

The effects of Self-Recording on the Generality of Parenting Behaviors

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Abstract: Generality of parenting skills was programmed as well as assessed using the technique of self-recording from audiotapes. A multiple baseline across problematic situations was replicated with two single-parent families. Self-recording was introduced in one situation at a time, while audio taped assessments were conducted in three situations throughout the day. A combination incentive plus cost system was used to encourage the recording and coding of tapes. Parent and child behaviors changed in the desired directions after self-recording was directly introduced. In addition, generality effects were clear in all response categories except descriptive praise. As the number of codings increased, greater behavior changes were evident in both targeted and non targeted situations.

Key Words: Parent training, self-recording, generality effects, generalization, audio recording.

Nota Introdutória

Este artigo é fruto do meu mestrado cursado nos Estados Unidos, na “Western Michigan University”. O trabalho realizado em uma disciplina assim como minha experiência anterior na Santa Casa de Misericórdia de São Paulo no trabalho com pais me motivou a escolher este tema como dissertação de Mestrado. A revisão bibliográfica deixou claro que

os procedimentos usados nos cursos para pais eram eficazes no sentido de produzir mudanças nos comportamentos de pais e de filhos. O grande problema encontrado era a pouca transferência da aprendizagem para outras situações e a falta de manutenção dos ganhos ao longo do tempo. Quis então pesquisar uma forma de aumentar a generalidade através de situações e do tempo com uma tecnologia simples, barata e pouco intrusiva. Na minha volta ao Brasil fiquei me correspondendo com minha orientadora Cheryl Poché e quase finalizamos o texto aqui apresentado. Fui protelando este término em função de dificuldades de readaptação ao Brasil, até desistir. Foi grande a satisfação de “salvar” todo o trabalho dedicado em 1980 a este artigo que o convite para escrever no volume especial de escritos dos professores, da Revista *TransFormações em Psicologia* me proporcionou. Tentei ainda retomar o tema no Doutorado, cursado na Psicologia Experimental na USP, mas entrevistas com diretores de escolas e pais me mostraram que não havia demanda para um curso de caráter preventivo. Minha tese foi em outro tema, o de comportamentos autolesivos em indivíduos com atraso de desenvolvimento. Hoje minhas pesquisas são sobre o processo de interação em psicoterapia. Apesar da mudança de tema, são vários os legados do trabalho desenvolvido no Mestrado, em especial o delineamento de pesquisa que atualmente estou empregando, o delineamento experimental de caso único.

Two major improvements are currently needed in parent training research. First is the need for inexpensive and convenient, yet objective and reliable, assessment devices. Second is the need for procedures which produce generality¹ of treatment effects across new behaviors and settings.

1 According to Johnston (1979), the term “generalization” is often erroneously used as a description or explanation of any appropriate change occurring in a non-training setting. This suggests that a single phenomenon is at work when actually a number of different phenomena need to be described, explained, and controlled. Stimulus generalization refers to the condition in which responses reinforced in the presence of one stimulus also occur, though possibly with less frequency or magnitude, in the presence of similar but different stimuli. Response generalization refers to the condition in which similar but

The present study used self-recording from audiotapes as both an assessment device and a method for enhancing the generality of treatment effects.

Assessment techniques used to evaluate parent training programs include verbal reports of parents, relatives, and friends through interviews and questionnaires, personality tests, and role-plays, parent-collected observational data, structured laboratory observations, and direct observations in the home (Berkovitz and Graziano, 1972; Eyeberg and Johnson, 1974; Forehand and Atkeson, 1977; O'Dell, 1974; Peed, Roberts, and Forehand, 1977; Roberts and Forehand, 1978; Wahler, 1969, 1975). Eyeberg and Johnson (1974) and Peed et al (1977) suggest that these different assessment methods produce different conclusions. Forehand and Atkeson (1977) stated that the more rigorous the method of assessment, the less positive the results have been, and that parents verbal or written opinions have questionable validity. The more rigorous methods involve the direct assessment of overt behavior.

Direct home observations, however, are costly and time consuming (Miller and Sloane, 1976; Herbert and Baer, 1972; Kelley, Embry and Baer, 1979). Time for transportation and conversation with the family must be added to the actual observation time for each home visit. It is difficult to obtain a broad sample of behaviors, since home observations must be conducted at a single convenient time of the day for the family, primary observer, and reliability observer. (The hour before dinner is a common observation time.)

Another problem with home observations is that they may be more obtrusive than other procedures, since the presence of the observer makes the family constantly aware that their behavior is being assessed. It may be difficult to ignore the observer and to interact normally. Studies of

different responses are evoked but a stimulus previously paired with reinforcement. These types of generalization are not strong enough, according to Johnston (1979), to produce or maintain desired responding in the face of a different set of environmental stimuli. Thus, for the behavior analyst, the issue is not so much how to obtain "generalization" but how to arrange control over different environmental conditions which result in desired influences on behavior. Generality, then, refers to universality or replicability.

the differential reactivity of different observational methods, however, have produced contradictory evidence (Gang & Poche, 1980; Johnson & Bolstad, 1973; Forehand & Atkeson, 1977; Kent, O'Leary, Dietz & Diamant, 1979; Johnson, Christenson & Bellamy, 1976, Bernal, Gibson, Williams & Pesses, 1971; Kazdin, 1979).

