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A CHILD'S PROGRESS IN SPEECH, WITH DETAILED
VOCABULARIES.

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I. BIOGRAPHICAL.

The subject of this study is the author's little daughter, Jane. She was born at Tientsin, China, March 19, 1911. Eight months later, owing to unexpected developments in the Chinese revolution, she returned to the United States with her parents. Since then she has lived for short periods in California and Utah, while the last year she has spent in Montana.

Both her parents are college graduates, her father a teacher of chemistry, her mother a designer: In descent she is mostly English, since her father's nationality is English-Welsh, and her mother's English and Dutch-German. Jane is, however, in two lines the fourth generation to be American born.

She has lived continuously with her parents, the various homes always being in the city. She has not associated much with other children, but there is a sister in the family eight months old. Both have been systematically trained since birth, and are considered by most acquaintances to be models of deportment.

Jane has received no special instruction in acquiring speech. All attempts in that direction are encouraged, questions always being answered unless they are asked merely to pass time. No efforts are made to force her mentally. In this respect her

parents have resisted temptations to consider her any but an average American child, but lately several people teaching education and psychology have pronounced her decidedly above the average. At 28 months she correctly performed the Binet tests for three-year-old children, and also two of the tests for four-year-olds. In her speech and vocabulary, however, there are only a few things unusual. She has used some of the Montessori apparatus, learning to do the simpler problems quickly and correctly.

Physiologically, Jane is practically perfect. A rather severe attack of tonsillitis and a few minor childish ailments have been the only breaks in otherwise splendid health. At birth she weighed eight pounds and was 19 inches in height; at one year these figures were 22 pounds and 29.25 inches, respectively; at 28 months, when the second vocabulary was secured, they were 32.2 pounds and 35.5 inches.

II. METHOD OF ACQUIRING DATA.

The vocabulary for the first year was easily obtained. For the second the methods made familiar by Mateer, Pelsma and others were used. For two weeks at the beginning of the 29th month one or both parents were continuously with the child writing down, on papers prepared for the purpose, all that she said. The detailed vocabulary was later arranged from these slips. Other investigators have taken longer periods of time for observations—Mateer, ten weeks; Pelsma, three weeks; Rowe, ten weeks—but on the 12th day it was discovered that the only new words found on the slips were four or five in number which the parents were sure had been acquired since the beginning of the experiment. The same thing was true on the 13th and 14th days, and so at that time the observations were discontinued.

During the two weeks the child did not seem aware that her conversation was being watched more closely than usual, and indicated by her remarks that she thought the parents were drawing, a favorite pastime with her. She is quite talkative, and the vocabulary was thus easily obtained, most of the words obtained being used during the first week. Occasions were

made for her to use well-known words, and she was sometimes asked to name articles infrequently used or noticed by her. While some writers have objected to this method, it does not seem invalid to employ it. The word may be well known, but if no occasion arises it is not used by the child. A number of words used without a real understanding of their meaning have been omitted, as well as all words merely repeated after others.

III. DETAILED VOCABULARIES.

In arranging the following vocabularies, simplification was the rule in deciding what words to set down. It is to be regretted that there is not greater unanimity of opinion among writers on this subject. Anything that will tend to keep the number of words at a minimum without sacrificing any important facts would clearly appear to be the best method. In accordance with this principle no proper names are listed in the vocabularies here presented; also no variants of verbs or adjectives nor plurals unless the singulars were not used. However, it is difficult to know where to stop in this weeding-out process, and the author has included all pronoun forms as well as a few variants of the verb "to be." The same word used in several senses is listed several times according to its grammatical use by the child. New words—that is, those acquired during the taking of the vocabulary—are italicized. Shortened words, etc., are in quotation marks.

Vocabulary at 12 Months.

Nouns—chow, daddy, dog, pot, toast.

Verbs—go, see.

Adjectives—pretty, good.

Interjection—hello.

Vocabulary at 28 Months.

A. Nouns—apple, apron, arm.

Verb—am.

Adjectives—a, all, awake.

Adverbs—all right, around, away.

Preposition—about.

Interjection—ah.

