

THE ACQUISITION OF LANGUAGE

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Language acquisition in the blind infant was one of the major areas of our study. In a world without pictures how does the blind baby name objects, make his wants known, combine words in the progression toward syntactical complexity and invention in language?

In the larger population designated as blind, gross delays in language acquisition are commonly reported and constitute a major problem in the education of the young school age child. Since this is a mixed population, with a large incidence of multiple handicaps and neurological impairment, we cannot make fair inferences from these findings. As far as we know, no language study exists which is based upon a group of blind children strictly comparable to ours and employs the data collection and scoring procedures that we have followed.

In our own group of infants, blind but otherwise intact, we can more fairly assess the effects of blindness per se in the language acquisition period. Moreover, since all of our children were probably advantaged through our educational program in which we maximized the experience

of the blind infant, we can assess those limitations or impediments in language development that can be fairly attributed to blindness itself.

INTERVENTION

We did not provide "speech training" for our blind infants in our guidance program. We did not provide an "infant curriculum" in this or any other aspect of our intervention program. As clinicians and developmental psychologists we chose another route.

As developmental psychologists we saw language as a component of sensorimotor organization which was inextricably linked with the development of human attachments, prehension, gross motor development and representational intelligence. It was our hypothesis that the reported delays in language development among children blind from birth reflected the experiential poverty of the blind infant. We saw the impediments of blindness in the human "dialogue" of signs and signals between the blind baby and his partners. We saw the unique problems for the blind infant in adaptive hand behavior, which deprived him of the experiences of

a richly furnished world of persons and things which are essential for naming and the attribution of qualities in language development. We saw how the delays in locomotion further reduced the blind child's experience in discoveries of persons and things and in representing this world through language.

We reasoned that everything we did to facilitate the blind child's development in the areas of human attachments, in tactile and auditory experience with persons and things and in locomotor experience would affect the progress of language. We also reasoned that everything we did to maximize the language environment in the home would affect the acquisition of language in blind children as it does with sighted children.

In earlier chapters we have seen that our intervention had positive effects in facilitating the blind baby's attachment to his mother, with close correspondence in milestones with those of sighted children. We saw in our report on prehension that expanding the blind infant's tactile-auditory experience with persons and things was essential to the coordination of ear and hand and for attributing substantiality to things and persons

"out there"--a crucial first step in naming. In our report on gross motor development we saw that our interventions facilitated locomotion in our group of blind children (and brought them closer to sighted child ranges than blind child ranges). We reasoned that locomotor experience had effects upon language development through enlarging the blind infants experience.

In our work we maximized the language environment for the blind child through encouraging vocal dialogues between parents and child and through naming (even in the preverbal period) the persons and objects and actions which the blind baby experienced.

Some of our blind babies would have been disadvantaged in language experience even if they had been sighted. In the range of families represented in our families we had three families for whom "talking to a baby" was alien to their styles of child rearing. For a sighted child in these environments perhaps the worst thing that might have happened would have been a baby who was "slow in talking". (And in each of these families with other siblings, the sighted siblings were in fact

retarded in speech development.) But a blind child is doubly imperiled in a world in which his partners "don't talk to babies"; he would be deprived of a primary mode in "knowing" his mother and other persons and in being introduced to a world of objects. We were able in each instance to help these parents understand the meaning of "talking to the baby," with demonstrably good results.

LIMITATIONS OF THIS STUDY

The most interesting questions for us and for the developmental linguist cannot be answered in this chapter. Developmental linguistics is a comparatively new field, and those questions which have to do with the acquisition of grammatical form and syntactical complexity are in the earliest stages of investigation. No scales exist which permit comparison between a sighted child population and our blind group in these crucial areas.

The language items on standard infant scales are not necessarily the "sensitive" items from a linguistic point of view. But in a territory that has not yet been mapped, these language milestones represent the only fixed points, the known territory where earlier

explorers set up their flags. Among the earlier scales (Gesell, Cattell) the median ages for attainment of these milestones differed from scale to scale because of differences in sample and scoring. By 1969 Nancy Bayley published her Scales of Infant Development which meets the requirements for adequate standardization in sample and rigor of administration, and we have selected this instrument for comparison of our blind group with a sighted population in those areas of language development where comparisons can be fairly made.

OBSERVATIONS AND SCORING

Our data on language acquisition are derived from verbatim records by the observers. All notations on the baby's early vocalizations, examples of receptive language, use of words as referents, simple sentences and, later, complex discourse, were recorded in context in a descriptive narrative. This gave us a large bank of data on every child, which was later coded and analyzed.

In this report I have selected a group of items in which the language capacities of our blind children can be fairly compared with those of sighted children,

using criteria from the Bayley Scales of Infant Development (Bayley (1969)). It should be noted that at the time our study was designed, the Bayley Scales were not yet published. However, our own verbatim records required no on-the-spot judgments or scoring by the observers, and we were able to return to the data bank during the evaluation period, search the records for the descriptive items, and make post-facto judgments using stringent Bayley criteria. Following is a summary of our procedures for data analysis and scoring:

(1) A first sorting of language items was made using observer reports only.

(2) Using Bayley criteria, a second sorting of items was made for each child, and the items were examined without scoring.

(3) All ambiguous items were discarded.

