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ELICITATION OF CHILDREN'S SPEECH SAMPLES:
REINFORCEMENT AND PROMPTING

by

REBECCA LOU WALKER

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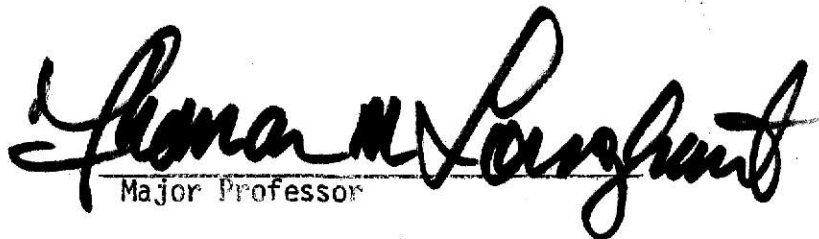
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INTRODUCTION TO THE PROBLEM

In the assessment of the growth and development of the handicapped child, expressive oral language is frequently the most important single factor. It is vital to the researcher, clinician, and special educator that as accurate a representation as possible of the child's language abilities be obtained.

Recent investigators in linguistics and developmental psycholinguistics (Chomsky, 1965, 1967; McNeill, 1966, 1970) have demonstrated the importance of differentiating between linguistic competence and linguistic performance. Competence is thought of as the speaker-hearer's tacit knowledge of his language and is generally discussed in terms of an internalized system of linguistic rules. Performance, on the other hand, is the actual use of the language in concrete, "real life" situations. Developmental psycholinguists are interested in the normal acquisition of competence and verbal behavior. Concern with individual child differences that alter the rate or type of linguistic rule acquisition and are manifested by deviant performance is what sets the areas of speech pathology and special education apart from developmental psycholinguistics. The generative rules which developmental psycholinguists wish to identify and describe have to do with the child's competence. For differential diagnosis of individual differences, the speech pathologist or special educator must effectively assess the child's performance.

Recent research has begun to focus on the structural or syntactic aspects of handicapped children's language performance (Lee, 1966; Wilson,

1969; Dever and Bauman, 1971; Lee and Canter, 1971; Engler, Hannah, and Longhurst, 1973; Longhurst and Schrandt, 1973). In evaluating the child's language performance, researchers or clinicians generally elicit a spoken language sample from the child. This sample is then analyzed in a number of ways, including the classification and categorization of utterances and the application of a variety of counting procedures and statistical ratios. These analyses are then compared with normative data, if available, and then, if indicated, various clinical or educational remedial procedures are prescribed to improve the child's language.

One major difficulty with this method of assessing the speech and language of handicapped children is that there is no standard method presently employed for eliciting the language sample from the child. In presently available language research there has been a monumental lack of concern for variables inherent in the elicitation process that may influence the obtained language sample. In language assessment for diagnostic purposes, the procedures used to elicit the oral language sample from a specific child are often quite different from the procedures used in the normative study with which the child's results are compared. In research, little attention is usually given to elicitation methodology equivalence among studies that are compared (Carroll, 1961).

Ahmed (1973) states that the ideal elicitation methodology is one which controls the relevant situational variables in such a way that the procedure results in an optimal and representative language sample from a given child, comparable with other language samples.

There is currently information which studies some of the variables relevant to the elicitation of language samples from handicapped children. The possibly relevant variables may be divided into at least four categories: variables connected with the (1) elicitation setting; (2) verbal directives, e.g., pretraining period, instructions, and prompting; (3) stimulus materials; and (4) the examiner. These variables may interact with the specific characteristics of the handicapped child to be examined, such as sex, intelligence, age, severity or type of handicap and socioeconomic status.

REVIEW OF LITERATURE AND STATEMENT OF THE PROBLEM

Any attempt to standardize the method of eliciting oral language samples from handicapped children must investigate as one of the variables the use of prompting and reinforcing during the sampling. That is the purpose of this research. Verbal directives are defined as the examiner's verbal instructions during a pretraining period, or prompting used by an examiner in evoking and sustaining responses from the child. The verbal directives used by various examiners have usually not been comparable, and it appears that often verbal directives given to subjects within individual studies have not been consistent. Usually a choice of verbal directives is given: "Tell me what you see in the picture", "Tell me what is happening," "Tell me what the people are doing," or "Tell me a story about this picture," and as pointed out by Cowan et al. (1967), the examiner may use different directives with different subjects in the same investigation.

