayed some approach behavior.

The cooperation of the parents was enlisted in the behavior therapy program. Although David was brought to the clinic without lunch, Hershey bars, coke and chocolate cookies were not strong enough reinforcers. The decision was made to use social rewards. The procedure for extinguishing undesirable behavior was by ignoring him. David learned to name nearly 100 objects, to follow seventy or eighty commands and to participate in simple verbal exchange.

The parents learned to use shaping procedures in the home. His responsiveness to verbalizations increased

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<sup>34</sup>Richards, op. cit., p. 352.

<sup>35</sup>Ralph J. Wetzel and Jean Baker, "Outpatient Treatment of Autistic Behavior," Behavior Research and Therapy, 4:169-177, 1966.

the mother's control of his behavior.

Jensen and Womack report on rapid increase of speech<sup>36</sup> in an autistic child. The speech of this child, Jerry, at age six, consisted of some single words for food. Deviancy in development was noted when, at two months of age, he was considered to be unresponsive to being held. He developed ritualistic play, had temper tantrums, avoided human contact, and became very disturbed if a change was made in his routine.

Progress with milieu and play therapy was discouraging, although he responded differentially to some people. A program of operant conditioning was undertaken to shape his behavior and to increase verbalizations. A social reinforcer was used, attention from his nurse, and two primary reinforcers, icecream and potato chips. Negative reinforcement was used to extinguish undesirable behavior, such as temper tantrums. The negative activity was placing him in a quiet, empty room with the door closed, and allowing exit only after he had quieted. Temper tantrums were reduced from ten a day to a rarity after several weeks.

The operant conditioning procedures for development of speech were similar to those used by Wolf, Risley and Mees (1964). Pictures were used and questions asked, "What is that?," "Which color is it?," and similar simple queries. Color photographs of all the people on the ward

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<sup>36</sup>Gordon D. Jensen and Mariette G. Womack, "Operant Conditioning Techniques Applied in the Treatment of an Autistic Child," American Journal of Orthopsychiatry, 37:30-34, 1967.

were presented to teach him their names. After simple responses were developed, the reward became contingent on his eliciting several words. Jerry's verbal repertoire generalized to the ward and to his home. As in David's case, the mother was instructed in operant conditioning procedures to induce appropriate behavior and to increase his use of language.

It should be noted that in the cases of Dicky, David and Jerry, some speech was present prior to the application of behavior therapy to develop speech. True, Dicky and David were merely echolalic whereas Jerry had some limited meaningful words, but their dramatic progress would substantiate the conclusion that the ability to mimic makes the development of speech much more rapid than in cases of mute children.

Other variables may enter into the successful development of speech, such as length of therapy sessions and the techniques of applying operant conditioning. An intensive program was carried out at the Neuropsychiatric Institute at UCLA.<sup>37</sup> Two mute schizophrenic boys, Billy and Chuck, six-year-old in-patients, were the subjects in this study.

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<sup>37</sup>0. Ivar Lovaas, John P. Berberich, Bernard F. Perloff and Benson Schaeffer, "Acquisition of Imitative Speech in Schizophrenic Children," Science, 151:705-707, February, 1966.



At the onset of the program, vocal behavior in both children was restricted to occasional vowel productions with no discernible communicative intent. These vowel sounds occurred infrequently, except when the children were tantrumous, and did not resemble the pre-speech babbling of infants.<sup>38</sup>

A spoonful of the child's meal was used as reinforcement. During the early stage of training, the child was rewarded for any vocalizations and for looking at the mouth of the therapist. The child and therapist sat facing each other, and the therapist restrained the child by holding him with his legs. For inattention and misbehavior the child was punished with spanking or shouting. Most of the undesirable behavior such as temper tantrums were extinguished within a week.

A unique feature of this carefully structured program was the fact that "training was conducted six days a week, seven hours a day, with a fifteen-minute rest period accompanying each hour of training."<sup>39</sup>

In the second step the child was required to vocalize within six seconds of the therapist's presentation of the stimulus word. In the third step the child was required to match the adult's vocalization. Vocalizations chosen were those that could be subjected to a cue, such as "b" where a finger on the child's lips could serve as a prompt and be faded gradually, and as a second criterion,

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<sup>38</sup>Ibid., p. 705.    <sup>39</sup>Ibid.

sounds or words with visual components. After twenty-six days of training the children's verbal repertoire had increased so rapidly that they were considered ready to learn to use language appropriately.

The experience with Billy and Chuck led to the conclusion that "reward immediately following correct, imitative behavior (and withholding of reward following incorrect responding) is a crucial variable in maintaining imitative behavior in these children."<sup>40</sup>

At the Nassau Center for Emotionally-Disturbed Children, Long Island, auditory training equipment is considered of primary importance in teaching speech. The earphones shut out extraneous noise. The therapist speaks into a microphone while holding the child's face firmly. Initially, vowel sounds are repeated as stimulation. Candy is used as reinforcement. Plans are being made for group therapy using the earphone method.<sup>41</sup>

Mrs. Margaret Shodell, Director of the Center, considers that

The biggest problem is communication. Unless we can get these children to communicate with us, we will accomplish very little. They see and hear everything in a confused, frightening blur. We have to teach them to block out the irrelevant.<sup>42</sup>

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<sup>40</sup>Ibid., p. 707.

<sup>41</sup>"Breaking Through to the Autistic Child," Medical World News, October 1966.

<sup>42</sup>Ibid., p. 90.

A recent study implies that speech which is taught through behavior modification techniques may not generalize outside the experimental setting, and thus language may fail to be attained.<sup>43</sup> Weiss and Born cite the case of Timmy, a seven and one-half year old negro boy who was described as almost completely autistic. Physical examination revealed no abnormalities. An EEG, however, indicated diffuse organic damage. The case history indicated that the mother had been hospitalized for hemorrhaging at the end of the first trimester. The father had been hospitalized at one time for emotional disturbance. Timmy began to develop speech, then regressed, using words in a meaningless and echoic way.

Speech training was begun with teaching concepts of position such as "inside," and "on top." All concepts were demonstrated in a concrete way. Candy served as reinforcement. Speech was encouraged and stimulated outside of therapy. Although he appeared to make some progress, he failed to learn to use speech in a meaningful way outside of the structured situation. The authors conclude:

Instead of perpetuating the ambiguous autism syndrome, efforts should be directed at describing a series of subcases that have in common descriptively reliable features. One important kind of operational criteria could be the patient's response to a specific treatment approach, such as speech training.<sup>44</sup>

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<sup>43</sup>Henry H. Weiss and Barbara Born, "Speech Training or Language Acquisition? A distinction when speech training is taught by Operant Conditioning Procedures," American Journal of Orthopsychiatry, 37(1):49-55, 1967.

Results of studies in operant conditioning procedures support Rimland's optimistic claim that this method of treatment for mentally ill children offers new hope. The extent of acquisition of language by means of operant conditioning requires further investigation.

## CHAPTER V

### APPLICATION OF LANGUAGE DEVELOPMENT TECHNIQUES

The subjects in this study were residents of Amos Cottage, a licensed forty-bed hospital under the Department of Pediatrics, Bowman Gray School of Medicine, Winston-Salem, North Carolina. Amos Cottage provides medical and therapeutic services to mentally retarded and emotionally-disturbed children. It is located on the Graylyn Estate in the proximity of the Developmental Evaluation Clinic.

The three children described in this chapter were non-verbal, emotionally-disturbed displaying autistic-type behavior. Their only vocalizations were occasional reflex or guttural sounds. Two of the children were diagnosed as mentally retarded, but in the history of development there was evidence of islets of intelligence. It had not been possible to obtain a psychological evaluation on the third child because of withdrawn behavior. All had been institutionalized from eight months to six and one-half years. In age they were five years three months, seven years five months, and eleven years seven months at the beginning of therapy. The two youngest were boys, the oldest a girl.

The goal of therapy was to develop speech through operant conditioning, with a flexible plan of sub-goals to

develop communication:

1. To establish a meaningful relationship by functioning as a source of need-satisfaction.
2. To motivate learning by exploring and expanding the child's interests.
3. To establish eye contact.
4. To identify with the child through imitation as a means of encouraging his imitation of the therapist.

A case history of each child is presented prior to the weekly account of therapy sessions. Therapy was conducted on a one-to-one basis over a period of at least six months at the D.E.C. The therapy room was windowless with lighting provided by overhead fluorescent lights. The room measured approximately twenty feet by nine feet and had wall-to-wall grey carpeting with grey walls. The furniture consisted of a desk and three chairs. Ample storage for toys and supplies was provided by enclosed cupboards along one wall. A full-length mirror was available on the inside of one of the cupboard doors. A large bathroom opened off the therapy room.

The length of sessions averaged forty-five minutes daily four or five days a week. In addition, the child was observed several times a week by the therapist in the setting of Amos Cottage and in the playroom of the Clinic.

## AMY'S CASE HISTORY

Amy's birth was normal following an uneventful pregnancy. She weighed seven pounds. At six weeks she smiled, and at three months she held her head steady. The first indication of deviancy in development was lack of babbling. At no time did she develop this type of vocal play.

At seven months Amy had pneumonia followed by asthmatic bronchitis which lasted for four months. During this period she was listless and paid no attention to people. Until thirteen months of age she preferred to lie in her crib and spent much of her time rolling her head in a peculiar arched fashion. At fourteen months, following treatment for hypothyroidism, Amy sat alone, and at eighteen months she walked alone. Up until the time of treatment her delayed motor development had been attributed to her prolonged illness.

By this time the parents had become concerned that Amy's hearing was impaired, although the mother stated with confidence that there were times when Amy did respond to sound. The result of psychogalvanic audiometry at eighteen months of age indicated responses at 60 to 70 decibels in the low frequencies. The threshold increased rapidly until at 4000 c.p.s. response was at 90 decibels in the left ear and 100 decibels in the right ear. Beyond this frequency

there was no response. She was diagnosed as profoundly deaf and enrolled in the John Tracy Correspondence School. In a short time she rejected this training and thereafter refused to look at anyone in the face. She refused all human contact and there was no means of communication.

Amy preferred to play alone and her interest focused on mechanical objects and devices. At four years of age she found a screwdriver and removed all the switchplates in the house. She inserted buttons in the pushbuttons on the stove which prevented the stove being used, but upon request, Amy was able to remove them. She took the control panel and vanes off the airconditioner, and succeeded in putting these back correctly without help. She demonstrated excellent, fine motor co-ordination.

If any change was made in her environment she reacted with extremely disturbed behavior. Painting and rearrangement of her room caused her to be upset for a period of weeks. She became upset when doors were closed, and when her bedroom door was closed she would react by smearing feces over the walls.

She looked through people and avoided eye contact. Her lack of communication, her disturbed behavior together with the initial diagnosis of profound deafness led to a series of evaluations in various centers. An electroencephalogram indicated minimal brain damage. In March, 1959, when Amy was almost four years of age, she was



evaluated at the University of North Carolina, Chapel Hill. The diagnosis was childhood schizophrenia (autistic type) superimposed on deaf mutism. In 1966 at Eastern North Carolina School for the Deaf, Wilson, North Carolina, Amy's condition was described as hearing loss with signs of emotional disturbance and aphasia. In the same year at Central Institute for the Deaf, St. Louis, Missouri, Amy was diagnosed as having a severe hearing impairment, no evidence of aphasia, and diminished intellectual ability. In this evaluation she scored an I.Q. of 73 on the Lane Performance Scale.

Amy spent five and one-half years in schools for the deaf and at the end of that time she was no longer accepted. Her academical progress was a maximum of two years. She had made little or no progress in verbal communication. It was at this time that she entered Amos Cottage.

In reviewing the history of her family, it is of interest that there is a distant cousin who is an untreated cretin, and also a familial history of deafness. She has two older normal sisters. The mother and father are both college graduates.

Amy entered therapy in December, 1966, at age eleven years seven months. She was non-verbal, withdrawn, aggressive and destructive. She made no effort to communicate with others except with gestures to fulfill a need. She appeared to be content to live in her own little world. Characteristically she avoided contact with people by keeping her head bowed or averted. Her dark wavy hair was thinned out from head-rolling on her bed, and from twisting and pulling out hair.

#### WEEKLY REPORTS

##### Week One

The first week was a period of observation. Amy sat by the therapist with head averted. A variety of noisemakers was presented without any interest demonstrated until a hand castanet was clicked several times close to her ear. Amy reached for the castanet and holding it first to the left ear, then to the right, clicked it a number of times. This performance was repeated without further demonstration each time the castanet was presented to her. Enjoyment of vibration is characteristic of the deaf child, but Amy lacked the visual attentiveness to the speaker's face that would be expected in a deaf child. She avoided eye contact with everyone.

The activities of Amy's choice were dumping a large number of red, blue, yellow and brown plastic animals on

the desk, then returning them to their box systematically until each color was completed; and collecting a variety of small toys to identify in writing. She obtained paper and pencil from the desk, lifted each object out of the box, held it up by her face without looking at it, then placed it back in the box and wrote its name. Thus she identified a truck, a cup, a car and similar simple words. She was right-handed and held her pencil tightly in an upright position. She used both manuscript and cursive writing. Partial interruption of an activity would result in vocalization of guttural sounds. Removal from the activity would cause loud vocalization and head-banging with both fists.