(4) Team meetings were instituted for scoring.

(5) Credit was given on the basis of team consensus.

Insert Figure 5 and Table VI.

SELECTION OF ITEMS FOR COMPARISON

A number of the language items on the Bayley scale

FIGURE 5.

X-7a

- LANGUAGE MILESTONES: CHILD DEVELOPMENT PROJECT BLIND STUDY

Bayley Items

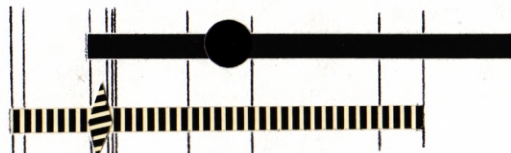
Listens
selectively
to familiar
words
(#84) 7.9



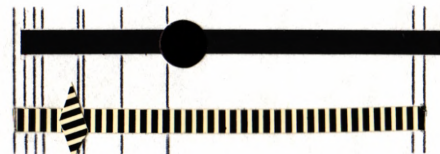
Responds to
verbal request
(#89) 9.1



Jabbers
expressively
(#101) 12.0



Imitates
words
(#106) 12.5



Says two
words
(#113) 14.2



Uses words
to make
wants known
(#127) 18.8



Sentence of
two words
(#136) 20.6 (N=9 this item only)



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

KEY:

Bayley ranges for sighted children

Bayley

Ranges for CDP study children

Median for CDP study children

Vertical lines indicate blind subjects' placement on scale

480a

TABLE VI

LANGUAGE ITEMS: MEDIAN AGES

BLIND (CHILD DEVELOPMENT PROJECT) AND SIGHTED (BAYLEY)

Item	Age Range		Median Age		Difference in Median Age
	Sighted	Blind	Sighted	Blind	
Listens selectively to familiar words	5.0-14.0	6.6-11.5	7.9	8.6	.7
Responds to verbal requests	6.0-14.0	6.6-13.5	9.1	9.8	.7
Jabbers expressively	9.0-18.0	6.9-16.0	12.0	9.4	2.5
Imitates words	9.0-18.0	8.9-17.5	12.5	10.3	2.2
Says two words	10.0-23.0	12.7-32.0	14.2	18.5	4.3
Uses words to make wants known	14.0-27.0	13.2-26.9	18.8	20.6	1.8
Sentence of two words	16.0-30.0	17.9-37.3	20.6	26.3	5.7

.9096
3096

cannot be employed for testing the blind child, either because vision is required for the task or because the manual instructions explicitly require a visual stimulus in the test procedures. Thus all items in the early smile sequence in the Bayley are tested by means of visual stimuli--the presentation of E's or mother's face. And, although all of our blind infants can demonstrate smiling in response to mother's or father's voice within the same age range as the sighted child's smile to the human face gestalt, we cannot substitute "voice only" for the visual presentation without violating the test. Then, since there is no Bayley item which specifically tests smiling response to voice only, we have chosen to eliminate the social smile from our inventory of comparison items.

Similarly, for items such as Bayley # 80, which combines both verbal instructions from E and an imitation of a task demonstrated by E with the baby's visual attention, we cannot substitute another form of the task for the blind baby. The task itself, however, which requires the baby to place a cube in the cup upon E's demonstration and verbal request can be achieved by a

blind baby if he has been given motor guidance by E. in learning the task, followed by verbal instructions to reproduce the act. However, we cannot assume the privilege of substitution and have therefore chosen to eliminate this item from our comparison inventory.

Again, in Bayley picture-identification items of the second year we would violate the integrity of the test if we substituted tactile-recognition items for visual-recognition items. Other tasks in the second year, which test both comprehension of language and comprehension of visually perceived relationships between the parts and the whole ("mend the doll") cannot be administered. It is of considerable interest, however, that blind children can demonstrate tactile recognition of objects and name them within sighted-child ranges, and this can be fairly demonstrated through a strict administration and scoring of Bayley # 113 ("says two words"), # 127 ("uses words to make wants known") and Bayley # 136 ("sentence of two words").

Finally, then, the language items which have been selected for comparison represent only those Bayley tasks which can be administered fairly to a group of blind

children without modifying manual procedures. In this selection we cannot, of course, see the full range of a blind child's language capacities. The blind child's differentiated repertoire in smiling and in tactile exchange is not represented in this facet of the language study because, of course, we have no comparative data for sighted children. The eliciting stimuli for these language behaviors must be restricted to sound and touch, a circumstance which affords no fair comparison with sighted children. These language behaviors which are uniquely constituted for the blind child are examined in other chapters from our research. (Chapters V & VI.)

Following these requirements for comparison we found 7 language items on the Bayley which could be fairly applied to our blind sample.

General Summary of Findings

In Figure 5 the language achievements of our blind infants are recorded for 7 items. The Bayley ranges for each of these items are represented by the black bar. Ages for three premature infants are corrected for prematurity in the Table and in protocols.

Selected Items: Data Summary

In the following pages we can examine the items selected for comparison with norms for sighted children. For some items, particularly the advanced language items, I will include excerpts from our protocols.

The Early Vocalizations

We have not included in our tables a group of Bayley items in the 0-7 month range attesting to the quality and range of early vocalizations. "Vocalizes once or twice", (0.9), "Vocalizes at least 4 times" (1.6), "Vocalizes two different sounds" (2.3), "Vocalizes attitudes" (4.6), "Vocalizes four different syllables" (7.0), "Says dada or equivalent" (7.0).

