PARENT EDUCATION PROJECT II. INCREASING STIMULATING INTERACTIONS OF DEVELOPMENTALLY HANDICAPPED MOTHERS

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Two studies are reported on the assessment and training of parent-child interactional skills in developmentally handicapped mothers. Study 1 compared the interactions of eight developmentally handicapped versus eight nonhandicapped mothers during play with their young (6-25 months) children. Results showed that the former group generally interacted much less with their children and that they were less likely to praise appropriate child behavior and imitate child vocalizations. Study 2 attempted to remediate these deficits, using a training package consisting of discussion, modeling, feedback, social reinforcement, and self-recording. Results showed, first, that the training did increase the targeted skills to well within the range found for the nonhandicapped mothers. Second, training effects generalized from the group instructional setting to the mothers' own homes. Third, newly acquired skills were generally maintained at or above levels found for the nonhandicapped mothers over a 5- to 10-month follow-up period. Finally, all seven children showed increases in vocalizations concomitant with parent training. The results suggest that developmentally handicapped mothers can be taught to provide more effective and stimulating interactions to their young children.

DESCRIPTORS: parent training, retarded parents, parent-child interactions, behavioral assessment, language

There is an urgent need to improve the parenting skills of developmentally handicapped adults. Increasing numbers of mildly and moderately retarded persons are now living independently in the community (Crawford, Aiello, & Thompson, 1979); many jurisdictions are banning involuntary sterilization (Dickin & Ryan, 1983); and equal rights in the areas of sexuality and family life for developmentally handicapped people are being advocated (Hickl-Szabo, 1985; Rubino, 1981) and protected (Ferguson & Harvey, 1985). These developments are likely to result in more mentally handicapped persons bearing and raising children.

Although applied behavior analysts have made

significant contributions to both the teaching of domestic living skills (e.g., Bauman & Iwata, 1977; Matson, 1981) and parent training (e.g., Heifetz, 1977; Koegel, Glahn, & Nieminen, 1978), there has been little research on the teaching of parenting skills to developmentally handicapped parents. To date, only a few reports, mostly nonexperimental, have described behavioral parent training for mentally retarded mothers. Peterson, Robinson, and Littman (1983) found initial increases in positive maternal interactions of six mothers that for the most part, were not maintained at a 1-month follow-up. Because a nonexperimental pre-post design was used in this study, the improvements cannot be attributed to the training provided. Sarber, Halasz, Messmer, Bickett, and Lutzker (1983) increased the menu planning and grocery shopping skills of a mother with an IQ of 57. Szykula, Haffey, and Parsons (1981) reported anecdotally that a "parenting salary" increased a mildly retarded mother's consistent use of behavior management techniques with her child's tantrums. Several program descriptions (Madsen, 1979; Schilling

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& Schinke, 1984) and unpublished case studies (cited in Budd & Greenspan, 1984) also report interventions with retarded parents. Thus, given the paucity of available research, it is not surprising that, although many family service agencies report having developmentally handicapped parents and their children as clients (Budd & Greenspan, 1984), few specialized services are actually available to this group (Crain & Millor, 1978). Research on the training of parenting skills could provide workers with the empirically based treatment model currently lacking in the field (Murphy, Coleman, & Abel, 1983).

There is little doubt that many developmentally handicapped parents require training in appropriate child-rearing practices (Schilling, Schinke, Blythe, & Barth, 1982). Indeed, their children are at-risk for maltreatment, neglect, and development delay (Baroff, 1974; Feldman, Case, Towns, & Betel, 1985; Reed & Reed, 1965; Schilling *et al.*, 1982). Although several areas of skill development may be needed, the failure of many developmentally handicapped parents to provide an adequately stimulating home environment is considered one of their most obvious and serious shortcomings (Baroff, 1974; Budd & Greenspan, 1984; McCandless, 1952; Schilling *et al.*, 1982). Indeed, a recent study (Feldman *et al.*, 1985) found that approximately 50% of the 2-year-old children of mentally handicapped mothers were showing signs of development delay, particularly in language. The children had no apparent genetic, physical, or neurological disorders that could account for the delay. This study also found a strong positive correlation between the child's cognitive development at 2 years and the quality of maternal interactions. This correlation was in fact greater than that between child development and maternal IQ. These findings suggest that early mother-child interactions may be (among other factors) important in promoting positive child development and also serve to identify a significant area for assessment and training. The present research, then, is designed to build on our earlier findings (Feldman *et al.*, 1985) by assessing and training stimulating

parent-child interactions in developmentally handicapped mothers.