Fingerpainting was introduced and Amy seemed to enjoy smelling, smearing and tasting this medium.

Because Amy demonstrated an ability to identify names of objects appropriately in writing, the therapist attempted to communicate with her in writing. This was not successful. Amy's responses were inappropriate and meaningless.

### Week Two

An attempt to establish eye contact by taking Amy's face gently in the therapist's hands met with resistance and pushing away. Similarly, she resisted having her hand placed on her own neck or face, and the other on the therapist's

neck or face to feel the vibrations of vocalization. It was apparent that if speech reading was to be taught Amy would need to be desensitized, and also learn to focus on the therapist's face.

Reinforcement was started this week to establish eye contact. The reinforcement was a Frosty-O. The piece of cereal was held in Amy's line of vision, then moved toward the therapist's face. When a fleeting glance was made in the direction of the cereal, it was popped promptly into her mouth. By progressively moving the piece of cereal closer to the therapist's face and eyes, Amy was conditioned to attend briefly.

### Week Three

Amy was quite hyperactive at times, especially when she first came to the therapy room, rushing about getting out many different games and performing many activities. The permissive atmosphere, intended to provide a non-demanding situation in which observation could be made of Amy's behavior, may have served the purpose of helping Amy enjoy the therapy session. At any rate, when it was time to leave, she banged on her head with her fists.

An effort was made to restrict her to only two activities. Her response was head-banging and guttural sounds.

Week Four

By the end of this week Amy was making eye contact often. In an attempt to induce her to prolong eye contact, the reinforcement was withheld. Her response was to close her eyes and open her mouth. When no sugar-coated cereal was forthcoming, she would open her eyes, look at the therapist, and be reinforced.

In completing a figure of a man at this time she followed the immature pattern of continuing the hair around the face. Of significance was lack of eyes. Three attempts were made before she matched the leg. (Appendix A).

Week Five

She was more responsive, interacting with the therapist by nodding, taking her arm and occasionally smiling. She was still resistant to feeling vocal vibrations, vigorously pushing away the therapist's hands placed on hers. Use of the tactual modality to aid in speech reading was temporarily discarded to avoid negative association with communication.

Dominoes were an activity of choice. She would write the correct number of dots, and then hold up the correct number of fingers to match the dots. This was a source of good interaction and visual feedback as she would attempt to imitate the therapist's verbalization of the number. For her attempted imitation she received a piece of sugar-coated cereal.

Similarly, an attempt was made to communicate with Amy through speech reading by giving her small figures of a family group and asking her, "Show me the girl . . . boy . . . Mother . . . Daddy . . . baby." She framed her lips for speech and moved her lips in rapid motion, but did not articulate any sounds. A brief session was spent on this each day, and she succeeded in saying [bʌ] for baby. But she was impatient with this activity and pulled her hair and pushed the figures away.

#### Week Six

The therapist took a child from Amy's play group whom she did not see regularly. When she returned the child, Amy rushed over to the door and pressed a note into the therapist's hand and kept nodding at her with good eye contact. The note was written on the panel of a Kleenex box:

Girl is me today  
me name Amy.

And on the reverse side:

girl dtyedy  
me? Amy

This was the most complete communication received from Amy up to this time.

Pairs of similar objects placed in a cloth bag with an elasticized top provided a method of tactual matching. The therapist removed an object, and asked Amy to find an

object like it. Amy learned very quickly to match tactually. The task was then made more difficult by requiring that she match the object to the therapist's verbalization of the name of the object through speech reading. She had now reached a point at which eye contact was established readily so, in this respect, it was felt that she was ready for this phase of training. By the end of the week she had more successes than failures, and was rewarded each time she produced the correct object from the bag.

#### Week Seven

Material was provided for making Valentines. Amy pasted lavishly, with obvious pleasure and much tasting. Not satisfied with a Valentine folder which had taken her a long time to make, she tore it up and made a second.

She addressed a number of Valentines: To Amy from Amy. The therapist then wrote down a number of children's names prefixed with "To:" Amy appeared to understand and addressed Valentines without help. At the end of the session she returned to the playroom, taking the Valentines with her, and delivered them to the children. The next day she ran down the long hall to the therapy room, immediately sat down at the desk and addressed cards to children in the playroom. She used names of children which had been written for her the day before, but in addition, names of other children. When there were no more cards left, she used the

cards which she had addressed to herself the day before, and wrote over her own name. As soon as she finished she ran back to the playroom and delivered the cards.

She had apparently learned the names from markers and identification tags at the Cottage. This was an encouraging revelation as it indicated that Amy was becoming more aware of others, even though she normally avoided interaction.

### Week Eight

Some progress could now be reported in speech reading which had been practiced daily, but for brief periods ranging from three to eight minutes. Imitation of the therapist's lip movements, even though only in approximation, was reinforced with sugar-coated cereal. Although tactual feedback was still resisted, Amy had become more co-operative and would work on speech reading for a short period quite energetically. If she were not reinforced for her efforts, however, she would try to get the cereal by thrusting her hand very quickly into the supply in the therapist's apron. On several occasions she elicited [bʌ] for boy, and [pʌ] for paste.

Her eagerness to use paste---and taste it ---was followed up by supplying her with colored construction paper. She cut out circles, squares, triangles and free form shapes and pasted collages. She worked so intently on



this that there was little opportunity for speech reading. Consequently the therapist hid the paste, and when Amy entered the therapy room the next day she began a frantic search, banging her head but not as hard as formerly.

When given paper and pencil she wrote "white moo." The therapist drew a line through "moo" and wrote "paste," then produced the desired object to reward her for her attempted communication. Amy nodded, vocalized [p^], and with great pleasure returned to her pasting activities. Another frantic search when the scissors were missing induced Amy to write what she wanted and show it to the therapist. The word was not spelled correctly but was readily recognizable.

Although there had been only meager graphic communication thus far, this medium was continually explored with simple questions. When asked in writing and verbally, "How old are you?" she did not seem to understand. A note was then made on the desk calendar on the correct day, "Amy's birthday" and a birthday cake sketched with twelve candles.

She copied words from books, wrote numbers and listed many common objects correctly, but had need of using her written knowledge for communication. To increase interest in written messages the therapist wrote "Amy is a good girl" using carbon paper. She laughed in a pleasant, spontaneous

way, and when the paper was lifted up so that she could see the copy, she laughed again.

### Week Nine

When the therapist visited the playroom to observe, Amy had tears in her eyes when she left without her. Although there was a growing relationship, and Amy was cooperative and did not present a behavior problem in therapy, reports from the Cottage indicated aggressive, destructive behavior. She watched television and remained apart from the other children. At mealtime she had been observed with head down, frowning or scowling.

Cutting and pasting was her activity by choice this week. One day she voluntarily taped one of her creations on the door of the therapy room. This week when there was no paste she was able to write "paste" correctly. When the therapist wrote "all gone" she did not seem to understand. Sign language was used, and although she nodded, she nevertheless still was in need of paste and remained disturbed. The therapist then took money from her pocketbook, wrote and verbalized, "I will buy more paste," and Amy smiled and nodded. The message was understood.

These incidents of frustration are rare during therapy because every effort is made to communicate by any possible means. Her eye contact has improved so that she may be getting visual clues that are helpful. At times it seems

to the therapist that she does get some meaning from verbalization, but this may be subjective.

She has a strange way of running, bending over until her back is quite rounded, legs lifted high, arms waving, in floppy, uncoordinated fashion. While running down the long hall to therapy she emits guttural noises and clicking sounds.

#### Week Ten

In labeling objects in the therapy room she missed "floor," "wall," "bathroom," and was correct on "door," "mirror," "window," and "chair." The therapist held each card to her mouth so that Amy could match the graphic symbol (manuscript) with the spoken.

Since marking her birthday on the calendar, Amy frequently turns to her birthday, points at it, and looks at the therapist.

Reinforcing for eye contact had been most successful. Operant conditioning was now focused on correct production of an object through speech-reading, with the number of pieces of cereal increased for attempted speech.

Naming of body parts was an activity that had to be introduced gradually. Amy would make only momentary contact with her own reflection in the full-length mirror, and then go limp like a rag doll, and become a dead weight in the therapist's arms. Since she no longer resisted body contact,

a comb was offered to her and she was asked if she would comb the therapist's hair. The request was made several times, in sign language, verbalization, and writing, before she complied. Thus she learned to say [ha] for hair. This made the sixth word that Amy had used, although in one-syllable form: [bʌ] for baby, boy, bubble, [pʌ] for paste, [mʌ] for more.

#### Week Eleven

A free field audiometric test was performed. Amy responded to speech at 65 decibels and to pure tone of 1000 c.p.s. at 65 to 70 decibels. She localized the source of sawtooth noise at 75 decibels. Although she had worn a hearing aid at the school for the deaf, she had not had it since coming to Amos Cottage. This hearing evaluation indicated that a hearing aid would possibly increase her effective use of residual hearing.

Amy has been pointing to words consecutively in children's books, and the therapist has been reading to her. On several occasions when she stopped reading, Amy stopped pointing at words and looked up at her. Often the therapist underlined a word and Amy invariably found the illustrated object, even when there was a great deal of detail in the picture.

A visit to the nearby Nature Science Center was a pleasurable outing for Amy. She appeared to enjoy looking

at the displays. She spent most of her time watching the turtles and fish. An observation had been made at this center that the aquarium was the most popular display with the youngest children.

Her interest in the desk calendar has been maintained; she checks it regularly, turning to her birthday and pointing. One day she wrote for the following day the names of the children in the order in which they normally come for therapy, placing her name appropriately. Another day she turned to the correct date when the page had not been turned. It was planned to make use of her interest in dates and the calendar.

#### Week Twelve

Some time is spent each day on speech-reading, an activity which it is not always necessary to initiate. For instance, this week she selected twenty objects and held each one in turn to her mouth as she attempted to say it. The sounds were only approximations, but she made efforts to imitate, and her efforts were reinforced with sugar-coated cereal.

When skipping was first introduced she showed no interest, and refused to try. But during the course of the past two weeks she made some progress, and surprised the aides by voluntarily skipping for the children in the playroom.

Amy went home for Easter vacation. When asked in

writing, "Did you have a good time at home?" she wrote, "Yes and No."

Incidents of frustration have been fleeting and rare this month.

#### Week Thirteen and Fourteen

Amy had her first opportunity to type. The typewriter was available only one day, and each day after Amy would "type" in the air in front of the therapist's face. Then she found a picture of a typewriter and brought it to her. It was obvious that here was a new interest and a possible medium for communication. Amy became quite frustrated when it was explained that there was no typewriter. She did not bang her head, but climbed into the therapist's lap and was most dejected. She brightened up when a trip to the Nature Science Center was suggested, and this, her second trip, proved an excellent learning experience. She kept pushing paper and pencil into the therapist's hands. She pointed to the animals and displays and the therapist kept writing down names until two pages were filled. When the therapist imitated an owl, Amy crouched down and made a similar imitation. She laughed when the therapist wrote "big eyes" after "owl."

Arrangements were made for Amy to have a typewriter, and a note was made on the calendar on the date of delivery that "Amy gets typewriter today." A count-down then began,

and Amy would hold up her fingers each day to indicate the number of days left.

#### Week Fifteen

The auditory training record of animal sounds, "What's Its Name?" has been used but with no specific response. The therapist pointed each time to the picture of the animal making the sound, and named it. One day Amy clearly articulated "pig" after the therapist. She has not learned to identify the animals by their sounds.

Amy circled a date fifteen days in advance and pointed to her teeth. She imitated the therapist by saying [ti]. A check with Amos Cottage confirmed that Amy had circled the date for her dental appointment.

The arrival of the typewriter found Amy in a happy mood. She typed her name, then the names of children at Amos Cottage. She did not want to be shown how to insert paper, or make adjustments. In fact, she pushed the therapist away from it. By the end of the week she had learned to operate the typewriter, but was forgetful about the space bar.

#### Week Sixteen

Another trip was made to the Nature Science Center. This time Amy seemed even more interested in displays, especially a novel device for bird identification which

caused a red bulb to be lighted when the bird was identified correctly, watching the rabbit drink water from a tube, and a colony of bees. This time she made some notes by herself and spent longer observing the animals. She covered her face with her hands and turned her back when a large group of schoolchildren trooped into the Center.

### Week Seventeen

She has an enormous appetite for sweets, and the therapist has to be on the alert to guard the sugar-coated cereal in her apron.

She can consistently produce [Kʌ], a sound learned several weeks ago when trying to say "comb." This sound was taught by the therapist pointing to her own tongue and placing her finger on the back of it. Several times she demonstrated this, and it seemed to be the essential cue. Cookies were now used as reinforcement to get practice with the double syllable.

Amy has been moved into a room where she is alone for her afternoon nap, and for sleeping at night. This was necessary as she sleeps briefly, rolls and rocks her head, and gets up and disturbs other children. She cries and acts depressed and displays aggressive and destructive behavior. One afternoon she removed all the stitching from one of her loafers.

Amy has learned to answer simple questions on the type-



writer. For instance, when the therapist wrote, "What is my name?" she typed it correctly.