All children available to us for study in the 0-7 month range produced a range of vocalizations which distinguished them in no way from sighted children. Since the later language items testify for both the physiological capacity to produce a full range of vocalizations and the higher-level achievements of imitation of syllables, words, and speech cadences, an item analysis of the early vocalizations adds little of

interest to this study.

As Lenneberg (1967) demonstrates through a range of empirical studies, the capacity to produce speech sounds of increasing complexity of articulation has specific neurophysiological correlates in maturation. In those instances where maturation itself is impeded by defects in the child's physiology (e.g. mongolism) the timetable for the sequence of differentiated sounds shows variance with that of intact children but consistency with the child's own rate of neuromuscular development. Lenneberg also adduces from the differentiated articulations of congenitally deaf children in the period under six months of age that these early utterances can be produced even under those conditions in which the child cannot hear these sounds from the speech of partners or as echoes of his own productions. Typically, these spontaneous utterances of congenitally deaf children do not become further differentiated after six months of age and may in fact drop out of the repertoire as inutile, having no sign function.

In examining the biological foundations of language, Lenneberg in no way diminishes the importance of the

language environment in the period of language acquisition. An impoverished language environment will be reflected in the poverty of the child's own language and will appear as measurable deficiencies through testing in the second year. But if I read Lenneberg correctly, he is saying that the capacity of the human infant to produce certain sounds that are uniquely within the repertoire of our species is given in human biology. Whether or not these differentiated sounds will evolve into new combinations learned, new combinations invented, and ultimately into the complexities of discourse will depend upon both progression in physiological maturation and the furnishing of the materials of language normally provided in the environment.

We are not surprised, then, that our group of otherwise intact blind infants cannot be differentiated from sighted children in the measurement of their attainment of these vocal milestones on the Bayley scale. Certain differences which we can report impressionistically cannot be measured on existing scales. There is a consensus among our staff and independent observers that there may be quantitative differences, that the amount of

spontaneous vocalization during a single observational session is less than we are accustomed to hear among sighted babies, even among the "high vocalizers" among our children under one year of age, and even when the amount of vocal stimulation and reinforcement in the environment is very high. As suggested in Fraiberg (1974), and Chapter V, these differences in quantity (assuming our impressions are fair) may reflect the absence of visual stimuli which are potent elicitors of vocalization in normal sighted children. (The sight of the human face--even when the partner is not speaking--may elicit vocal "greeting" sounds from the baby. A colorful hanging in the crib, or a mobile without sound, can elicit a volley of utterances from a sighted baby.)

But the discrete utterances which are uniquely human appear in a normal progression in the first months of life for our blind infants. This inventory from the records of Ronnie may suffice to document the point.

RONNIE

Bayley item # 30: ("vocalizes 2 different sounds") (1-5) median 2.3 months.

0:2:11 Ronnie's vocalizations now include a recently acquired 'gagagaga' . . . as

well as such expressive vocalizations as a laugh, a cry, a groan and a grunt.

As Ronnie is lying in the crib, banging the toys of the cradle gym, we hear 'ememem' sounds.

Bayley # 35 ("vocalizes attitudes")
(3-8) median 4.6

0:5:3 Ronnie was vocalizing a great deal during this session . . . He listens and responds with enthusiastic 'ahahaha' sounds . . . During the interruption of the pat-a-cake sequence with mother, there is a surprised look on Ronnie's face and then a melancholy 'ahahaha' chant.

Bayley # 79 ("vocalizes 4 different syllables") (5-12) median 7.0

0:4:20 Ronnie doesn't like to have his bib tied on. He made some harsh, complaining "uh" sounds.

In the course of this session we hear the syllables "ha" and "huh" and "aw aw aw" and "mamamama".

Bayley # 85 ("says 'dada' or equivalent")
(5-14) median 7.9

0:4:20 says "mamamama" (cited in preceding example).

An Item Analysis of Selected Language Milestones

The items selected and recorded in Table VI and Figure 5 permit a close comparison between sighted and blind infant achievements during the language acquisition

period. These items, which emerge in the 6-30 month range test the child's capacity to understand verbal requests, imitate words, to employ words as referents, to express wants, to combine words in simple sentences. Here we are no longer testing the child's innate capacity to produce discrete utterances in the vocal repertoire of his species but his capacity to make meaningful utterances, to classify and label, and finally to employ his vocabulary to generate new combinations--to invent with language.

In the following pages we can examine each of these items with excerpts from the protocols. In all instances we have credited only those performances which were in accord with Bayley's procedures and criteria for scoring.

"Responds to verbal requests" Bayley # 89 (7-17)
median 9.1 months

Bayley procedures: "Determine whether the child has learned to perform any act in response to a spoken request. (It is often necessary to suggest something the child has learned.) Common early responses include waving in response to Bye-Bye, clapping hands in response to Pat-a-cake, or responding to such questions as Where is the light? or Where is the clock? or Where is daddy? If you cannot elicit a response, ask the mother to try, but make sure she uses words only and no gestures.

"Credit" if the child responds in any appropriate manner to any verbal request unaccompanied by a gesture."