- B. Nouns—back, bacon, bag, ball, basket, bath, bathroom, beans, bed, beet, bib, *bird*, *biscuit*, bite, blanket, block, book, bone, bottle, bouquet, box, bread, broom, brush, bucket, buckle, button.
Verbs—bite, break, brush, build, button.
Adjectives—beautiful, big, broken.
Adverbs—back, better, backward.
Interjection—boo.
- C. Nouns—*cabinet*, cake, can, candy, car, carrots, cart, cascara, cat, cellar, chair, *chain*, charcoal, cheese, cherries, chick, chocolate, chow, clock, closet, clothes, clothes-pin, coal, coalshed, coat, cocoa, coffee, comb, cotton, cork, couch, crayon, cream, “crax” (crackers), *cube*, cup.
Verbs—can, can’t, carry, clean, close, come, cook, cough, *crawl*, cry, cut.
Adjectives—chocolate, clean, cold, *crooked*.
- D. Nouns—daddy, diaper, *dinner*, *ditch*, dog, doll, door, dress, drink, duck.
Verbs—dance, do, don’t, draw, dress, drink, drop.
Adjectives—dear, dirty.
Adverb—down.
Interjection—darn.
- E. Nouns—ear, egg, enough, eye.
Verbs—eat, excuse.
- F. Nouns—face, feather, feet, fire, fish, floor, flower, fly, fork.
Verbs—fall, feel, *fit*, fix.
Adjectives—foolish, funny.
- G. Nouns—garter, girl, glass, go-cart, “gran.” (grandma), grass.
Verbs—get, go, gulp, gurgle.
Adjective—good.
Adverbs—good-bye, good-night.
- H. Nouns—hair, hand, handle, “hankie” (handkerchief), hat, head, heel, *hole*, home, honey, house, horse.
Verbs—hang, have, hear, help, hit, hug, hurry, hurt.
Adjectives—heavy, high, hot, hurt.
Adverb—here.
Pronoun—him.
Interjection—hello.
- I. Verb—*is*.
Pronouns—I, it.
Preposition—in.
- J. Nouns—jacket, jar, jelly.
Verb—*jump*.
Adverb—just.
- K. Nouns—key, kiss, kitchen, knee.
Verbs—keep, kick, kiss, knock.
- L—Nouns—*lawn*, leg, lid, light, “lots.”
Verbs—lay, laugh, lean, let, lie (recline), like, lock, look.
Adjectives—long, lost, lovely.
Adverb—lot.

- M. Nouns—macaroni, man, meat, milk, mother, moon, mosquito, mouth, mouthful, mush.
Verbs—move, must.
Adverb—more.
Pronouns—me, my.
- N. Nouns—"nakum" (napkin), neck, needle, nightshirt, nose.
Adjectives—nasty, naughty, new, nice.
Adverbs—no, not, now.
- O. Verb—open.
Adjectives—old, one, other.
Adverbs—off, on, out, over.
Prepositions—of, on.
Interjections—oh, ouch.
- P. Nouns—pail, pair, pan, paper, paste, pease, pencil, pie, piece, pillow, pin, plate, plenty, *plug*, pocket, pot, prunes, pudding, pup.
Verbs—pat, pick, play, put.
Adjectives—*pink*, precious, pretty.
Interjection—"plunk" (kerplunk).
- R. Nouns—rabbit, *rake*, rattle, ribbon, rice, rocking-chair, rompers, room, rubber.
Verbs—rain, *rake*, reach, rock, run.
Adjective—ready.
Adverb—right.
- S. Nouns—salt, salve, sandal, school-side, shirt, shoe, shovel, slipper, soap, socks, *sound*, soup, spoon, stair, step, sticker, stove, strawberries, string, suef'chow, sugar.
Verbs—say, see, sew, sit, shall, shut, sleep, smell, spank, spill, splash, stand, step, sweep.
Adjectives—silly, soaking.
Adverbs—so, some.
Pronoun—she.
- T. Nouns—table, tablecloth, taste, tea, teeth, things, tie, toast, tongue, town, train, tray, tree, trunk, tub.
Verbs—take, talk, tear, thank, tickle, tip, try, *turn*.
Adjectives—that, the, thin, this, thirsty, *tin*, tired, two.
Adverbs—there, through, too.
Pronouns—that, this.
Preposition—to.
Interjection—there.
- U. Noun—umbrella.
Adverb—up.
Pronoun—us.
- V. Nouns—vase, vaseline.
- W. Nouns—walk, washrag, water, wood.
Verbs—wake, walk, want, wash, would.
Adjectives—warmer, wet, white, wrong.
Adverbs—"wayup," what, where.

Pronoun—we.

Interjections—whoa, whoop.

Y. Adverb—yes.

Pronouns—you, your.

The following table shows the number of words of each initial letter classified as to grammatical form, the total number of words beginning with each initial letter, and finally, the total number of words in the above list:

TABLE I.

