

IMPROVING SOCIAL SKILLS AND DISRUPTIVE BEHAVIOR IN CHILDREN WITH AUTISM THROUGH SELF-MANAGEMENT

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The literature suggests that children with autism typically are unresponsive to verbal initiations from others in community settings, and that such unresponsiveness can lead to problematic social interactions and severely disruptive behavior. The present study assessed whether self-management could be used as a technique to produce extended improvements in responsiveness to verbal initiations from others in community, home, and school settings without the presence of a treatment provider. The results showed that children with autism who displayed severe deficits in social skills could learn to self-manage responsivity to others in multiple community settings, and that such improvements were associated with concomitant reductions in disruptive behavior without the need for special intervention. The results are discussed in terms of their significance for improved development of social skills in children with autism.

DESCRIPTORS: autism, self-management, social skills, language, disruptive behavior

Although language researchers traditionally have been concerned with syntax (i.e., structure) and semantics (i.e., referential meaning), a shift in the field has gradually emerged that emphasizes a functional approach to understanding communicative competence and stresses a social perspective of language use (Kaiser & Warren, 1985). With the shift toward pragmatics, a greater emphasis is now being placed on the social interaction of communicators within a given context, thus resulting in the study of larger units of conversation. Some questions of prime concern for pragmatic assess-

ment are: (a) Does the child relay a message accurately? (b) Can the child adhere to a topic without abrupt transitions to new topics? and (c) Does the child respond to questions and statements appropriately (Cole & Cole, 1989)?

This shift in focus has been especially important in the treatment of children with autism, whose social and interpersonal relationships are pathognomonic to the syndrome. Even in Kanner's follow-up study of his original sample approximately 30 years later (Kanner, 1971; Kanner, Rodriguez, & Ashenden, 1972), he observed that the original clients remained extremely aloof and continued to experience significant difficulties in interpersonal relationships. Relatedly, some researchers have suggested that social deficits may be the primary difficulties in autism (Fein, Waterhouse, Lucci, & Snyder, 1985). Further adding to this problem is the fact that the smooth flow of connected discourse depends on the listener's ability to monitor the speaker's messages and to provide feedback to the speaker concerning their effectiveness (Fey & Leonard, 1983). This type of discourse regulation during conversational turn-taking is necessary for fluent conversation. Although most typical children are taught to use appropriate communication during their preschool years, many children with disabilities who have difficulty with language skills at-

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tempt to avoid interactions, thereby disrupting the communicative interaction. Because these disruptions occur frequently in children with autism, their ability to fit into integrated community settings is limited. Thus, the critical need for attention to social skills is obvious and of utmost importance.

Integration is now being considered as a primary goal in special education research, and it is now realized that mainstreaming and integrating individuals with disabilities by simply placing them together in the same program or setting without support can be problematic. That is, such placement can result in poor social acceptance of the individuals with disabilities, negative rates of social interaction among their peers, poor self-concepts of individuals with disabilities, and a generally negative attitude toward mainstreaming by regular educators (Gresham, 1986). It is clear that social skills need to be an integral component of the treatment program for children with autism if successful integration is to be realized.

Self-management (R. Koegel & Koegel, 1990) is one treatment technique that has been found effective with speech sounds of children (L. Koegel, Koegel, & Ingham, 1986), academic skills with learning-disabled children (Harris, 1986), and in the treatment of children with developmental disabilities. Teaching self-management techniques allows the child to manage his or her own behavior in the absence of a treatment provider for potentially long periods (cf. Dunlap, Dunlap, Koegel, & Koegel, 1991; L. Koegel, Koegel, & Parks, 1991). The decreased need for staff assistance suggests that self-management techniques are ideal for persons with developmental disabilities in integrated academic and community settings (Lagomarcino, Hughes, & Rusch, 1989; Moore, Agran, & Foder-Davis, 1989; Ninness, Fuerst, Rutherford, & Glenn, 1991; Rhode, Morgan, & Young, 1983).

The present study attempted to improve social skills in children with autism in a number of integrated community settings with as little clinician presence as possible. We were concerned primarily with these children's lack of response when other individuals attempted to interact with them. Be-

cause we wanted the children to be able to interact socially without the continual presence of a treatment provider, self-management was chosen as an intervention strategy. We also reasoned that if the children responded more consistently with a communication partner, the overall interaction would become more positive and escape- or avoidance-driven disruptive behaviors would decrease. Two primary questions were addressed. First, we asked if self-management could be used as a means of improving social communication skills (i.e., appropriate responding to others' questions) in children with autism. Second, we asked if such skills were improved on an ongoing basis, would decreases in interfering disruptive behaviors occur when others (e.g., parents, peers, and adults) attempted to engage the children in social communicative interactions.

METHOD

Subjects

Four children with autism participated. All were diagnosed by outside agencies and referred to our clinic for treatment. Three were in classrooms for children with communicative handicaps, and 1 (Ian) was in a classroom for children with severe disabilities. During an initial intake interview, all 4 children demonstrated symptoms in accordance with the diagnostic criteria for autistic disorder described in the DSM III-R, including a lack of responsiveness to other people, gross impairment in communicative skills, bizarre responses to various aspects of the environment, and ritualistic behavior. In addition, each exhibited lengthy histories of disruptive behaviors (as described below).

