THE EFFECT OF NONVERBAL TEACHER APPROVAL ON STUDENT ATTENTIVE BEHAVIOR¹

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The effect of contingent nonverbal teacher approval on student attentive behavior was examined in a classroom with 12 retarded children. After baseline data were gathered on contingent verbal and nonverbal teacher approval and student attentive behavior, the teacher was instructed to increase her use of contingent nonverbal approval (smiles and physical contact) and to maintain her baseline level of verbal approval. After a reversal phase, the nonverbal approval phase was reinstated. Nonverbal teacher behaviors increased during the experimental phases, whereas verbal teacher approval (alone or in conjunction with nonverbal behaviors) did not increase. Attentive behavior increased for 11 of 12 students during the phases in which contingent nonverbal teacher approval increased. Correlational data suggested that nonverbal teacher approval accounted for behavior change of the students to a greater extent than did changes in the amount of teacher approval *per se* or in the teacher's use of verbal approval.

Teacher approval or attention has been used extensively to alter student behavior in the classroom. In many studies, teacher approval is operationalized as verbal praise (Hall, Panyan, Rabon, and Broden, 1968; McAllister, Stachowiak, Baer, and Conderman, 1969; Ward and Baker, 1968; Wasik, Senn, Welch, and Cooper, 1969). Yet, in other studies, verbal approval is supplemented with nonverbal attending behaviors on the part of the teacher such as smiling, patting, holding, touching, moving toward the child, making eye contact, varying tone of voice, among others (Becker, Madsen, Arnold, and Thomas, 1967; Buell, Stoddard, Harris, and Baer, 1968; Cooper, Thomson, and Baer, 1970; Hall, Lund, and Jackson, 1968; Hasazi and Hasazi, 1972; Kaufman and O'Leary, 1972; Kounin, 1970; Schutte and Hopkins, 1970; Thomas, Becker, and Armstrong, 1968; Wahler, 1969). Although nonverbal behaviors have been included in definitions of teacher approval,

their individual effect on student behavior is rarely evaluated. Even when observational codes include nonverbal teacher behaviors such as facial expressions and physical contact (Becker *et al.*, 1967) or proximity of the teacher to the pupil (Hall *et al.*, 1968), it remains unclear whether these behaviors contribute to behavior change in the students independently of verbal approval alone. One reason that nonverbal attending behavior usually is not evaluated is that verbal approval, as opposed to facial expressions and physical contact, constitutes most (about 85%) of teacher attending behavior (Madsen, Becker, and Thomas, 1968). Moreover, teacher training is more likely to emphasize and alter verbal behavior as opposed to nonverbal behaviors (facial expressions and physical contact) (Kazdin, *in press*). Nevertheless, nonverbal teacher behaviors alone may provide an important source of reinforcement in the classroom. Indeed, several texts and manuals on behavior modification in the classroom advocate the use of nonverbal approval behaviors either to supplement praise or to provide reinforcement in their own right (Ackerman, 1972; Becker, Engelmann, and Thomas, 1971; Buckley and Walker, 1970; Carter, 1972;

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Diebert and Harmon, 1970; Madsen and Madsen, 1972; Mink, 1968; Skinner, 1968). However, there is a paucity of data on the reinforcing properties of nonverbal behaviors in the classroom. In the present study, nonverbal teacher behaviors were altered to determine their effect on student attentive behavior.

There are other reasons to evaluate the reinforcing properties of nonverbal approval. Nonverbal behaviors are considered to play a central role in interpersonal relationships, particularly in the communication of emotions (Duncan, 1969; Ekman and Friesen, 1968). For example, the expression of warmth has been shown to be highly related to the frequency of smiling and other nonverbal cues (Bayes, 1972). (Some authors contend that warmth is important in teaching [*cf.* Mathis, Cotton, and Sechrest, 1971].) Another reason for interest in the reinforcing effects of nonverbal approval is that it is a "naturally occurring" event that often follows behavior in nonprogrammed environments. Treatments consisting of nonverbal behavioral consequences alone or with other events, such as verbal praise, may facilitate the maintenance of target behaviors in new settings that feature "naturally occurring" nonverbal consequences.