Blind Group: This item was passed by 100% of our sample within the Bayley ranges, with 50% above the median. It is of considerable interest that nearly all of the items which we credited for our blind children were in the context of interpersonal games. Pat-a-cake was a great favorite among our blind children and we have numerous examples of pat-a-cake on spoken request by mother or observer. Other games included a version of peek-a-boo for a blind baby (which is described below), a game "show me your tongue," "come to mommy and get a kiss," and "give mommy a kiss."

In all cases we ascertained that no tactile or motor cues were given. At least two demonstrations of the game were required for credit. This is beyond the requirement of Bayley procedures but essential to rule out chance in the case of a blind child. To further strengthen the case for the blind child's demonstration, we tallied all instances of 'response to spoken requests' for each child. Following the first credited demonstrations for each child, we begin to get a proliferation of instances of 'games on request,' and an expanded repertoire of games on request. This

means, of course, that the blind child's response to the spoken request as credited in the first instances was a fair measure of the child's emerging ability to understand key words.

Pat-a-cake

Six of the credited responses (first examples in each protocol) in Table II were for pat-a-cake on request. One example follows:

Jamie 0:9:12 (recorded on film with transcript of verbal cues)

Mother asks Jamie to "pat-a-cake" (no motor cues given). Jamie claps his hands together.... After an interval observer (MS) repeats the request. As she says the words 'pat-a-cake' Jamie claps his hands.

Peek-a-boo

Several of our parents found a way to adapt 'peek-a-boo' for their blind infants.

Paul 0:7:23

Paul is on the floor and father covers his face with a light comforter. Father says, "Paul, where are you?" Through the quilt one could see Paul's arms come up and begin to pull the light cloth from his face. The game was repeated several times. Each time, waiting for the spoken words, "Paul where are you?", Paul uncovered his head.

Within a few months this game becomes a great favorite of Paul's and he begins to initiate the game with his parents.

"Come to mama; and get a kiss"

Toni 0:11:15

Toni is in her walker, propelling herself around the room. Mother demonstrates a game for us. Mother says, "Toni, come to mama and get a kiss." Toni, with a big smile, orients her walker and scoots across the room to mama. She is rewarded with a kiss. This is repeated several times in this visit and subsequent visits.

"Pat Mommy's face"

Kathie 0:6:17

A favorite game. Supine, facing mother. Mother says, "Pat mommy's face." Kathie reaches up and touches mother's face. Other examples in this session and later sessions.

(Pat-a-cakes added to repertoire within two months.)

"Where is your tongue?"

Jackie 0:8:26

A favorite game. When mama says, "Where is your tongue?" Jackie sticks out his tongue.

Pat-a-cakes on request added to repertoire within a month.

("Imitates words") Bayley # 106 (9-18) median 12.5

Bayley procedures: "In a playful way, say to the child several words such as mama, dada, and baby. Also, while presenting other test items, note the child's attempts to imitate the examiner's or the mother's words. Record what the child says, and indicate the accuracy of his imitation."

"Credit a recognizable imitation of any word, even if it consists of vowels only."

Blind Group: This item was passed by 100% of our blind children within the Bayley ranges with 70% above the median. This good achievement among our blind children may have been facilitated by the unique dilemma of the blind infant and his parents. Vocal exchanges and reciprocal imitation are among the few avenues of parent-baby discourse that are not disrupted by the visual deficit, and one that parents and baby tended to exploit as a social medium.

Our inventory of word imitations does not discriminate the blind baby from the sighted baby.

"Ma-Ma" "Da-Da" "bye-bye" "good" "caca" (cookie).

("Says two words") Bayley # 113 (10-23) median 14.2

Bayley procedures: "Note any words the child applies appropriately to a specific object or situation. Observe whether the words are spoken spontaneously or imitatively. Ask the mother what words the child

uses, and attempt to elicit them from him, in meaningful use or in verbal imitation.

"Credit if the child says two different words during the period of observation. Credit 'mama' and 'daddy,' if used meaningfully. Approximations are acceptable as long as their intent is clear."

Blind Group: Scoring: Our criteria may be more demanding than Bayley's. In all instances we credited the child with two words "in meaningful use." (The Bayley instructions which also include credit for verbal imitation appear ambiguous to us, since verbal imitation is on a lower level of cognition and actually is credited in Bayley # 106 ("imitated words") at 12.5, 2 months earlier.

All items employed in data analysis were retrieved from the descriptive protocols. Our design from the start of the study had separated observer reports from mother's report and, since our own interest in 'first words' centered in 'word as referent,' recording procedures called for explicit descriptions of context so that usage could be judged by independent scorers. Several levels of data sorting described earlier preceded the actual scoring sessions, and items which

passed the final screening represented the staff consensus and were credited.

For correspondence with Bayley procedures, we chose the first instances recorded in a single observational session in which two words were employed by the child in a context which established its meaning both to the observer and independent judges. (We have instances in our records of one word (e.g., mama, bopple) under one year of age.)

In Figure 5 we see that 90% of our blind sample was credited for two words within the Bayley ranges, with 20% above the median.

The credited selections follow:

Paul 1:0:21

At one point, when he pulled himself up on his mother's knee, he clearly said "mama". . . As his father was leaving and speaking to Paul and mother I (observer) heard Paul say "dada".