Criteria for participation in this study were twofold. First, the children had to be reported by parents and teachers as characteristically unresponsive to others' verbal initiations, despite the fact that language assessments indicated their receptive and expressive language scores to be at least at the 3-year-old level. That is, assessments indicated these children were able to combine at least three words, speak in a fairly intelligible manner, and understand most question types, such as yes/no, what, what

do, where, who, why, how, and when (it was noted during the sessions that Ian was unable to understand "where," although he did understand "what place"). Second, parent and teacher reports indicated the children's typical response to the verbal initiations of others to be disruptive behavior. Individual subject characteristics were as follows (see Table 2 for descriptions of individual children's disruptive behaviors).

Tony was 6 years 10 months old at the start of the study. Tony's data were collected over a 22-month period. His composite IQ score, as measured by the Stanford Binet, was 58. His nonverbal intelligence score on the Leiter International Performance Scale was 100. On the Peabody Picture Vocabulary Test-R, he scored an age equivalent of 4 years 4 months, placing him at the 1st percentile. On the Assessment of Children's Language Comprehension, he scored 94% on the vocabulary section and 100%, 80%, and 50%, respectively, on two, three, and four critical elements. His mother reported that he had numerous disruptive behaviors, including self-injury (picking at his skin to the point of drawing blood), inappropriate emotions such as laughing and crying too easily, frequent temper tantrums, physical aggression, and self-stimulatory behaviors.

Adam was 11 years 1 month old at the start of the study. His data were collected over a 16-month period. His composite IQ, as tested by the Stanford-Binet, was 85 and his IQ on the Leiter International Performance Scale was 70. On the Peabody Picture Vocabulary Test, he scored 3 years 7 months below his age level, placing him in the 1st percentile. On the Assessment of Children's Language Comprehension he scored 98% on vocabulary and 90%, 80%, and 70%, respectively, on two, three, and four critical elements. Informal language probes indicated he was able to answer questions and use sentences of four or more words with correct syntax. His mother reported that he emitted numerous inappropriate behaviors, including noncompliance, frequent temper tantrums, stubbornness, high levels of self-stimulatory behavior, and excessive preoccupation with objects.

Howard was 6 years 10 months old and was

Table 1
Sample Questions for Each Child

Tony	<ol style="list-style-type: none"> 1. What did you eat for lunch today at school? 2. Who are your best friends? 3. Did you have fun at school today?
Adam	<ol style="list-style-type: none"> 1. Who drove you to school today? 2. How many tissues do you think are in this pile? 3. What is your favorite video?
Howard	<ol style="list-style-type: none"> 1. Why do you like Garfield? 2. Are you building any models now? 3. Did you take the bus to school today?
Ian	<ol style="list-style-type: none"> 1. Did you eat lunch at Burger King today? 2. What place did you shop at today? 3. Who came and visited us last week?

Tony's identical twin. His data were collected over a 22-month period. His WISC-R yielded a full-scale IQ of 69 and a verbal IQ of 60. The Stanford-Binet yielded a full-scale IQ score of 74. On the Leiter International Performance Scale, he received a nonverbal IQ of 111. On the Peabody Picture Vocabulary Test-R, he scored an age equivalent of 4 years 2 months, placing him in the 1st percentile, and on the Assessment of Children's Language Comprehension he scored 90% on vocabulary and 80%, 90%, and 80% on two, three, and four critical elements. His mother reported that he had occasional tantrums, frequently ran away, exhibited inappropriate affect, and had poor concentration and attention.

Ian was 11 years 2 months old at the start of the study. His data were collected over a 27-month period. His IQ was measured by the Stanford-Binet at 58, with a verbal score of 53. His standard score on the communication domain of the Vineland Social Maturity Scale was 73. He was able to combine up to seven words with correct syntax, although he had difficulty attending to others, relaying messages, and describing attributes or emotions of others. Further, he had difficulty with social norms, and had never been observed to apologize for unintentional mistakes, follow rules of games, or respond verbally or favorably to the good fortune of others. Additionally, he exhibited numerous disruptive behaviors in social situations such

as masturbation, inappropriate noises and singing, and tantrums and aggression toward his mother when she attempted to engage him in a social interaction.

Settings and Design

Sessions were conducted in the context of a multiple baseline design across settings and subjects with a withdrawal for Adam and Ian. Settings were selected if reported as problematic by the children's parents. Three to four separate settings were used for 2 subjects, and two settings were used for the other 2 subjects. These settings included a clinic setting and community settings for all subjects, a home setting for Tony, and a home and school setting for Adam. Treatment was not implemented at home for Howard and Ian because they typically were quite responsive in those settings during baseline measurements. Baseline measurements were collected in all settings, and initial self-management treatment sessions were conducted after school in a clinic on a university campus. The initial clinic treatment was conducted in a small room containing a table, two chairs, and a one-way mirror, through which the sessions could be viewed. During community sessions, data were collected while each child was accompanied by adults (who were not involved in the treatment program) to a store to make a purchase (e.g., groceries, ice cream, cookies, etc.). The home sessions were conducted by the child's parent after school or in the evening, and communicative interactions with family members were measured. School sessions took place during lunch periods, when the child had ample opportunity for communicative interactions, and data were collected on interactions with peers and the adult playground supervisor (who also were not involved in the treatment procedures).