Since the experience of talking about toys or pictures to an adult may be a new experience for some handicapped children a certain amount of learning

how to respond is assumed to be necessary by most examiners. Some examiners have discarded the first portion of a language sample, assuming that the child may be adapting or learning how to respond at the first of the examination session (Templin, 1957). Other examiners have conducted a specific pretraining period in which the child is given specific instructions and allowed to practice on some stimulus materials. Cowan et al., (1957), Standberg, (1969), and Mintun (1968) suggest that the examiner reward the longer responses emitted during pretraining so that longer responses will occur when the actual sample is elicited. Mintun (1968) and Strandberg (1969) also instructed their children to avoid naming responses.

Some examiners have suggested that children be prompted by questions about the stimulus materials or statements such as "Tell me more." Lee and Canter (1971), for example, give the following instructions:

The speech sample should be taken in a conversational setting with an adult rather than as an egocentric monologue...or in play with other children.... This adult interaction is especially important in a clinical setting since language-delayed children seldom engage in self talk and only intermittently talk with one another. The success of the speech-sampling procedure is dependent upon the skill of the clinician in eliciting from the child a verbal performance which is representative of his level of grammatical achievement. The clinician should avoid structuring the child's responses by asking questions which elicit one-word answers, such as "What's this?" and "Where is he?" Instead, he should ask questions which encourage complete-sentence answers, such as "What happened next?" "What would happen if...?" "What did he say?" and "Tell me about it." Sometimes a clinician can elicit complete sentences by telling the first part of a story or picture description himself, thus setting a standard of speech for the child, and then merely saying, "You tell what happened next."

Other examiners, such as Wilson (1969), have not prompted in any way. While Wilson did not interact with the subject at all she did make comparisons across studies and criticized the work of Lee (1966), who did not mention her own elicitation procedure.

Leonard (1972) used still a different set of verbal directives which consisted mostly of questions (prompting) but no systematic reinforcement. These are reproduced in Appendix A. He analyzed some verbal behavior elicited by his procedure but also included in his analysis some sentences given to him by Lee which were elicited using different procedures. This comparison, between studies and even between language samples themselves, does not take into account such variables as different examiners and/or different verbal directives (e.g., prompting or reinforcement) used during elicitation.

Lovitt and Smith (1972) used the following specific instructions: "I am going to show you some cards. Please make a sentence about the picture on each card." The teacher in this experiment merely told the child what was expected with no training period, instructional materials, or reinforcement contingencies presented. The results of the study showed the subjects' responsiveness to oral instructions to be excellent.

Few if any attempts have been made toward standardization of reinforcing or prompting procedures during elicitation. The use of these techniques is reported by some researchers though not by others such as (Graham and Graham, 1971). Yet the language samples and results are analyzed and compared with other studies which may or may not have used the same techniques.

Longhurst and Schrandt (1973) asked questions such as, "What is happening here?", and attempted to encourage the child by saying, "Yes," "Really," and nodding of the head.

The following is an example of the instructions given in various studies for language analysis (Ahmed, 1973; Engler, Hannah and Longhurst, 1973; Longhurst and Grubb, 1974):

We are going to play a game. I will show you a picture and you are to tell me all you can about the picture. Don't just name the things in the picture but try to string words together. Let's practice the game now.

In all of these studies the examiner attempted to be generally encouraging, but did not give any specific reinforcement, or prompt the child to continue speaking by asking any questions.

The purpose of the present study was to analyze the effects of reinforcement and prompting when evoking verbal responses from mentally retarded children at two levels. Specifically this investigation was an attempt to study the effects of reinforcement and prompting on the obtained language sample when used by an examiner in evoking and sustaining verbal responses. Comparisons were also made with a control group which was not prompted or reinforced.

The study was designed to answer whether there are differences in language samples elicited when the child's long utterances are reinforced versus when the subject's verbal behavior is prompted. Furthermore, it was designed to test whether the use of prompting or reinforcement precipitates a more optimal language sample than when these techniques

are not used. A second question was designed to test whether reinforcement or prompting interact with the level of the child. The information derived from this research should be applied to the development of a standardized method of eliciting oral language samples from handicapped children.