Although few studies have examined specific parenting deficits in developmentally handicapped parents, substantial research in developmental psychology has identified a consistent pattern of maternal responses that will facilitate child language, cognitive, and social development (reviewed by Clarke-Stewart & Apfel, 1979). Across socioeconomic, racial, and ethnic backgrounds, it has been found (e.g., Bradley & Caldwell, 1976; Clarke-Stewart, 1973) that mothers who are warm, supportive, affectionate, responsive to child vocalizations, and who contingently reinforce, talk to, and play with their children promote more positive child development. Although much of this research is correlational, there is some evidence (Bradley, Caldwell, & Elardo, 1979) that suggests that starting in the child's second year of life, these maternal behaviors do in fact influence child development. Consequently, in Study 1 we assessed whether developmentally handicapped mothers would show deficits in certain important stimulating maternal behaviors.

To determine the social validity (Wolf, 1978) of the observations of mother-child play, Study 1 also included a nonhandicapped comparison group. The findings of Study 1 were used to identify low-occurrence interaction skills of the developmentally handicapped mothers. The performance of the nonhandicapped mothers in Study 1 served as a guide in establishing training objectives in Study 2, which evaluated the effects of parent training.

STUDY 1

METHOD

Subjects

Eight developmentally handicapped mothers, eight nonhandicapped mothers, and their children participated. The handicapped mothers were chosen on the basis of having an IQ of less than 85 (as assessed by independent sources using the Wechsler Adult Intelligence Scales) and that they

had previously been labeled "mentally retarded," "mentally handicapped," or "developmentally handicapped" by the educational system, child protection, or other social service agencies. It was determined that these mothers, because of their intellectual limitations, needed support services to cope with activities of daily living and parenting. Each mother was assigned a caseworker (usually a social worker employed by the local association for the mentally retarded) who arranged for financial and legal assistance, counseling, training, daycare, and accommodation as needed. Another social worker representing a child protection agency was responsible for monitoring the family and ensuring the well-being of the child. The mean age of the developmentally handicapped mothers was 26 years (range: 21–33) and their mean IQ was 66 (range: 59–77). Three were single parents and six were receiving welfare. From a group of mothers attending an exercise class, the first eight nonhandicapped mothers interviewed whose children's ages matched those of the children of the handicapped mothers were recruited to participate (all did). The nonhandicapped mothers were also within the same age range of the developmentally handicapped group, although the comparison mothers appeared to be of average intelligence (actual IQ scores unavailable) and of middle socioeconomic status. The children of the developmentally handicapped mothers were five girls and three boys with a mean age of 16 months (range: 6–25 months). Their mean Bayley Scales of Infant Development Mental Development Quotient (Bayley, 1969) was 104 (range: 98–109). The comparison children were seven girls and one boy with a mean age of 14 months (range: 6–25 months). Developmental test scores were not available for these children, but they appeared to be developing normally.

Behaviors, Recording, and Reliability

Based on a review of the child development literature, we chose to observe five maternal interactions that have been found to stimulate child language and cognitive development:

Mother praises child—Comments directed at

child expressing approval or pleasure and contingent on action of child.

Mother talks to child—Any verbalization directed at child (e.g., labeling objects or actions); includes praising, imitating child vocalizations, and verbal prompting.

Mother looks at child—Mother faces and watches child for at least 2 s.

Mother imitates child vocalizations—Mother repeats, approximates, or expands (within 5 s) sounds made by child during the observe interval.

Mother prompts child to play—Mother provides verbal, gestural, modeling, or physical prompts to encourage her child to play.

We also monitored two child behaviors:

Child plays—Child uses toy for purpose intended; plays social interaction games (e.g., "peek-a-boo").

Child vocalizes—Any sound emanating from the child's vocal chords except a cry, burp, whine, or scream.