Procedure

Treatment providers and communicative partners. Treatment was conducted by advanced undergraduate and graduate students, and was supervised by licensed speech and language specialists. All self-management training and reinforcers were delivered in the clinic. In the community settings,

the child interacted with undergraduate students who did not provide formal treatment in any of the settings. During the home sessions, the children most frequently interacted with their mothers, and on occasion with their fathers or siblings. At school, interactions occurred with a peer or the playground supervisor.

Baseline conditions. Prior to implementation of self-management treatment, baseline measures were recorded in each setting. During these sessions, procedures were identical to all of the treatment sessions with one exception; the children were not required to self-manage their correct responses. Throughout the baseline and all experimental conditions, the communicative partner was instructed to ask similar types of questions. These were chosen from the children's regular activities, were age appropriate, and included the same proportion of yes/no and information questions to control for task difficulty (see Table 1 for examples of the types of questions asked throughout all conditions). Data were recorded on the percentage of appropriate responses emitted by the children with autism in response to the questions in each of the settings. In addition, because we were concerned about the children's disruptive behavior in the community, data were collected on disruptive behavior.

Withdrawal condition. To control for the possibility that increased reinforcement alone during the self-management condition might be responsible for any improvement in the children's behavior, a withdrawal condition with reinforcement only (without self-management) was implemented for Adam and Ian. During this condition, reinforcers were provided on the same interval schedule provided at that point of the self-management treatment. The children were told that they could still earn rewards for correct responding, but that the clinician would keep track of the correct responses so they did not need to wear the wrist counter. All other procedures were identical to the treatment procedures (i.e., type of questions, adult asking the questions, rewards, etc.).

Self-management training. All training sessions were implemented in the clinic room. The exact procedures were as follows. Prior to the first treat-

ment sessions, several functional reinforcers were identified for each child. These typically consisted of small edibles that could be easily administered after correct self-monitoring response(s). In addition, a wrist counter (i.e., an inexpensive golf counter purchased from a sporting goods store) that could record up to 99 responses was used. To begin the initial steps, each child was taught to discriminate between a correct and an incorrect response. Specifically, the clinician demonstrated a question and an appropriate answer and showed the child how to record this response immediately on the wrist counter. Similarly, for incorrect responses, the clinician demonstrated a variety of questions without a response or with an inappropriate response, and showed the child that a point could not be counted on the wrist counter for those behaviors.

Next, the wrist counter was placed on the child's wrist. To teach the child to record appropriate responses, the clinician asked the child a question and then, following a correct answer, prompted the child to press the wrist counter. To do this, the clinician began by rewarding the child after one correct response was recorded appropriately on the wrist counter. Typically, within the first 30-min session, the child acquired this chain of responding (i.e., answering a question and recording the response on the wrist counter). Although some children required occasional verbal prompting to record all correct responses, prompting was completely faded after about 3 hr of treatment. As in baseline sessions, questions continued to vary systematically so that they included a combination of both yes/no questions and information questions.

To teach independence simultaneously with the above procedures, the schedule of reinforcement was gradually thinned until the child recorded a large number of points (30 to 40) before earning a reinforcer. Also, during this time the child was taught to take or solicit his own reinforcer when he had earned enough points. This was accomplished by systematically fading prompts to obtain a reinforcer. To do this, two goals had to be accomplished. First, the child had to be able to recognize on the wrist counter when the desired number of points had been obtained. This was

accomplished by telling the child how many points he needed to earn for a reward, and by making sure he looked at the numbers on the wrist counter prior to obtaining the reward. Second, the adult's prompt to take a reinforcer was faded. This was accomplished by initially permitting the child to obtain his own reinforcer from the bag with verbal prompting. Next, the clinician simply made statements such as "What happens when you earn all of your points?" or "How many points did you earn?" Finally, the clinician provided minimal non-verbal prompts (such as glancing at the wrist counter) until the child obtained the reinforcers without any prompts after the desired number of points had been earned.

All of the self-management training and almost all of the fading of prompts and reinforcers were completed within the first few sessions (the sessions in which prompting began and in which the fading of the reinforcement schedule was completed to either fixed-ratio 30 or 40 are indicated in Figures 1 and 2).

Self-management in community, home, and school settings. At the designated point in the multiple baseline design, self-management was introduced into the community, home, and school settings by telling the child that points could now be earned in these settings. That is, the child was permitted to wear the wrist counter in the new setting, and the treatment provider instructed (i.e., prompted) the child to continue monitoring responses. All subsequent trials then took place with individuals who were not involved in either the self-management training or in providing prompts or reinforcers.