The purpose of the present study was to determine whether contingent nonverbal teacher behavior could strengthen attentive behavior in students. The nonverbal behaviors employed were facial expressions (smiling) and physical contact (patting, touching).² Because this was a preliminary investigation, no attempt was made to isolate the relative impact of a particular nonverbal teacher behavior on student performance.

METHOD

Subjects, Teacher, and Setting

An entire class consisting of 13 moderately retarded elementary school students (six girls and seven boys) enrolled at the laboratory demonstration school at The Pennsylvania State

University participated in the study. (One girl in the class did not serve as a subject because she was removed from class daily for tutoring at the time that observations were made.) Student's ages ranged from 7 to 12 yr (median = 10 yr); IQs ranged from 48 to 79 on the Stanford-Binet (Form L-M) (mdn. = 70). Most desks were arranged in groups of two or three with approximately 4 to 6 ft (1.2 to 1.8 m) between the groups of seats. This allowed the teacher to circulate freely, supervise individual performance, and administer praise. The female teacher had 2.5 yr of teaching experience with 1 yr experience in implementing behavior modification programs in the classroom.

Assessment

The teacher and children were observed daily (between 9:00 and 10:15 a.m. Tuesday through Friday, and between 10:00 and 11:15 a.m. on Mondays). (The observations were made 1 hr later on Mondays because the regular observation period was taken up with music instruction with a different teacher.) Each day, individual seat work (handwriting) was assigned for the period during which observations were made. Five observers (three male and two female undergraduates) were used throughout the experiment. Each day at least two observers were employed, one to observe the children and the other to observe the teacher. The observational assignment was alternated so that approximately every other time the observer was in the room, he would observe the children and on other times the teacher. On days when reliability checks were conducted, three or four observers were in the room, depending upon whether reliability was checked for the teacher or children, or both simultaneously.

Teacher behavior. The teacher was observed from 100 to 150 15-sec intervals (median =

²Two additional teacher behaviors (nodding approvingly without verbalization and verbal approval with nodding) were also recorded. However, they were not observed with sufficiently high levels of agreement to be reported.

37.5 min or 150 intervals over approximately 50 min. The teacher behaviors observed included two categories of contingent positive interactions with children: Nonverbal Behaviors (without concomitant verbalizations), and Verbal Behaviors (alone or paired with nonverbal behaviors). The categories encompassed five *positive teacher responses that followed appropriate child behavior*. (Appropriate or attentive child behavior is defined below.) The teacher categories were defined as follows:

- I. *Nonverbal behaviors* (NV): Positive teacher behaviors (which followed child attentive behavior) without concomitant verbalizations or vocalizations.
 1. *Smiling* (S): Extension of the mouth (with or without lips parted) appearing to express pleasure or approval.
 2. *Physical contact* (P): Any physical contact appearing to indicate approval such as patting on the head, back, or shoulder, or hugging.
- II. *Verbal behaviors* (V): Any verbal attention or approval with or without accompanying nonverbal behaviors included in the above category.
 3. *Verbal approval alone* (VA): Approving statements such as "Good." or "I like what you are doing!" with no accompanying nonverbal behaviors.
 4. *Verbal approval with smile* (VS).
 5. *Verbal approval with physical contact* (VP).

Antecedent events (commands, instructions), negative consequences (threats, reprimands, and physical coercion), and verbal or nonverbal teacher behaviors that were not delivered after appropriate student behavior were not counted.

