A METHOD FOR RECORDING VERBAL BEHAVIOR IN FREE-PLAY SETTINGS¹

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The present study attempted to test the reliability of a new method of recording verbal behavior in a free-play preschool setting. Six children, three normal and three speech impaired, served as subjects. Videotaped records of verbal behavior were scored by two experimentally naive observers. The results suggest that the system provides a means of obtaining reliable records of both normal and impaired speech, even when the subjects exhibit nonverbal behaviors (such as hyperactivity) that interfere with direct observation techniques.

Obtaining reliable records of verbal behavior in preschool free-play setting poses a number of problems that are exacerbated if the verbal behavior is sufficiently aberrant to present detection difficulties to an observer. Children with moderate to severe speech impediments very often produce verbal behaviors that are difficult to record simply because their speech is foreign to the untrained ear. Even trained professionals may disagree on the type of verbal event emitted unless given an opportunity to hear the event more than once. Unfortunately, live observation in free-play settings provides but one opportunity to record a single verbal event.

Other conditions can cause recording problems in free-play settings. The noise level in an average sized preschool classroom is often very high, particularly during a free-play period. An observer simply cannot hear a child under these conditions unless he is very close to the child. Close observation is often not practical during a free-play period because the children spend much of their time moving rapidly about the room. For example, running, jumping, sliding, and climbing are common activities observed in preschool free-play settings. Thus, obtaining records of normal speech during free-play periods is difficult; obtaining reliable records of aberrant speech is almost impossible.

The conditions discussed above may account for the fact that very few researchers have attempted to record verbal behaviors in free-play settings. Usually, a teacher-structured situation is selected where noise and movement are controlled. Sometimes the children are removed from the classroom altogether. Risley and Reynolds (1970), for example, observed their children in a special room (one at a time) where audio taped records were obtained and later transcribed. Risley and Hart (1968) instructed observers to record verbal behaviors during a snack period. The children were divided into small groups and sat with a teacher who spoke with them while they ate their food. This type of structure usually ensures that only one or two children will talk at a time. Thus, the observer's task is made considerably easier. It is interesting to note that the children in this study were also observed during a free-play period; but only non-verbal behaviors were recorded. This type of experimenter control over child activity is commonly observed in research dealing with verbal behavior.

A small number of researchers have attempted to study verbal behavior in free-play settings. Reynolds and Risley (1968) and Hart and Risley (1968) collected verbal samples by instructing observers to follow a child from one activity to another and write down in longhand "everything" the child said. Reliability checks taken periodically over the year yielded very acceptable product-moment correlation coefficients between observers in both cases. However, none of the 16 children involved in these studies exhibited serious speech

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impediments (at least none were reported), and none of the children presented behavior problems (such as hyperactivity) that might have compounded recording problems. Nevertheless, these researchers have developed a system of recording verbal behavior in free-play settings that does appear to have a fairly broad applicability.

Children who exhibit speech deficits have not been observed in free-play settings. The speech-impaired child is usually observed in a clinical setting where just the therapist, or occasionally the parents are present (*e.g.* Wheeler and Sulzer, 1970; Hall, 1970; McReynolds 1970). Sometimes, the child is concurrently observed in a clinic setting and a home setting (*e.g.*, Wahler, Sperling, Thomas, Teeter, and Luper, 1970) but the conditions in both of these settings differ considerably from the preschool free-play setting.

To record verbal behavior in a free-play setting, an experimenter would have to devise a system that satisfied the following criteria: first, the child must be visible and preferably facing the observer a large part of the time so that his mouth may be seen; second, an observer must be able to hear the child well enough to identify various components of the speech repertory; third, the system should provide the observer with some means of reviewing verbal samples. This is particularly important when one is working with speech impaired children. Finally, the system should control for observer bias and produce acceptable inter-observer agreement. The present paper describes a system that satisfies all of these criteria.