Self-Management 2 condition. For Howard, a slight variation in the program was made after he continued to show variable responding following the implementation of self-management. The typical order of conditions was always a community session followed by a clinic session, in which the child completed earning the total number of points necessary to obtain a reinforcer for that day. However, it appeared that Howard was not discriminating the contingency between points earned in the community and the subsequent reinforcer de-

Table 2
Disruptive Behaviors Measured in Community Settings for Each Subject

Tony	Self-injurious behavior (head-banging with closed fist, intense picking at skin in arm, neck, and facial areas often to the point of drawing blood) Tantrums (crying and/or throwing self on ground) Running away from communicative partner Stereotypic twirling of hair lasting for more than 3 s, usually accompanied by leaving communicative partner
Adam	Spinning the entire body in circles while standing or walking Lying on the ground; hands inappropriately placed on head or over ears while rapidly and repetitively tapping head with hands Yelling, screaming, or other out-of-context vocalizations at an extremely inappropriately high-intensity level
Howard	Running away from the communicative partner Tantrums (screaming, crying, and/or throwing self on ground) Shouting words out of context at an inappropriately high-intensity level Self-injurious behavior (head-banging with a closed fist)
Ian	Pretending to play an imaginary instrument or singing at an inappropriately high-intensity level Delayed echolalic phrases, typically from a television commercial or program (repeated inappropriately loudly with inappropriate voice quality) Hitting objects (e.g., hitting cars with a closed fist) Walking or running away to avoid the communicative partner

livered later in the clinic session. Therefore, in the Self-Management 2 condition, to emphasize the contingency between points earned in the community and the reinforcer Howard obtained, the order of sessions was reversed for one session. That is, Howard began that day in the clinic session, and then continued earning points in the subsequent community session so that he reached criterion on the number of points needed while in the community, and then obtained the reinforcer.

Dependent Variable Definitions

Data were recorded for all responses or the absence of a response to every question asked by another individual in each setting. Data were recorded continuously throughout all sessions (i.e., 30 min for the clinic sessions, 15 to 20 min for the community sessions, and 10 to 20 min for the school or home sessions). Each data category is defined below.

1. An event recording system was used to record appropriate and inappropriate responses to questions. *Appropriate responses* were defined as any verbal response or appropriate attempt at a response that was related to the stimulus (question) and occurred within 3 s of the stimulus. Each time one

of these events occurred, the observer marked a precoded data sheet.

2. *Inappropriate responses* were defined as the child either not responding at all (within 3 s of the question; typically if the child did not respond within this time period, no response occurred), making a response that was unrelated to the question, or making an echolalic response.

3. Because *disruptive behavior* was less discrete than the above responses (i.e., it did not always have a discrete onset or offset) and its duration was as important as its frequency, a continuous time-interval recording system was used to record disruptive behavior. That is, disruptive behavior was recorded in each community setting in continuous 1-min intervals any time a child exhibited one of the disruptive behaviors (defined individually for each child) listed in Table 2. Then the percentage of intervals with disruptive behavior was calculated by dividing the number of 1-min intervals in which disruptive behavior occurred by the number of intervals with disruptive behavior plus the number of intervals without disruptive behavior and multiplying by 100.

4. The *accuracy of self-recording* (i.e., if correct responses were tallied on the wrist counter and

incorrect responses were not tallied) was calculated in all settings for all subjects with the exception of Tony, whose accuracy was calculated in only the clinic and community settings. Accuracy was calculated separately for occurrences and nonoccurrences by dividing the number of unprompted accurate tallies by the sum of the accurate and inaccurate tallies.

Reliability

Reliability measurements were taken across all settings and conditions for all subjects. For given pairs of observers, one observer was rotated unsystematically (from a pool of 14 observers) throughout the course of the study to prevent observer drift. During 69 sessions (i.e., 22% of the total number of sessions), two independent observers recorded data on the child's responses to questions. Percentage of agreement between the observers (calculated separately for occurrences and nonoccurrences) was calculated by dividing the number of agreements by the sum of the number of agreements and disagreements and multiplying by 100 for all sessions that had at least three occurrences or nonoccurrences. Additionally, reliability was calculated for disruptive behavior during 21 separate sessions (i.e., during 15% of all the sessions in which disruptive behavior was recorded), with an agreement defined as both observers recording the behavior as either not disruptive or disruptive in any given 1-min interval.

The percentage of agreement for recording occurrences of appropriate responses to questions averaged 96% (range, 56% to 100%, with 68 of the 69 sessions above 80%). The percentage of agreement for recording nonoccurrences averaged 87% (range, 56% to 100%, with 33 of the 43 sessions above 80%). The percentage of agreement for recording disruptive behavior averaged 89% (range, 40% to 100%, with all but five of the sessions at 100%). The reliability for recording the accuracy of the children's self-management responses was calculated for 47 sessions (i.e., during 21% of all sessions in which accuracy was recorded). Percentage of agreement averaged 96% (range, 75% to 100%).