Although the main communication is through writing and sign language, speech reading is encouraged daily through reinforcement for her efforts in framing words. Amy was ill for three days. On the first day of her illness she went to the nurses' station and wrote correctly, "infirmary."

#### Week Eighteen

Amy began playing with dolls---a new type of behavior in therapy. She spent time dressing them, bathing, diapering, and taking great care to fold blankets for the doll's bed. As soon as she finished she would begin all over again going through the same procedure, folding and refolding the blanket until it satisfied her.

This week she typed her most complete communication, "we saw a ride today." At first she typed "ride," and when the therapist appeared not to understand, she typed the sentence. It was obvious that she wanted to be taken for a ride as she pointed to the therapist's pocketbook. This good communication was reinforced with a ride in the car.

An auditory training unit with doughnut type headphones was used for the first time, and Amy was quite content to wear the earphones. She wrote on a scrap of paper, "a latter." Paper was then given to her and she printed a

letter addressed to herself without hesitation.

Although there was no calendar available, the date and day were correct, confirming once again Amy's awareness of time. The therapist was amazed at the accuracy of her description of the ride three days previously.

The ride had been to the grounds of the Nature Science Center. Amy had counted ducks accurately holding up the correct number of fingers according to the manual method. At first she had written they were fish, but the therapist corrected her, and was glad to see that she remembered in the letter to call them ducks. The bush of pink flowers, and the orange flowers had been stopped by and commented on.

The letter was written in the bus. As soon as it was finished Amy jumped out to go into the building. When asked to come back, she leaned into the bus and wrote on the back of the letter "will in rear." The therapist then followed her in, only to find that Amy had gone to the bathroom in the rear of the building.

#### Week Nineteen

When the therapist told Amy that it was time to go back to the playroom, she got a pencil and scratched out the names of all the children listed on the calendar for therapy that day. This was repeated several times this week.

Amy has been receiving "coke" and "cookies" on Fridays as reinforcement for articulating these words. This was done because she wanted to go to the dispensing machines every day. By making a notation on the calendar on Fridays, she readily accepted the restriction. Similarly, a piece of candy from a jar in the office became reinforcement for her efforts to say this word, but only the first syllable is recognizable. The therapist made a practice of having coffee while Amy was having her coke. Each time she wrote, "You have coke. I have coffee." This was done to provide an opportunity for Amy to learn use of "you" which had not yet appeared in her vocabulary. She succeeded in good approximation of "coffee" which provided better visual clues than the [K] words revealed by the tongue only.

#### Weeks Twenty and Twenty-One

Amy had referred to the notation on her birthday many times. She could now reply in writing to such questions as: "How old are you?" "What day is your birthday?" "What day is tomorrow?" and similar questions. She made birthday cakes by cutting out round pieces of art paper, decorating with colored designs, and affixing twelve candles with modeling clay.

On her birthday when the children sang "Happy Birthday" to her she clapped her hands and seemed to enjoy the celebration. She displayed a child's typical

excitement in opening her gifts.

For several weeks Amy had been playing doctor (or nurse) which she did in a realistic manner. The patient was a doll which seemed never to recover. She used a pencil, or the filler for a ball point pen, as her thermometer, lubricated it with hand cream and took an oral temperature. In reading the temperature she held it up, rotated it slowly, then shook it down. Using a red pencil she made marks on the doll, then taped over them. She used a pin to give shots, first cleaning off the area with a piece of toilet paper dampened with water. One day she cut off a length of ribbon and placed it around the doll's head---looked at it intently---then readjusted it. This measurement of the doll's head became an habitual practice. One day she arrived with a handful of beans. She filled a doll's cup with water and pushed one "pill" after another into the doll's mouth, followed by a drink of water. Since she had brought the "pills" from the Cottage several hours earlier, the therapist was impressed with the purposefulness and planning of this type of play. She did not demonstrate any of the procedures followed by Amy in her hospital play ---she was a mere observer who could be taken by the hand occasionally to be led to what the busy nurse needed. The search for Scotch tape, which was intentionally removed from the room a number of times, provided an opportunity for Amy to communicate her need. The therapist learned to

recognize Amy's breathy "tape."

The therapist attempted to verbalize activities being performed by Amy, and she was rewarded with occasional nodding and brief eye contact. Questions asked in writing regarding the doll patient were glanced at cursorily; Amy appeared too busy to make an effort to vocalize.

- Although this type of play was encouraging in that she had to watch the nurses and doctor in order to imitate them, the therapist was concerned because of the perseveration in this play. As soon as Amy finished, she would repeat the procedures until it was time to go. She could not be interested in any other activity in the therapy room. Hospital play could be avoided only by taking her to another part of the building and using materials for other activities.

The auditory unit was used as one of her special activities away from the room. It seemed to put her in an attentive mood, and she habitually wrote letters as long as the earphones were in place.

Amy's interaction with the children and hospital staff had greatly improved by this time. One day she tore up paper towels into small squares, wrote on each square the name of a child hospitalized on the wing, and collected small pebbles to place on each square in imitation of the nurse dispensing medication.

When Amy attempted to use a child as a patient it was

decided to find other outlets for her interests. Accordingly her doll patient was removed from the therapy room. When Amy came into the room a great search began. She showed frustration, but did not revert to her old habits of hair-pulling and head-banging. She found a pen-filler, and when the therapist made her understand that the doll was gone, she reached into the drawer for a tongue blade and whacked the therapist on the back of the hand. The therapist looked suitably reprimanded, then after a moment, looked at Amy and smiled. Amy returned the smile good-naturedly. It was gratifying to see her ability to relate and respond.

Amy went home for a weekend. As she was leaving she put her arm around the therapist and placed her cheek on hers.

Several weeks ago Amy had written her name on the desk calendar, and printed under it "shy." It was discovered that this was the date of her next dental appointment. She also wrote on a date in the following month, "Amy home," and on a date three days after, "Amy an airplane." These dates were meaningless, but correspondence with her parents gave a satisfactory explanation. The date marked "home" was about the time that she had previously returned from the School for the Deaf for summer vacation, and the following date was the time she had made a flight with her parents the previous year. Her ability to retain dates, and her

consistent correct use of day and date in letters indicated potential ability.

Week Twenty-two

On a visit to the Nature Science Center, which had become in a sense a classroom for Amy, she wrote down three pages of information from the displays. The therapist kept these pages until Amy wrote her next letter. Previously she wrote about what she had seen at the Nature Science Center from memory, but the therapist wanted to see how successfully she could incorporate this information when she had it in front of her. She began her letter with a pencil writing in manuscript, "Dear Amy" which was surprising since she had been addressing letters for several weeks to her mother. When given a pen she started another letter in cursive writing, "Dear Mother." As soon as she started writing about the Nature Science Center, the pages of Amy's notes were placed beside her. She began to include items from these lists, but had some difficulty in decyphering the words as they were written in columns without adequate spacing between words. By checking off the words as she wrote, however, this letter included more correctly spelled words than formerly. Her confusion with meanings was evident when she included "Close curtain, press button," which she had copied from a display.

It was reported that Amy was crying and very upset one evening because the nurse had taken a tongue blade from her after

she had broken it in two and attempted to insert it in her rectum. When the doctor asked her what she wanted, she whispered "blade" clearly. She was allowed to have a blade but kept under close supervision.

### Week Twenty-three

On the day marked "Amy an airplane" it was explained verbally and in writing that she could go to the airport to look at airplanes. While watching two Piper Cubs take off she kept smiling and nodding, looking from the therapist to the planes and back to the therapist. When it was time to go she began to whimper and by the time she was back in the car she was crying softly. Again it was explained that she could not fly in the airplanes, that she could only watch them. Her disappointment was brief---perhaps she finally understood. At any rate, a small plastic plane was given to her, and she helped to put it together. The outing ended in a happy mood as she learned readily how to fly the airplane.

Amy's gesturing, nodding and smiling are becoming more frequent occurrences---a form of interaction that takes precedence over vocalizations. She still attempts only single words. Recently she became more willing to have her hands placed to feel vibrations during vocalizations. In this way she tried to say "airplane."

Amy wrote and illustrated a four-page letter to her sister. The illustrations consisted of small colored circles



for the most part, but the turtle was plainly drawn and placed over the word "turtle," and a sun and flower were clearly illustrated. She made mention several times in her letter of "sings." When asked what a "sing" was she led the therapist outdoors to the swing.

Amy swings high and for a long time. She also enjoys the slide, but is a little apprehensive of the seesaw. The therapist demonstrated chin-ups on the bar. Anna reached up to the bar voluntarily, but could not chin herself. Then she took the therapist's arms and placed them around her waist for help in boosting her. She smiled happily when given the desired help.

#### Week Twenty-four

While walking outdoors Amy was frightened by a toy poodle that was barking. Although the dog was standing still and some distance from her, Amy began to run as fast as she could.

When wearing an auditory training unit she nodded to the therapist when the intensity was set at number five. She repeated this communication on several occasions at the same intensity when the therapist purposely adjusted the volume at various levels.

Letter-writing continues to be an activity which takes up much of her time. She now writes letters not only in therapy, but also in the playroom and at the Cottage.

The letters are addressed to her Mother, but during the past two weeks she has been writing to her sisters, and also to her father. When addressing the envelope she wrote "Miss Daddy . . ." She likes to enclose her letters in envelopes and address them. This week she wrote a letter which began "Dear Dog," and unlike her lengthy letters, she stated simply, "How are you. I am fine. I love you. Love, Amy." This letter she did not enclose in an envelope. A recent letter from home mentioned the family dog.

If a written communication is made to Amy while she is engrossed in letter-writing, she is likely to include it in the contents of the letter. She is more willing to accept correction of single words. For instance, an effort has been made to teach her the concept of "I" by erasing or striking out "Amy" and writing in "I." Recently, when this correction was made she wrote the next sentence using "I" correctly. In all of her communications until this time she has referred to herself by name except in the stereotyped opening of her letters, "I am fine," and in the ending, "I love you."

She spends much of her time alone in a room adjoining the playroom making dolls of modeling clay which measure eight to ten inches. They are most realistic in detail, suggesting that she has achieved a good concept of body parts.

In June, 1967, on the Leiter International Performance Scale Amy scored I.Q. 64, M.A. 7.9.

In concluding therapy for purposes of this study, some progress can be reported. It is the consensus of Dr. Alanson Hinman, Director of the Developmental Evaluation Clinic, and of staff members, nurses and aides, personnel at the Nature Science Center, her parents, in addition to the therapist, that Amy has improved in social awareness and interaction, and in attempts to make contact and communicate.

Although for the most part she remains withdrawn from the children at Amos Cottage, and prefers to be alone, she appears to be happy when with adults who are important to her. The fact that she is accepting correction of her written work, her most effective means of communication, that she can make eye contact, and that she has acquired a limited skill in speech reading, indicate that in some measure she has moved out of her shell.

Her multiple handicaps, which include impaired hearing and emotional disturbance, exacerbate her problem of communication. She needs the ever-present understanding and support of an individual who can interpret and extend her limited communication, and provide the necessary stimulation to induce her to develop her potential.

## JOHN'S CASE HISTORY

John was born at full term weighing seven pounds twelve ounces. He cried and breathed instantly. After two days he was discharged from the hospital in good condition.

The mother was twenty years of age at the time John was born. She had her first prenatal examination at twenty-six weeks in this third pregnancy. At eight months she was placed on a diet because of generalized edema.

John's motor development was within normal limits. However, he was slow to learn to feed himself and ate strained or mashed food until two years of age. In reviewing his speech development it is notable that he cried infrequently during the first six weeks, but that he had a strong cry. Onset of babbling was delayed. The actual age of onset is not clear; one history reports eight months and another twelve months. At fifteen to twenty months he was reported to have said "da-da" and a disyllable for his own name. He did not elicit any word again until four years of age when he said "ma-ma" while waiting for his mother to tie his shoe. At five years of age he said "no" occasionally. Communication was by grunting, pointing, leading or showing.

It is reported that John coughed a great deal from infancy; this was worse when he had a cold. He had diarrhea frequently. In addition to these chronic conditions, he had

otitis media, influenza and a hernia repair during his first two years.

John has four siblings---two older and two younger. Family history indicates the maternal grandmother as having asthma and that the mother had rickets as a child. The father reports that there is some history of retarded speech in his family. He described John's first cousin as "very late to talk;" in addition, two uncles are reported to have speech problems. There is no history of mental illness in the parents or their families. The father completed the eighth grade and the mother the eleventh grade.

At six years of age John was admitted to Amos Cottage because he was non-verbal and a behavior problem. He was aggressive, destructive, extremely withdrawn and avoided contact with people. He rocked a great deal and avoided eye contact. An intellectual evaluation was not possible because of withdrawn and negativistic behavior. He was normal neurologically and physically. Language retardation was described as profound.

He was returned to his family after four months because they were reluctant to have him stay, but was re-admitted several months later.

John is a blue-eyed red-haired well-developed boy. When he entered therapy at age 7.5 he was non-verbal and hyperactive. His withdrawn behavior was not as extreme as in his first months at Amos Cottage, but he continued to avoid contact with people, both physically and visually. Rocking behavior was characteristic. His gross motor abilities were well-developed.

#### WEEKLY REPORTS

##### Week One

John worked very quickly snapping clothespins on cans of matching colors. Yellow was consistently correct. He had some confusion with red and green.