METHOD

Subjects

The subjects were thirty-two mentally retarded residents of Parsons State Hospital and Training Center (PSHTC) between the chronological ages of 10 and 18 years, with an over-all average age of 14 years 8 months. They were divided into two equal groups of sixteen, on the basis of their measured intelligence and adaptive behavior (MI-AB) levels (Heber, 1959). Group I consisted of children who had been classified by the Psychology Department at PSHTC as MI-AB level I, which corresponds roughly to traditional definitions of educable mentally retarded. Group III consisted of children who had been classified as MI-AB level III, which roughly corresponds to traditional definitions of trainable mentally retarded. Members of each group were then randomly assigned to each of two treatment groups (T_1 and T_2).

Any subject exhibiting gross neuromotor disabilities, a hearing disorder, misarticulation of / -s, -z, -iz/ or speech so unintelligible that it would have seriously impeded later transcription was excluded.

The results from the two treatment groups in the present study were compared with data reported by Ahmed (1973). These data served as a control for the treatments in the present experiment. Ahmed's (1973) group consisted of sixteen subjects with the same characteristics of those in the present experiment. They were also divided into the same MI-AB level groups as in the present experiment. Table 1 shows the assignment of groups to treatments.

Table 1

Assignment of subjects to MI-AB level groups
(I and III) and treatment groups.

TREATMENT	C*	T ₁	T ₂
VERBAL DIRECTIVES	No Prompting or Reinforcing	Reinforcing	Prompting
GROUP I	8 subjects	8 subjects	8 subjects
GROUP III	8 subjects	8 subjects	8 subjects

*Control is from Ahmed (1973)

Stimulus Materials

The stimulus materials consisted of eight, multi-colored pictures of multi-objects, (W-1, 2, 3, 4, 5, 6, 11 and 12) from the Peabody Language Development Kit (Level 2), (Dunn and Smith, 1966). Multi-object

pictures were chosen because Ahmed (1973) found that if pictures are to be used as the media for elicitation of verbal samples from handicapped children at both levels, multi-object pictures elicit better speech samples.

Experimental Facility

The language samples were collected in laboratory space located at Parsons Research Center of PSHTC. The experimental room was free of distracting visual or auditory stimuli and contained a table, two chairs, a microphone, a remote control slide projector, and slides of the stimulus pictures, all an exact duplication of Ahmed (1973). The tape recorder (Wollensak, 1520ss), equipped with a remote control, was located in an adjacent control room.

Procedure

Each subject was brought individually to the experimental room by the same male examiner, seated at the table, and instructed:

We are going to play a game. I will show you a picture and you are to tell me all you can about this picture. Don't just name the things in the picture but try to string words together. Let's practice the game now.

The subject was then presented with a picture and allowed to describe it in any way he wished. The examiner either remained silent (C), reinforced (T_1), or prompted (T_2) in accordance with the experimental condition designated for the particular child. After this brief pretraining period, the examiner presented the eight remaining pictures in a random order to the subject.

For the control group the examiner offered no prompting such as "Can you tell me more?", did not ask any questions, and did not offer any social reinforcement such as "Good" or "Fine talking." At times the examiner was generally approving but most of the time he remained silent.

Previously all of the subjects in the reinforcement condition had been asked to describe pictures not used in the present experiment. From this previous language sample a mean length of utterance (MLU) was computed for each child. When a subject in the reinforcement treatment group (T_1) emitted an utterance equal to or longer than the previously computed MLU, the examiner would reinforce the utterance by saying, "Good" or "Fine talking" and nodding or smiling. The examiner socially reinforced the equal to MLU or longer utterances as often as appropriate during the elicitation period.

The subjects in the prompting treatment group (T_2) were encouraged to do more talking about the picture. When the subject paused for a period of time the examiner said, "Tell me more," or asked questions, "What else is happening?", or "What is happening here?" (pointing).

Initial Protocol Preparation

After language samples from all the subjects had been collected, typewritten transcripts were prepared from the tape recordings according to procedures described by Siegel (1963). Siegel's instructions are reproduced in Appendix B.