Probably because of the cost, time requirement, obtrusiveness, and inconvenience to the family and observers, direct observations have often been brief in duration and limited to one pre- and one post-observation (Forehand and Atkeson, 1977). However, in order to clearly demonstrate the process of behavior change, and to provide more representative data, a continuous measure of behavior is preferable to pre- and post-observations.

Audio recording in the home is an alternative method for data collection which has several advantages over live observation. Audio recording attenuates the problem of observer bias and obtrusiveness by limiting subject- observer contact (Johnson and Bolstad, 1975). It is less costly than direct observation. A cassette recorder with a built-in microphone is inexpensive and can provide audible recordings. Audio recordings can be carefully reviewed, can be stored for later interobserver agreement checks, and are available for later analysis of different variables. Also, time-samples can be superimposed to demarcate observation intervals (Hughes & Haynes, 1978). Furthermore, audio recording places fewer restraints on the family than direct observation. The family can move to different rooms by carrying a portable recorder, placing microphones in several places in the home, or having the child or adult wear a wireless radio transmitter. Parents need not induce the occurrence of children's targeted behaviors, since recording can take place at the time when the problem generally occurs. No transportation and interaction time is needed. Tape recordings can be made at any time of the day, and with a high frequency, since they do not depend upon observer availability. Audio recordings also provide the therapist or researcher with a record of the actual behavior rather than parent-collected data, such as that using wrist counters or data sheets, which may be subject to errors and/or bias.

The technique of self-recording from audiotapes has been used successfully to produce changes in single behaviors and settings. Horton (1975) had teachers listen to audiotapes recordings of their classroom interactions, while scoring and graphing their behaviors. The rates of teachers' behavior-specific praise increased, but these increases were restricted to subject matter areas in which self-recording were conducted. Doleys, Doster, and Cartelli (1976) had parents score their own behavior from an audiotape made in a clinic as part of a package that also contained post-interaction feedback, lectures, and role playing in effective child management. The package produced significant behavior changes in the clinic. It is not clear if these changes were also produced at home. Doleys et al. (1976) suggested that self-recording of home interactions might enhance generality and maintenance.

The second deficiency of parent training programs is the lack of data demonstrating the generality of treatment effects to new behaviors and settings. When generality occurs, the therapist need not treat recurrences of previously treated problems (temporal generality), the problem behaviors in new settings (setting generality), or all behavior problems of a person (behavioral generality).

In two reviews parent training programs, O'Dell et al. (1974) and Forehand and Atkeson (1977) stated that most parent training programs did not show generality to non targeted behaviors or settings and that there were no well-developed techniques for producing such generality. Kelley, et al. (1979) enhanced the generality of child management skills across time (temporal generality) by teaching both parents to engage in behaviors supportive of each other.

Self-control procedures such as self-recording may promote generality. Such techniques are easy to transport and may be employed readily to facilitate responding under untrained conditions. Studies that have employed various self-control tactics, including self-assessment, self-recording, self-determination of reinforcement, and self-administration of reinforcement, have displayed some maintenance and generality effects (Stokes & Baer, 1977).

Coding of audio tapes is one tactic of self-control similar to self recording. It's occurrence at a later time than the actual recording presents a theoretical problem if the coding process is considered as a consequence that aims to change the behavior listened to. The categorization of one's behavior as a correct command can probably function as reinforcement, and its categorization as an incorrect command, as punishment. But how can the categorization affect the behavior if the consequence is contingent on the categorization? What probably occurs when people listen to their own behavior is that the controlling circumstances such as children's verbalizations are partially presented again through the tape. The consequences would then act upon the actual behavior if the person is behaving, along with listening, to the tape. The consequences would then act upon the actual behavior if the person is behaving, along with listening, to the tape. It would be a similar process to the one described by Skinner (1974) at page 120: "On a future occasion such a record can evoke behavior appropriate to an earlier occasion and may permit a person to respond more effectively".

The consequences of coding from a tape could be more effective in producing generality than either therapist's consequences or those obtained through coding ongoing behavior. This is because the stimulus control generated by other aspects of the situation when the tape recording took place are absent when the tape is played at a later time. The absence of strong situation-specific stimulus control could be the instrumental factor in the production of generality. The parent's correct responses could be controlled solely by the relevant characteristics of the child's behavior.

A multiple-baseline design can be used to study the generality of treatment effects (O'Dell, 1974; Forehand & Atkeson, 1977). With this design, different behaviors or settings are observed simultaneously, but treatment is introduced in one behavior or setting at a time. When generality occurs, changes are observed not only in the behavior or setting in which treatment was not directly introduced. In order to insure that the effects observed were not produced by an extraneous factor, it is desirable to reproduce those effects in more than one subject.