He scribbled rapidly with crayons and pencils, using up one sheet after another in quick succession.

He was able to identify objects in a picture book by pointing, but after one or two pages he rejected this activity by closing the book.

While observing John at the cottage it was noted that he was very active, but obedient and helpful. He understood and followed such directions as, "Get the balls," "Get a paper towel, please," and "Show Steven how to get water from the fountain."

When he broke a cardboard box in which he was playing he exclaimed "oh-oh" softly, but with typical inflection. This was the first meaningful sound he made. He elicited

grunting sounds when in therapy, but only to get attention, or to obtain something. When the therapist pretended not to understand, he led her by the hand to his objective and pointed to what he wanted.

He rode and maneuvered a tricycle without difficulty. Eye contact could not be established.

### Week Two

John was co-operative in following directions, but markedly limited in his ability to play purposefully with toys. He would begin an activity, such as pushing a car along the floor, then reject it. The therapist, after testing his responses, would take the rejected toy and attempt to stimulate his interest in it by showing him ways to play with it.

Each day as she led John down the stairs to the therapy room she kept repeating "down" and "downstairs," "We're going down the stairs," and similarly with "up" on returning him to the playroom.

Because of his interest in mechanical things, he was given a plastic dish containing a bubble solution to whip up with an eggbeater. He was very interested in the beater, turning it about and running his hands over it, but it was difficult for him to coordinate his movements to turn it. He became quite excited when the therapist blew bubbles for him. He would not try to blow bubbles

himself, and shook his head each time the bubble blower was presented to him. He tried to catch the bubbles floating through the air and with his quick movements could pop most of them.

### Week Three

When playing with bubbles, the therapist kept repeating to John, "Look," each time she blew bubbles. He kept catching bubbles, then turned the eggbeater upside-down and elicited a whispered tense "look" when he caught a big bubble on the end of it.

After three weeks of stimulation, John said "up," when nearing the top step. The "p" was a good, clear, plosive.

He consistently avoided eye contact.

### Week Four

John was ill with chickenpox.

### Week Five

Because no progress had been made in establishing eye contact, a program was initiated of conditioning him to look directly at the therapist's face. The reinforcement was sugar-coated cereal.

John has learned to match red and green. His motions are very rapid in snapping clothespins on the rims of matching cans.



He likes to spin the wheels of toy cars, and one day turned the tricycle upsidedown and spun the wheels with evident pleasure. Then he brought a paper towel from the bathroom, crushed it, pushed it between the spokes, and gestured to the therapist to watch it as he made it spin.

John began saying "down," in unison with the therapist while going down the stairs.

He has become very resistant to going back to the playroom.

#### Week Six

By holding the piece of cereal next to her face, the therapist was able to get John to look briefly at her. By withholding the reinforcer, his attention was extended. During this conditioning, the therapist talked quietly to him, "See my eyes," "Where are my eyes?" and simply verbalized "eyes" and "look."

One day when the reinforcer was withheld to maintain eye contact, John pointed to his eyes. Sometimes he closed his eyes when not reinforced, but each time opened them when told that he must keep his eyes open to get the Frosty-O's.

John said "down" three times this week, and "up" frequently. These verbalizations were in unison with the therapist, and then echolalic as he would repeat immedi-

ately after her. His voice continued to be whispered, hoarse and tense.

### Week Seven

John made his first trip to the Nature Science Center. He seemed to enjoy watching the ducks swim about in the pond outside. Inside the building he was distractible and hyperactive.

By now John's eye contact had improved, although still of a fleeting nature. As a means of getting him to attend to her face, the therapist drew a face with features, then took his hand and helped him to draw one, naming "eyes," "nose," "mouth" and "ears." The drawings were done at the chalkboard where motions were free and the drawings large. Each time the therapist said "eyes" John looked at her intently and was reinforced. Again and again he took her hand to draw another face, and as she said "eyes" he began eliciting "eye" as he looked at her.

Each day thereafter John led the therapist to the board, picked up the chalk, with the other hand placed her hand on his, and indicated that he wanted to draw a face. By the end of the week he was eliciting "eyes" with a clear final "z" sound. John is right-handed and right-footed.

### Week Eight

John was shown how to tape Valentines on the outside of the playroom door. As the word "valentine" was repeated

by the therapist, he began saying "tine" in unison with her. Similarly he echoes "whee" when riding a tricycle fast circling a room.

He refused to return to the playroom after a playful session and had to be carried back.

#### Week Nine

As eye contact had been achieved, reinforcing was now directed toward word production. There followed a most productive period of new words. One day he emitted "all right," "hot," "stairs," "train," "jump," "upstairs," and "found it"; the next day "top," "plant," "brush," and "chalk." The therapist observed that a play situation, particularly an active one like jumping the last step with her as she emitted "jump," or a tension-release situation as climbing to the top of a spiral stairway were productive of speech. She knew by the tightening of John's hand in hers as he went up the second flight that he was somewhat fearful, even though he gestured that he wanted to go to the top.

#### Week Ten

Each day John is eliciting new words and is following his usual pattern of saying the word in unison with the therapist, and then in echoic fashion, immediately after the word is vocalized. This transition can sometimes be made by the therapist at first emphasizing the word with a loud voice,

then gradually lowering intensity so that John's voice is the louder. The word chosen for repetition is the name of an object which he shows by gestures that he wants, or activity in which he shows interest.

John's first vocalization outside of the therapy session was in the form of a mand, "throw ball" just after receiving a shot and was directed to the person who had held and comforted him, and soon after "pull" to the same individual. John was very interested in his apronful of tools, and "pull" was the cue allowing him to pull out a tool.

He elicited "orange" echoically with startling clarity and correct articulation. His vocabulary at the end of this week consisted of thirty-four words, six of these words were in two-word phrases. This acquisition covered a period of one month. Reinforcement was immediate with each word production.

#### Week Eleven

John has insisted with gestures that his hand be held while drawing a face. At the end of this week he drew a recognizable face without help. (Appendix B).

Cutting and pasting is an activity which John enjoys, but his hyperactivity interferes with co-ordination of cutting with scissors and he is not able to make more than a few snips before tearing the paper.

Week Twelve

In an hyperactive state John scribbled on the wall of the therapy room. When told that he was not to write on the wall, and paper offered to him, he scribbled on the wall a second time. He was returned to the playroom immediately. This behavior was not repeated.

John is increasing his naming vocabulary. Sugar-coated cereal serves as reinforcement.

According to a free field audiometric speech and pure tone test in the soundproof booth, administered March 10, 1967, John's hearing is essentially normal.

Week Thirteen

John greets the therapist with "hi," and on one occasion gave her a spontaneous hug. He is always happy to go to therapy, but continues to struggle at the end of the session when it is time to go back.

Week Fourteen

John continues to give prolonged attention to drawing faces, and is pointing to and naming more of his own body. He is using the word "eyes" quite spontaneously, pointing to eyes in magazines and picture books.

When playing hide-and-seek John's immaturity is quite evident---he has not learned yet that he needs to hide more than his face. His body concept may be improving as he is able to identify many body parts.

Week Fifteen

The auditory training record, "What's Its Name?" was used together with the manual to determine if John could identify the sounds. He appeared rather apprehensive of the animal sounds, and on the second day he panicked and threw himself into the therapist's arms, eyes full of tears, when he heard the pig sound. The therapist was able to calm and distract him, but he refused to enter the room for several weeks thereafter.

Although he has not progressed as rapidly during the past month in the acquisition of new words, he is beginning to use the words he has learned appropriately in more spontaneous fashion. His vocalizations, however, continue to be more whispered than voiced. He now has a naming vocabulary of fifty words.

He has learned to identify blue consistently and to name it.

Week Sixteen

Use of verbal reinforcement instead of food reinforcement was initiated. This was done because his acquisition of words had been rapid, and secondarily, because John had begun to elicit occasional words when with a volunteer aide (college student) who took him out for a romp on the grounds twice a week. Up to this point no words were elicited by John outside of therapy with the exception of the two mands during Week Ten. It appeared that John was now able to echo words when with an individual with whom he responded differentially.

Efforts to extend John's attention span have been quite futile. It is difficult for him to attend to an activity which does not call for motion. When restrained, he struggles and reverts to a rocking motion.

A Viewmaster has been used with colorful nursery rhyme illustrations as an attention device, but also to have him experience some rhythm and flow in speech as the therapist repeated a few lines. He became so engrossed in the mechanics of the device that he could not wait to see all of a series of pictures before removing it and inserting another.

Drawing faces continues to be an activity in which he perseverates. He needs to have his hand held for all parts below the neck.

#### Week Seventeen

John's receptive language was far superior to his expressive language. An attempt was made to administer the Peabody Picture Vocabulary test, but his hyperactivity interfered. He attained an M.A. of 2.8, but this was considered an inadequate measurement. He demonstrated typical behavior of being able to attend to pictures for only brief periods.

A magnet that was strong enough to attract a variety of items at one time captured John's interest this week. Each day when he came in he went to the drawer where it was

kept and found items that he could pick up with it. Sometimes he played with it on the floor for as long as ten minutes. As was usual with all activities, the therapist verbalized in simple structured phrases and sentences, with much repetition.

#### Week Eighteen

Because of John's frustration with sedentary activities, such as looking at picture books and being read to, these means of teaching and attempting to extend his attention span were offered with some regularity, but without seeming progress. Even when he chose his own book, and appeared eager, his impatience would be evident presently as he would try to turn pages forcefully, or attempt to close the book.

An activity in which he perseverated, however, was drawing faces, which had now been extended to complete men. His drawing was rapid, and he showed some progress in attaching the hair and ears to the face. Without help he would begin to draw the body by continuing the circle around the face.

#### Week Nineteen

In trying to teach simple number concepts, John has not progressed beyond "Give me two . . . ." From three on he gathers up all the blocks, or whatever item is being used, and thrusts all of them into the therapist's hands.



Fewer words were produced this past month using the verbal reinforcement of "Good," "Right," or "That's right." However, John has used words he has learned in more spontaneous fashion. This is particularly true of body parts which undoubtedly have been repeated to him more than any other words, since this type of drawing he does by choice daily. On one occasion when a piece of tape was stuck, he tried to get it off the desk, then turned to the therapist and announced, "Stuck---yeah." "Hi," "no," and "yeah," are used frequently.

#### Week Twenty

A kitten in a box that kept crawling out of the box provided an occasion for teaching the concepts of position. On this occasion he learned to say "box" and "cat," but it was not until the end of the week that he learned "in," and he did not learn "out." He would not touch the kitten to place it back in the box.

Reports from Amos Cottage and from the playroom indicated that John still was not using meaningful vocalizations. He had on one occasion called out "stop," to a boy who was teasing him, but other than this he used grunts and gestures to have his needs fulfilled.

#### Week Twenty-one

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#### Week Twenty-one

It was decided to use food reinforcement in addition

to verbal reinforcement to determine if John's acquisition of new words and usage of words would increase. The sugar-coated cereal was used, as before, and some experimental sessions were held in the kitchen using ice cream as reinforcement. It was apparent that he liked ice cream, and he soon learned "cold," "more," and "please." The word "ice cream" was difficult for him. His attempts this week were a mere approximation of the second syllable. As has been characteristic throughout the entire therapy program, almost all new words are at first whispered. A notable exception was the word "orange." (Week Ten).

#### Week Twenty-two

Although he could identify objects and common activities from pictures, he was extremely limited in his attention span and rejected such an activity after brief presentation; hence the actual objects, or a word connected with a meaningful situation were used as stimulation.

John was very interested in mechanical devices and played with such objects using rapid motion---raising and lowering an umbrella, turning a flashlight on and off, opening and closing a suitcase. When the repetitious play became prolonged, it was found that rather than frustrate him by taking the object away, a walk through the building letting him carry the choice object with him, dispelled

some of his pent-up energy and he more readily released it upon returning to the therapy room. The flashlight was particularly useful as he would shine it on various objects thus providing an opportunity for the therapist to verbalize while his attention was fixed.

#### Week Twenty-three

John's interest in drawing faces was as keen as ever, but he continued to insist on the therapist taking his hand while drawing the body. When he tried to draw the body, he would begin at the neck and encircle the face. He began to show some ability to draw arms and legs, stick fashion, as the therapist would hold her hand on his but not give guidance. Without help he would attach appendages to the face. His naming of body parts was improving with daily practice.

While watching some men load up coolers with Coca-Cola, John stood at the doorway rocking steadily. When some bottles were dropped, causing glass to scatter over the floor, one of the men asked for a broom. John took him to a closet and gave him a broom and dustpan. This incident was characteristic of his helpfulness.

#### Week Twenty-four

His vocabulary continued to increase at about the same pace as in the past two months.

Week Twenty-four

Only now was he willing to go back in the room where he had heard the "pig" sound which had frightened him. (Week Fifteen). He went to the record-player and gestured that he wanted to have a record played. An auditory training record was played and the therapist endeavoured to have him match a picture with the appropriate sound. This he was unable to do. Objects were used but he still was unable to match them to the sounds.