METHOD

Subjects

Six children were selected from a population of 13 children, all of whom attended a preschool program for 5-yr olds at the University of Tennessee Nursery School. The program runs for 3 hr in the afternoon, four days a week. Three of the children did not present any speech problems. The other three had been diagnosed as moderate to severe articulation problems (in two cases) and moderate stuttering. All three speech-impaired children exhibited non-verbal behaviors that were also considered deviant. The stutterer and one articulation child were very hyperactive and unresponsive to teacher efforts to control their

behavior. The other child was afraid of peers, spending less than 5% of her time interacting with the other children during free-play periods.

Setting

The study was conducted in a large classroom connected via two one-way mirrors to an observation area. The room was equipped with a variety of toys, games, tables, and climbing equipment which the children used as they wished during free-play periods. A bathroom area was connected to the same observation room via a wire mesh screen that also permitted one-way viewing.

Apparatus

To control for background noise and movement, each child was wired for sound by securing a wireless microphone just below the mouth at about chest level. The microphone (Olsen, Model RA-626) was mounted to a harness which had been designed for this purpose. Figure 1 depicts one of the children wearing the apparatus during free-play.

The harness can be made by hand for less than \$1. With a little elastic, needle and thread, one can produce a reasonable fac-

Fig. 1. Photograph of a child wearing a wireless microphone secured to a harness.

simile in about 1 hr. The microphone retails for less than \$20. It is battery operated and can be adjusted to transmit a radio signal within a 95 to 108 megacycle range. Any radio with a standard FM band will receive a clear signal if transmitted from a distance of less than 200 ft. The microphone emits a signal powerful enough to override local FM stations.

A radio with FM band adjusted to match the microphone's transmitting frequency was placed in the observation booth and connected via a line (Sony, RK-64) to the "line-in" jack at a Sony Mixer (Model MX-600M).² The signal was then fed from the mixer to the videorecorder (Sony, AV-3400) at the "line-in" jack. A camera operator stationed behind the one-way mirror could hear the child's voice by connecting a headset line to the "earphone-out" jack on the videorecorder and placing the videorecorder in the record mode.³ After checking the tuning adjustment at the radio, volume was reduced to a just-audible tone (this produces a much clearer playback record). Camera focus and lighting were also adjusted at this time.⁴ Since the method of observing required time-interval samples, 10-sec signals (pre-recorded on audio tape) were fed to the videotape recorder via a line (Sony, RK-64) from the tape recorder's "earphone-out" jack to a "line-in" jack at the mixer. After actuating the camera, the operator pressed the "play" mode button on the audio tape recorder and commenced video recording for a 15-min period. Since the operator could hear the interval signals, he knew exactly when to terminate shooting. A photograph of the equipment used in this research is presented in Figure 2.

Observers and Scoring

Two undergraduate volunteers served as observers. Each had received training in naturalistic science methods of observation, but

²The Sony Mixer is equipped with three channels so that teacher-child or peer-peer verbal behavior could be simultaneously recorded. The mixer retails for less than \$20.

³The Sony Videorecorder (AV-3400) is a small, portable unit that comes equipped with its own special camera. After placing the switch in the record mode, the tape may not be actuated until a trigger at the camera is released.

⁴The camera is equipped with a 1-in. monitor for this purpose.

neither was familiar with the purpose of the research. Since each observer was already familiar with the scoring system, no training sessions were necessary. Each 15-min video record was played back to both observers independently. A Sony videorecorder (AV 3600) was used for this purpose. An earphone headset was connected to the TV monitor at the "earphone-out" jack and worn by the observers when scoring the tapes. The headset was used to eliminate extraneous sounds produced by the air conditioners, traffic outside the building, *etc.*

The responses to be scored were different for the normal and speech-impaired children. For the normal children, an observer entered a code on a behavioral check list (see Nordquist, 1971, for a description of the check list) whenever the child said the pronouns "We" or "I" within a 10-sec interval. Only one unit per interval was recorded, regardless of the number of pronouns emitted during the interval period. Thus, a total of 90 possible units could be scored for any single observation period.