In the present study, generality of parenting skills across problematic situations was programmed as well as assessed by the technique of self-recording from audiotapes. A multiple-baseline design across situations was replicated with two families.

Method

Subjects

Six families answered a letter of invitation sent to the parents of children attending a preschool affiliated with a university. One of four families who attended an initial interview was elected to participate. The other family was contacted by telephone, but was not interviewed because of health and work problems. The second family was referred by a personal source.

Family A consisted of a 24-year-old, divorced, high school graduate and her three-year-old daughter. The mother was a welfare recipient who babysat with other children. Family B consisted of a 27-year-old divorced welfare recipient, her seven-year-old daughter, and her eight-year-old son. The mother was enrolled in university classes and worked as a volunteer 20 hours per week. Both families gave their written informed consent to allow the therapist to hear their tape-recordings and to communicate the results of the study while maintaining their anonymity.

Setting

All data collection and behavior change programs were conducted by the parents in their homes. All parent/therapist meetings were conducted in the therapist's office at the preschool, with the exception of one home visit.

Apparatus

Each family was provided a cassette tape recorder and five 60 minute blank tapes each week. When the family returned the tapes, a 10-second-interval verbal count was superimposed on them. Parents used a watch with a second hand to measure the duration of the recordings and codings.

Data Collection Procedures

Tape Recordings. All the data on parent's behaviors were collected from tape recordings of family interactions in their homes. The parents received instructions on how to record sessions, with details on where to place the tape recorder and how to make a clear recording. They were asked not to change their family interactions during the recordings, but to tell their children the general purpose of the recordings if they asked. If the parents recorded something confidential, they could erase that part of the tape if they wished. If she had to leave the room, the mother was instructed to carry the recorder with her. When the children and mother were in different rooms, the mother was asked to keep the recorder near her since her behaviors were the ones coded.

Each parent chose three situations they wished to change. Family A chose dinner, cleanup, and naptime. The main problems in all three situations were non-compliance and talking back. Family B chose breakfast, getting dressed in the morning, and bedtime. The main problems that occurred were arguing and using bad language.

Parents were asked to record for a minimum of 15 minutes in order to increase the likelihood that 10 full minutes would be available for coding. If the targeted situation was mealtime, and the meal was over in 7 minutes, the data were transformed into a comparable unit by taking the number of responses for each category, multiplying this number by 10, and then dividing by the number of minutes. The parents were asked to record each situation two or three times weekly, for a minimum of six and a maximum of nine tapings per week. They could choose the days on which to make the recordings.

Coding the Tapes. During the experimental phases, the parents coded their own behavior from the recordings. The number of codings required per week ranged from zero to five, depending on the experimental condition. The time required to code a 10-minute situation ranged from 10 to 30 minutes. Parents were provided with written instructions for coding, definitions of the behaviors, several data collection sheets, and graph paper. They coded every phrase, statement, or comment into one of five categories.

1. *Correct command*: Statement that specified an act of compliance which could be initiated by the child within 10 seconds, was delivered in a normal tone of voice, specified the referents, did not specify aversive consequences, was not a bribe, and was not a repetition of an earlier command.

2. *Incorrect command*: Statement that did not have all of the above characteristics of a correct command.

3. *Attention for inappropriate behavior*: Anything said to the child while s/he was acting inappropriately, including the announcement of an unpleasant consequence, a command, a remark, reasons why the child should or should not do something, or conversation.

4. *Attention for appropriate behavior*: Anything said to the child while she was acting appropriately, or not acting inappropriately, except aversive statements and descriptive praise.

5. *Descriptive praise*: Statement of approval in which the approved behavior was clearly described.

Parents tallied and then totaled the frequencies for each of the five categories and then plotted them on graph paper.

Training in Coding. Parents and reliability scorers received written definitions of the five categories of parent behaviors. First, they practiced coding written examples of the behaviors until the percentage of correct codings of all categories were 90% or above. Next, they coded an actual tape. If agreement with the therapist was below 90%, the therapist coded that tape with the parent or reliability scorer, answering questions and correcting mistakes. Training was concluded when the parent or scorer obtained 90% or better agreement with the therapist. During the program, retraining was conducted when mistakes in coding were noted.

Reliability Procedures

The therapist used a frequency count within intervals in addition to a total frequency count to code 100% of the parents' tapes. Reliability scorers did not know the families or the phase of the study from which each recording came. The tapes chosen for reliability scoring were randomly selected, while equally distributed among the situations and experimental conditions.

Agreement with parents. Using an exact frequency count, the mean percentage agreement between the therapist and mother A averaged 60% and ranged from 47% for attention for inappropriates to 81% for descriptive praise. Agreement with mother B averaged 67% and ranged from 43% for attention for inappropriates to 89% for attention for appropriates. Both parents generally recorded a lower frequency of correct commands, incorrect commands, and attention for inappropriates than did the therapist.