Week Twenty-five

While tossing a ball to the therapist, John kicked it, causing a fluorescent light to fall to the floor. The therapist removed him immediately from the room, and although he did not appear frightened by the loud crash, he began gesturing, pulling vigorously on her arms, and vocalizing in the flow of sound that was unintelligible. He appeared to want to communicate, so the therapist did not allow herself to be dragged down the hall, feeling that a delay would enable him to get some intelligible word expressed. John continued to make a variety of sounds which could not be interpreted and became so anxious that the therapist let him lead her to whom or what he wanted. His destination was the broom closet downstairs. When he saw the broom he vocalized distinctly "broom." This incident was notable because of John's jargon. On no other occasion had he elicited more than three simultaneous syl-

lables.

### Week Twenty-Six

A trip to the airport provided the necessary stimulation for John to learn "plane" and "airport." After several weeks of practice "ice cream" was intelligible. John elicited his first proper names: "Frank," the name of the student with whom he had spent two afternoons each week all spring, and "George," who had made himself useful to John by retrieving his plastic plane from inaccessible spots, and who ran an electric train for him. One day John was overheard to count the cars in the train set. His voice was low and trailed off at five, but came back clearly on ten.

When John's parents came to visit he seemed quite aware of them, but did not interact with them, glancing very briefly in their direction. Without any cues he went to the office, obtained paper and pencil, brought it to the therapist, and drew one man after another, naming some of the body parts in his typical fashion. To draw his attention to his mother, the therapist pointed to the ring on her finger, then added it to the finger on one of his figures. Each drawing after that, John would glance at his mother and on one occasion reached out and touched her ring, then let the therapist guide his hand in adding a ring to his drawing.

Recent efforts to obtain a psychological evaluation

were unsuccessful due to John's hyperactivity.

In concluding therapy with John, it seems apparent that his hyperactivity is interfering with his performance and with his ability to learn. Although John has acquired a vocabulary of almost 100 words during a six-month period, only a small number of these words are used spontaneously with frequency. The one word used most frequently is "eyes," a word which received reinforcement over a long period. His voice has remained tense, with a tendency to whisper. Only toward the end of therapy did John begin to elicit familiar words in the presence of others. Although conditioning may have been the incentive that helped John to vocalize, it would appear that prolonged repetition and a meaningful relationship are factors to be considered in developing this child's speech.

## STEVEN'S CASE HISTORY

Steven weighed five pounds ten ounces at birth following a pregnancy that was normal except for mild anemia. He was slow to respond and was given oxygen in the delivery room. Some jaundicing was present, but this was not considered abnormal.

By four weeks of age Steven had gained one pound two ounces, but jaundicing of the skin reappeared requiring hospitalization. An operative cholangiogram and liver biopsy were done at Duke Hospital, Durham, North Carolina. The diagnosis was "viral hepatitis, probable." Other illnesses reported during the first year and one-half were: otitis media, varicella, diarrhea, and influenza. He was reported to be allergic to eggs.

Steven's first year gave evidence of abnormality. He would not tolerate being held---in fact, he preferred to be left alone. At no time did he reach out to his mother or any individual to be picked up, and when picked up he stiffened and resisted being held. He appeared to ignore or be oblivious of people. In addition, he was unusually unresponsive to bright lights, bright colors, and unusual sounds. As he grew older it became evident that any change in his environment disturbed him; for instance, if he discovered that the books were not upright in the bookcase he would become tantrumous.



His developmental pattern was severely retarded. He sat without support only occasionally by two years of age. He did not walk alone until three and one-half years of age.

His speech development was profoundly retarded. At nineteen months it was reported that Steven babbled, but at twenty-six months his only vocalization was a primitive sound. No imitative behavior was observed until at twenty-two months he began to wave bye-bye. This behavior faded, was reestablished during the fourth year, then faded again.

A series of evaluations at the Speech and Hearing Clinic of Asheville Orthopedic Hospital, Asheville, North Carolina, culminated in the tentative diagnosis of mental retardation with possible receptive aphasia. Steven was two and a half years old at this time.

A review of hearing assessments indicates the baffling picture which Steven presented. At the Speech and Hearing Clinic in Asheville under free field conditions only gross responses to 1000 c.p.s. at 100 decibels were obtained. A hearing evaluation at the D.E.C., Winston-Salem, North Carolina when Steven was two years, two months showed that he was unresponsive to auditory stimulation. There was no startle response, although there was an inconsistent response to a recorded "baby cry" at 70 decibels. Galvanic skin response audiometry at the Asheville Clinic when Steven was three and one-half years old indicated some conditioned

response at 20 decibels in the left ear at both 1000 c.p.s. and 4000 c.p.s., and at 10 decibels at 1000 c.p.s. in the right ear. In a second free field evaluation at this same clinic Steven demonstrated less responsiveness than during the previous examination. The conclusion was offered that there appeared very little likelihood that he would ever behave as a hearing individual.

At four and one-half years of age Steven was admitted to Amos Cottage. The question of his hearing continued to perplex those who worked with him. Extensive observation tended to negate the diagnosis of hearing loss. A hearing evaluation at the Baptist Hospital, Winston-Salem, North Carolina concluded that although no responses could be observed from any type of intensity at any level, Steven did not have the characteristics of a deaf child.

At Amos Cottage Steven continued to be isolated and remote. He played repetitively with objects, such as blocks, lining them up meticulously. When interrupted in this activity he would become extremely upset. He displayed manneristic behavior of pulling on his ears, especially the right ear, shaking his head, and examining his hands minutely. Mirrors, shadows and reflections captured Steven's attention; and to have a mirror to look at reflections in another mirror was an activity that set off a tantrum when time for the cessation of that activity came about. His mother reported that she thought this was the way Steven had of watching her

since he avoided eye contact. He kept mirrors hidden under furniture and in odd places in his home, and always seemed to remember where to find them.

His extreme range of success and failure on the Cattell Infant Intelligence Scale at two years four months suggested an uneven developmental pattern and raised the question of emotional factors. At four years nine months he received a mental score of 40 plus. Note was made that his potential seemed greater than indicated on this test.

When Steven entered the speech therapy program, described in this paper, he was five years and three months old. He was growth retarded, developmentally retarded, and did not appear to receive auditory stimuli. He continued to play alone in rigid stereotyped patterns. Although some progress had been made in that he was not as resistant to physical contact as he had been when admitted to Amos Cottage a year and a half previously, he avoided eye contact, was non-verbal and extremely withdrawn.

## WEEKLY REPORTS

Steven had been observed in the playroom over a period of several weeks before he was taken into therapy. Observations made during this time pointed to emotionally and socially-detached behavior. His play was patterned and rigid; he would line up blocks with precision, arrange toys in a definite pattern, match colors, forms and shapes. If his activity was interfered with, or another child knocked his arrangement out of place, he would go into a temper tantrum, screaming and slapping his head with his hands.

He played alone, and whenever the therapist moved close to him he would move away. At first he would move behind the desk out of sight, but in time he did not move so far, and as the therapist continued to mingle daily with the other children, Steven remained engrossed in his play and the therapist could sit nearby. He appeared oblivious of sound and utterly aloof. He did not play with any of the children, and although he did not resist the attention of the aides, he did not seek out their attention during this period of observation. When an aide picked him up he would sometimes pinch or pat her cheeks, the only personal interaction observed at this time.

Week One

Steven's favorite activities were provided for him ---a variety of colored blocks, puzzles, paper and pencil. Observation could now be made at closer range. As soon as the therapist recognized a pattern, such as lining up all blocks of a certain color, she would add the appropriate block and found that Steven would accept this help.

At no time did he make eye contact. In fact, any attempt to make eye contact with him was met with what appeared as deliberate avoidance.

He explored the small room, opening and closing the row of closet doors. Thus he discovered a full-length mirror and was immediately absorbed by it. He did not look at his own image, but at the reflection of the room. Removal from this choice activity produced a violent tantrum regardless of the length of time he had spent at it.

Week Two

Although Steven appeared totally unresponsive to sound, he did not display the characteristics of a profoundly deaf child. This week activities were planned to observe Steven's hearing behavior when exposed to sounds outside his experience.

A trip was made to a nearby airport. Inside the airport Steven searched for the sound when a loudspeaker announcement was made. When outside the building about fifteen minutes

later, the same man's voice made the announcement of departure time; Steven again searched and this time localized the sound above the doors. Two other observers noted the same behavior independently.

Steven covered both ears momentarily about a minute after the motors of the F-27 were started when a high frequency sound was produced. After that he paid no attention to the plane, and turned his head away.

Other observations were made on this trip. He caught his reflection in the shiny windows and had to be moved along quickly to prevent his being absorbed in this activity. Sometimes he sucked in his breath with his teeth placed lightly on his lower lip making a little slurping sound. This he did when walking from the car to the airport with a light breeze blowing against his face, and again when watching a revolving display of toys. Although the trip lasted one and one-half hours during nap time, Steven did not appear tired or sleepy.

Another observation of Steven's hearing behavior was made by having two electric guitars play at full volume after Steven was brought to the therapy room. The hidden boys were whispering in low tones as Steven entered the room with the therapist. He moved his head around in all directions, but did not localize the sound, and did not search around the room. The sudden loud music did not cause any overt behavior on his part. He continued activities without any apparent awareness

of the sound. When the boys opened the door, however, he walked over slowly and looked at them and at the guitars. Then he went back to the desk and continued drawing. He looked up and smiled in their direction several times.

When he was returned to the cottage he curled up on the floor around a shiny chromium trash can, moving this way and that, touching the reflection.

### Week Three

Encouraged by Steven's response to new experience, therapy was planned to provide stimulating activities, particularly the kind of experiences that would cause him to make sounds and to laugh. Throwing a ball up the stairs and watching it bounce down stimulated spontaneous sounds of pleasure.

A trip was made to a recreation park to let Steven feed the ducks, and to observe his behavior in new territory. The ducks got his attention, but not his bread. He ate several slices, although it was crusty and stale. He liked especially the sesame seeds which he picked off the crust and ate one by one. He showed the natural curiosity of the young child, getting down on hands and knees to peer into a culvert, picking up duck feathers to feel on his face, and looking into every nook and cranny. He used his gleeful sounds climbing up the steps to run through an old model train engine and caboose, then down the steps to repeat the

circling over and over again. Leaving this activity brought signs of frustration, kicking and stiffening, but he did not reach the point of screaming, and settled down when back in the car.

As he was no longer so resistant to eye contact, although contact was of a fleeting nature, games requiring puffing and blowing were introduced with the hope of stimulating his interest in the oral area and at the same time to provide some practice in control of respiration and lip movement.

Accordingly, a pinwheel was introduced. Steven would not imitate blowing, but he liked to spin it with his fingers. Even when the therapist repeatedly blew on the back of his hand for tactile feedback, he made no effort to blow. In going down a long spiral staircase holding the therapist's hand and with the other clutching his pinwheel while trying to grasp the rail, he tucked the pinwheel under his chin and proceeded down the stairs with his hand free to hold the rail.

With the hope of substituting a small mirror for the large one which completely absorbed him, a compact was offered. He took out the puff and powdered his face slowly and deliberately. This had not been demonstrated by the therapist. This imitation of behavior observed in the past was an encouraging note. He looked at the mirror a moment, then ran to the large



door mirror and began adjusting the small mirror to see in it reflections from the big mirror. The mirror play had to be eliminated in order that motivation to learn new activities could be induced. Hence the door with the large mirror was locked, and the therapist's pocketbook containing the compact was put out of sight.

The following day Steven tried hard to open the door which contained the mirror, running his fingers under the edge of it and pulling at the knob. Then he pulled the therapist to the door and placed her hand on the knob. Although he fussed there was no temper tantrum; he seemed to accept that he could not get to the full-length mirror.

On the following days he did not try to open the door to the mirror. But feeling that he was being denied a source of pleasure and possible stimulation, the therapist held him up to the mirrors in the bathroom which were too high to be accessible to him. Thus she could control the mirror-watching. Invariably he positioned the mirrors to observe reflections.

He became irritable each day when the therapist put him in the bus to return to Amos Cottage for his lunch. He would take off his shoes and throw them out of the bus. Sometimes he kicked them off as she carried him to the bus.

#### Week Four

With a block in front of him on a bare desk, Steven drew a square with a third dimensional view. In fact, it was an

optical illusion. Although he had been drawing circles, squares, triangles and spirals, this drawing showed a spatial relationship that was far superior to all of his drawings thus far. It raised the question as to what influence the double mirror play may have had on his concept of form. It had been observed that Steven gave rapt attention to forms and patterns. (Appendix C).

When a cylinder was similarly placed on the desk in front of him, he positioned it on end on the paper and tried tracing around it. But the diameter was so small that his hand was restricted, and he took the therapist's hand and showed that he wanted her to trace around it. Then he filled in the circle with intersecting lines.

Steven continued to enjoy playing with little sailboats. The goal was to get him to blow the boats across the large sinkful of water, but he preferred to splash and pour and sink the boats.

Bubble-blowing was another daily activity with the goal of getting Steven to blow and get practice in lip control. He took a great interest in watching the therapist as she blew the bubbles, then tried to catch and step on them. When the bubble ring was held up for him to blow he tried only to lick it.

Steven was not able to match tactually. He became very impatient with this project.

Outdoors for a romp he showed the most response vocally when he rolled a volley ball up the slide and it rolled back to him, and in rolling himself down a grassy slope. His laughter had inflection and was not the muffled laugh of the child who is profoundly deaf.