RESULTS

Responses to Questions from Others

Figures 1 and 2 show the percentage of appropriate responding to others' questions for all 4 children in all settings. Data were collected in one or more (but not necessarily all) settings in each session. The data showed that during baseline in each setting, the children responded appropriately only infrequently and inconsistently when others attempted to interact with them. For example, during baseline in the clinic, the 4 children responded appropriately only 59%, 61%, 49%, and 35% of the time. Further, in the community, home, and school settings, the children typically responded at even lower levels. Note that because home sessions occurred relatively infrequently, home and school settings were plotted together on the graphs, with home settings marked by an open square. With the initiation of self-management procedures, however, all 4 children showed relatively rapid improvement (typically within a few sessions) in the clinic, and remained at improved levels in that setting for the rest of the self-management conditions. It is also noteworthy that the children learned the self-management procedures relatively quickly. The arrows in Figures 1 and 2 indicate the sessions in which prompts were provided to teach the child the chain of responding to a question, recording the response on the wrist counter, and obtaining a reinforcer. The final arrow indicates the approximate point at which the reinforcement schedule was thinned to its peak level of fixed-ratio (FR) 30 or 40. Typically, prompting was faded and the reinforcement schedule was thinned to FR 30 or 40 within a few sessions. In contrast to baseline, responding typically reached 90% to 100% after completion of self-management training. In addition, the withdrawal of self-management procedures for Adam and Ian resulted in decreases in appropriate responding, followed by subsequent rapid improvements when self-management procedures were reintroduced.

In accordance with the multiple baseline design, self-management procedures also were introduced in all of the targeted settings. The results in the home and community settings paralleled the im-

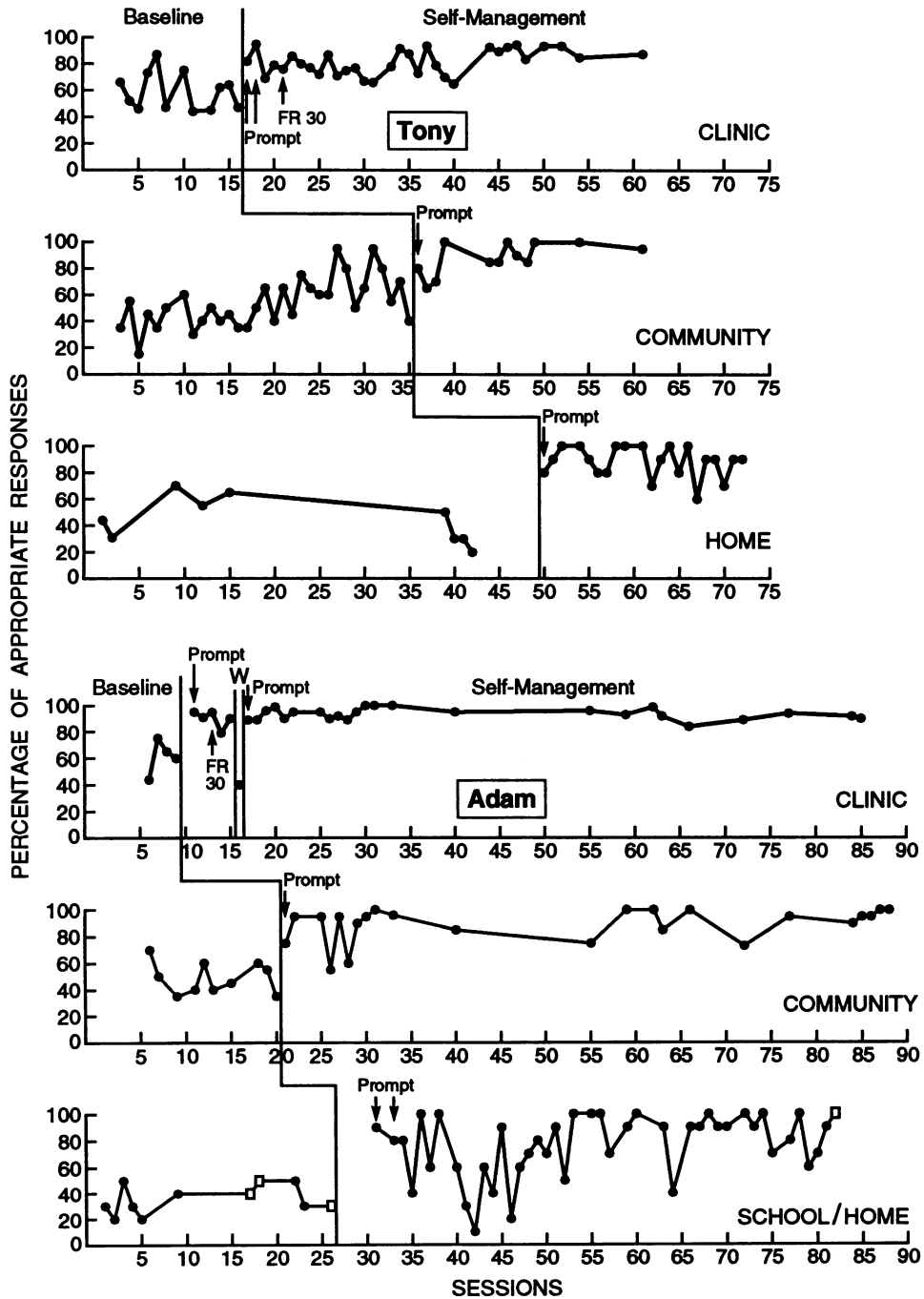


Figure 1. Appropriate verbal responses for Tony and Adam, who each received self-management training in three settings (Adam also had several data recorded in his home, indicated by open squares) in a multiple baseline design (with a withdrawal in one setting for Adam).