Karen 1:1:23

Karen reaches and touches the camera equipment and says "whatsit?" ("What is it?")

Karen is sitting on the couch. J. (student assistant) comes over and plays the musical toy and talks to Karen. "Whosit?" ("Who is it?") she says to J.

Jamie 1:2:4

Jamie, sitting on the edge of his rocking chair, kicking the runner.

Having tired of kicking the runner of the rocker, Jamie said "down", and scooted down so that he was able to touch the floor. He then stood erect, holding onto the rocker to steady himself. His mother stooped down immediately, about one foot from him and said, "one-two." In response to her cue, he took two steps forward and she caught him as he pitched forward. He smiled with delight. He then said, "ock!" (his name for rocker) and mother put him back into the rocker.

Note: "ock" for rock and rocker appear correctly used in several contexts in this session and earlier observations.

Kathie 1:2:25

Mother puts Kathie's bib on her. She sits patiently asking for "cookie".

Mother gives her a seashell (which she knows and likes). Mother says, "What is this?" Kathie says, "sell," "sell".

Toni 1:6:16

(Toni lives in a double house, and her aunt Nan lives next door with a separate entrance.)

Several times we saw Toni creep to the door of Aunt Nan's house and call "Nan! Nan!"

We heard her call "Jane! Jane!" to her sister.

Robbie 1:7:3

Uses "mama" and "dada" in this session with clear reference to mother and father.

Ronnie 1:7:3

Ronnie, supine on floor, drinking his bottle. He puts the bottle down against his chest and begins to say, "ba-ba-boo" which is his name for bottle.

In his rocking chair, twisting his torso, elevating his legs. Observer asks him if he is going to stand up. At first he says "no" and continues his rocking. But finally says, "yeah!". He then moves forward, places his feet firmly on the floor and begins to elevate himself.

Sitting in rocker, says "ca-ca" (cookie).

Says "how do!" in greeting.

Carol 1:8:27

Observer held a watch up to Carol's ear. Carol, smiling, said, "Tick-a-tick-a" (her word for watch).

Carol has played peek-a-boo with the observer, using the observer's silk scarf. A favorite game. Today, without prompting from the observer, and in the midst of a social exchange between observer and baby, Carol says, "peek-a-boo" (to invite a game, as O heard it). The observer plays the game with her. At one point, as the observer picked up Carol, Carol said "up".

Joan 1:9:19

Feeding sequence She was particularly vocal during this period. Said "hi" to the observer and said "all gone" after Irene fed her a second bite.

Jackie 2:8:0

(Jackie, who has not produced more than one meaningful word in any session prior to this one [and could not be credited for two words] surprises the observers by producing several on this occasion.)

Mother hands him his plastic cup; he says "milk" . . . Plays with the telephone, says "hello" into it. . . Says "Hi!" to his brother when he came in from kindergarten.

(Other words and phrases listed by the observer may be echo forms and are therefore not credited.)

Uses Words to Make Wants Known Bayley #127-Range
(14-27) Med. 18.8

Bayley Procedures: Notice whether the child uses words to make his wants known. At first, this is usually a single word such as "up" "down" "bottle", etc. spoken in a commanding tone or accompanied by gestures.

Credit if the child uses one or more words in an effort to make his wants known.

Blind Group:

This item was passed by 100% of our blind group within the Bayley ranges, with 40% above the median. Credit was given for the first recorded item in the

child's protocols.

Karen 1:2:7

To invite a tickling game, says to mother: "Tickle, tickle, tickle" and mother ran her fingers up and down Karen's tummy.

At one point mother said, "Karen do you want to go bye-bye?" Karen thought for a moment and then answered with a question "car?"

Kathie 1:3:22

(Kathie loves to sing. "Sing" is one of her favorite words.)

Kathie to mother: "Sing! Sing!" Mother: "No, Kathie, I'm too tired to sing right now. You sing". Kathie did indeed start singing on her own with "dadadada" sound.

Ronnie 1:5:2

Ronnie was pulling on the bars of the playpen, trying to stand up. Says "Up! Up!" and when mother didn't pick him up he began to fret and cry, still pulling on the bars.

Jamie 1:5:27

As observer speaks to mother about Jamie taking a bath Jamie responds "No ba!" (No bath!)

Toni 1:8:9

When mother removed the pacifier from her mouth, Toni cried "Mama?" in a questioning voice. . . On several occasions when an object was taken away from her or could not be recovered, she uttered a plaintive "Mama".

Carol 1:8:27

Says "peek-a-boo" to invite O to play game.

(Cited also in # 113)

Paul 2:1:3

Trying to turn on the TV Paul says "Pull!
Pull!" as he has his hands on the button.

Jackie 2:1:13

Says "Cookie?" while mother is washing his
face. (anticipates dessert)

Joan 2:2:15

In pediatrician's office, observers present.
"Walks to her mother. Begins to pull mother
to door and pleads "Mama" while crying.

As Dr. R. places stethoscope on her chest,
she cries "No! No!" and struggles and
reaches toward her mother.

Robbie 2:2:29

Robbie was lying on the couch with his bottle,
when his mother took it away. He protested,
saying "bottle! bottle!" but made no attempt
to actively retrieve it.