#### Week Five

By now Steven had learned to purse up his lips when the therapist blew bubbles. Sometimes he would simultaneously draw in his breath. He had become more willing to follow directions; formerly all of his play was his way, and he showed displeasure if there was any interference.

The therapist continued to verbalize to Steven as though he were a hearing child. She used a normal voice, simple phrases and protracted stimulation of words appropriate for the activity. She tried to take advantage of his improved eye contact by talking to him so that he could get visual clues. But his responses had not increased, and grunting and reflexive sounds were still being emitted.

AT THIS POINT A PROGRAM WAS INITIATED OF REINFORCING WITH COOKIE BITS AND FRUIT LOOPS ANY SOUND EMITTED BY STEVEN other than fretful or crying sounds. As he emitted sound only occasionally, this required that the therapist be on the alert continually in order that the reward could be popped into his mouth immediately.

Only on one day this week did Steven emit sounds that

could be reinforced.

He ran down the long lighted hall to the therapy room each day in the same characteristic fashion with arms held above his head watching the shadow which he made on the wall.

Although he displayed no temper tantrums recently, at least during therapy, he occasionally became tense and began to shake; for example, when he was interested in an activity and it was time to leave.

#### Week Six

Steven displayed temper tantrums when the therapist took two other children from the playroom. He has been having temper tantrums this week when returned to the playroom, or when put on the bus at the end of therapy.

He used fifteen small discs from a Winnie-the-Pooh game to make a triangular design, each disc placed carefully in relation to the others. When he finished he brushed the precise arrangement aside, then looked at the therapist and laughed.

#### Week Seven

Only the sugar-coated cereal was used as reinforcement as it was more convenient than the cookie bits, and he seemed to like it. Vocalizations were infrequent.

It appeared by now that there was a growing one-to-one relationship if his frustration at the end of therapy,

his displeasure in the therapist taking other children from the playroom, and his obvious pleasure in therapy could be so interpreted.

The door with the mirror was set slightly ajar to observe Steven's reaction. He discovered it promptly, opened it, glanced casually in the mirror, then spent several minutes simply opening and closing the door.

The following day he discovered the shiny surface on the bottom of two toy telephones and adjusted them in such a way as to get a variety of reflections in the door mirror. He was not interested in any other activity that day and made no sound to reinforce.

#### Week Eight

Steven's sounds were unpredictable. There were occasional days when he was reinforced only once, or not at all, and other days when he earned up to one-quarter cup of sugar-coated cereal. In order to evoke a pleasurable vocalization, the therapist had to involve him in an activity that amused him. Care was taken that at no time fretful or discomfort sounds were reinforced. Playing peek-a-boo by hiding behind the drapes and then popping out seemed a successful technique to cause him to elicit a brief pleasurable sound.

Letting him catch and pop bubbles, or play with boats in the water continued to occupy his attention, and these

activities were a source of occasional evokation of an indefinite vowel sound.

### Week Nine

Because Steven's vocalizations had been so spasmodic thus far, it was decided at the end of this week to provide more intensive stimulation over a longer period of time, and to be completely permissive in letting him choose his own interests. When he wanted to throw a toy in the commode, however, and was prevented from this, he became tantrumous. Later he began laughing when he could not get the blower out of the bottle of bubbles. He could not blow bubbles yet; when the blower (a ring with a handle) was held in front of him he caught his reflection in the soap solution, took the blower in his hand and turned it from side to side playing with the reflection.

On this particular morning he voluntarily played peek-a-boo in the drapes in imitation of the therapist, and this time he produced more sound than usual and hence received more reinforcement than during any previous session.

On returning from a run through the building on this same morning, Steven crawled into a window seat on the stairway, and the therapist sat down beside him. This was a favorite place to sit. After he had been reinforced for several spontaneous sounds, he raised his arms over his head, opened his mouth wide, got a dreamy look in his eyes, and

produced sound. He was reinforced promptly. The sequence of events had been slow and deliberate. Again he went through the same motions, and when rewarded this time, he laughed. The process was continued about ten times until all the cereal was gone. The spontaneous laugh each time he was reinforced assured the therapist that Steven had made the association between sound and receiving cereal.

He then took the therapist's hand, placed it on his forehead, put his head on her lap, and lay quietly until time to go back to the cottage. He felt warm. His temperature was 101° when he returned to the cottage.

It was difficult to explain why Steven put his arms above his head each time he produced sound. An explanation is proffered: His sounds had been largely reflexive up until this morning. When he deliberately chose to produce sound he had to differentiate between the finer movements of sound production and larger muscle movements. A review of speech development of the child states: "At first when he makes his noises, large bodily movements accompany this activity."<sup>1</sup>

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<sup>1</sup>Charles Van Riper, Speech Correction Principles and Methods (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1964), p. 98.

Week Ten

Steven was ill and returned on Friday, seven days after conditioning. He looked quite pale. He played quietly with games and drew on the chalkboard. After about fifteen minutes he made his first sound which was immediately reinforced with two Frosty-O's, the sugar-coated oat cereal that had been used a week ago when Steven was conditioned to produce sound. He sat down and looked searchingly at the therapist, then at the paper cup of cereal, back again to the therapist, and repeated this several times. He made a sound [a], and as soon as he finished eating the cereal he made the same sound. At first he moved his arms above his head, then he discontinued this motion. His sounds were of varying intensity and duration. Sometimes he forced the air so strongly that it was more like [ha]. By smiles and laughing he showed evident pleasure in having learned how to get the reward. In all he received a full paper cup of cereal equal to four ounces.

Week Eleven

On Monday, after a few minutes of play, Steven sat down and began his vocalization which was similar to the sounds he had produced on the two preceding Fridays---a voiced emission of air with his mouth fairly open. His abdominal muscles were contracted sharply for the production



of this sound. When the therapist purposefully did not reward him immediately, he repeated the sound several times. He showed a great deal of pleasure in this accomplishment.

He became interested in earphones and tolerated them for a moment as intensity was increased to 90 decibels at 1000 c.p.s. Then he took them off. This was repeated several times. Wearing the earphones he turned to the mirror and smiled at himself.

On the following day Steven led the therapist back to the windowseat where he first became conditioned. He raised his arms for the first few sounds as on the first two occasions.

Play therapy was continued through these weeks with bubbles, playing in a sinkful of water with boats and containers for pouring, building with blocks and working puzzles. These activities held his attention for long periods. As new activities were added to his repertoire, he lost interest in using pencil and paper. When he did not choose pencil and paper, they were offered occasionally but he preferred other activities.

He was fascinated with the Viewmaster and quickly learned to flick the colorful slides of nursery rhymes. He used the right eye only. He had a penchant for peeking through key holes and consistently used his right eye.

Toward the end of this week a new behavior pattern emerged. He took the cereal from his mouth and continued sound until he had accumulated three or four pieces on a doll's plate. He ate them with a tiny spoon, cutting each one into three small pieces. It was difficult for him to cut the crisp cereal with the plastic doll's spoon. He showed a great deal of perseverance.

The following day he prolonged and repeated sound until he had accumulated as many as ten pieces of cereal. The therapist soon learned to put the pieces of cereal into his hand when he began saving them, rather than directly into his mouth. This time he ate the hoarded cereal with his fingers, several at a time. When he had eaten enough dry cereal to be thirsty, the therapist showed him a toy teapot of water and gave him a doll's cup. After trying to take the teapot from the therapist, he became silent for a moment, then began vocalizing. Thus water produced the same response as the cereal.

### Week Twelve

Getting the reinforcement became Steven's primary motive in therapy. The therapist observed that he vocalized when his lunch was being served at the Cottage. This was the first evidence of generalization.

An apron divided into three sections was now used to

hold the cereal and doll dishes which Steven liked to use. He began holding out a tiny cup or plate for the cereal.

### Week Thirteen

Because Steven had learned to "ask" for water, and because he was normally a thirsty little boy, the therapist attempted to elicit production of "wa-wa" by providing aural, visual and tactual stimulation. Although there was a growing rapport, visual contact was still difficult to maintain, aural stimulation was questionable, and he resisted vigorously manipulation of his lips. Withholding the water resulted in lots of prolonged sounds of [a], and [aja], but not the desired sound.

The reinforcement was changed to cereal without sugar coating as he was receiving at least four ounces (Liq.Meas.) each day, and his appetite for meals was poor at best.

On a trip to the Nature Science Center, Steven emitted sound repeatedly near a girl who was eating a sandwich at her desk. When she did not give him a piece, he reached up and slapped her on the face. This was the second incidence of generalization. Steven showed no interest in the animals and displays but stood looking into the aquarium for several minutes. His main activity was pressing buttons, turning switches and opening and closing doors.

### Week Fourteen

Stimulation of "wa-wa" was pursued. When the therapist

frustrated him by withholding the reinforcement while trying to induce an approximation, he did not show any signs of temper tantrum but slapped her on the cheek.

During the past two weeks he had been looking at the palms of his hands, rotating them as though seeing shadows. Manneristic behavior with his hands had been noted in previous reports by other observers. He continued to run down the long hall to therapy with hands over his head watching his shadow on the wall.

He had not displayed his typical temper tantrum in therapy for the past month. One day when he had been with the therapist for a much shorter time than usual and it was time to leave on the bus, he became tantrumous. The aides reported that he refused to eat his lunch and cried for an hour.

#### Week Fifteen

Steven enjoyed being pulled through the snow on a toboggan. He kept removing his mittens to put his hands in the snow and taste it. After this outing he cuddled down on the therapist's shoulder for the first time.

A plan has been followed for several weeks of letting Steven play in water with little boats and plastic containers for filling and emptying. Most of the play has been purposeful with occasional random splashing. This water play has been accompanied with stimulation in all modalities for production of "wa-wa." He has become more accepting of light

pressure on his lips, and occasionally approximates a bilabial.

An interesting observation was made regarding Steven's hearing. When the therapist made a sudden loud sound, he put his hands to his ears.

#### Week Sixteen

He has been throwing objects frequently of late when it is time to go back to the playroom. This may be a delaying tactic.

He likes to walk to the top of a spiral staircase and look up at the brick dome. He looks carefully all around at the brick walls, moving his eyes slowly with a searching look upward.

A number of pictures were made of Steven and the therapist using a polaroid camera. When each picture was placed in his hands he looked at it carefully, then held it up to the therapist's face and patted her on the cheek. He became very interested in the camera, and ran over to see each picture as soon as it was removed from the camera.

Despite prolonged stimulation of the early sounds in babbling, Steven has continued to emit his characteristic [a], [ha] and [aja]. Only occasionally does he move his lips apart from the jaw. (This has been considered a problem in teaching apes to speak. "Undoubtedly one reason for the lack of language in apes is their lack of a tendency to

Many techniques were experimented with in trying to get Steven to regard the therapist's face while she was vocalizing. A plan which was quite successful was to back down the stairs ahead of Steven as he walked down alone. The therapist was in a position to protect his descent and at the same time could establish eye contact as she held out a cereal reinforcer. Another method was to hold the cereal close to her mouth. When in a playful mood he could be placed on his back and the therapist could bring her face close to his as she attempted to stimulate babbling. This latter technique caused Steven to laugh gleefully one day this week.

There was evidence of increasing rapport, but of a tenuous nature. He was eager to come to the therapist when she went into the playroom, or when he was brought by an aide to the therapy room, and he resisted leaving her; but during therapy he frequently displayed aloofness. Sometimes when absorbed in an activity, such as putting a puzzle together, he would lift and turn his shoulder away from her if she approached as close as two feet. This was offset by his willingness to sit in her lap as he worked at her desk, and his pleasure in being carried about.

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<sup>2</sup> Susanne K. Langer, Philosophy in a New Key (Cambridge: Harvard University Press, 1951), p. 105.

He stiffens when being carried against his will, throws objects and kicks off his shoes when it is time to leave, but there have been no temper tantrums this month during therapy with the exception of the incident in week fourteen.

#### Week Seventeen

Two days this week he seemed lethargic and dull; some drooling was noted. He did not vocalize during these two days. On one of these days he walked into the closet, closed the door, and did not emerge for three or four minutes, even though he was in the dark.

He has an obsession about opening and closing doors; that is, if a door is open he will close it, and if it is closed, he will open it and then close it. This had been observed in the large building where therapy was performed, and this week it was observed at the Nature Science Center. Other than doors, he seemed engrossed with shadow patterns on the ceiling of the planetarium and stood with his head tilted back slowly rotating his eyes. Then he sat down on the circular seat and repeated his searching observation. He moved from one position to another, each time tilting his head back and looking around the dome. This behavior was typical of his attending to the dome above the circular stairway at the clinic.

The polaroid pictures taken the preceding week were kept on the desk in an accessible spot for Steven to pick

them up. His attention was not directed to them, but each day he went to the desk first to get the pictures. He would then come to the therapist, pat her on the cheek and hold the picture against the other cheek. He appeared to recognize the pictures.

A new behavior in verbalization occurred this week. The therapist slipped the prized pictures into her apron at the end of the session, and when descending the stairway, instead of cereal she held up the pictures. Steven made his usual sound when asking for cereal and held out his hand. The sounding was prolonged, with increased gesturing of his hand. It was obvious that he wanted the pictures and these were given to him without the cereal, the pictures serving as reinforcement.

