Order Number 9510662

Training and generalization of affective behavior displayed by youth with autism

Gena, Angeliki, Ph.D.

City University of New York, 1994

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

TRAINING AND GENERALIZATION OF AFFECTIVE BEHAVIOR DISPLAYED BY YOUTH WITH AUTISM

ANGELIKI GENA

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor in Philosophy, The City University of New York.

1994

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirements for the degree of Doctor in Philosophy.

9/26/94
Date

Claire L. Poulson
Claire L. Poulson, Ph.D.
Chair of Examining Committee

9-28-94
Date

Kay Deaux
Kay Deaux, Ph. D.
Executive Officer

Nancy Hemmes, Ph.D.
Thom Verhave, Ph.D.
Patricia Krantz, Ph.D.
Marilyn Rousseau, Ph.D.
David Roll, Ph.D.

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

Abstract

TRAINING AND GENERALIZATION OF AFFECTIVE BEHAVIOR DISPLAYED BY YOUTH WITH AUTISM

by

Angeliki Gena

Adviser: Professor Claire L. Poulson

The purpose of this study was to teach contextually appropriate affective behavior to youth with autism. Treatment consisted of modeling, prompting, and reinforcement introduced in a multiple-baseline design across different categories of affective responses for four youths. All youths were diagnosed with autism, displayed inappropriate affective behavior, and were between 12 and 18 years of age. Experimental sessions were conducted in a classroom adjacent to the youths' regular classrooms in a day-treatment program. Under treatment conditions, verbal praise and tokens were delivered contingently upon appropriate affective responding during training trials. Modeling and prompting were used as correction procedures. Each youth received treatment for at least three of the following response categories: (a) showing appreciation, (b) indicating dislike, (c) talking about favorite things, (d)

laughing about absurdities, and (e) showing sympathy. Generalization of treatment effects was tested across untrained (probe) questions or scenarios that corresponded to all five response categories. Modeling, prompting, and reinforcement for appropriate affect were withheld during probe trials. Generalization of treatment effects was also examined across therapists and settings, and during a one-month follow-up. During the presentation of scenarios, therapists displayed contextually appropriate affect throughout all experimental phases. Treatment effects were specific to the affective response category or categories under treatment. That is, generalization occurred within a response category, but not across response categories. Furthermore, treatment effects generalized across therapists, settings, and time.

Acknowledgements

This dissertation could not have been made possible without the continuous guidance and support of my advisor Dr. Claire L. Poulson. Dr. Poulson has provided me with a great model of a scientist, teacher, and leader in the field of behavior analysis. In addition, I want to thank all of my professors at the Learning Processes Program, who teach with unsurpassed dedication and have taught me to pursue the scientific advancement of the study of psychology.

In addition to my academic models, Doctors Pat Krantz and Lynn McClannahan have supported and inspired me as scientist practitioners. Their pursuit for excellence in providing the best systems for the education and treatment of people with autism has given greater meaning to my academic studies.

The person who has lived and endured the impossible, it seemed at times, through the years of my doctoral studies, is my dearest, most loving, and supporting husband, Manny. With his love, support, and constant encouragement, he made all obstacles easier to surpass -- especially those having to do with computer use.

Finally, I want to thank my friends and peers from the Learning Processes program, and especially Dr. Effie Kymissis, whose friendship, help, and understanding are beyond words.

Table of Contents

List of Tables

Page

List of Figures

Page

The importance of displaying appropriate affective behavior as a means of communicating effectively in social contexts cannot be overestimated. Affective behavior includes facial expressions, and may also include language, and gestures that are congruent with the social context. An example of appropriate affective behavior would be smiling and extending one's hand while saying "I'm happy to meet you". Affective displays serve as discriminative stimuli for ongoing exchanges between interacting individuals (Rutter & Schopler, 1987). Therefore, a delay or deficiency in displaying appropriate affect may retard overall social development of the individual (Feldman, Philippot, and Custrini, 1991).

Affective displays may take various forms and are important throughout the life-span. During infancy, affective displays are often associated with attachment to the primary care-giver (Twardosz & Jozwiak, 1981). Twardosz and Jozwiak define attachment as an organized group of responses, such as seeking contact and being comforted by a care-giver when under stress, that are indicative of a close relation or bond between infants and parents. Infants who were attached to their mothers exhibited better problem-solving skills and displayed positive affect more frequently than infants who were not attached. According to Stone and LaGreca (1986), having difficulty relating to peers during childhood was predictive of "emotional maladjustment" in

adolescence, at which point, peer reputations tend to be highly stable across time.

Children with autism demonstrate great difficulties in social interactions (American Psychiatric Association, 1987; Grossman, 1977) and particularly in expressing contextually appropriate affect (McGee, Feldman, & Chernin, 1991; Snow, Hertzig, & Shapiro, 1987). There are many studies that compare the affective behavior of children with autism to children with other developmental disabilities and/or to children of typical development (Dawson & Adams, 1984; Mcdonald et al., 1989; McGee, Feldman, & Chernin, 1991; Mundy, Sigman, Ungerer, & Sherman, 1986; Sigman, Mundy, Sherman, & Ungerer, 1986; Snow, Hertiz, & Shapiro, 1987, Volkmar, et al., 1987; Weeks & Hobson, 1987; Yirmiya, Kasari, Sigman, & Mundy, 1989). Those studies consistently underscore the disadvantages of individuals with autism, as compared with typical individuals. Children with autism manifest such disadvantages as early as 3 to 5 years of age in the form of significantly less frequent mother-child interactions (Sigman et al., 1987). Frequencies of interactions remain lower among children with autism even when variables for mental age are controlled. In addition, the quality of caregiver-child interaction is different among children with autism. Sigman et al. (1986), found that children with autism avoided interactions with their care-givers (e.g., walked away from their care-givers

frequently), avoided physical contact, and were less engaged in mutual eye contact than children with mental retardation as well as children of typical development matched on the basis of mental age.