The above five teacher responses were not mutually exclusive in a given 15-sec interval. Hence, the teacher could be scored for any or

all of the responses. A problem in pilot work with scoring teacher behavior was that a nonverbal response (e.g., smile) might immediately precede a verbally approving statement ("Good."). This led to difficulty in reliability because the latency between a smile and praise might be extremely short. To ameliorate this difficulty, a teacher response was defined in terms of the child response consequated. Hence, if a child received reinforcement for a particular behavior *i.e.*, a smile and verbal approval in a given interval, the Verbal Behavior category was scored (specifically a VS or verbal approval with smile). Once a teacher category was defined, the specific behaviors within the category were not necessarily independent. For example, if the teacher consequated attentive child behavior by simultaneously smiling and patting the child on the head (without concomitant verbalizations), the teacher's behavior would be counted in the Nonverbal Behavior category. Both an "S" and "P" would be checked to code the teacher's behavior. In a given interval, the teacher was able to consequate behavior of several individuals so that an "S" and "P" might be delivered for separate child behaviors. Once a teacher behavior was scored in an interval, that behavior could not be scored again for that interval.

Child behavior. The children were also observed using 15-sec intervals. During each interval, a different child was assessed until all children had been observed for one interval. The sequence was then repeated until each child had been observed for at least 20 intervals. The order for observing children was selected before the study as a matter of convenience based upon the seating arrangement, and did not change throughout the study. Each child was observed between 20 and 25 intervals daily, or between 5 and 7.5 min daily (median = 20 intervals or 5 min), distributed over approximately 70 min of class time. Observations of the children took about 10 to 15 min longer to complete than the observations of the teacher. Each day, the observer who was scoring teacher behavior began

observing about 5 to 10 min after the other observer had begun observing the children. Observations of the teacher were still completed a few minutes before the observer finished with the children. Hence, observation of teacher and child behaviors were not completely concurrent.

The behaviors observed in a given interval were categorized as either attentive or inattentive (after Kazdin, 1973). To be scored as attentive, the child had to be sitting in his seat, working on the assignment, and not talking to a neighbor without permission. The child had to be attentive for the entire 15 sec of the interval. Inattentive behavior was scored if the child did not meet the above requirements, or played with materials inappropriate to the assigned task, reclined on his desk, or rocked his chair. For each observational interval the observer merely circled a "+" (attentive) or "O" (inattentive) on the observation sheet.

Experimental Conditions

An ABAB or reversal design was used to evaluate the effect of nonverbal teacher approval on the attentive behavior of the children. Due to a time limitation (end of the academic term), the length of the phases was determined *a priori*. It was decided that each base phase would have an equivalent experimental period following it. The entire study lasted 30 days.

Baseline. Teacher and child behaviors were recorded for nine days before the teacher was instructed to alter her behavior.

Increase in contingent nonverbal approval. The teacher was instructed to increase her use of smiles and physical contact following attentive child behavior. In addition, the teacher was instructed not to increase her verbal statements given with or without concomitant nonverbal behavior. Daily feedback was delivered to the teacher immediately after the data were collected for the first three days only. Similarly, for the first two days the teacher was cued in class (from the back of the room) to increase nonverbal behavior. After the first three days, immediate feedback and cueing were removed.

Until the end of this phase, feedback was delivered every other day at the end of the school day. Feedback consisted of informing the teacher of her approximate rates of nonverbal and verbal approval relative to base levels (*e.g.*, "You have increased your smiles, but try to increase this some more; verbal approval was fine—try not to increase it."). A major point of this feedback was to ensure that nonverbal behavior increased and, equally important, that verbal behavior did not increase as well. This phase lasted nine days.

Reversal. Baseline conditions were reinstated. The teacher was told to return to her previous classroom practices without making a special effort to deliver favorable nonverbal consequences for student behavior. No feedback was given to the teacher during this phase. The reversal phase lasted six days.

Increase in contingent nonverbal approval. Again the teacher was instructed to increase favorable nonverbal consequences for student performance without increasing her verbal approval. However, no feedback from the experimenter was delivered during this phase. This phase was conducted for the last six days of the study.