A 10-s observe, 10-s record, interval recording procedure was used, and an undergraduate student was trained via instructions and practice with feedback to record these behaviors. Reliability checks were made independently by a second observer during 31% of the sessions. Mean overall percentage interobserver agreement (agreements divided by agreements plus disagreements $\times$ 100) was 91%. Reliability for each dependent measure was calculated using the relatively conservative Kappa technique, which corrects for chance interobserver agreements (Hartmann, 1977). Mean Kappa reliability coefficients for each of the seven dependent measures in Study 1 were as follows: praise: 1.0, talking: 0.78, looking: 0.58, imitating child vocalizations: 0.93, prompting play: 0.93, child plays: 0.86, child vocalizes: 0.90.

Procedure

The observer, who knew which parents were retarded but was naive to the experimental hypotheses, first met informally with each mother separately to establish rapport and obtain some demographic information. Each mother was in-

Figure 1. Mean percentage of the five maternal and two child behaviors for eight developmentally handicapped mothers and eight nonhandicapped mothers, and their children.

formed that she was being asked to participate in a study investigating mother-child interactions during play, and written consents were obtained. The observer then watched each mother-child dyad playing in their own living or family room for a single 10-min session. The child's own toys (e.g., rattle, car, picture book, blocks) were used. To obtain the most natural observations possible, no attempt was made to standardize or structure the play session; the mothers were simply asked to "play with your child the way you usually do." There did not appear to be any systematic differences in the types and number of toys used between groups.

RESULTS AND DISCUSSION

Figure 1 reveals that the developmentally handicapped mothers' mean scores were lower than those of the nonhandicapped mothers on each of the five interaction measures. To analyze these data a "total interaction score" was first calculated for each mother by summing the number of occurrences (i.e., interactions with the child) across all five in-

teraction categories, and then the total interaction scores of the developmentally handicapped mothers were compared to those of the matched (on the age of their children) nonhandicapped mothers. A Wilcoxon Matched-Pairs Sign-Ranks Test (Siegel, 1956) revealed that the handicapped mothers interacted with their children significantly less than the nonhandicapped mothers ($t = 0$, $p < .01$, two-tailed).

A closer examination of Figure 1 reveals that the largest differences between the two groups of mothers were in percent occurrence of praise and imitation. Six developmentally handicapped mothers exhibited no praise at all, and the remaining two praised only once during the observation session ($M = 2.5\%$, range = 0%–10%). All the nonhandicapped mothers praised their children, with seven out of eight mothers praising at least twice in the session ($M = 30\%$, range = 10%–50%). Six out of eight handicapped mothers did not imitate child vocalizations, despite the fact that all had the opportunity to do so ($M = 3.5\%$, range = 0%–14%). The two handicapped mothers who

imitated (once) did not praise, and the two handicapped mothers who praised (once) did not imitate. Only one nonhandicapped mother failed to imitate ($M = 37.5\%$, range = 0%–60%). In short, the nonhandicapped mothers praised and imitated their children significantly more than the developmentally handicapped mothers ($p < .01$ and $.02$, two-tailed, for praise and imitation, respectively, using the Wilcoxon test). No other differences in specific maternal behaviors were significant.

In terms of child behavior, the comparison children vocalized significantly more ($M = 66.3\%$, range = 20%–100%) than the children of developmentally handicapped mothers ($M = 43.8\%$, range = 10%–70% ($t = 0$, $p < .02$, two-tailed, Wilcoxon test), but the two groups did not differ significantly in the occurrence of appropriate play behavior.

This study extends our earlier findings (Feldman et al., 1985), to show specific interactional deficits of developmentally handicapped mothers and potential language deficits in their toddlers. Certain limitations of this study should be noted, however. The sample size and the observation period were relatively small; thus the representativeness of the data to each population of developmentally handicapped and nonhandicapped mothers requires further replication (although some replication is provided in Study 2). Also, because the children were matched according to age, but not other demographic and socioeconomic variables (e.g., single parent, sex of the child, family income), it is not clear whether the differences observed in this study were due solely to differences in maternal intellectual functioning or in part to other factors that might differentiate the nonhandicapped from the handicapped groups (Murphy et al., 1983; Schilling et al., 1982).

Despite these limitations, results did clearly show that the developmentally handicapped mothers interacted less with their children. Importantly, two consistent low-frequency maternal behaviors were identified that accounted for much of the differences between the two groups. These behaviors,

then, became the primary focus for parent training in Study 2.