A low reliability coefficient did not always mean a large discrepancy between parent and therapist in the recorded frequency. If the frequency of responses was low, the parent and therapist might disagree on only one instance but produce a reliability coefficient suggesting a larger discrepancy.

Agreement with reliability scorers. Using a frequency count within intervals, occurrence agreement between therapist and reliability scorers averaged 87% and ranged from 52% to 100%. Overall agreement averaged 99% and ranged from 95% to 100%.

Children's Behaviors

While the parents tape-recorded their own behaviors, they also recorded their children's target behaviors on paper and later graphed them. A written record of the children's behaviors was required because their motor behaviors could not be identified through the tapes. The recording was kept simple, however, since two detailed recording procedures might have involved too much work for the parents and since child behaviors were not the primary emphasis of the study.

At dinner, mother A recorded the number of bites of food eaten by the child. In the cleanup situation, she recorded whether the child picked up all the toys, half of them, or less than half. At naptime, she recorded the occurrence of kicking, screaming, and refusal to nap. Mother B recorded the duration of getting dressed in the morning, the duration of breakfast, and latency of quieting down at bedtime.

Incentive System for Taping and Coding

An incentive system that included prizes, a cash deposit, and a termination contingency was used to motivate parents to reliably record, code, and graph their own behavior.

Prizes. Parents received points for completing the required recordings and codings. The recordings had to contain session information, to be audible, and to include a corresponding written record of the child's behavior. In addition, each tape had to be coded before making the next recording. Bonus points were given for each recording or coding done in addition to the required ones. Points were exchanged weekly for prizes, which were small gifts ranging in price from 50¢ to \$3.00 and free child care at the WMU day care center.

Cash Deposit. The parents deposited \$10.00 three times during the program which they received when they completed the recordings and codings as specified above and returned the tapes and recorder in good condition.

Certificate. Parents were told they would receive a certificate indicating that they had completed the program on effective parent training, provided their participation continued until the end of the program.

Termination Contingency. Parents agreed to terminate their participation in the program if they obtained less than 50% of the required points for two consecutive weeks or four non-consecutive weeks.

Weekly Meetings

The therapist met weekly with each parent for 1 to 2 hours throughout all conditions. At each meeting, the clarity of the recordings was discussed. Prizes were awarded and cash credits and debits were recorded. Tapes and

data sheets were collected from parents prior to each meeting so that the therapist could hear the recordings, determine the following week's assignment, and award points and money. Midweek phone calls were made to check progress, solve problems, and remind parents of the recordings.

Experimental Design

The experimental design was a multiple baseline across problematic situations for each family. The sequence of conditions for each situation was as follows:

Baseline. At the first weekly meeting during baseline, parents chose three problematic situations. The therapist helped the parent define the problem behaviors of the child and design a simple data sheet to record them. The parents received recording instructions, a tape recorder, and five tapes. They were asked to record the three situations two to three times per week each. Baseline continued until the situation was recorded for at least three days and the data appeared stable.

Coding. At the first weekly meeting during training, parents received a written handout summarizing basic principles of behavior change, along with a brief discussion of these principles. They also received a handout describing how to code their own behaviors, along with definitions of the categories. They were asked to study the handouts in order to participate in an exercise in coding at the next meeting. Parents were also asked to design a behavior change plan for the first situation. The therapist gave no help in the initial design of the plan. The parent developed it at home, basing it on the handouts already given. Parents used a given format to set up the behavior change plans. This format required them to specify what behavior they wanted to occur, when it should occur, and what they would do before and after the behavior occurred. They also specified the behavior they did not want to occur, when it did occur, and what they would do before and after their behavior occurred. Several blank formats were given to each parent. No codings were required this week.

During the second weekly meeting, the therapist reviewed the behavior change plan and, if it was incomplete or inappropriate, helped to correct it. The therapist helped parents analyze the contingencies maintaining the children's inappropriate behaviors but gave no direct answers to questions like, "What should I do when my daughter uses bad language?" this was so that parents would have a history of independent behavior analysis and development of intervention plans and thus might be more likely to analyze behavior and develop a plan on their own in the future. Practice exercises in coding were provided. Parents were asked to code and graph their behavior from every tape recording of the first situation in the next week. They were also asked to implement the plan for child behavior change in the first situation. The therapist made one home visit during this week to help parents with the first coding.

In later meetings, parents were asked to examine their behaviors from the graphs and to state whether or not their behaviors were improving. The therapist praised any increases in correct behaviors.

Fading 1. Parents continued to tape-record the situation but coded and graphed their behavior from only half of the recordings.

Fading 2. Parents continued to record the situation, but no coding nor graphing were required.

Results

Treatment and Generality Effects

Figures 1 and 2 show the data recorded by the therapist from the parents' tape recordings. A decrease in the mean frequency of incorrect commands, total commands, and attention for inappropriate behavior and an increase in the mean frequency of descriptive praise was observed for both families as a function of the direct and generality effects of self-recording.

Figure 1. Mean frequency of incorrect commands, total commands, descriptive praise, and attention for inappropriate behaviors per 10 minute session displayed by family A during baseline, coding, and fading.