Reliability of Observations

Teacher behaviors. Checks on the reliability of observations on the teacher were made 16 times over the duration of the study (at least three checks in each phase). Reliability was computed separately for each teacher behavior. During different phases of the study, a particular teacher behavior may have occurred at a very low or very high rate. Averaging percentages of agreement across all phases might misrepresent reliability during individual phases. Hence, reliability was computed separately for each behavior for each phase of the study by summing agreements and disagreements across reliability checks within a given phase. An agreement was scored if observers recorded the behavior in the same interval; a disagreement was scored if one observer recorded the behavior

and the other did not. A percentage of agreement was computed by dividing agreements by disagreements and multiplying by 100. Reliability of each teacher behavior for each phase of the study is presented in Table 1. Reliabilities of the two categories of teacher behavior (Nonverbal and Verbal) were calculated for each phase by summing the number of agreements and disagreements across all behaviors in that category and computing a percentage.

It is interesting to note that reliabilities of Verbal Behaviors tended to exceed those of Nonverbal Behaviors. Although these differences are negligible, they suggest that observers can more easily discriminate teacher behaviors involving verbal responses. This notion is supported by the high reliabilities attained for verbal approval alone (in the absence of any of the accompanying nonverbal behaviors).

Child behaviors. Checks on the reliability of observations for child behaviors were made in 13 sessions (at least two times in each phase). The reliability of attentive behavior was calculated each day by dividing the total number of agreements by the total number of agreements plus disagreements. An agreement was counted only when two observers agreed on the occurrence of an attentive response in a given inter-

val. Forming a percentage, reliability ranged from 83.9 to 94.4% (median = 89.7%).

RESULTS

Teacher Behavior

The purpose of the present study was to examine whether changes in contingent nonverbal teacher approval alter student attentiveness. Hence, the data were first examined to determine whether the teacher altered her contingent nonverbal behavior according to instructions. The dependent measures consisted of the daily percentage of intervals in which each teacher behavior was performed. The five teacher behaviors are plotted in Figure 1. To summarize the teacher data, three composite measures were derived from the percentage of intervals in which: (1) any nonverbal teacher behavior was scored, (2) any verbal behavior was scored, and (3) any nonverbal or verbal behavior was scored. These data are plotted in Figure 2.

Nonverbal behaviors. Figure 1 shows that levels of smiling and physical contact in the experimental phases increased relative to Baseline and Reversal levels. During the first experimental phase, smiling increased from a mean

Table 1
Per Cent Reliability of Teacher Observations

<i>Teacher Behavior</i>	<i>Phases</i>			
	<i>Baseline</i>	<i>Exp. I</i>	<i>Reversal</i>	<i>Exp. II</i>
I. Nonverbal Behaviors	81.0	82.5	87.5	89.1
1. Smiling	80.0	80.0	83.3	81.5
2. Physical Contact	100	83.5	100	90.1
II. Verbal Behaviors	88.6	87.5	90.2	95.4
3. Verbal Approval Alone	91.5	89.5	90.4	96.2
4. Verbal Approval with Smiling	82.2	84.6	91.7	87.5
5. Verbal Approval with Physical Contact	88.2	84.6	88.9	100
III. All Behaviors Combined	87.9	83.8	90.0	90.1

Fig. 1. Teacher nonverbal and verbal behaviors (left and right side of figure, respectively).

of 1.3% during Baseline to a mean of 8.6%. In the second experimental phase, smiling increased from a mean of 1.0% during Reversal to a mean of 6.9%. Changes in physical contact were more pronounced. During the first experimental phase, physical contact increased to a mean of 19.8% from the mean rate of 0.2% during Baseline. During the second experimental phase, physical contact increased to a mean of 38.4% from the mean rate of 0.3% during Reversal. Figure 2 reveals that the percentage of intervals in which at least one nonverbal teacher behavior (smiling or physical contact) was scored increased in both experimental phases.