provements in the clinic setting (Figures 1 and 2). That is, responses during baseline sessions in the home and community settings tended to be relatively low, with the children typically responding

less than 50% of the time when someone asked them a question. For Tony, Howard, and Ian during baseline in the community setting, there may have been some slight initial cross-setting gener-

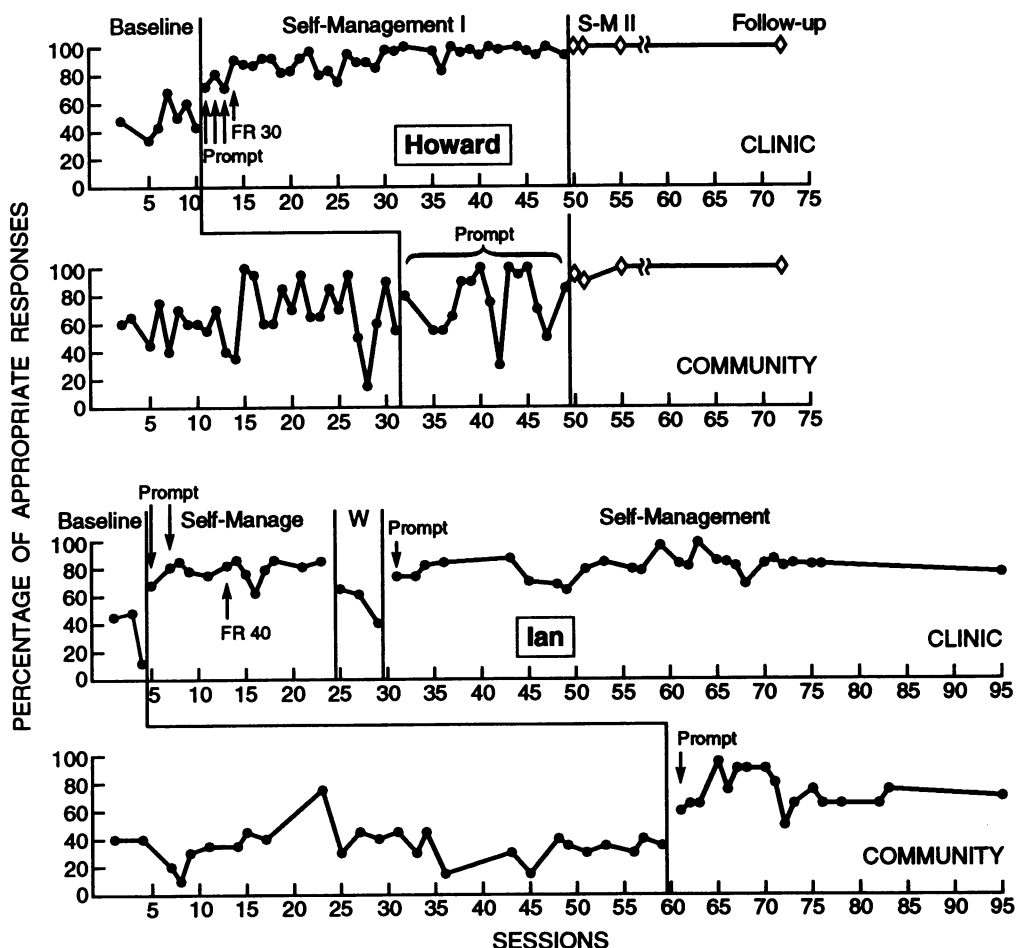


Figure 2. Appropriate verbal responses for Howard and Ian, who each received self-management training in two settings in a multiple baseline design (with a withdrawal in one setting for Ian). Howard received self-management sessions in two different orders: Order 1 was the typical order, and Order 2 (diamond symbol) reversed the clinic and community settings for one session in order to emphasize the response-reinforcer contingency (see text).

alization after the self-management procedures were introduced in the clinic setting. However, this generalization was relatively brief, and responding returned to approximately the initial baseline level before the self-management intervention was introduced in the community setting. Then, after self-management procedures were introduced, 3 of the 4 children showed increases in responding in every setting. Howard also showed immediate improvement during Self-Management 2, after the order of self-management sessions was reversed for one session in the community setting. In short, only after the introduction of self-management did relatively prolonged high levels of responding occur. This was especially clear in the home setting, where

no generalization occurred following implementation of treatment in the clinic.