STUDY 2

Based on the results of Study 1, low-occurrence behaviors were targeted for training in seven developmentally handicapped mothers. Generalization and maintenance of parental gains were also evaluated. Generalization of newly learned child management skills is not easily accomplished even with parents of normal intelligence (e.g., Sanders & Glynn, 1981), and it may be even more difficult to obtain in parents with limited intellectual abilities (Schilling et al., 1982). Yet, a parent training program that does not result in transfer of skills to the home is of little benefit. This study, therefore, incorporated some strategies similar to those recommended by Stokes and Baer (1977), such as common stimuli and multiple exemplars, in an attempt to enhance generalization. Social validation (Wolf, 1978) of the training results was also assessed by comparing the posttraining performance of the developmentally handicapped mothers to that of the nonhandicapped mothers in Study 1. Finally, child vocalizations were monitored to determine the impact of parent training on the child, i.e., to assess the validity of the training procedures and parent target behaviors.

METHOD

Subjects

Four mothers from Study 1 (Tara, Marla, Rae, and Colleen) along with three new referrals (Katy, Amy, and Bea) participated. The three remaining developmentally handicapped mothers from Study 1 did not participate in Study 2 either because their children had been removed from the home, or the families had moved. The mean age of the mothers was 25.7 years (range: 21–33), and their mean IQ was 71 (range: 64–77). All of the mothers were unemployed. Three of the seven received welfare, and four lived in government housing projects. Five were married, and two were single, and four of the five fathers were employed in blue

collar jobs. IQ scores were not available for the fathers, although casebook records indicated that two had been labeled mentally retarded by the school and social welfare systems, and one was not considered retarded (case records were not available for the remaining two). Four of the seven children were male. The children's mean age was 13.7 months (range: 4–22). Bayley Mental Development Index scores were within the normal range for six of the seven children.

Setting and Group Assignments

Observations and training were conducted in the families' own homes or during weekly group meetings or both. Tara and Katy received training at home only. Marla, Rae, and Colleen were trained in the group setting only; observations in their own homes, therefore, served as generalization probes. Amy and Bea were observed and trained in both locations. These assignments were not random as Tara and Katy did not attend any of the group training sessions whereas Amy and Bea attended only one. To provide a homelike atmosphere, the parent-group meetings took place at a group home for developmentally handicapped persons that was vacated during the day.

Behaviors, Recording, and Reliability

The maternal behaviors observed were praising, talking, looking, imitating child vocalizations, and prompting play; child vocalizations were also scored. The recording and reliability procedures were the same as those described in Study 1. Reliability checks were made independently by three observers, two per session, on 13 % of the sessions across all phases. Mean percentage interobserver agreement across all behaviors was 93%. Kappa reliability coefficients for each dependent measure in Study 2 were: praise: 0.93, talking: 0.97, looking: 0.97, imitating child vocalizations: 0.78, prompting play: 0.96, and child vocalizations: 0.79.

Procedure

Baseline. Each mother-child dyad was observed in the group or their own home in a free play

situation to determine their pretraining performance on the six interaction measures. The mothers received 3–12 baseline sessions, each lasting 10 min, over a 3- to 7-week period. Each mother's performance in baseline determined which skills needed training, using the performance of the nonhandicapped mothers in Study 1 as a normative guide. For the higher frequency behaviors of talking, looking, and prompting, a mean baseline score of less than 80% served as the criterion because this represented the lowest score seen in the nonhandicapped group for these behaviors. Those mothers who fell below a baseline mean of 80% on talking, looking, or prompting, but whose last baseline sessions were within the range of 90%–100%, were excluded from training on that skill. For praising and imitating, however, a mean baseline score of less than 30% was used as the criterion for training because this approximated the mean of the nonhandicapped mothers on these skills. (Means rather than low scores were used to set the criterion for praise and imitation as, in Study 1, one nonhandicapped mother praised at only 10% whereas another nonhandicapped mother did not imitate at all.) Applying these criteria to baseline performance the following skills were trained: (a) praise—all seven mothers; (b) imitation—all seven mothers; (c) talking to the child—Bea and Rae; and (d) looking at the child—Bea, Rae, and Colleen.