Sentence of two words Bayley # 136 Range 16-30;
Median 20.6

Bayley Procedures: Observe whether the child can put
2 words signifying 2 concepts together, such as
"shut door", "Daddy gone", etc. Two words denoting
only one concept, such as "bye-bye", or "all gone",
are not credited. "Good girl" when spoken often
refers to a specific act, in which case it is not
credited as combining two words, but should it be

used to mean approved behavior in several situations, as distinguished from unapproved behavior, it should be given credit.

Credit if the child can put 2 words denoting 2 concepts into 1 sentence or phrase.

Blind Group

This item was passed by 70% of our blind group within the Bayley ranges with 20% above the median. (One child, Toni, had no 2 word combinations when last seen at 27 months.)

Jamie 1:5:27

. . . . Now Jamie says to his grandmother, "Nana, what?" This is followed by "Daddy go".

As O speaks to Mrs. B. about Jamie taking a bath, Jamie says, "No ba" (no bath)..

Kathie 1:7:21

As she comes upon mother at the side of the rug, Kathie asks her "sing baby-bye" which is one of their songs.

Robbie 2:0:1

(During object concept testing sequence.) Robbie was sitting on the floor with two tin cups directly in front of him, placed one behind the other. He made manual contact with the cups and knew their placement. I took the bell from him, ringing it so that he could follow its trajectory, by-passed cup # 1 and placed the bell in cup # 2. Then I said "Where is the bell, Robbie?"

Robbie went directly to cup # 2, by-passing cup # 1, picked the bell out of cup # 2 and said "In dah."

Carol 2:1:30

Mother stood Carol on the floor near her. Carol said, "sit down" and sat on the floor near her mother.

Later: Carol had a bowel movement in her diaper. (Mother has begun toilet training and Carol is really not ready for it.) Carol began to cry as mother began to change her. Mother, seeing Carol's distress waited a few moments. Later, when mother returns to change the diaper, Carol says plaintively "good girl?" and mother says, "yes, you are a good girl."

(Clearly, in the second credited example Carol was seeking approval, following the disapproved act of soiling her diaper.)

Paul 2:2:7

Observer with a flashlight, flashed the light on and off and put Paul's fingers on the button as she did so, saying "push". Paul wasn't able to do it himself and said "You do it".

Paul walked to the kitchen and said "go away, go away".

Ronnie 2:2:13

Ronnie just waking up. Mother asks if he wants to get up. Ronnie: "No, do' wanna".

Later says, "wan pop", meaning he wanted pop to drink.

Karen 2:2:13

After a drink of milk at her feeding table: Karen put down the glass. Mother asked her if she were full. Karen: "I'm just full!" . . . her mother asked her to have some milk and toast, whereupon Karen pushed the milk and toast away with her left hand. After these movements she said "Me's done."

Joan 2:9:15

She is afraid of the Beatle doll. Sister goes to get the doll to demonstrate to O. Joan says, "I won't, beatle bite, bite beyull." And later, to mother, "Kill beyull".

Jackie 3:1:10

To mother: "Want cookie. Jackie want cookie!"

Toni

(No report, Last seen at age 27 months. No two-word combinations in repertoire.)

Discourse at 20 months. Illustration from protocols of highest ranking blind child.

Jamie, who ranks highest in our group of 10 in language achievements, has been totally blind from birth. He is the child of working class parents, he has been largely advantaged through parental devotion, much tactile intimacy, vocal exchanges and games from the

earliest months of life.

Jamie 1:8:12

. . .A little while later he said, "Mama" and mama said, "What?" He said, "Iwanna babbo-bah-pop." (His phrase for bottle of pop.). . .As he was going around the kitchen, he periodically made remarks in the context of a conversational exchange with his mother:

"Igo chair" (I go to the chair). "Igo Ibox" (ice-box). Mother said "Go to the washing machine." He goes over to the machine and says, "washing machine" approximately. . . He does the same with stove. Then he went over and touched the play-pen and said "Pay-pen" leaving the l out.

Somewhere during the course of the morning he also mentioned his wagon, his bike, the tube. He said at one time, "Igot bells", when he had the toy bell that he owns himself. At one time when "wagon" was mentioned, Jamie said, "Let's go wagon".

This sample of Jamie's discourse at 20 months compares favorably with an above average sighted child. (At 20 months, we recall, the reasonable expectation for a sighted child is that he demonstrate at least one example of a two word "sentence" in a single observational session.

His vocabulary includes nominals and action words; his syntax does not distinguish him from a sighted child. He has a syncretic form of "I" ("Iwanna", "Igo") which he

employs for self-reference and, in this respect, he shows some precocity since, typically, this syncretic form of "I" does not emerge in the sighted child's discourse until the end of the second year.

DISCUSSION

The picture that emerges for our blind infants as they move upward on the Bayley scale can be summarized thus:

The early language items, the production of differentiated vocalizations and imitation of sounds and words, show a balanced distribution of achievements within the Bayley ranges. These items speak for neurophysiological maturation and performance which is demonstrably not impeded by blindness in this otherwise intact group of blind infants.