Segmentation

The protocols were first segmented into utterances following the same procedures of other researchers (Engler, Hannah, and Longhurst, 1973; Longhurst and Schrandt, 1973; Ahmed, 1973). An utterance was defined as a unit of spoken language preceded and followed by a perceived pause (Engler and Hannah, 1967). These are sometimes called "per breath units". The protocols were also segmented into sentences following the directions of Miner (1969) as modified by Ahmed (1973).

Final Protocol Preparation

All of the procedures used in the final preparation of the protocols replicated those of Ahmed (1973). The middle 50 utterances from the protocol of each subject were selected for the mean length of utterance (MLU) measure, and these 50 utterances were retyped into a final protocol containing one utterance per line and the lines were numbered.

Following the procedures suggested by Griffith and Miner (1969) for the length complexity index (LCI) measure, the first ten sentences of each protocol were excluded. The next 15 sentences were then selected from the protocol of each child. These sentences were retyped into a final protocol. The scoring of the 15 sentences was done according to procedures by Miner (1969) with certain modifications by Ahmed (1973).

Linguistic Analyses

Four linguistic measures were computed from the final protocols. These were the total number of words (TNW) in each protocol, the mean length of the middle 50 utterances (MLU), the length complexity index (LCI) score, and the Carroll type token-ratio (CTTR). The TNW measure was viewed as a quantitative index of a subject's total verbal output. The MLU measure has long been used as a qualitative measure of language and before the development of LCI was described as the best single index of language development (McCarthy, 1954). The LCI index is a qualitative measure of sentence length and sentence complexity taken together (Miner, 1969; Barlow and Miner, 1969; Griffith and Miner, 1969). Sentence length and complexity are jointly evaluated according to a numeric weighting system in which the sum of noun phrase (NP) points plus verb phrase (VP) points plus any possible additional points (AP) for each sentence is divided by the number of sentences (NS). Written as a formula, $LCI = (NP + VP + AP)/NS$. LCI has been found to be a sensitive measure of grammatical quality (Mintun, 1968; Longhurst, Odom and Boatman, 1973; Longhurst and Schrandt, 1973).

The standard or traditional type-token ratio (TTR) has long been used as a feature of vocabulary quality and diversity (Johnson, 1944; Simmons, 1962; Siegel, 1967; Cartwright, 1968; Longhurst and Siegel, 1973). This measure, expressing the proportion of types (the number of unique words in a given sample) to tokens (the total number of words in the sample), has the disadvantage of being dependent on the size of the language sample

in words, thus making it impossible to compare TTR's computed on samples of different sizes. Carroll (1964, p. 54) has formulated a TTR which ". . . is approximately independent of sample size." The formula for the Carroll type-token ratio (CTTR) is $CTTR = \text{types} / \sqrt{2 \times \text{tokens}}$. This latter measure was chosen for the present experiment because different sample sizes in words were obtained.

Statistical Analysis

A two factor analysis of variance (Weiner, 1962) was used to compare experimental conditions and MI-AB level group means. When a significant F ratio resulted, a least significant difference procedure (Fryer, 1966) was utilized to compare the individual means.

RESULTS

Means for the four language measures and the two treatments and control are presented in Table 2.

Means for the four language measures and the MI-AB level groups when the three conditions were combined are shown in Table 3. There were significant differences between the two levels for LCI and CTTR. In Table 4, when only the means for the two treatments (reinforcing and prompting) are shown, these differences disappear. Only the TNW means for the two treatments are significantly different.

The only significant interaction between treatment and group means on any of the four language measures was for CTTR.

Table 2

Summary of means for the four language measures in the two treatments and control.

	C*	T ₁	T ₂
TNW	382.37	434.68	672.50
MLU	3.68	5.57	6.45
LCI	5.60	8.00	8.38
CTTR	5.01	5.63	5.50

Table 3

Summary of means for the four language measures in the two MI-AB level groups when the three conditions are combined.

	Group	
	I	III
TNW	475	397
MLU	4.9	4.6
LCI*	7.2	5.9
CTTR*	5.3	4.7

*Significant group difference at the .05 level of confidence.

Table 4

Summary of means for the four language measures in the two MI-AB level groups when the means for the control groups are omitted.