The same system was used for the speech-impaired children; the response class was

Fig. 2. Wireless microphone on the left transmits radio signals to the FM receiver. A wire (Sony, RK-64) connected to the earphone jack on the receiver carries the signal to a microphone-in jack at the Sony Mixer (three channels, Model MX-600M). A Sony audio tape recorder (to right of radio) feeds time-interval signals into the mixer by same process. Both signals are carried out of the mixer on one line to the video tape recorder (far right) at the microphone-in jack. A Permoflux headset (Model PDR-10) permits the camera operator to monitor the transmission and adjust FM receiver to the clearest megacycle frequency before recording.

different. Speech for these children was coded either fluent or disfluent. For the stutterer, if any hesitancy, struggling or repetition occurred during a 10-sec interval, the interval was coded disfluent. If hesitancies, struggling, and repetitions were absent from his speech, the interval was coded fluent. The same codes were entered for the articulation children. However, fluency in this case referred to intelligibility. If an observer "understood" what the child had said during the 10-sec interval, he entered the code for fluent speech; otherwise, the speech was coded disfluent.

Procedure

Two children were observed each day, one normal and one speech impaired, until five observation periods had been recorded for each child. Thus, a total of 75 min per child was recorded. The procedure followed was simple: after obtaining two 15-min taped samples, the camera operator carried the tape (the recorded tape contained both 15-min data samples) from the observation booth to the experimenter's office in a building adjacent to the nursery school. He placed the tape on the videorecorder and picked up a second tape to be used the next day. The observers independently scored the same tape each day. Both observers were familiar with the equipment. After obtaining a check list and entering a code for his name and the date, an observer mounted the headset and started the tape. Scoring commenced with the first interval signal and continued for a 30-min period (two 15-min samples). When the scoring was completed, the check list was placed in a folder provided by the experimenter. The tape was then returned to its original position for use by the second observer. When the second observer had also scored the tape, it was removed from the recorder and set aside for use the following day.

RESULTS

Reliability

Inter-observer reliability was tabulated for both the normal and speech impaired groups. A per cent agreement between observers was computed separately for "occurrences only" and for "occurrences or non-occurrences" of a response class by tallying for each 10-sec interval an agreement or disagreement, and then

dividing total agreements by the sum of agreements plus disagreements (*cf.* Bijou, Peterson, and Ault, 1968). The data are presented in Table 1.

For the normal children, inter-observer agreement was quite good. The mean per cent agreement between observers for "occurrences only" was 0.95 (range: 0.89 to 1.00). The mean per cent agreement for "occurrences or non-occurrences" was 0.98 (range: 0.97 to 1.00). For the speech-impaired group, inter-observer agreement for "occurrences only" was also good, but a little lower when compared to the normal group. The mean percent of agreement for fluent speech was 0.83 (range: 0.81 to 0.90); for disfluent speech, 0.83 (range: 0.79 to 0.92). "Occurrences or non-occurrences" mean per cents agreement were 0.98 (range: 0.96 to 0.99) for fluent speech and 0.98 (range: 0.97 to 0.99) for disfluent speech.

Table 1

Mean inter-observer agreement percentages computed separately for "occurrences only" and "occurrences or non-occurrences" for normal and deviant speech groups.

Group	Response Class	Occurrences or Occurrences Non- Only Occurrences	
		0.95	0.98
Normal (n:3)	Pronouns "I" and "We"	0.95	0.98
	Fluent Speech	0.83	0.98
	Disfluent Speech	0.83	0.98

DISCUSSION

The study of verbal behavior in free-play settings depends upon the accurate measurement of verbal responses. The system described above eliminates many of the problems previously faced by researchers and provides a reliable means of gathering verbal data regardless of the type of speech being studied. This system also provides an experimenter a means of storing information for later use, possibly to train new observers or demonstrate principles of behavior analysis to various interest groups. Most university and private research facilities have access to videotape equipment. The audio apparatus described above can be purchased at a minimal cost. The use of the system would therefore seem advantageous in

settings where natural play behaviors have a high probability of occurring. The system is also amenable to the study of children exhibiting multiple behavior disorders where functional relationships between the verbal and non-verbal aspects of child behavior are of interest.

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