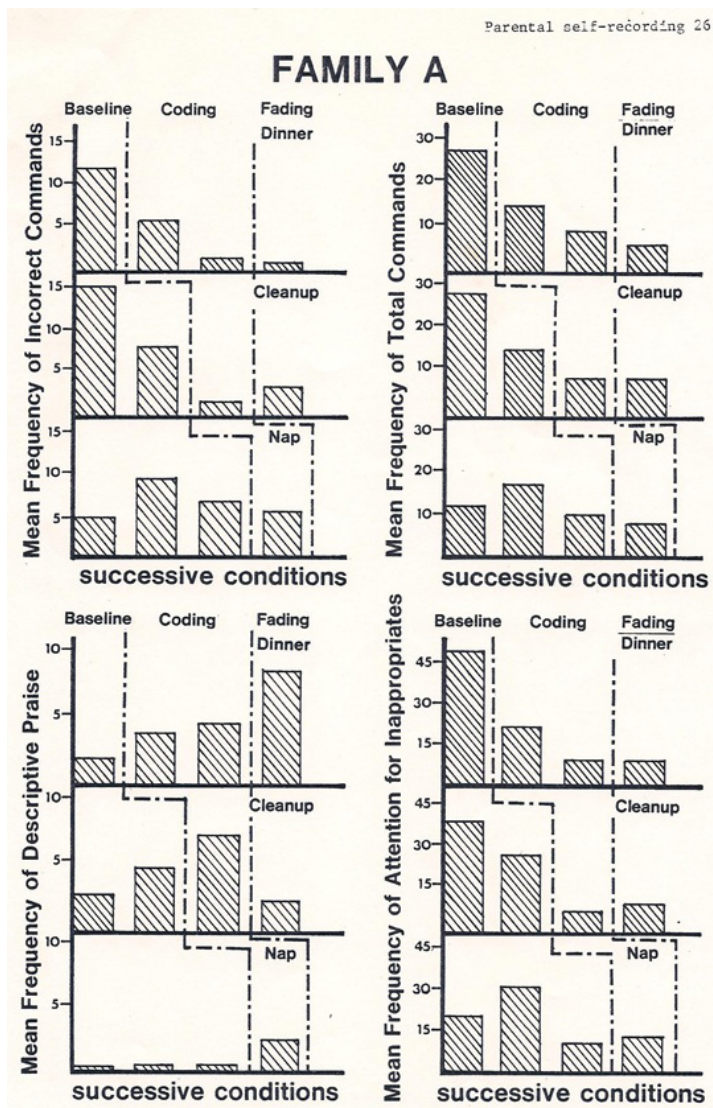
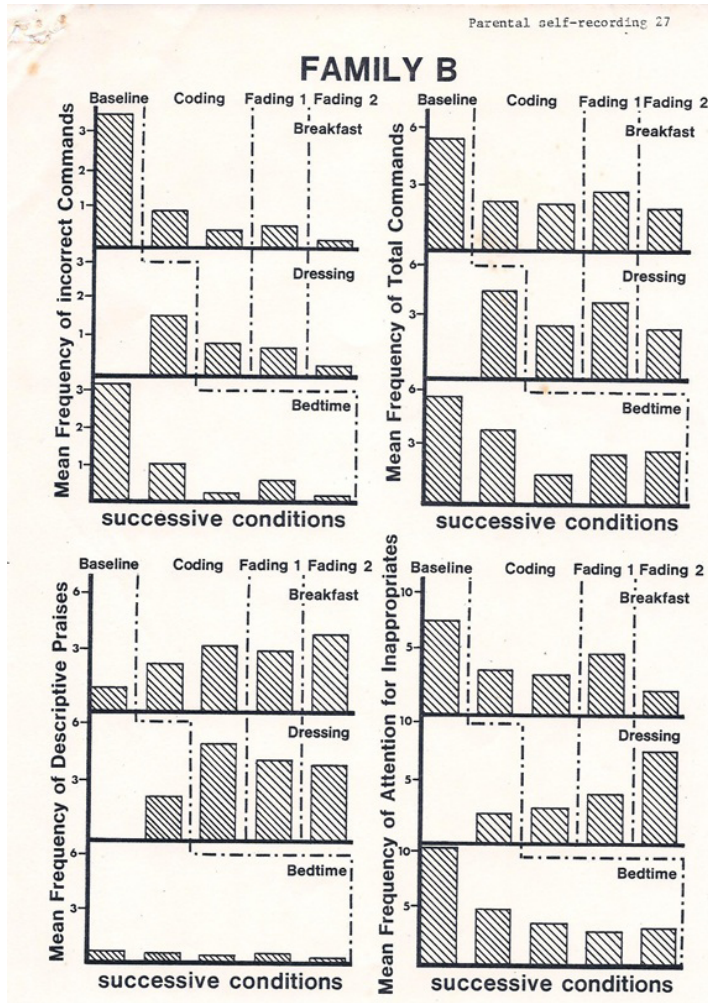


Figure 2. Mean frequency of incorrect commands, total frequency of commands, descriptive praise, and attention for inappropriate behaviors per 10 minute session displayed by family B during baseline, coding, and fading.