	Group	
	I	III
TNW*	672	435
MLU	6.4	5.6
LCI	8.4	8.0
CTTR	5.5	5.6

*Significant group difference at the .05 level of confidence.

DISCUSSION

This study was concerned with the effects of verbal directives, specifically reinforcing or prompting the child during elicitation of a language sample. The results from these two treatments were then compared with a control group (Ahmed, 1973). The examiner and the stimulus materials remained constant throughout the study. Four linguistic measures were used to evaluate the experimental conditions. There were no significant differences between reinforcement (T_1) and prompting (T_2) for MLU, LCI, and CTTR. Both treatments were however significantly

different from the control (C) on these three measures. For TNW, control and reinforcement mean were not significantly different, but they were significantly different from the prompting mean.

Thus, a child should produce a higher level language sample if he is prompted or reinforced than if he is not. These two treatments were not significantly different, except for TNW, and this precludes a choice between these two procedures that produces the highest level sample. Possibly, if these two treatments were combined so that the examiner prompts and reinforces, this combination may produce samples of even higher level than either used singly. This possibility must be left to future researchers. Since there was a significant difference in favor of the prompting treatment, at least for TNW, the examiner that wishes to produce a long speech sample should prompt the child with such directives as, "Tell me more," or he should ask specific questions that are designed to extend the child's description. He should obviously avoid questions that can be answered with short statements. Note from Table 2 however, that these longer samples produced through prompting are no more complex in terms of structure (MLU and LCI) or vocabulary (CTTR) than those produced through reinforcing.

The results of the MI-AB level groups are shown in Tables 3 and 4. When all three conditions were analyzed together, there was a significant difference between groups I and II for LCI, and CTTR. However, when the means for the two treatments in the present experiment were compared (Table 4) these differences disappeared. These comparisons show that when

prompting or reinforcement is used the lower level child's (III) language is brought closer to the developmental level of the level I child. Thus, especially for the lower level child, the child's optimal language level will be approximated if the clinician prompts or reinforces.

Of the four linguistic measures TNW is probably the least important for clinical information because a long sample in and of itself has little diagnostic implication. However, this linguistic measure is important to the researcher because of the useful information it adds to statistical comparisons. Quantity should not imply quality or that a child's developmental language level will automatically appear higher than in a shorter sample from that child. The child may talk more but his developmental language level may not change simply because more complex structures are not present in his verbal repertoire.

MLU may also not be particularly suitable for the evaluation of the verbal output of handicapped subjects. Ahmed (1973) agrees with this conclusion. One of the principle problems with MLU appears to be the segmentation procedure which is based on "breath units." "Per breath units" were not deemed appropriate for the subjects of the present study because their protocols revealed pauses at junctures where the "normal" speaker would not pause. These subjects also seemed to have an uncommon intonation pattern which was also noted by Ahmed (1973). More research would be helpful in the area of intonation patterns in the speech of the mentally retarded.

Among the four linguistic measures LCI required the most analysis time, skill, and linguistic background on the part of the examiner. However this study found it to be a sensitive measure as did Mintun (1968) and Ahmed (1973). The instructions given by Miner (1969) for the division and scoring of sentences were not completely explicit. These instructions were clarified by Ahmed (1973) with additional explanation and rules for the scoring of sentences. The combined Ahmed (1973) and Miner (1969) rules were followed for the LCI sentence analysis in this study.

Prompting and reinforcing may be viewed as teaching techniques. Obviously, teaching techniques may have to be used with the non-motivated subject, the one who can but will not perform the requested task (Lovitt and Smith, 1972). One recommended strategy would be to couple instruction or verbal directives with reinforcement contingencies, that is, ask for the behavior and pay off or reinforce when it occurs. In this regard, Herman and Tramontana (1971, p. 118) speculated that "...although instruction can be used to prompt very specific behavior..., consistent reinforcement is needed to maintain it."

The present study has shown that indeed reinforcing and prompting do increase the quality of verbal behavior and aid in obtaining a more optimal sample of the child's current verbal ability. Perhaps findings such as these will lead to a standardized procedure for elicitation of language samples that will make accurate comparisons for clinical and research endeavors possible.

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APPENDIX A

APPENDIX A

A 50-utterance language sample was obtained from each child in the following manner. After a brief conversation with the child, the examiner gave the instructions:

I'd like you to tell me some stories. I'm going to show you some pictures and I'd like you to make up a story for each picture.