As we move up the scale to higher-level tests of language comprehension and usage, the blind babies match sighted babies in the comprehension item "Responds to verbal requests" with all children in the sample within the Bayley ranges and 50% above the Bayley median. They match sighted babies on the item "imitates words",

with 70% of our blind infants above the Bayley median. These achievements show good and appropriate language capacities in these blind infants and, as suggested earlier, may in fact be facilitated by the unique dilemma of the blind infant, for whom vocal exchanges and games are among the few channels available for reciprocity with his human partners. (We saw vocal exchanges richly exploited by our parents who were as hungry in their own way as their babies for discourse in a common language.)

Then, as we move toward meaningful use of words and two word combinations, the distribution of credited achievements begins to shift. The item "Two words in meaningful use" is passed by 90% of our blind group, with 20% above the median. On a slightly more advanced level, "Uses words to make wants known", our blind babies hold their own again, with 100% within the Bayley ranges and 40% above the median. The last item "Sentence of Two Words" is passed by 70% of the sample within Bayley ranges, and only 20% of the group is above the Bayley median.

Before drawing inferences from these patterns we

should note that the shift in distribution of the sample on items which test cognitive capabilities is not a morbid downward trend. In those instances in which we were able to follow the later development of children in our sample, language abilities in the 3-5 year range compared favorably with those of sighted children, and in only two cases did we see serious lags in later language achievements.

The eccentric patterns observed in the second-year distribution of the blind children on sighted tests can be fairly examined as an impediment of blindness but one which need not have permanent effects.

What is being tested in these three items is representational intelligence. The sighted child in naming objects has a bank of pictures in his head which can be elicited when one of the pictures "out there" matches or approximates an item in his picture bank. Recognition memory is largely a picture memory for the sighted child; and the picture, as the synthesizer of all sensory data, becomes an economical form in which the memory and the name-tag can be retrieved for use. The picture lends itself easily to generalization and

classification at higher and higher levels of organization. And, last, the pictures "out there"--an inexhaustible gallery of pictures is available to the sighted child from the moment he opens his eyes. The sighted child spends his days in a state of chronic intoxication with his picture world, and the pictures lure him on into exercises in recognition, classification, naming, and ultimately to the retrieval of pictures in memory without a presenting stimulus, which Piaget calls "evocative memory".

For the blind child there is no true equivalence in experience. In a world without pictures, his experience with persons and things is both quantitatively and qualitatively meager. The sound-touch experiences provided by persons and things do, miraculously, lead to recognition behaviors for those persons and things which are highly cathected, but the sound-touch experiences depend upon proximal contact, while the sighted child's picture gallery gives him distance contact and multiplies, to the point of saturation (and even sensory fatigue), the number of things and events

which are available to him for elementary exercises in sorting, classification and storage. In quantity of stimuli, we can see that the sighted child's exteroceptive experience is crowded, maximally loaded for learning, while the blind child's world has large empty spaces, and learning and language must exploit near-space, chance encounters, and need-related experiences.

But shouldn't mobility enlarge this space, increase the blind child's encounters and the exploitation of the surround? Here we meet another irony and another hurdle for the blind child. As we reported in Chapter IX mobility is delayed for the child who is totally blind from birth. In our highly advantaged group of blind babies (advantaged because our research had given us the educational means to lure the blind baby into mobility) the median age for creeping was 13.25 months; the median age for independent walking across the room was 19.25 months.

Therefore, at 14 months when sighted babies produce "two-words" for the examiner, the sighted child not only draws upon his saturated visual experience of persons,

things, and events, but he has been creeping for nearly 7 months and walking independently for 2 months. He has long ago ceased to be the watcher of spectacles; he has been a traveler for those seven months, an actor upon things, and he has learned through his own mobility and experimentation the properties of those objects and the identity and class of a large number of them. He has also learned that those objects have names, and how to respond appropriately when fluent speakers of English employ those names, and, finally, that he himself can produce two such names (thus passing the test).

When we now turn to the blind child at 14 months we find that two of our blind children have produced two words at ages above the Bayley median and that 8 children pass the test at or below the Bayley median. But 9 of the 10 are within the Bayley ranges for this achievement! When we consider the poverty of experience for the blind child compared to the sighted child this achievement is impressive. It means that the blind child, through exploiting near space with no mobility or limited mobility has a language capability that falls within sighted-child ranges, and that the impediment is reflected

only in the clustering of the blind group in the lower ranges of the Bayley. The delay is reflected in the difference in median age for the sighted and the blind, which is 6.3 months.

In the next item, "Uses words to make wants known", the blind babies nearly match sighted babies, with 100% within the Bayley ranges and 40% above the Bayley median which is 18.8. The median age for our blind group is 20.75, or a 1.9 month difference between the Bayley median and the median for our group.

For this achievement, blindness appears not to be an impediment, and we are confronted with an interesting puzzle. To name a need or a want is not more difficult for a blind child than a sighted child.

This brings me to reflections along these lines: Needs and wants are first experienced in response to endogenous stimuli. These stimuli which register as appetites or motor impulses are, of course, the same for the blind child as for the sighted child. The pathways that lead to registration of a need or want and differentiation and naming of a specific need or want, appear to be undistorted for the blind child. At

the threshold of naming a want we can postulate a form of mental representation for the desired thing or action or event. For the sighted child the excitation of need or want may evoke a picture as in the analogy of dreaming where "need gives rise to the image of its satisfaction," and giving a name to the picture of need can follow if the name is available in the child's vocabulary. For the blind child, who has no pictures, we must postulate a form of mental representation in which the characteristics of the desired object or event are derived from non-visual data, and this form of representation is clearly capable of leading the blind child to the threshold of naming and to naming "the want".