Verbal behaviors. One goal of the study was to maintain the teacher's verbal responses close to or lower than Baseline during each of the experimental phases so that increases in nonverbal behavior would not be confounded with increases in verbal behavior. Figure 1 shows small decreases in each verbal teacher behavior in both experimental phases. The greatest change occurred in verbal approval alone. Across phases of the study, verbal approval alone averaged 10.9, 8.6, 10.9, and 6.8%, respectively. Verbal approval with smiles showed negligible changes across phases (4.1, 3.0, 3.3,

and 1.5%, respectively). Similarly, verbal approval with physical contact showed small changes across phases (2.8, 2.2, 3.6, and 2.2%, respectively). Figure 2 presents the number of intervals in which any verbal response occurred (alone or in combination with nonverbal behavior). In both experimental phases, the number of intervals of verbal approval decreased relative to Baseline and Reversal phases.

Teacher approval (nonverbal and/or verbal). Figure 2 presents the changes in the intervals in which any teacher behavior (of the five responses) was scored. In both experimental phases, the teacher made significantly more approving responses relative to Baseline and Reversal phases. Since verbal approval tended to decrease in the experimental phases, the increases in teacher approval appear to have resulted from an increase in nonverbal behavior.

Summary of results of teacher behavior. Intervals of nonverbal teacher behavior increased in both experimental phases relative to Baseline and Reversal phases. The initial goal of increasing nonverbal behavior during the experimental phases was achieved. An important goal was to ensure that verbal approval behaviors did not increase during the experimental phases. An

Fig. 2. Summary of teacher nonverbal and verbal behavior. (Nonverbal behavior includes intervals in which at least one of the nonverbal responses occurred; verbal behavior includes intervals in which at least one of the verbal responses occurred. Nonverbal-Verbal behavior includes intervals in which any approval response occurred.)

unanticipated change was a decrease in the intervals of verbal behavior during the experimental phases. These changes were accounted for primarily by a decrease in verbal approval alone. Despite this slight decrement in verbal approval, overall levels of teacher approval (nonverbal and/or verbal) increased in the experimental phases.

Child Behavior

The effect of changes in teacher behavior was evaluated on the attentiveness of the students. The dependent measure for student behavior was the daily percentage of intervals of attentive behavior. The mean daily performance

for the class as a whole is plotted in Figure 3. Attentive behavior for the class was 50.2% during Baseline. This increased to 75.9% when the teacher was instructed to increase the use of nonverbal attentive behaviors. During the Reversal phase, attentiveness dropped to 52.7%. In the final phase, when the teacher again was instructed to increase the use of nonverbal behaviors, student attentiveness increased to 81.5%.

The data for individual subjects appear in Figures 4 and 5. Examination of these figures shows that 11 of 12 subjects increased in the mean percentage of attentive behavior during both experimental phases relative to Baseline and Reversal phases, respectively. One subject (S₁₁) was unaffected by alteration of the contingencies.

A repeated measures analysis of variance made across phases of the study revealed a significant effect of Phases ($F = 80.93$, $df = 3/33$, $p < 0.001$). This effect reflects an estimated product-moment correlation of 0.843 between the experimental conditions and attentive behavior. Hence, approximately 71% of the variance in student attentive behavior was accounted for by alteration of the experimental conditions.

Relationship Between Teacher and Child Behaviors

Correlations were computed between teacher behaviors and student attentive behavior for each student and the class as a whole across the 30 days of the study. Table 2 shows that nonverbal behaviors were moderately correlated with attentive behavior for most students. Physical contact correlated significantly with attentive behavior for 11 of 12 subjects, and smiling with attentive behavior for 10 of 12 subjects. Verbal behaviors were negatively correlated with attentive behaviors. Verbal approval alone was significantly correlated with attentive behavior for nine of 12 students. Verbal approval in combination with nonverbal approval correlated significantly with attentive behavior for

Fig. 3. Mean daily rate of attentive behavior in the class.

only two students. The correlations of teacher behaviors with mean daily attentive behavior of the students tended to be larger than the correlations obtained with individual students. Physical contact and smiling were highly correlated with mean student attentive behavior,