Because of Steven's questionable perception of sound, opportunities were frequently presented to observe his response. He alerted to and localized the sound of hand castanets at a distance of twelve feet.

#### Week Seventeen

An audiometric evaluation was undertaken with the assistance of an audiologist and four graduate students in speech and hearing to judge responses. Steven responded to speech at 65 db., to the sound of jingling keys at 60 db., to sawtooth noise at 45 db., and to the clicking of castanets at 0 db. No responses could be elicited with pure tones. The consensus was that Steven was a hearing child, but that



his hearing was selective, suggestive of psychogenic deafness.

At four o'clock the therapist awakened Steven from an extended afternoon nap. At first she called his name, and when he did not respond she shook him gently. As he was beginning to stir, she removed her hands and simply kept calling his name. He covered his exposed left ear with his hand. When he recognized the therapist he removed his hand from his ear, put his arms around her neck and crawled into her lap where he sat contentedly.

#### Week Eighteen

Repetitious babbling has been provided as stimulation this month, but with very little variation in Steven's sound. He had become resistive to tactual cues for variation of sound production, and this method had consequently been discarded until such a time as he did not react negatively. One day while playing in water he became quite boisterous and produced a greater variety of vocalization than heretofore.

There were a number of occasions this week when he used his "sound" to get something other than food.

Auditory training was attempted but Steven showed no interest in noisemakers, with the exception of the hand castanet to which he gave fleeting attention. He showed no overt response to the training records, "What's its Name?" even when the speaker was placed close to him.

A new approach was suggested from his interest, meager though it was, in the little wooden hand castanets. Could it be that wearing wooden shoes would awaken auditory feedback, or cause him to associate vibrations with each step in walking? At first he had some difficulty with balance and reached out for support by the therapist. He was amused with this novel activity and smiled as he learned to gain balance. At first the walking was confined to the rug. When he was led from the rug to the wooden floor, or to the tile floor, for the sound effect, he sat down, took off the wooden shoes and threw them away. At no time did he resist putting on the shoes, often taking off his own shoes and holding out his feet to the therapist. This approach was abandoned because of his consistent pattern of throwing the shoes away when he went beyond the rug.

#### Week Nineteen

Vocalizations had decreased so another brand of sugar-coated cereal was used as a reinforcer. Steven had a very poor appetite, so it was questionable as to whether these quiet days were because he was not hungry, because the cereal had become a weak reinforcer, because he was simply withdrawn, or some other reason. At any rate, changing to Fruit Loops which had been used prior to his being conditioned appeared to be a strong enough reinforcer to evoke vocalization.

An incident occurred that could be considered significant. While in the soundproof booth he pulled on the therapist's skirt and pointed to the speaker indicating that he wanted to be held up. He put his head against the speaker for a moment or so, then was satisfied to be placed on the floor. The audiometer was not turned on at the time. Of interest in this incident was the fact that Steven had responded to sounds from this speaker during his test almost two weeks previously.

Steven still likes to crawl into enclosed places; for example, the fireplace grate, closets, the narrow passage between the soundproof booth and the wall, the soundproof booth, and under tables.

He is a skillful climber and when given his freedom to run about through the building, needs constant attention. A large living-room was one place he would head as soon as he was free to run. A piano in this room was of no interest, but the therapist would consistently sit down and strike a few notes. No overt response was observed at any time. However, one day he climbed up on the bench and spontaneously struck a few notes. It was considered that this was more likely imitation of what he had seen the therapist do on other occasions than that he was responding to sound. At any rate, imitation in and of itself was considered a positive gain.

Week Twenty

Steven has begun to develop time sense. He has been taking his jacket and standing by the door of the playroom at eleven o'clock when the therapist comes for him.

The hand mannerisms which were so prominent last month have not been in evidence during therapy. This behavior, however, has been observed at other times. Neither have there been any temper tantrums during therapy. He still stiffens and fusses when it is time to go, and has to be picked up and carried most of the time.

Week Twenty-one

Although Steven will make limited eye contact sporadically when within close range, prolonged eye contact has been noted when looking through an observation window at him lying in bed, a distance of twenty feet, and when looking through a window at him in the play-yard where he stood at a distance of fifteen to twenty feet. In this latter case he left his play, came to the window, put his face against it, and maintained prolonged eye contact even though the therapist came up to within a few inches of the window.

He has become quite cuddily this month and when picked up gives the therapist's neck a squeeze and puts his head on her shoulder. He has a way of patting and pinching the cheeks of certain people who hold him.

keep them out of reach of other children, they were hung on lengths of ribbon taped to a door frame. In closing another door to the room, the paper eggs would swing back and forth. Steven discovered this for himself and he would push the door while watching the eggs sway back and forth. He had not learned to use even a child's play scissors as his hands were so small, so he was provided with some oval shapes. He decorated these, taped on ribbon, then pulled a chair over to the door and reached up gesturing that he wanted to be held up. He was lifted up and succeeded in taping up his creations.

#### Week Twenty-two

Steven has demonstrated good memory retention at scattered intervals. In exploring the living-room, a favorite destination when he was taken for a walk in the large building, he discovered cardboard coasters in a drawer in a circular table. He carried them with him for the remainder of the morning, a period of about twenty minutes, and when picked up to be taken to the bus, he squirmed and wiggled down to the floor, ran back to the table, one of many tables in the room, and returned the coasters to the correct drawer.

#### Weeks Twenty-three, Twenty-four, Twenty-five and Twenty-Six

There was no appreciable change in Steven's vocalizations. The therapist provided prolonged stimulation of simple phrases and stock phrases interspersed with babbling. His autonomous

behavior would indicate that if he were receiving these sounds, he was not able to interpret them into meaningful response. He had shown an ability to imitate the action of others, but not imitation of verbalizations. Withholding the reinforcement while attempting to evoke an approximation of the stimulus sound resulted in urgent repetition of his sound, [aja] when he moved his mandible on the output of this sound, or [ha] when he forced the sound.

The decision was made to withhold water until an approximation was obtained for "wa-wa." Water was a meaningful part of his experience as he was given an opportunity to play in it daily, and drank thirstily any water offered to him. As in the past, a practice session was run with dry cereal to ensure that he would be thirsty, water was poured from a doll's teapot into a little plastic cup, the therapist all the while babbling "wa-wa" and interspersing, "Do you want a drink of water?" or some simple phrase regarding water. Visual contact was maintained as much as possible, the water being held up to the therapist's face. His face was watched closely for any movement of lips and the water presented as soon as such movement was apparent.

At this time tactual stimulation of his lips was not done because of his continuing resistance to this technique; this month was given over to patient and prolonged verbal stimulation with visual clues. It was felt by now there was sufficient eye contact and facial attention for him to receive

such clues.

His lip movement was rare and reinforcing for these occasional movements did not become associated with getting the water. Withholding the water resulted in the extinguishing of his characteristic sounds; vocalizations were then re-established by randomly returning to holding up the cereal reinforcer which was given for his [a] sound or its variations.

Another reaction to withholding water was a struggle to get the water when the therapist was not on guard; for instance, one day when the cup of water was placed momentarily on the desk while the therapist was collecting some toys, Steven quickly picked up the cup and drank it. He was laughing so that he choked. At other times when the water was withheld he ran into the bathroom and let the water run over his hands, and then licked them. This was accompanied with much laughter.

Despite the frustration of not getting water, or getting it only occasionally, Steven did not resort to temper tantrums. He continued to be reinforced with the cereal for his sound, although this was kept to a minimum. At the end of the month the therapist felt she had given enough concentrated stimulation of presentation of visual clues to conclude that another method must be used. Because Steven drank water readily, and in quantity, it seemed that it should have been an adequate reinforcer.

The only firm conclusion from this month's efforts to condition Steven to produce a bilabial was that he had plateaued. At this point the therapist had to make an honest appraisal of her feelings. There were times during the past month that she had felt it was hopeless to try to move Steven beyond his sound. She knew that if she honestly believed that it was hopeless, there was danger of a transference of this feeling taking place. It was time to make a realistic evaluation on which to base future goals.

#### Week Twenty-Seven

A review of the past months of therapy, and in particular, of the preceding month, seemed to point to some obvious conclusions that would have to be considered if speech were ever to be developed, or if any further progress were to be made.

1. Steven could not, or would not imitate lip movements by visual and aural clues; therefore, tactual stimulation would have to be used.
2. A stronger reinforcer needed to be used to overcome his resistance to manipulation of his lips.
3. Steven did have ability to observe, imitate, demonstrated sporadically remarkable memory span, and gave many overt signs of enjoying being with the therapist.
4. He had passed the milestone of being conditioned to produce sound.
5. The therapist could not allow herself to feel discouraged until more techniques were applied.



The new plan, therefore, was to use tactual stimulation, and by using icecream, Steven's favorite food, to try to offset resistance of stimulation of his lips.

Before instituting the new plan, another trip was made to the Nature Science Center to observe if Steven had progressed in his responses there. He seemed happy to be there, but followed his usual pattern of giving his attention to the dome of the planetarium, and trying to open the doors of the cages, or squeezing behind the cages. For the first time there were lines of kindergarten children; he did not pay the least attention to them, but pushed his way through. A new display in a small booth was of interest to him. By pushing a button the light went out and the fluorescent minerals could be observed. He entered several times and was able to find the button and control the display.

#### Week Twenty-eight

The new plan of therapy was initiated. Ice milk was chosen as the reinforcer rather than ice cream so that he would not earn too many calories prior to his meal. The flavor was vanilla-chocolate swirl because Steven liked chocolate and this offered an interesting design. The verbal stimulus was [bʌ] which the therapist repeated without stimulation of his lips in order to discover if the stronger reinforcer would motivate a desired response. The desired response was any bilabial which Steven could be

induced to emit.

Steven was placed on the counter directly in front of and a few feet away from the refrigerator. The ice milk was taken out and the cover removed. Steven was immediately interested in the design on the inside of the plastic cover made by the chocolate swirl. He looked intently, then tasted it on his finger and emitted his characteristic sound. The therapist repeated the verbal stimulus [bʌ] protractedly as she filled the familiar little doll's cup with the ice milk and returned the container to the refrigerator. The vocalization which had formerly been reinforced by a piece or two of cereal was ignored, and the ice milk on a doll's spoon held in front of Steven. The vocalization became more urgent; he attempted to get the spoon and failing this, slapped the therapist on the face. Again and again the therapist was slapped, on the face and on the arm, but she remained neutral and firm.

In order that the vowel sound would not be extinguished, Steven was randomly reinforced with a Cheerio.

When it was apparent that sound stimulation was inadequate, it was planned to reinforce Steven for making any sound while his lips were lightly touched. In this way, Steven learned to tolerate manipulation of his lips. At first the forefinger was pressed laterally and lightly on the upper lip, then more firmly with the thumb pressing on the lower lip.

On the second day, when the ice milk was held in front of Steven, he reached for the therapist's hand and placed it on his lips. The therapist's help was not necessary for his tensed lips were projected so firmly that [mu] was emitted each time. This response was then accepted as his word for ice milk.

When the doll's cup of ice milk was gone, Steven tugged on the therapist's dress until she was turned with her back to him. With both hands on her shoulders he pushed her firmly in the direction of the refrigerator. It was obvious that he wanted more.

#### Week Twenty-Nine

By the second week, during random reinforcement of the vowel sound, Steven kept his Cheerio; he then vocalized [mu], took the spoon from the therapist's hand as she was about to pop it in his mouth and carefully placed the Cheerio on top of the ice milk before eating it with obvious pleasure. Steven's slight tremor in his hands which shows up when performing fine manipulation was evident.

In order to obtain a clear [mu] the therapist had to return to manipulation of his lips frequently. Otherwise, Steven was approximating other bilabials as he relaxed his lips. At last Steven was moving his lips when vocalizing and another corner had been rounded.

He was reinforced with ice milk only for the new syllable in order that he would have a name for his favorite food.

Week Thirty

By now Steven was hoarding Cheerios earned for his old sound, and although sometimes he ate them as soon as he received them, often he would place, carefully, up to three Cheerios on his ice milk before eating it.

An experiment was tried out by having a little girl who had delayed language come into therapy with Steven. She was willful, aggressive, and much stronger than Steven whom she appeared to like. Operant conditioning was being used for the establishment of speech in this child. Since they had been observed to watch each other in the playroom, the therapist wanted to discover if one receiving reinforcement would influence the other to vocalize. At this point Steven was much more vocal. There was increased vocalization in both children to the point that it became difficult to reinforce promptly. The variables that entered into this increased production would require further experimentation; no conclusions could be drawn from the three days this plan was attempted. On the fourth and fifth sessions the little girl had become aggressive and both children were involved in struggling over possession of toys. The sounds were not of a nature to be reinforced.

Week Thirty-one

The two children were returned to individual therapy, and in a calmer state, without the competition and physical struggle of the last two sessions, Steven returned to his sounds. At times there were variations approximating [mama] [ama], [mu], and a new sound [ga]. The new sound occurred only two or three times. His vocalizations were very similar to babbling. [mu] was the only sound reinforced with ice milk. Steven still reached for the therapist's hand and placed it on his lips if he did not receive the ice milk.