Training sessions. The parent trainers were three women, between 30 and 40 years of age, who held degrees in psychology, nursing, and early childhood education, respectively. Although they had been working with other developmentally handicapped parents for 1 year prior to this study, this was the first time they were systematically using behavioral observation and parent training procedures. They received specific instruction (readings, discussions, roleplaying, and feedback) in these techniques from the first author.

In the group parent-training sessions, three to six mothers (depending on attendance) and their children formed a circle with one or two parent trainers. The trainers first led a brief, general discussion about mother-child play. Topics covered

in this discussion included examples of stimulating interactions, inexpensive toys for infants of different ages, developmental expectations, and the importance of playing with children. Next, the trainer focused on the particular target behavior being trained (e.g., praise). For example, the trainer described and illustrated how all people like to be praised for accomplishments and that babies are no exception. The trainer then gave examples of things babies do at different ages that should be praised (e.g., grabbing a rattle, looking at the person calling the child's name, building a tower with blocks). During the discussion period, the mothers were encouraged to come up with their own examples and ask questions. The trainer also asked them simple questions to determine if they were following the discussion (e.g., "Bea, if your child gave you the rattle when you asked her for it, what would you do?"). Next, the trainer modeled the target behavior with several of the children, one at a time, while all the mothers watched. The trainer emphasized and pinpointed her use of the target behavior (e.g., "You see, Jeffrey looked at me when I called his name, so I said, 'Good boy, Jeff, you looked at me!' and I gave him a big smile and a hug to let him know how happy I was that he is learning his name.>"). This portion of the training session lasted about 10 min.

After modeling, the group broke up into mother-child dyads. The trainers spent about 10 min watching each mother play with her child using available toys. During this time, the trainer prompted and praised each mother's performance of the target behavior(s). If the mother missed an opportunity, the trainer modeled an appropriate interaction and then asked the mother to try again. While waiting for this individual feedback session, the mothers received supervision, if necessary, conducting various needed caretaking activities (e.g., changing diapers, feeding), from another trainer, volunteer, or student.

Several procedures were used to facilitate generalization from the training setting to the home for the three mothers (Rae, Marla, and Colleen) who received all their training at the weekly group meetings. First, training was conducted in the con-

text of an already naturally occurring event in the home—mother-child play; the goal was for common stimuli (i.e., the child's behavior and the play context) to gain control over the mother's behaviors. During training, the mothers were specifically taught to "cue-in" to the child's behavior (e.g., looking at or touching a particular toy, various forms of appropriate play, vocalizations) in an attempt to increase the likelihood that the mother's response would be prompted by the child rather than by the parent trainer. The second generalization strategy involved the use of multiple exemplars: during training, the mothers played with their children in various locations in the training home (e.g., on the living room floor, sitting at the dining room table, in the hallway); in addition, numerous age-appropriate toys, games, and books were used to show the mothers how to evoke appropriate play, exploration, and vocalizations in their children with a variety of play materials.

Home training for Amy, Bea, Tara, and Katy (who missed all or most of the group sessions) was similar to that provided in the group (i.e., discussion, modeling, feedback) except that the discussion focused on the particular child and his or her own toys were used. Amy and Katy received three home training sessions, and Tara and Bea received two.

Training probes. In the training setting, within 30 min of the completion of a training session, the trainer or another observer (e.g., another trainer, student) watched the mother playing with her child for 10 min. No instructions, modeling, or feedback were provided during these probes; the observer passively recorded mother-child interactions as in Study 1 and the baseline of this study.

Generalization probes. Ten-min observations of mother-child play were conducted in the living room at home, as in baseline, throughout this study. Generalization to the home was assessed only for Rae, Marla, and Colleen, as the other mothers received training in the home.

Maintenance. Five to 10 follow-up sessions were conducted per client over a 10-month period in the mothers' own homes. The setting and observation procedures were identical to those used

during baseline, training, and generalization probes. Occasionally the mothers were asked, "Do you remember what you are supposed to do when playing with your child?" at some time during the home visit (but not during the observation session itself). If the mother did not know the answer to this question and requested the answer, she was reminded of one or more of the target behaviors; this was scored as a prompted maintenance session (as shown by a "P" on the horizontal axes of Figures 2–4). Rae received five prompted sessions, Tara, Katy, and Amy received one, and Marla, Bea, and Colleen received no prompts during maintenance. Neither modeling nor feedback, however, was provided during any of the follow-up visits. To promote maintenance through self-recording, each mother was given a chart and stickers during the first 2 months of follow-up and was asked to place one sticker on the chart each time she played with the child and remembered to praise appropriate play and imitate child vocalizations. The chart was posted on the living room wall or the refrigerator, and on home visits the therapist viewed the chart and praised the mother for recording play sessions on the chart.