Table 2
Product-Moment Correlations Between Teacher and Student Behaviors

Subjects	Nonverbal		Verbal			Summary		
	S	P	VA	VS	VP	Int NV	Int V	Int Any Att
1	0.55**	0.59**	-0.48**	-0.41	-0.31	0.60**	-0.59**	0.53**
2	0.63**	0.75**	-0.46**	-0.28	-0.20	0.76**	-0.50**	0.76**
3	0.59**	0.73**	-0.50**	-0.20	-0.16	0.75**	-0.50**	0.74**
4	0.71**	0.75**	-0.35	-0.41	-0.48**	0.77**	-0.57**	0.75**
5	0.52**	0.61**	-0.48**	-0.47**	-0.10	0.63**	-0.57**	0.55**
6	0.80**	0.78**	-0.46**	-0.27	-0.31	0.82**	-0.55**	0.77**
7	0.69**	0.66**	-0.43*	-0.27	-0.26	0.71**	-0.51**	0.70**
8	0.53**	0.61**	-0.57**	-0.35	-0.23	0.64**	-0.61**	0.54**
9	0.57**	0.65**	-0.60**	-0.27	-0.05	0.68**	-0.53**	0.59**
10	0.57**	0.73**	-0.51**	-0.23	-0.29	0.73**	-0.53**	0.73**
11	-0.01	0.05	-0.04	-0.22	-0.18	0.04	-0.10	0.02
12	0.33	0.49**	-0.11	-0.33	-0.29	0.49**	-0.28	0.47**
Group Average	0.78**	0.89**	-0.59**	-0.42*	-0.34	0.91**	-0.69**	0.86**

*p < 0.05
**p < 0.01

Fig. 4. Attentive behavior for individual subjects. (Missing data points on individual figures represent absences on the part of the subject.)

whereas verbal approval alone and paired with smiling were moderately negatively correlated with mean attentive behavior.

Table 2 also presents the summary categories of teacher behavior: intervals in which nonverbal approval appeared, intervals in which any verbal approval appeared, and intervals in which any teacher approval (nonverbal and/or verbal) appeared. The correlation between nonverbal teacher behavior and group attentive behavior was $r = 0.91$. Verbal attention (with and without accompanying nonverbal behaviors) was negatively correlated with mean student attentive behavior ($r = -0.69$). The amount of attention of any type was highly cor-

Fig. 5. Attentive behavior for individual subjects. (Missing data points on individual figures represent absences on the part of the subject.)

related with attentive student behavior for the class ($r = 0.86$). This latter correlation suggests that the amount of attention *per se* (independently of the type, nonverbal or verbal) accounted for behavior changes in students. Yet teacher approval correlated highly ($r = 0.95$) with nonverbal approval and negatively with verbal approval ($r = -0.57$). This suggests that increases in attention (any type) were accounted for by changes in nonverbal teacher behaviors (Figure 2).

DISCUSSION

The major finding in the present study was that an increase in contingent nonverbal teacher

approval tended to improve student attentive behavior. The results were obtained without concomitant increases in teacher verbal approval (either alone or in conjunction with nonverbal behaviors). Thus, as several authors have suggested, nonverbal behaviors can reinforce appropriate classroom behavior.

Several alternative interpretations of the results should be considered. First, attentive behaviors may have increased merely because there was an increase in the amount of approval delivered in the experimental phases rather than the specific use of nonverbal approval. This is suggested by the high correlation between teacher approval (nonverbal and verbal) and attentive student behavior for the class ($r = 0.86$). Since verbal approval (alone and paired with nonverbal behaviors) did not increase during the experimental phases, the results would seem to be due to the increase in nonverbal teacher behaviors. Indeed, as mentioned earlier, the correlation between the amount of teacher approval (nonverbal and verbal) and nonverbal teacher approval was $r = 0.95$, which suggests that increases in attention were accounted for largely by increases in nonverbal behavior.