Accuracy of Self-Recording

The accuracy of the children's tallying correct and incorrect responses was calculated separately for each child. In general, the children averaged relatively high levels of accuracy in self-recording their responses, with increasing percentages of correct recording as their training progressed. Tony's accuracy for tallying correct responses averaged 84% (range, 50% to 100% during training). Adam's accuracy for correct responses averaged 72% (range, 0% to 100% during training); Howard's accuracy averaged 72% (range, 0% to 100% during train-

ing); and Ian's averaged 89% (range, 19% to 100% during training). Accuracy for recording nonoccurrences (i.e., the child did not make a tally when an incorrect response occurred) averaged 76% (range, 0% to 100% during training) for Tony, 69% (range, 0% to 100% during training) for Adam, 87% (range, 50% to 100% during training) for Howard, and 95% (range, 50% to 100% during training) for Ian.

Disruptive Behavior

To assess whether increased and sustained responding to questions from others could result in a general reduction in disruptive behavior, results for each of the 4 children's disruptive behaviors in the community settings are plotted in Figure 3. The data show that, following the implementation of the self-management procedures, disruptive behavior was much lower in the previously problematic community settings than it was before the intervention. This was true for Tony, Adam, and Ian with the regular order of sessions. Howard's disruptive behavior followed a pattern similar to his appropriate responding described above. That is, his baseline level of disruptive behavior was very high, and it did not decrease during the initial implementation of the self-management treatment (Self-Management 1). However, following the implementation of the self-management sessions in the reversed order, Howard's disruptive behavior was completely eliminated (i.e., it decreased dramatically from 42% in Self-Management 1 to 0% in Self-Management 2).

DISCUSSION

Overall, the results of this study showed that the lack of social responsivity that is so characteristic in autism can be successfully treated with self-management procedures, requiring minimal presence of a treatment provider in the children's natural environments. Other studies corroborate these findings, suggesting that self-management may be an especially promising intervention for children with autism when minimal therapist presence is

desired (e.g., Johnson, 1991; R. Koegel & Koegel, 1990; Stahmer & Schreibman, 1992).

The second finding, that collateral reductions in disruptive behavior occurred when the children's responsivity improved, relates to several bodies of literature (Hunt, Alwell, Goetz, & Sailor, 1990). For example, Carr and Durand (1985) suggested that as more effective communication skills are learned, disruptive behavior commonly decreases. In the present study, it appeared that when the children responded consistently to their communicative partner, the interaction not only was more normal in appearance but it also provided a more coherent and fluid conversation (in contrast to the disconnected interactions that occurred when the children were responding only inconsistently during the baseline and withdrawal conditions). The more fluid and consistent responding permitted many opportunities for the nondisabled partners to adjust to the child's competency level and to assist the child's communication. Thus, the conversational interactions during the treatment conditions were very likely much less aversive, and less likely to be associated with escape- or avoidance-driven disruptive behavior (e.g., Carr & Durand, 1985).

Implications for Social Integration

The marked improvement in the children's behaviors (both increases in social communicative responses and decreases in disruptive behavior) has major implications for social integration of these children in community and educational settings. There is little question that quality of social interaction is a predictor of social acceptance (Asher & Renshaw, 1981; Dodge, 1983; Hartup & Sancilio, 1986; Quay & Jarrett, 1984). Without appropriate social skills in their repertoire, children with autism or behavior problems have significantly greater difficulty being socially integrated into their schools and neighborhood communities (cf. Haring, 1990). In contrast, increases in social interactions due to social skills competence is likely to result in greater opportunities to be exposed to appropriate behavior models, spontaneous tutoring, and/or social reinforcement for appropriate behavior (Cowen, Ped-