The Children's Apperception Test cards were then presented. To insure consistency in the method of obtaining the language sample, as well as to insure that each child emitted 50 utterances, five "directions" were given to each child for each of the 10 picture cards. After the first direction, each subsequent direction was given only when the child ended his utterance with a period of silence. If the child emitted a response such as "I don't know," a second direction was given. These directions are presented below. Segments of the script in parentheses were optional and were intended for occasional variation in order to preserve the sanity of both child and clinician.

[(Now) (Here's one)] What do you think is happening in this picture? SECOND--Just tell me anything.

[(Well) (Let's)] Look real hard all over the picture and tell me something else about it. SECOND--Tell me anything else.

[(Hey)] What do you think was happening just before this picture was taken? SECOND--How do you think he/they got there?

[(Let's)] Look at the picture again. (Why don't you)
make up a story about what's going to happen next.

SECOND--What do you think will happen in just a little
while?

If this were you, what do you think you'd say? SECOND--
If this / these was / were your friend/friends, what would
you say?

Only the first utterance in response to each direction was included in the analysis. Because five directions were given for each of 10 picture cards, a sample of 50 utterances from each child was assured. Further, because utterance 12 from Child A, for example, was necessarily a response to the same direction and picture card as utterance 12 from Child B (because only the first utterance in response to each direction was included), the obtained utterances were directly comparable between children.

The children's use of syntactic and morphological structures were analyzed according to the three levels (phrase structure, transformational and morphological) of grammar as formulated by Chomsky (1957). Menyuk (1964) provides examples of some of these structures. In addition, the structures Lee and Canter (1971) analyzed were also analyzed in this study.

APPENDIX B

APPENDIX B

1. Type the transcripts in the predetermined random order.
2. Differentiate verbalizations of the adult from those of the child by placing the identifying symbol (a) in the margin for adult verbalizations and (c) for remarks made by the child.
3. Do not use capitals (except for proper names or for the pronoun "I"), commas, question marks, or any other form of punctuation in preparing these transcripts. Use apostrophes, however, to indicate a contraction or to indicate possession.
4. Some of the remarks made by either the child or the adult will be completely or partially incomprehensible. If a response is either partially or completely incomprehensible, exclude it from the transcript.
5. Sometimes the adult or the child will make some non-communicative noises during the session. For example, the adult may say, 'The dog goes bow-wow and the lion goes grr.' If, as in the above remark, the noise is an integral part of the response, type it in. If, however, the noise is not essential, omit it. For example, the child may say, 'Bow-wow, here come the dog.' In this instance omit the expression 'bow-wow.'
6. Interjections such as 'uh,' 'er,' should be omitted except when they are used as words.

7. If the speaker starts but does not finish a word and you are quite sure what he is going to say, include the word, but place it between parentheses.
8. Include repeated words in the transcript.

ELICITATION OF CHILDREN'S SPEECH SAMPLES:
REINFORCEMENT AND PROMPTING

by

REBECCA LOU WALKER

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ABSTRACT

An accurate representation of the child's language performance is vital to the research, clinician, and special educator. In evaluating the child's language performance, researchers or clinicians elicit a spoken language sample. This sample is then analyzed by applying a variety of counting procedures or statistical ratios. However, one major difficulty with these methods of assessing the speech and language of handicapped children is that no standard method exists which can be employed to elicit a language sample from the child.

One of the possible variables relevant to the elicitation of language samples is that of verbal directives (pretraining, instructions, prompting). The present study analyzed the language samples of thirty-two mentally retarded children of Parsons State Hospital and Training Center. Sixteen children were prompted during the elicitation of the language sample, and sixteen were reinforced. These language samples were then analyzed by four linguistic measures (MLU, TNW, LCI, and CTTR). The results were then compared to a control group of sixteen mentally retarded children of the same ages who were not prompted or reinforced during elicitation.

The results of the present study showed that reinforcing or prompting does significantly increase verbal behavior and aid in obtaining a more optimal sample of the child's current verbal ability. Perhaps findings such as these will lead to a standardization procedure for elicitation of language samples that will make accurate comparisons for clinical and research endeavors possible.