During baseline at dinner for family A, the mean frequency of incorrect commands was 12. With the institution of the coding procedure, the

mean frequency of incorrect commands decreased to 5.6. When coding was also initiated in the cleanup situation, the mean frequency of incorrect commands at dinner decreased further to 1.1. During fading, the mean frequency decreased to 0.7. The variability in the frequency of incorrect commands during dinner also decreased after coding was initiated.

During baseline in the cleanup situation, the mean frequency of incorrect commands was 15. During coding at dinner, the cleanup situation remained in baseline for another 8 sessions, but a decrease of 47% to 8 in the mean frequency of incorrect commands was observed, illustrating a generality effect. Variability also decreased during this time. When the coding procedure was introduced directly in the cleanup situation, incorrect commands decreased further to an average of 1.3 or 13% of baseline levels. Variability also decreased further during this period. During fading, incorrect commands increased slightly to 3 but were still at only 20% of baseline levels. Variability remained low during fading.

During baseline at naptime, the mean frequency of incorrect commands was 5. When coding was introduced at dinner, incorrect commands at naptime increased to a mean of 9.5. When coding was introduced in the cleanup situation, incorrect commands at naptime decreased to a mean of 4.2, showing a generality effect. When coding was finally introduced at naptime, incorrect commands dropped to a mean of 3.2. Similar trends in frequency and variability were observed in the mean frequency of total commands and attention for inappropriate behavior.

The frequency of descriptive praise at dinner increased from a baseline average of 2 to 4 after the introduction of coding. Descriptive praise at dinner further increased to an average of 4.7 when coding was also introduced in the cleanup situation. During fading, praise at dinner increased to an average of 9.2.

When coding was introduced at dinner, praise in the cleanup situation, still under baseline conditions, increased from 3 to 5, showing a generality effect. Praise increased further to 7.7 when the procedure was directly introduced at cleanup. During fading, praise at cleanup dropped to a mean of 2.3.

During naptime, praise increased from an average of 0 to 2 when coding was introduced at dinner and 4 when coding was introduced at cleanup, showing a generality effect. When coding was directly introduced at naptime, praise increased again to an average of 2.8 instances per sessions.

The results for family B were similar to those for family A, as seen in Figure 2. The frequency of incorrect commands, total number of commands, and attention for inappropriates at bedtime decreased greatly when the coding procedure was introduced during breakfast and dressing. In the dressing situation, changes from baseline can only be inferred because of the lack of complete baseline data. The means for the dressing situation when coding began at breakfast are compared to the baseline means at breakfast and bedtime. An estimated decrease of 55% was obtained for incorrect commands, 24% for total commands, and 82% for attention for inappropriates. An estimated increase of 60% was obtained for descriptive praise.

Some differences between families were observed. The frequencies of all behaviors were 53% to 80% lower for family B than for family A. Variability was also lower. In addition, the coding procedure was not introduced in the third situation for family B, as the levels of behaviors were already acceptable. The frequency of attention for inappropriates increased during dressing in contrast with the other situations and with the results for family A.

The mean frequency of attention for appropriate behaviors showed no systematic trends across situations for either family after the introduction of the coding procedure.

Incentive System

Mother A obtained 83% of the required points and earned a total of \$24.20. Mother B obtained 95.5% of the required points and earned a total of \$27.20. Both earned the certificate indicating completion of the parent training program.

Behavior Change Plans and Results

Based on their graphs of their behavior in the problematic situations, the parents decided to decrease the frequency of their incorrect commands and their attention for inappropriate behavior, as well as the total number of commands they gave. They also decided to increase the frequency of their descriptive praise statements and sometimes supplemented praise with activity and edible reinforcers. The parents often specified quantitative goals for themselves based on their previous rates of behavior (i.e., only two commands to prompt the child's behavior; one descriptive praise statement following each correct behavior).

After implementation of a behavior change plan at dinner, mother A reported that her child displayed appropriate eating behavior (defined as eating at least three bites of each food item within 15 minutes) in 72% of the dinners, compared with 50% before the plan. At cleanup, the child picked up all of her toys in 77% of the sessions compared with 40% before the plan. At naptime, the child refused to nap in 27% of the sessions, compared with 87% of baseline.

Mother B reported that, after implementation of a behavior change plan at breakfast, the children finished breakfast promptly 90% of the time, compared with 33% before the plan. The children were dressed within 10 minutes 92% of the time, compared with 40% before the plan. At bedtime the children went to bed promptly 87% of the time, compared with 31% before the plan.

Discussion

This study demonstrated that having parents code and graph their own behavior from audiotapes made in their homes was effective in obtaining parental behavior change. For both families, each time that coding was directly introduced in a problematic situation, the mean frequency of incorrect commands and the frequency of total commands decreased,

and the mean frequency of descriptive praise increased in that situation. The mean frequency of attention for inappropriates decreased, with two exceptions, which were no more than 4% above baseline and which were observed after the occurrence of a generality effect.