Initial.	Nouns.	Verbs.	Ad- jectives.	Ad- verbs.	Pro- nouns.	Prepo- sitions.	Interjec- tions.	Total.
C	36	11	4	0	0	0	0	51
S	21	14	2	2	1	0	0	40
B	27	5	3	3	0	0	1	39
T	15	8	8	3	2	1	1	38
H	12	8	4	1	1	0	1	27
P	19	4	3	0	0	0	1	27
D	10	7	2	1	0	0	1	21
W	4	5	4	3	1	0	2	19
L	5	8	3	1	0	0	0	17
R	9	5	1	1	0	0	0	16
F	9	4	2	0	0	0	0	15
M	10	2	0	1	2	0	0	15
G	6	4	1	2	0	0	0	13
A	3	1	3	3	0	1	1	12
N	5	0	4	3	0	0	0	12
O	0	1	3	4	0	2	2	12
K	4	4	0	0	0	0	0	8
E	4	2	0	0	0	0	0	6
J	3	1	0	1	0	0	0	5
I	0	1	0	0	2	1	0	4
U	1	0	0	1	1	0	0	3
Y	0	0	0	1	2	0	0	3
V	2	0	0	0	0	0	0	2
Q	0	0	0	0	0	0	0	0
X	0	0	0	0	0	0	0	0
Z	0	0	0	0	0	0	0	0
	205	95	47	31	12	5	10	405

Table II shows the percentage each part of speech is of the total number of words.

TABLE II.

	Nouns.	Verbs.	Ad- jectives.	Ad- verbs.	Pro- nouns.	Prepo- sitions.	Interjec- tions.	Total.
Number....	205	95	47	31	12	5	10	405
Per cent....	50.62	23.46	11.60	7.65	2.96	1.24	2.47	100.00

The next Table shows the number of words beginning with each initial sound (as contrasted in some cases with initial letter).

TABLE III.

Sound.	No. of words.	Sound.	No. of words.
K	50	th	12
B	39	ch	9
S	34	e	6
P	27	sh	6
H	27	j	5
T	26	wh	5
D	21	i	4
L	17	u	3
R	16	y	3
M	15	v	2
F	15		
W	14		
G	13		
A	12		
O	12		
N	12		
			405

Proper Nouns.—During the first year no proper names were used. At 28 months the following were observed:

Billie, Grand-ranch, Henry, Jane, Patsy, Percy, Puck, Roger, Rose, Sam, Squire.

If these were included in the vocabulary the total number of words would be 405 plus 11, or 416, of which the proper names would constitute 2.64 per cent.

IV. DISCUSSION OF VOCABULARIES.

Number of Words.—The number of words for the first year is about the same as the average of nine children so far reported. If the highest of these (twice as many as any other) and the two lowest are not considered, the average is still practically the same—Jane, 10; average of nine children, 9.5; average of six children, 9.2.

For the second vocabulary Tracy has reported two children of the same age. Their average was 564, considerably above 405. This author, however, includes inflected forms of verbs and adjectives. Of these, Jane used 72, thus bringing her total number of words to 477 if they are counted in. The average number of words used by seven children from 25 to 28 months old is 477, which also includes inflected forms. The average of 23 children from 24 to 28 months is 441. These are all the

observations now available except for three cases, where the totals for children two years of age are given as 1227, 1121 and 36. These were omitted as deviating too far from the average. The latter figure contains in some cases proper nouns, in others inflected forms, in some cases both. Jane's vocabulary of 405 words with neither of the above classes, of 416 with proper nouns, 477 with inflected forms and 488 as a maximum figure compares well with this average. Considering all the facts, the number of words in the vocabulary is, in all probability, close to that of the normal child of this age.

Number Vocabulary.—Numbers above two have been excluded from this list of words, since the child clearly did not comprehend their magnitude. Three was used indiscriminately for small numbers, while "lots" was used for larger quantities. This compares closely with other observations.

Color Vocabulary.—This embraces only two terms—pink and white—although the day after the experiment was finished brown was employed correctly. This was at least average; for some authorities state that the average child of two years knows only one color term, while many five-year-olds employ only four or five.

Parts of Speech.—In this respect the vocabulary is unusual, in that there is decidedly a larger proportion of verbs and adverbs and fewer nouns than found in any group of children reported. The adjectives, pronouns and interjections are also above the average, while the prepositions are about the same. Possibly some explanation of this may be found in the fact that Jane is very active, has been encouraged to do things herself for her own welfare and amusement, and likes to help her mother with anything on hand. The acquisition of terms for attributes of objects and actions shows some budding powers of observation also manifested in other directions.