A related interpretation of the results is that increases in nonverbal approval *per se*, rather than the contingent delivery of nonverbal approval, altered student behavior. Exigencies of the setting and constraints of time did not permit the noncontingent delivery of nonverbal teacher approval. Yet contingent nonverbal approval did serve as a reinforcer in the present study. Once a reinforcer is identified, seldom is its noncontingent delivery as effective in altering behavior as its contingent delivery, as shown with tokens (e.g., Schaefer and Martin, 1966), praise (Hall *et al.*, 1968), and privileges or activities (Bushell, Wrobel, and Michaelis, 1968). Nevertheless, the present findings need to be replicated by comparing contingent and noncontingent increases in nonverbal teacher approval. By altering the response-contingent relationship between nonverbal teacher ap-

proval and student behavior, the amount of approval can be held relatively constant. In the present study, the amount of approval was allowed to vary.

A third interpretation of the present results is that the slight decrease in verbal praise during the experimental phases accounted for change. Correlational data revealed that verbal teacher approval was significantly negatively correlated with student attentive behavior. In light of several studies of praise in the classroom (e.g., Hall *et al.*, 1968; Ward and Baker, 1968), it seems implausible that a decrease in contingent social praise would cause increases in student attentiveness. Moreover, the magnitude of change of verbal approval in the present study was small so it is unlikely to have been responsible for student behavior change. Yet, the present results should be replicated with teacher verbal behavior held constant throughout the study, rather than changing systematically in any direction.

A fourth interpretation of the present results is that punishment on the part of the teacher covaried with nonverbal reinforcement in some way that altered student attentiveness. Punishment (verbal and nonverbal) on the part of the teacher was observed for two weeks before the study. During this period there was an exceedingly low incidence of threats, reprimands, and frowns (less than 0.5% of any form of aversive control). There seemed to be no apparent change during the study. Other studies suggest that training teachers to alter attention to appropriate behavior does not necessarily alter their attention to disruptive behavior (Cooper *et al.*, 1970). However, data on punishment will need to be gathered to examine the possibility of covariation of additional teacher behaviors with nonverbal approval.

Several factors in the present study may limit the generality of nonverbal reinforcements to other teachers and student populations. First, nonverbal behavior was dispensed by a teacher who, in the previous year, had conducted a behavior modification program in the same classroom. In that program, the teacher may have

established herself as a reinforcing agent. Her nonverbal behaviors may have been a markedly weaker source of reinforcement had she not already spent some time with these students. Second, nonverbal teacher behavior, particularly physical contacts, increased dramatically in the present study. A question remains whether a large increase in nonverbal attention is essential to effect behavior change in the students. Further study will have to be made to see if relatively small increases in nonverbal behavior alter student behavior. A third point is that children in the present study were mentally retarded. Retardates may be responsive to nonverbal reinforcement because of possible problems in responding to language (verbal praise). Physical contact (e.g., patting) may be less subtle than verbal praise. The results need to be replicated with nonretarded students.

The present study was an initial attempt to see if gross changes in nonverbal teacher behavior could serve as reinforcement. In light of the results, a much finer component analysis of various nonverbal behaviors is recommended. The effects of smiles and physical contact and other nonverbal behaviors need to be evaluated independently and in conjunction with each other. Most importantly, further investigation will be required to determine the extent to which the use of nonverbal behaviors augments the efficacy of verbal reinforcement in applied settings. With the addition of carefully executed nonverbal behaviors to verbal reinforcement, it may be that powerful reinforcers, such as tokens, will not have to be used as readily. To examine this empirically, it will be important to separate the individual and combined effects of verbal and nonverbal reinforcement and their relative efficacy to token reinforcement.

Nonverbal teacher behaviors represent an interesting source of response consequence because similar behaviors characterize normal social intercourse outside the classroom. Often, programs using artificial extrinsic reinforcers, such as tokens, attempt to ensure response maintenance after the extrinsic reinforcers are no

longer presented and control is transferred to other reinforcers. Presumably, certain nonverbal behaviors accompany praise as it is ordinarily delivered in the "natural" environment. Possibly, bringing behavior under control of verbal and nonverbal reinforcers in a programmed setting will facilitate later response maintenance.

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