Week Thirty-two

If [mu] was to be his symbol for ice milk, a new reinforcer would need to be used if another sound was to be established. Cheese was offered and he seemed to like this. Since he no longer objected to manipulation of his lips, an attempt was made to push up his lips at the corners as he was sounding his familiar [a]. He thought this was funny and co-operated by smiling. The result was a recognizable vowel sound [i].

Thus, as therapy is ended as far as this study is concerned, Steven has three vowel sounds and variations, and one consonant with variations. This would seem to be a very limited achievement, but the fact that he is learning now to shape his lips when he vocalizes, and that he

accepts lip manipulation, point to a better prognosis for speech development than was considered possible only five weeks ago.

Although he has not displayed temper tantrums in therapy for several months, reports from the cottage and the playroom indicate that this was a behavior that was quiescent for longer periods, but that he still reverted to it if frustrated. This week when visiting the cottage Steven ran to the therapist to be picked up. He cuddled on her shoulder for ten minutes or so and waved bye-bye to the nurse with whom the therapist was in conversation. Apparently he thought he was going out. At any rate, when it was time for her to leave Steven became tantrumous with screaming and head-banging.

The waving reported in this incident was a behavior acquired during the speech therapy program and shows some endurance as he has learned to wave spontaneously and appropriately without cues.

A landmark was achieved in April, 1967, when he was bladder trained, and more recently, bowel trained.

He is generally more outgoing and interacts with others more readily.

On June 30, 1967, Steven scored an I.Q. of 101 on the Leiter International Performance Scale.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

Procedures were employed to develop communication in three non-verbal, emotionally-disturbed children. The children were institutionalized and ranged in age from five years three months to eleven years seven months. The oldest was a girl who had been diagnosed at age four as schizophrenic (autistic type), and the two younger were boys. All of the children had in common autistic features of withdrawal, avoidance of eye contact, and lack of ability to develop relationships with people. The oldest and youngest reacted to interference with their rigid, repetitious activities by head-banging. The third child was hyperactive and displayed rocking behavior.

The basic therapeutic method utilized was operant conditioning, with sugar-coated cereal serving as the main reinforcement for desirable verbal behavior; and, in a more limited way, water, ice cream, cookies, coke, candy and cheese were used. Social reinforcement was also employed. For the oldest child in particular, reinforcement of verbal and graphic communication, whenever possible, was in the form of supplying the desired object or activity when this could be done so that the crucial criterion of immediacy could be met. Negative reinforcement was a firm "No," or immediate cessation of an activity.

Results varied with each child. The largest acquisition

of speech was by the older boy, a vocabulary of almost 100 words which included several spontaneous phrases. The oldest, whose hearing was impaired, made some limited progress in speech-reading, and improved in her ability to communicate in writing. The youngest subject learned, through operant conditioning, to tolerate the tactual method of speech stimulation. This method was employed when the visual and auditory modalities failed to provide the necessary stimulation. He acquired one consonant and several vowel sounds.

All of the children responded positively to conditioning for improved eye contact. It was the consensus of staff members, nurses and aides, in addition to the therapist, that all of the children made gains in relating to people. The hyperactivity of the older boy was not abated.

The extremely inconsistent responses of the youngest child to auditory stimulation and environmental sounds indicate that his ability to perceive auditory stimuli is still an enigmatic question.



## CHAPTER VII

### PROBLEMS FOR FURTHER RESEARCH

This study has raised many questions indicating need for further research and training:

- 1) The extent of acquisition of language by means of operant conditioning.
- 2) The dynamics effecting two children who receive reinforcement for desirable verbal behavior when within visual and auditory proximity of each other.
- 3) The urgency of undertaking investigation of the problem of selective hearing, and need for acquiring more training in the identification of this problem.
- 4) The value of an auditory training program for the child who demonstrates selective hearing, or psychogenic deafness.
- 5) The extent to which negative reinforcement should be employed in operant conditioning for development of speech.
- 6) The relationship of improved social interaction to the development of speech in the non-verbal emotionally-disturbed child.
- 7) The value of providing stimulating experiences and activities when attempting to develop speech in the non-verbal emotionally-disturbed child.
- 8) Further detailed studies of the development of speech in the non-verbal emotionally-disturbed child.

## APPENDIX A

Amy's completion drawing of a man,<sup>1</sup> January, 1967.



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<sup>1</sup>1965 Gesell Institute of Child Development.

Amy's completion drawing of a man, June, 1967.



Letter written by Amy, May 4, 1967.

Thursday  
May 4, 1967-

Dear

AMY

How are you? dam fine, We had fan,  
They were happy, We saw a moose Saturday.  
AMY is sick today, He went to the  
infin many today, We saw a green fast,  
it is cloudy today, The sun shone  
yesterday, it was rained yesterday,  
We went to the amcaies at Beidling  
Roon Saturday after moon, We saw a can,  
We went to the Nance Surese Cinetine  
yesterday after moon, We saw a duck,  
They were at towers pink, They were  
a orange flowens, We had a fan,  
We went to the a tree, We saw  
a affethy, We saw a green the grass,  
We saw the sky and the sun,  
We saw the bus,  
Thank you, a letter,  
I love you,  
Love,

AMY

Letter written by Amy, June 26, 1967.

Monday  
June 26, 1967,

Dear Daddy,  
How are you? I am  
fine, We had fun, they were  
happy, AMY have on blue  
shoes.....

The sun is shining  
today, The sun shone yesterday,  
AMY whits

cried and coss today,  
Thank you a letter.  
I love you,  
Love,  
AMY

## APPENDIX B

## John's Vocabulary

January look up down

February Whee eyes tine/Valentine all right  
hot stairs train jump upstairs  
found it top plant brush chalk  
ears stuck bump lights hair mouth  
sticky pop knees big piece neck  
throw ball pull wet red yellow  
orange

March Hi paper paste siz/scissors cut fish  
duck egg arm hand feet shoe nose  
yeah bridge\* stick\* stone\*

April cat leg blue there it is Winnie stop\*\*  
horse broom clip go round magnet  
book tent toes car\* truck\* woods\*

May box in teeth locked apple balloon  
house hot accident bird\* hole\* bang-  
bang\* fixed\* cold more please  
ice cream

June vator/elevator plane airport ring  
George one two three four five ten  
Frank

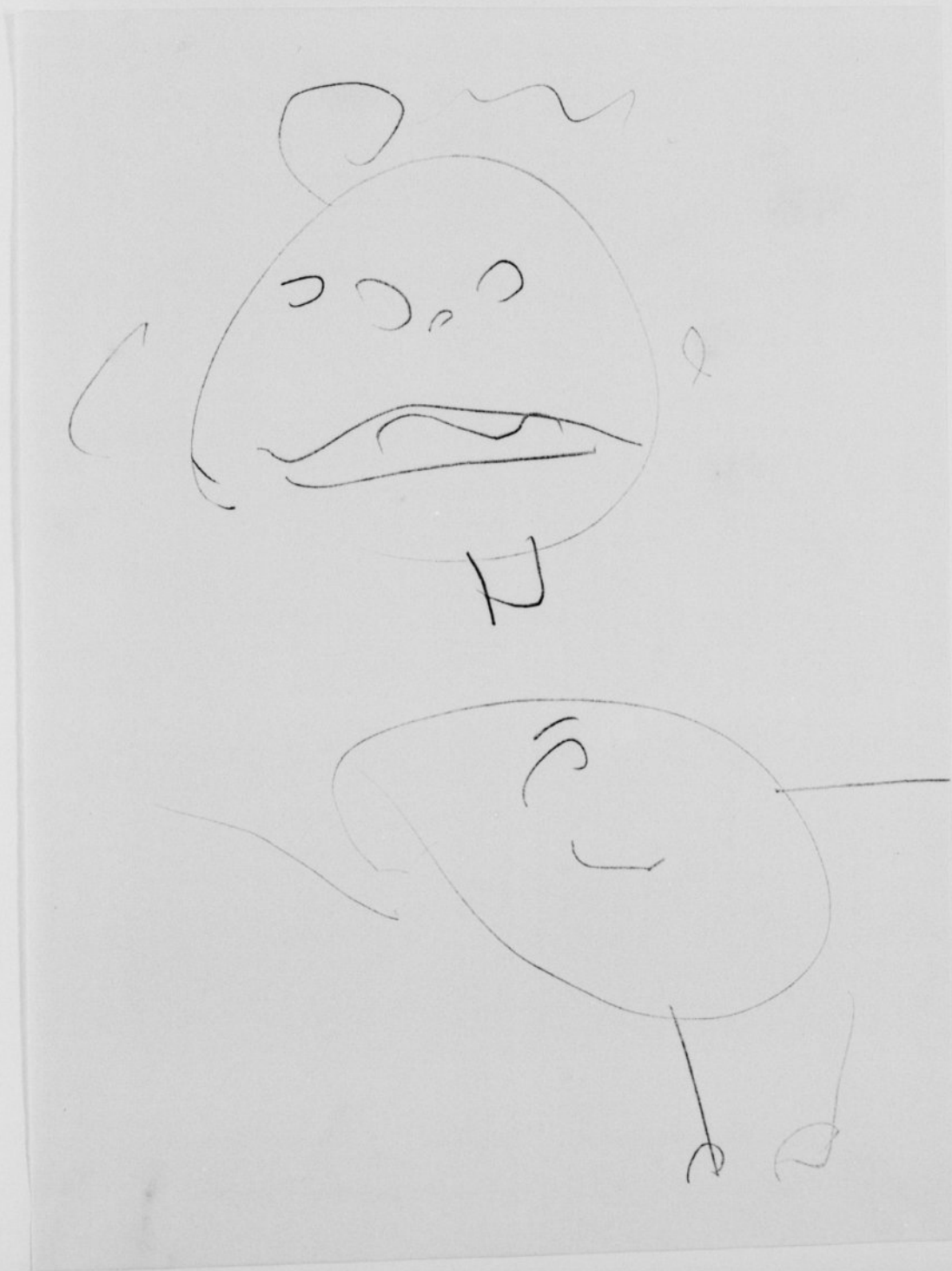
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Spontaneously to maintenance man.  
\*\* Spontaneously to a child.  
\* Spoken when with student (volunteer aide)

John's drawing of a face, February, 1967.



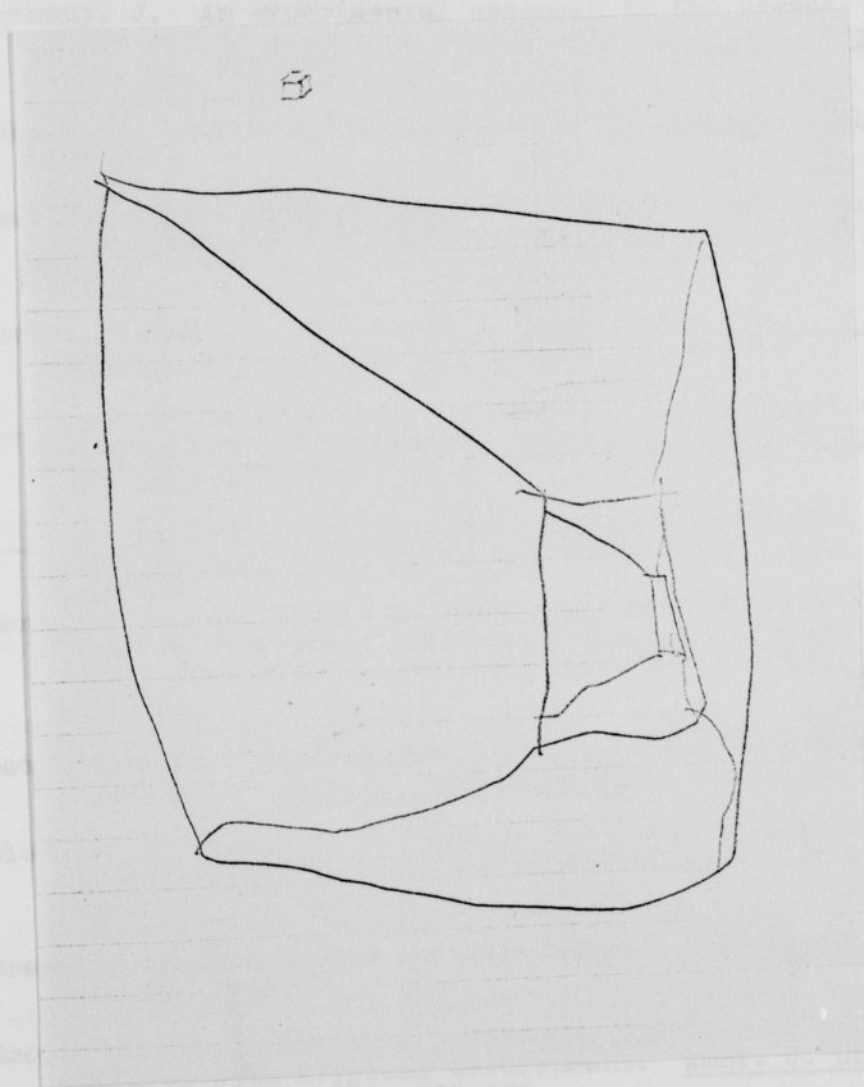
John's drawing of a man, June, 1967.





APPENDIX C

Steven's drawing of a cube, November, 1966.



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