Experimental Design

A multiple baseline design was used, across sequentially trained skills, to evaluate the effects of training on the mothers' behaviors.

RESULTS

In general, praise and imitation again proved to be the major deficit areas; the baselines of each of the seven parents were below the mean of the nonhandicapped group of Study 1. Praise ranged from 0%–16%, with four mothers at or below 6%; imitation ranged from 0%–27%, with three parents at or below 6%. Deficits in other types of parent-child interactions were infrequent and idiosyncratic.

All the mothers showed increases in the target skills after training, and these gains were generally maintained at or above the mean performance of the nonhandicapped mothers over a 5–10 month follow-up period. Figures 2–4 present the individ-

ual results across baseline, training, and maintenance phases, both for the maternal interactional skills trained and for child vocalizations.

Across all seven mothers, praising increased from a baseline mean of 5% to 30% in training and 33% in maintenance. In some cases, however, the training probe data are equivocal; Bea, for example, showed only a minimal (if any) increase in praising, and for Marla and Tara, a decreasing trend was evident. Even so, the maintenance scores of each parent were well within the range (10%–50%) seen in the nonhandicapped mothers of Study 1, although there is a great deal of variability in the data, both within (e.g., Colleen) and across subjects (e.g., Tara vs. Bea).

It is also interesting to note that although lack of praise was initially a concern across all mothers, for several mothers the problem immediately turned into one of excessive and nonspecific (e.g., "good boy!") praise. Specifically, with Tara, Rae, and Marla, praise immediately jumped to the 80%–100% range after only one training session; this is considerably higher than that seen in the nonhandicapped mothers in Study 1, and although it was given contingent on appropriate child behavior, it clearly looked excessive to all observers. Starting with the second training session, these three mothers were instructed to reduce their overall rate of praise and to be more specific when they did praise.

Imitation of child vocalizations also increased when the mothers began to receive training on this skill. For example, Tara's data (Figure 2), show no instances of imitation in baseline, despite several opportunities. Subsequent to training, however, her imitation increased to a mean of 77%. Similar results were obtained with the other mothers; overall mean scores were 17% in baseline, 75% in training, and 56% in maintenance. Thus, as with praise, posttraining imitation scores were raised to near the top of the range (0%–60%) found for the nonhandicapped mothers. As in the case of praise, however, there is substantial variability in the imitation data, both within and across subjects, and for some mothers (Bea and Rae) little change was evident during training probes.

The three mothers who showed idiosyncratic def-

Figure 2. Baseline, training, and maintenance data for Tara, Katy, and Amy, respectively. A "P" atop the session numbers indicates that a verbal prompt was given to the mother during the home visit. Mean levels during baseline and maintenance phases are indicated by horizontal dashed lines (Tara—home data only; Katy and Amy—home and group training site data combined).

icits in other skills generally showed increases in those skills after training. For example, Bea (Figure 3) talked substantially more to her child, increasing from a mean of 17% in baseline to 84% in follow-up. Looking at her child increased from 40% in baseline to 90% in follow-up. Similarly, Rae's talking (Figure 3) increased from 68% in baseline to 85% in follow-up, although her looking did not appear to increase. Colleen's looking (Figure 4) increased from 73% to 97%. These high posttraining scores were similar to those of the nonhandicapped mothers in Study 1.

Although Rae (Figure 3), Marla (Figure 4), and Colleen (Figure 4) received training at the group meetings only, they all showed increases in the targeted interactional skills in their own homes, reflecting setting generalization. During the training phase, Colleen's praising, looking, and imitating, averaged 13%, 87%, and 85%, respectively,

in the training home and 10%, 100%, and 90%, respectively, in her own home. Similar generalization was obtained with Rae and Marla on their target behaviors. In fact, the generalized performance of these three mothers was similar to that found for the four mothers who had actually received training at home: the mean at-home praise and imitation scores during the training and maintenance phases were 37% and 61% for the home-training mothers and 33% and 53% for the home-generalization mothers.