Coinced Words.—Most observers report a number of these expressions, together with unusual deviation from the dictionary or grammar, but in this list not one is to be found unless it be the expression "wayup." This does not result from a lack of imagination, as some authorities appear to consider, but from the fact that much care is exercised to see that the child both acquires and pronounces its words correctly. Instead of

the household using quaint expressions and thus fixing them in the child's memory, no attention (publicly at least) is paid them. The word "heavy" for some time was used to express the ideas of heavy, difficult and hard. If the Montessori forms did not fit easily they were "heavy;" if the door stuck, it was "heavy;" the putting away of the playthings was once said to be "heavy," too. But this can scarcely be said to deviate from common usage, and shows how easily words may be applied in a figurative sense even by a little child.

Objectionable and Non-grammatical Words.—In the first category only one word appears—the exclamation "darn." It is not known who was the guilty party, but the child has used it several times with much vim. Under the second heading there is to be noticed a confusion between the verbs "lie" and "lay," which no doubt is natural enough. Several shortened and mispronounced words will be discussed later.

Foreign Words.—Two Chinese words and one Pigeon-English expression are to be found in the list. The former, "chow" and "suei'chow," mean food and sleep, respectively. The latter, "school-side," is self-explanatory. These came from Jane's oriental experiences!

New Words.—Those acquired during the period of observation were 20 in number, or 4.93 per cent. of the whole.

V. THE ACQUISITION OF SPEECH.

A large number of writers, both scientific and otherwise, have ascribed to the baby's first cry the expression of various emotions, both poetical and prosaic. Pain, indignation, grief, surprise, are some enumerated. In Jane's case this first beginning at self-expression was a series of short, rapid, vigorous cries continued for about one minute. Judging by later samples, this cry was most like that which later warned her mother of some general discomfort, such as coldness. Contrary to the contention of some writers that all very small babies "sound alike," Jane's voice had a very distinctive timbre, being low pitched and full in tone. It was easily distinguished from the voices of other children.

For the first few days all the crying was of much the same character as the first cry, but by the end of the second week her parents could distinguish several different varieties. Pain was expressed by high, sharp yells, forcefully uttered; hunger by much the same cry, but pitched in a lower and milder key; general discomfort or discontent was shown by intermittent cries. The child developed a dislike for hearing paper rattled, and expressed this by a definite vocal performance. At about the same time every day she indulged in an "exercise cry," during which she tried various pitches and modes of utterance, generally rather vociferous. Later a cooing, singing style was adopted to show general satisfaction with things.

When about two months old she began to "talk," using in rapid succession a great variety of sounds. These began with "a" and "o," to which easy consonants such as "b," "d" and "m" were soon prefixed. The latter sounds were then doubled into "mama," "dada," etc., and then strung together in long chains. It was evident that the child was experimenting, and enjoyed doing so. During the course of the next few months practically all the sounds in the language were heard by the parents. A favorite pastime of the child was the stringing together of the combination, "doglely-oglely-woglely" to form many variations.

Conscious imitation was first shown during the seventh month. This was at that time only applied to sounds and gestures, while it was not until the ninth month that any but very simple words were attempted. At first it was plain that only imitation was at work, and the child was ten and one-half months old when the first word was spontaneously used in such a way as to show that to it was attached some meaning. The word was "hello," usually repeated four times in rapid succession. The child was greatly pleased with this performance, beginning her salutation when people were some distance away.

From this time on words were slowly, but surely, acquired. At the end of the twelfth month 10 words were in constant use; at 15 months it was estimated that this number had increased to 75; at 18 months, to 175, and at 28 it had reached the total here shown, 405.

No definite plateau stage was observed, such as was noted by several authors. After the eighteenth month a very rapid increase in the vocabulary was remarked, but at no time was interest in acquiring speech almost or entirely absent, since almost every day a new word would be used. Jane did not walk until she was 18 months old, when she suddenly learned to do so in one evening between 6 and 9 o'clock. She was so infatuated with the new accomplishment that she practised it until quite exhausted, staying up beyond her usual bedtime to explore new parts of the house. The next morning she started out walking, and has not crawled a foot since. Perhaps this is why no plateau was clearly marked in the child's speech development. But, as remarked above, at the same time as the walking was so suddenly acquired there was a great enrichment of the vocabulary, so perhaps some assimilative process had been at work.

VI. METHODS.

Fully as interesting, and perhaps more valuable, is information as to how the child gains materials for expression. In the present case the child passed through several well-defined stages, finally employing an original method for learning sentence structure which was justified by results.

At first, while the imitative period was in progress, Jane would repeat many of the words she heard, saying the same word over and over to perfect pronunciation.