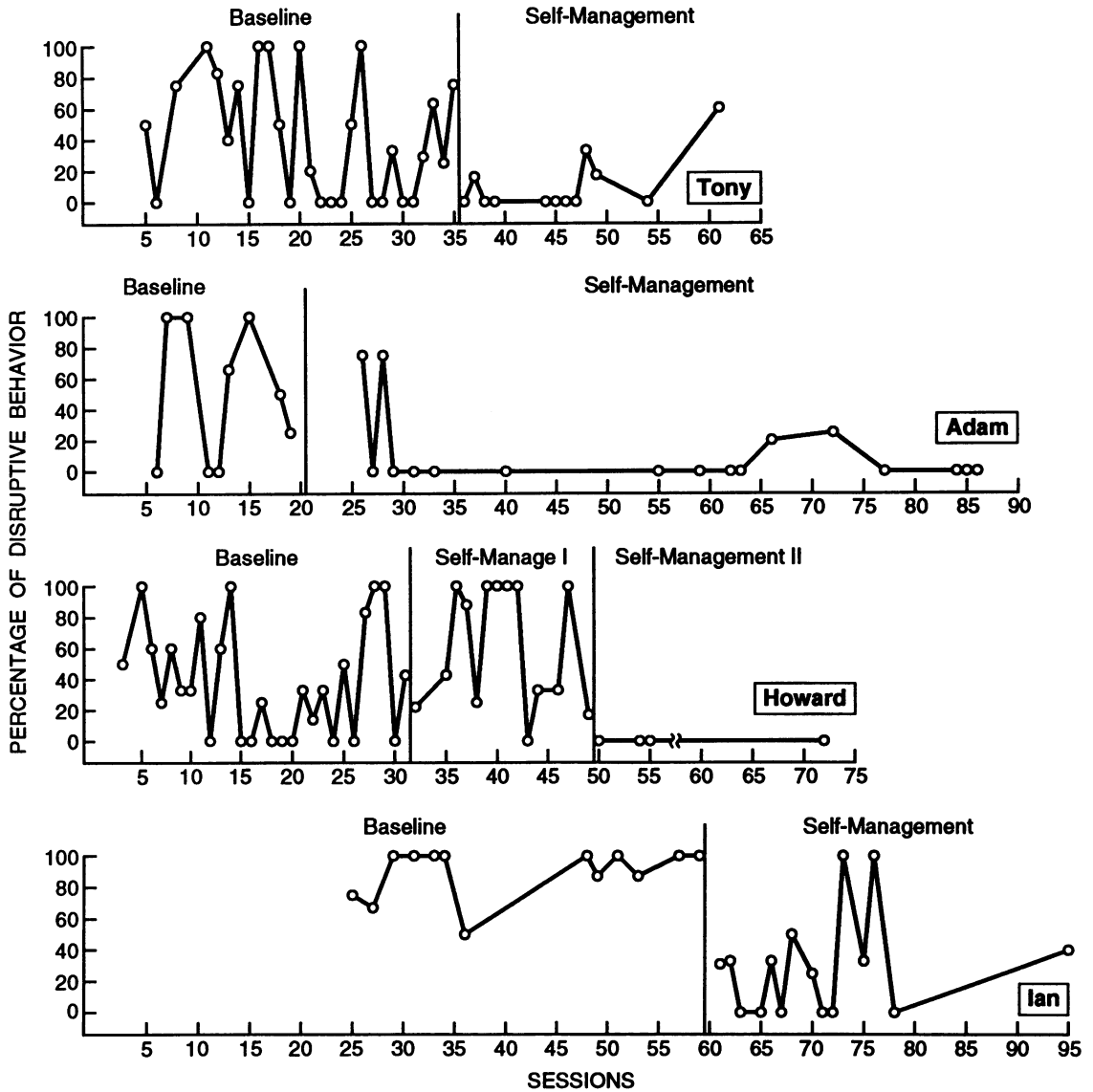


Figure 3. Percentage of disruptive behavior (which was untreated) for each child before and after the self-management procedures were implemented for *only* verbal responses in the community settings. Consistent with the data for appropriate verbal responses, Howard received self-management sessions first in the typical order (Self-Management 1) and then with the order of sessions reversed for one session to emphasize the response-reinforcer contingency (Self-Management 2; see text).

erson, Babigian, Izzo, & Trost, 1973; Parker & Asher, 1987; Strayhorn & Strain, 1986). Studies in our own and other laboratories are examining these issues.

For example, the success the present study demonstrated in treating a specific social aspect of language encourages future study in the self-manage-

ment of other social language skills. Children who have difficulties with effective communication, especially children with autism, usually are deficient in more than one social aspect of their speech (Garfin & Lord, 1985). One particularly intriguing occurrence in the present study was the anecdotal observation of an increase in verbal initiations by

2 of the children following increases in their appropriate responses to questions from others, and 3 of the 4 children began to initiate conversations outside of the treatment environment without the self-monitoring wrist counter. This observation is consistent with the hypothesis discussed in other studies (e.g., R. Koegel, Frea, & Surratt, in press) that social skills directly involved in conversation may be part of a relatively large response class. Also, although the fading of the self-monitoring device was not addressed in this article, we believe it might be particularly easy with children who achieve generalization with little programming. Support for this speculation is provided by Stahmer and Schreibman (1992), who achieved fading relatively quickly under such conditions. The techniques and types of children for which this stimulus fading can be most successful will be an interesting and important area for future research.

The role of the wrist counter in the naturalness or quality of the children's interactions is another issue that deserves discussion. During the initial treatment sessions, the conversational flow was somewhat disrupted as the children looked frequently at their wrist counters. However, this appeared to be directly related to the amount of prompting and the dense schedule of reinforcement. As the fading of prompts and reinforcers was completed, the children looked at their wrist counters infrequently, and the counters became a relatively unobtrusive part of the environment, with a corresponding improvement in the naturalness of the conversational exchanges.

The independence that self-management permits for children with autism, and the stimulus generalization it promotes, make this technique particularly promising. The fact that it is teachable in a relatively short time and provides rather quick results makes it especially useful in previously difficult treatments environments (e.g., the classroom). The fact that self-management permits much less direct contact with the treatment provider again makes this ideal for the classroom environment as well as for the community and home, where the child is provided with greater opportunity to interact naturally with family members and peers.

An important question for further investigation is how to fade self-management materials optimally, as well as fading the reinforcement role of the adult. Natural reinforcement from social interaction will occur for different children with different amounts of mediation or programming. This requires further investigation in the context of a self-management treatment package, but appears to be an especially important area for future research.

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