Analysis of child vocalization data reveals that all children showed increases, although only four of the seven children (Amy's, Bea's, Marla's, and Colleen's) showed substantial increases. Amy's and Bea's children showed immediate increases in vocalizations when their mothers received training in praise; mean increases from baseline to follow-up averaged 87% for Amy's child and, dramati-

cally, 866% for Bea's. Marla's and Colleen's children showed increased vocalizations when the mother received training in both praise and imitation, with mean follow-up performance 80% and 55% higher than baseline, respectively. Tara's, Katy's, and Rae's children showed smaller mean increases of 17%, 24%, and 12%, respectively, after training was completed in praise and imitation.

DISCUSSION

Training results indicated that relatively brief behavioral instruction, consisting of discussion, modeling, feedback, social reinforcement, and self-recording, was effective in increasing and maintaining the positive interactional skills of low-IQ mothers when playing with their children at home. Interestingly, we did not find it necessary to substantially modify or enhance standard parent training strategies to compensate for the lower intellectual functioning of the mothers. Although we minimized didactic instruction and focused instead on modeling and feedback, this emphasis on performance-based techniques is consistent with research (e.g., Flanagan, Adams, & Forehand, 1979; Hudson, 1982) showing that the interactions of nonhandicapped parents do not change significantly from verbal and written instructions.

We were particularly impressed by the increased frequency, richness, and responsiveness of the mothers' interactions. After training, the mothers were more likely to sit down and play with their babies, encourage new motor behaviors, and initiate verbal interchanges. Mothers became more sensitive and responsive to infant vocalizations, and new games such as "copycat" occurred more frequently. These types of stimulating and rewarding interactions were rarely if ever observed prior to training.

Training results were maintained, for the most part, up to 10 months following training; terminal levels were generally comparable to and sometimes considerably above those seen in the comparison

group of nonhandicapped mothers of Study 1. This finding is particularly noteworthy considering that Peterson et al. (1983), working with a similar population, failed to obtain maintenance of positive maternal interactions after only 1 month of follow-up.

It is not clear from these data what contributed to the maintenance observed. The use of the self-record home play charts may have facilitated early maintenance. Also, during the home visits the trainer would occasionally remind the mother about the target behaviors, although only Rae received prompts on more than one visit. These prompts, however, did not appear to be responsible for the maintenance obtained. First, up to 40 weeks of maintenance was observed in the mothers who received no prompts at all (Bea, Marla, Colleen) or only one prompted visit (Tara, Katy, Amy). Tara had maintained her skills over a 16-week period before receiving a perhaps unnecessary prompt on the last follow-up session. Katy received one prompt for imitation on the first follow-up session but then maintained this skill for 40 more weeks with no further prompting. Second, when prompts were used, they did not appear to be related to improved performance, except for Rae's imitation; in fact, Rae's praise declined despite prompting. The present design, however, does not allow for an unambiguous conclusion regarding the role of the prompts.

Despite our generally positive follow-up results, the variability obtained (e.g., Bea's imitation, Colleen's praise and imitation) indicates that maintenance cannot be taken for granted with this group. Several additional strategies might be considered to facilitate more consistent maintenance, particularly for the few instances where the skill appeared to deteriorate by the end of the follow-up period (e.g., Rae's praising). The self-record play charts were used only for the first several months in follow-up and then discontinued; perhaps the continued use, or gradual fading, of both the play charts

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Figure 3. Baseline, training, and maintenance data for Bea and Rae, respectively. A "P" atop the session numbers indicates that the mother was given a verbal prompt during the home visit. Mean levels during baseline and maintenance phases are indicated by horizontal dashed lines (Bea—home and group training site data combined; Rae—home data only).

Figure 4. Baseline, training, and maintenance data for Marla and Colleen, respectively. Mean levels during baseline and maintenance phases are indicated by horizontal dashed lines (Marla—home and group training site data combined; Colleen—home data only).

and the resulting trainer's social reinforcement, would have produced even greater maintenance. Also, the provision of more tangible reinforcement for the parents (Muir & Milan, 1982; Peterson et al., 1983; Szykula et al., 1981), using desired items that are available to most service agencies (e.g., donated gift certificates, toys, and clothes), contingent on maintaining performance during follow-up, may be an effective maintenance strategy. It is also possible that maintenance may have been greater if more training sessions had been provided, as research in "overtraining" (Sutherland & Mackintosh, 1971) suggests broadened attention and learning when training is continued beyond mastery.