The study also demonstrated that appropriate parenting behaviors obtained through self-recording showed generality, that is, occurred in different situations than those in which coding and graphing occurred. With the introduction of self-recording in the first situation, the behaviors changed in the desired direction in second situation for family A and in the second and third situations for family B, except for descriptive praise, which showed minimal changes. When the procedure was introduced in the second situation for family A, generality of responding was observed in the third situation in all four behaviors. When self-recording was introduced in the second situation for family B, the generality effects observed earlier in the third situation were even greater. It is interesting to note that further changes in the desired directions occurred in all behaviors in the first situation after the introduction of the procedure in the second situation. These findings are similar to those of Herbert and Baer (1972) and Horton (1975), who observed further improvements in behavior when self-recording was introduced for a second time.

Rosenbaum and Drabman (1979) stated that desirable effects associated with self-recording may be short term, requiring the addition of reinforcing contingencies for their maintenance. These contingencies were not necessary in the present study. When the number of codings was reduced in the fading conditions, most behaviors in most situations remained appropriately well above or below baseline levels. In many cases, parental behavior improved even further during fading as observed in family A at dinner and nap and in family B during fading 2. These results suggest that the greater the number of codings accomplished, the greater the behavior change in coded as well as uncoded situations.

The use of a combined incentive plus cost system for making tapes and coding them worked well for both families. Family B often made more

tapes and codings than the minimum number required by the therapist. It is important to note that no formal contingencies of reinforcement were designed for parental behavior change. No contingency was introduced for good reliability with the therapist either.

Minor differences between parents' and therapist's codings were expected with the use of a frequency count. Verbal interactions do not always have a discrete onset and offset. In such cases the use of an interval measure is indicated (Roberts and Forehand, 1978). Indeed, with the use of an interval measure occurrence plus nonoccurrence reliability was 99%, and occurrence reliability was higher than exact frequency reliability. It would have been desirable to have the parents use interval recording, but to do this would have increased the cost of the program as well as the time and skill of the parents in operating the necessary equipment. Future improvements in recording equipment might solve this problem. The fact that the parents' behaviors were generally of low frequency made the exact frequency method of reliability a very stringent one. A difference of one point between codings could mean 0%, 50% or 80% reliability, depending upon whether the actual frequencies were 0 and 1, 1 and 2, or 4 and 5. According to Rosenbaum and Drabman (1979), self-recording need not be accurate to produce desirable behavior change. Kazdin (1974) asserted that, when used as a behavior change technique rather than an assessment device, the accuracy of self-monitoring is less crucial and perhaps irrelevant.

A question pertinent to the use of data assessed through audio recordings is whether they are similar to data obtained through direct observation. The answer to this question was positive in previous studies (Bernal et al., 1971; Johnson and Bolstad, 1975; Gang and Poche, 1980). Indeed, observers scoring audio taped interactions may attend more closely to the verbal behaviors being recorded than observers scoring live observations, who may pay more attention to physical movements. A shortcoming of audio recordings is that its most physical behaviors cannot be identified from the tape alone.

If the self-recording procedure were clinically applied, it would require less time than conventional parent training programs. Most programs involve a two or three hour weekly meeting, frequent home visits, and time spent supervising home projects. The self-recording procedure would require a one hour weekly meeting and a half hour each week to code half of the recordings from one situation as a reliability measure. One home visit at the beginning of the program is recommended to ensure that the parent is initially recording and coding correctly and to observe a family interaction. The cost of the program, which includes the cost of a reusable cassette recorder, tapes, and small gifts, is much less than that of a program in which observers must be trained and paid to go to the home.

The self-recording procedure consisted of several behavioral components, including tape-recording, listening to the tape, coding it, graphing the results, recording the child's targeted behaviors, developing an intervention plan, reading theoretical material, and attending weekly meetings with the therapist. One might ask whether aspects of the program other than coding and graphing were responsible for the changes observed. Audio recording alone did not seem to produce any behavioral changes, since baseline rates did not show any systematic trends. The recording of children's behaviors was not responsible for the changes either, since this recording also started during baseline. Reading theoretical material and attending weekly meetings were probably not instrumental in producing all of the changes alone. Flanagan, Adams, and Forehand (1979) found that written presentation of material did not result in parental behavior change in the home. O'Dell (1974) concluded that actual behavior training appears to be necessary to produce measurable changes in parent behavior. It is possible that simply listening to the tapes without coding and graphing them would produce similar results. This is an interesting possibility to investigate since it might involve less parental time. Parents might answer a number of questions about their behaviors that would not include the precise counting of behaviors.

Self-recording from audiotapes proved to be effective in producing parental behavior change in targeted problematic situations, as well as in other situations involving different child behaviors at different times of the day. The audio recordings also served as a convenient and objective assessment device for the therapist, saving both time and expense. Self-recording could be applied to many other training situations, such as staff or teacher training, thus decreasing supervisor time and increasing trainee effectiveness in multiple settings.