Since, on this item, our blind children compared favorably with sighted children in "naming wants", we must conclude that the picture is not indispensable for the representation of needs and wants and for their expression in language. More than this: Where internal need states are the stimuli for expression in language, the blind child's need states are physiologically identical with those of a sighted child's. Given the same biological capability for expression in language

we should not be surprised, after all, that our blind babies score as well as sighted babies in the task. "Uses words to make wants known" is on a higher level of difficulty on the Bayley scale than the previous item, "two words." Median age for "two words" is 14.2; Median age for "uses words to make wants known" is 18.8. Our blind babies passed the higher-level test fairly matching sighted babies in median age of attainment. On the lower level test there was a six month lag expressed in the difference between the sighted and blind medians. The clue must lie in the nature of the task.

The item "two words" (I nearly slipped, significantly, and wrote "two worlds") may be more closely related to exteroceptive experience, "naming objects". Where the stimuli for "making wants known" are endogenous and give the blind child physiological parity with the sighted child, the stimuli for the first words as referents are, in large measure, exogenous, i.e., persons and things. And while the blind child's actual world is furnished with a large number of persons and things, his experience of them is significantly reduced by the condition of blindness and his delayed mobility. The

identity of objects which is built into the sighted child's experience through visual pictures and picture sorting, is laboriously achieved by a blind child who must go through manual-tactile-acoustical exercises in synthesis to establish the identity of mother, father, and his favorite sound-making toy before he can confer names upon persons and things.

First words for the sighted infant are, predominantly, nominals as Kathryn Nelson (1973) found in her analysis of the first 10-word vocabularies and 50-word vocabularies of infants. In her middle-class sample, over 65% of the first 50 words were nominals, specific and general, for persons, animals, objects. Because of differences in sample and methods of recording (Nelson employed parent inventories), we cannot fairly compare the early vocabularies of our blind infants with Nelson's sample. However, a cursory review of the credited words for our blind children on the Bayley "two words" item shows that nominals predominate. It may be the difficulty in naming, in a world without pictures, that we see in the blind child's lower median age for the achievement of this item.

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In the item Sentence of two words we again find a distribution of scores among our blind group which suggests the impediment of blindness. Our blind median of 26 months is nearly 6 months lower than the Bayley median of 20.6. Two children are far below the Bayley ranges at 33 1/2 months and 37 1/2 months respectively. The task is to "put two words signifying two concepts together". The 6 month difference between the two medians is the same for this item as the earlier item "two words", which suggests that the same conceptual problems which impeded the blind child in the acquisition of first words are present in the combining of two concepts, and the 6 month lag in both items may be consistent.

Is it experiential poverty which accounts for the blind child's delay in uniting two concepts? Are the linkages of nominals and action words, for example, normally facilitated by vision, in which the person or thing observed and his or its actions are united in a picture or a picture sequence? (e.g. "Mama-bye-bye" "car go"). Or, in the case of a nominal and modifier "Big truck". Is blindness an impediment in these constructions because of the unique problem for the blind

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child in the attribution of actions and qualities to objects which cannot be derived or inferred from his own experience in the second year?

Since, demonstrably, the blind child does "get there", does combine, does move toward syntactical structures of higher and higher complexity, and does speak a respectable English at 4-5 years of age, the impediment can be largely overcome. What we see, then, in the second year, in the comparison of our blind median age of achievement and that of the sighted, may be an impediment in concept formation which affects naming in the two words item and combining two words in the sentence item. Without vision, the child must take a long and circuitous route to the construction of a world of objects (and naming them) and to the attribution of actions and qualities to things and persons (two word sentence).

And as we bring these speculations to a close, we are left with the remarkable facts that two of our children, totally blind, produced their first two word sentence at ages above the Bayley median, that 7 of the children in all were within Bayley ranges, that two were

below the Bayley ranges for an N of 9 available to us for study in the second and third years.

AN AFTERWORD: THE COURSE OF LATER LANGUAGE DEVELOPMENT

The orderly progression in the achievement of these early language milestones did not prepare us for a detour in the course of language development which appeared in the third and fourth year. The discovery came by chance. Our research commitment to NICHD covered the developmental characteristics of blind infants in the age range 0-2 1/2. But four of our older blind children remained in our educational program through age five, and, following our usual practice, we maintained our observational and recording procedures during all visits.

It was in this way that we discovered that self representation in both language and play were impeded for even the two highest ranking subjects of our original group. A syncretic "I" ("I wanna") which had emerged well within sighted child ranges was slow to evolve into stable and flexible "I", "you" usage, and reversals were recorded well into the fourth and fifth years. A parallel development was seen in the blind child's incapacity to represent himself in play during the same period. We

understood this to indicate the extraordinary problems posed by blindness in constituting a self and an object world and in representing the self as an "I" in a universe of "I's". This protracted delay in the acquisition of a stable "I" usage was seen among our children in a context of advancing language abilities with steadily expanding vocabularies and syntactical structures!

In the following chapter we will examine this problem in some detail.