Concern has been expressed about the ability of mentally handicapped people to generalize parenting skills (Schilling et al., 1982). The finding that the three mothers who did not receive in-home training showed consistent generalization of newly trained skills into their own homes, and with different toys, is highly encouraging. Generalization was likely achieved through the incorporation of strategies explicitly designed to foster generalization, such as the provision of common stimuli and multiple exemplars.

Vocalizations also increased after parent training in the seven children, although the amount of increase varied greatly across children. Although increased vocalization would be expected to occur as the children grew older, it is interesting to note that three of the children showed immediate increases following the first parent training session in praise or imitation. Future studies need to control for maturation effects to determine if increased child vocalization can be more clearly attributed to changes in maternal interactions. The current results, however, do support a large literature (Clarke-Stewart & Apfel, 1979) showing that praising appropriate behavior and imitating child vocalizations, along with the other target behaviors, will facilitate children's language development. Although the children did react to the changes in their mothers' interaction style with increased vocalizations, we did not expect that the relatively

few maternal responses targeted in this study would necessarily be associated with substantial gains in child development, particularly given that six of the seven children were already apparently developing normally. Importantly, Colleen's child, who evidenced a substantial language delay on the Bayley Scales of Infant Development, did show a corresponding increase in vocalizations as the mother's praising, looking, and imitative interactions increased during training and maintenance. Also, Bea's child, who very rarely vocalized during baseline observations, showed an increase in vocalizations to well within the range of the children of nonhandicapped mothers seen in Study 1.

GENERAL DISCUSSION

Developmentally handicapped people are often considered incapable of either handling the complexities of child-rearing or benefiting from training (Green & Paul, 1974). Consequently, these parents have a higher probability of having their children taken into custody than parents not identified as developmentally handicapped (Hertz, 1979; Wald, 1975). The studies reported here demonstrate both the need for training and the subsequent ability of developmentally handicapped mothers to provide more stimulating interactions to their children.

It is interesting to note that two of the behaviors monitored—praise and imitation—were in fact found to be deficient in all 11 handicapped mothers across Studies 1 and 2, whereas deficits in other skills were more idiosyncratic. It is possible, then, that lack of praise and imitation are to some degree characteristic of low-IQ parents, and therefore should be standard components of any parenting assessment device and curriculum for this population. Although it is premature to draw firm conclusions at this point without further replication, the generality of these two deficits across our developmentally handicapped mothers is startling. Furthermore, the generality of these deficits to other types of parents (e.g., teenagers, abusive, depressed, or insular) whose children are also at-risk,

as well as the relationship between these deficits and their children's behavior/development, might be important areas of future research.

It appears that more and more developmentally handicapped persons are being given the opportunity to have and raise their own children (Ferguson & Harvey, 1985; Hickl-Szabo, 1985). Many of these parents may be able to provide adequate parenting if they receive appropriate and effective support and training. Thus, there is a continuing need for research to identify which parenting deficits are associated with low IQ and which are related to socioeconomic and other life-style variables (Murphy *et al.*, 1983; Schilling *et al.*, 1982), and whether early intervention and parent training programs can decrease the risk of developmental delay (Feldman *et al.*, 1985) and maltreatment (Schilling *et al.*, 1982) in children of developmentally handicapped parents.

The studies reported here represent the initial steps in the development of a model assessment and training of parenting skills for mentally handicapped parents. Through the use of direct observation and social comparison procedures, we have empirically identified several important and common interactional deficits in these mothers. Using the performance of the nonhandicapped mothers as a "normative" guide, we found that developmentally handicapped mothers, with IQs as low as 64, could quickly learn, in a generalized way, more effective nurturing skills. Finally, by monitoring the effects on child behaviors, we were able to assess the validity and importance of the parent training. We do not presuppose that this program necessarily results in quality parenting in a general sense; further work is needed to identify the undoubtedly large set of skills that constitute "good parenting" (Murphy *et al.*, 1983). The present data do suggest, however, that the model holds promise as a means of effectively identifying and remediating parenting deficits.

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