At 15 months, however, this practice was discontinued entirely. Nothing now could induce her to repeat new words; they were listened to in silence. Nevertheless, there was a constant use of expressions unused before. Apparently the child was carefully observing, assimilating, and when opportunity presented, using the new words correctly and with distinct enunciation without any practice. Frequently the parents were startled at hearing some word they had forgotten having used. During this time the use of two Chinese words was also discontinued, whereas before they had been among the most worked. No other words were dropped in this way. Did the **child** perceive some difference between these and the English

vocabulary and consciously avoid them, or was this and the failure to repeat signs that a plateau was then being crossed? At any rate, after the eighteenth month Jane once more repeated any combination of words she heard, at the same time using freely once more the tabooed oriental phrases.

While first learning to talk there was shown a tendency to generalize. Thus "dog" was applied to any animal from a hen to a cow, even to a horse and wagon, together or singly. Motion seemed to be the quality linking all these together. Later, "dog" was used as a sort of class name for animals, the correct term, cat or pig, being used concurrently. At last the word was restricted to its proper sense. This progress occupied about three months. In the same way boys, men, teddy-bears and a red fire hydrant were called "girls," but the incongruity here was perceived more readily than in the dog case.

At the time of writing, "girls" was the term used for anything feminine from six to sixty. This trait of generalization has been noticed by a number of observers.

Some words the child would or could not learn, though they appeared no more difficult than many easily acquired. Perhaps growing independence or a spirit of contrariness was at work. In one case somebody laughed at her pronunciation of a certain word, which caused it to be cast out bodily from the vocabulary. An interesting word in this connection is "yes," which is used but seldom. The negative in all forms was early and easily learned; indeed, some days all suggestions offered were vetoed. "Yes" was first used much later, and is now avoided, certain circumlocutions taking its place.

In this building up of the vocabulary the parents aided as much as possible by never talking baby-talk; also by consistently giving each thing its right name. In this respect, however, the father did not always have the courage of his convictions, for although the child easily learned to say cube, and later, cylinder, the father did not quite venture upon polyhedron or parallelopiped.

During the twenty-first month simple sentences of a few words were first used, although previous to this it was evident that one or two words constituted to the child a complete

thought. Two months later more ambitious sentences were in service made up of all parts of speech except conjunctions. The latter were not used even at 28 months. At the beginning of the twenty-fourth month a new development appeared, which at first was decidedly puzzling. Although talking more than usual, the child suddenly became all but unintelligible, only a sensible word here and there lifting its head above the stream of meaningless nonsense. In a few days it was noticed that this babble was divided into parts, each ending with a full stop, an exclamation or interrogation point; also that a great variety of expressive inflections and turns of the voice acted as an accompaniment to the apparent nonsense sounds. It was then obvious that the child was imitating conversation,—which its performance closely resembled if heard from a distance. This idea was confirmed when guests were present, for the child, adopting the proper social tone, joined in the conversation with beautifully modulated periods quite devoid of meaning. It was then mortifying to the parents, who remembered the former rapid progress, to hear the visitors say: "She doesn't talk at all yet, does she?"

This lasted nearly two months, and then the value of it all appeared. Out of the chaos of sounds there emerged complete sentences with all parts in good order, with emphasis and inflection correct, the whole colored with some of the individual expression which distinguishes one person's conversation from another. The remarks of visitors were now more gratifying than before. The child has not since reverted to the more primitive sentences.

There remains only to mention the progress in enunciation. Regarding this there is little to say, since Jane has always spoken distinctly, and only a few combinations have presented any difficulty.

The "pk" in napkin refuses to be conquered. Handkerchief is shortened to "hankie." The "v" in shovel has a tendency to become a "b." If initial sounds only are considered, the least difficult sounds for Jane are K, B, S, P, H, T. This order closely approximates that of several observers. Only one word has a history of several changes. This is "book," which was acquired very early as "gook." When attempts were made to correct this it became "cook," but shortly relapsed into "gook" again, which is used along with the correct form.

VII. MIND CONTENT.

An attempt was made to find what the child had stored in its mind concerning the words in its vocabulary. But with questions as "What is a cart?" Jane did not understand what was wanted. To all such she would either repeat the question or the noun, or else go to the object and say, "Here it is." The same questions in different forms fared no better. To most questions intelligent replies were given, but they showed only associative memory.

VIII. CONCLUSION.

The author has already on hand a record of the progress made along these lines by the youngest member of the family, and is continuing observations on both children. It is hoped that these notes may contribute something to the knowledge of the psychology of language development, a study which may perhaps be based mainly upon its genetic aspect.

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