References

- Berkowitz, B.P., & Graziano, A. M. Training parents as behavior therapists: a review. *Behavior Research and Therapy*, 1972, 10, 297-317.
- Bernal, M., Gibson, D. M., Williams, D. E., & Pesses, D. I. A device for recording automatic audio tape recordings. *Journal of Applied Behavior Analysis*, 1971, 4, 151-156.
- Doleys, D. M., Doster J., & Cartelli, L. M. Parent training techniques: Effects of lecture-role playing followed by feedback and self-recording. *Journal of Behavior Therapy And Experimental Psychiatry*, 1976, 7, 359-362.
- Eyberg, S. M., & Johnon, S. M. Multiple assessment of behavior modification with families: effects of contingency contracting and order of treated problems. *Journal of Consulting and Clinical Psychology*, 1974, 42, 594-606.
- Flanagan, S., Adams, H. E., & Forehand, R. A comparison of four instructional techniques for teaching parents the use of timeout. *Behavior Therapy*, 1979, 10, 94-102.

- Forehand, R., & Atkeson, B. Generality of treatment effects with parents as therapists: a review of assessment and implementation procedures. *Behavior Therapy*, 1977, 8, 575-593.
- Gang, D., & Poche, C. E. An effective program to train parents as reading tutors for their children. *Education and Treatment of Children*, in press.
- Herbert, E. W., & Baer, D. M. Training parents as behavior modifiers: self-recording of contingent attention. *Journal of Applied Behavior Analysts*, 1972, 5, 139-149.
- Horton, G. O. Generalization of teacher behavior as a function of subject matter specific discrimination training. *Journal of Applied Behavior Analysts*, 1975, 8, 311-319.
- Hughes, H. M., & Haynes, S. N. Structured laboratory observation in the behavioral assessment of parent-child interactions: methodological critique. *Behavior Therapy*, 1978, 9, 428-447.
- Johnson, S. M., & Bolstad, O. D. Methodological issues in naturalistic observation: some problems and solutions for field research. In Hamerlynk et al. *Behavior change: Methodology, concepts, and practice*, Research Press, 1973, 7-67.
- Johnson, S. M., & Bolstad, O. D. Reactivity to home observation: a comparison of audio recorded behavior with observers present or absent. *Journal of Applied Behavior Analysis*, 1975, 8, 181-185.
- Johnson, S. M., & Christensen, A. C., & Bellamy, G. T. Evaluation of family intervention through unobtrusive audio recordings: experience in "bugging" children. *Journal of Applied Behavior Analysis*, 1976, 9, 213-219.

- Johnston, J. M. On the relation between generalization and generality. *The Behavior Analyst*, 1979, 2, 1-6.
- Kazdin, A. E. Self-monitoring and behavior change. In M. J. Mahoney, and C. E. Thorensen (Eds.), *Self control: Power to the person*, Monterey, California: Brooks/Cole, 1974.
- Kazdin, A. E. Unobtrusive measures in behavioral assessment. *Journal of Applied Behavior Analysis*, 1979, 12, 713-724.
- Kelley, M. L., Embry, L. E., Baer, D. M. Skills for child management and family support: Training parents for maintenance. *Behavior Modification*, 1979, 3, 373-396.
- Kent, R. N., O'Leary, K. D., Dietz, A., & Diamant, C. Comparison of observational recordings in vivo, via mirror, and via television. *Journal of Applied Behavior Analysis*, 1979, 12, 517-522.
- Miller, S. J., & Sloane, H. N. The generalization effects of parent training across stimulus settings. *Journal of Applied Behavior Analysis*, 1976, 9, 335-370.
- O'Dell, S. Training parents in behavior modification: a review: *Psychological Bulletin*, 1974, 81, 418-433.

- Peed, S., Roberts, M., & Forehand, R. Evaluation of the effectiveness of a standardized parent training program in altering the interaction of mothers and their non-compliant children. *Behavior Modification*, 1977, 1, 323-350.
- Roberts, M. W., & Forehand, R. The assessment of maladaptive parent-child interaction by direct observation: an analysis of methods. *Behavior Therapy*, 1978, 9, 793-798.
- Rosenbaum, M. S., & Drabman, R. S. Self-control training in the classroom: a review and critique. *Journal of Applied Behavior Analysis*, 1979, 12, 467-485.
- Skinner, B. F. *About Behaviorism*. New York: Vintage Books, 1976. (Originally published, 1974).
- Stokes, T. F., & Baer, D. M. An implicit technology of generalization. *Journal of Applied Behavior Analysis*, 1977, 10, 349-367.
- Wahler, R. G. Oppositional children: a quest for parental reinforcement control. *Journal of Applied Behavior Analysis*, 1969, 2, 150-170.
- Wahler, R. G. Some structural aspects of deviant child behavior. *Journal of Applied Behavior Analysis*, 1975, 8, 27-42.