Avoidance of affective displays among children with autism is not restricted to interactions with care-givers. It is observed in various social contexts and may take various forms. For example, according to Shah and Wing (1986), 4-year old children with autism did not use gestures to display emotions when interacting with others. Rather, they used idiosyncratic verbal expressions, which could be interpreted only by their mothers. Furthermore, they used facial expressions to convey extreme emotions only, rather than the range of emotions displayed by typical children. As the authors pointed out, children with autism do not lack the physical mechanisms that produce gestures, facial expressions, and speech, but rather fail to use them to communicate their emotions effectively.

Snow and her colleagues (1987), found that children with autism displayed specific deficits in the area of affective expression. When interacting with familiar or unfamiliar people, they displayed less than half as much positive affect as did children with other developmental disabilities and they displayed affect more often during solitary activities than during social interactions. Howlin (1986) found that in addition to displaying positive affect

in lower frequencies, children with autism did not reciprocate or adapt their affective expressions according to the ever-changing demands of social situations. Rather, they tended to demonstrate a variety of incongruous and negative affective "blends" which affected the clarity of their facial expressions (Yirmiya et al., 1989). When judging facial expressions of children with autism, it was difficult for raters to distinguish between expressions as different as "happy" and "sad" (Mundy & Sigman, 1989). Even studies comparing adults with autism to typical adults, matched for intellectual functioning, point to a disadvantage among adults with autism in displaying recognizable emotions (Hobson, 1989).

The above findings lead to the conclusion that failure to discriminate and display affective behavior is primary to autism, is independent of mental age, and tends to persist across the life span if treatment is not provided (American Psychiatric Association, 1987; Grossman, 1977, Hobson, 1989). Researchers and clinicians are in agreement that children with autism produce idiosyncratic vocal, gestural, and facial displays of affect (Hobson, 1989; Mundy & Sigman, 1989). Nevertheless, there is not a uniform agreement regarding the etiology and prognosis of affective deficits associated with autism.

The treatment of affective deficits is likely to vary with different theories of etiology and with prognosis for

improving affective behavior. Shah and Wing (1986) describe children with autism as deficient in adjusting their affect according to changes in setting events, rather than as having physical limitation in displaying appropriate affect. The etiology of affective deficits in children with autism has also been attributed to biological and cognitive factors such as, "lack [of] a biologically based attentiveness and emotional responsiveness to certain of the bodily features of others, including features of emotional expression" (Weeks and Hobson, 1987), inability to infer the "mental status" of other people because of a general cognitive deficit (Baron-Cohen, 1988), and lack of cognitive readiness to communicate successfully (Abrahamsen and Mitchell, 1990; Hobson in Dawson, 1989). When biological and cognitive factors are tied to affective deficits, research questions address the identification of biological and cognitive factors that relate to the perception and expression of affect (Prior, Dahlstrom, & Squires, 1990).

On the other hand, researchers with a cognitive-behavioral orientation emphasize the importance of redefining affective behavior in operational terms and of basing those definitions on direct observations (McGee, Feldman, & Chernin, 1991; Twardosz & Nordquist, 1983). In addition, they stress the importance of exploring affective behavior in relation to context and analyzing the conditions and variables that promote display of affective behavior

(Dunlap & Koegel, 1980; Knapp, 1960). Emphasis for future research is therefore placed on acquisition of skills related to affective behavior.

There are only three published studies that directly addressed teaching of affective behavior. First, Acker, Acker, and Pearson (1973) demonstrated that children of typical development displayed generalized imitative affection toward animate and inanimate objects following training that consisted of modeling, priming, and tangible or social reinforcement. A graphic presentation of the results would improve the clarity of the stated findings for the reader. In addition, it is not clear whether the group data presented were representative of the affective behavior displayed by individual subjects. Cooke and Apolloni (1976) demonstrated a systematic increase in social-emotional responding of children with learning disabilities using instructions, modeling, and contingent social praise. Those results were maintained in the absence of intervention and generalized to untrained subjects who interacted with the children who had received training. The authors do not specify the context provided for the children to engage in social-emotional responding beyond stating that they were in a playroom and that verbal prompts for smiling were provided. It is not clear whether the trainer provided discrete opportunities for displaying social-emotional behavior or simply reinforced incidental occurrences of

social-emotional behavior other than smiling. The modelled behavior and the instructions provided for each of the target responses were not specified, which makes this study difficult to replicate. In addition, it is not clear whether reported data during training depict prompted or unprompted responses.

The third study that directly addressed the production of facial expressions was conducted by Field and Walden (1982). One of the purposes of their study was to compare the effectiveness of various procedures in teaching facial expressions to preschoolers of typical development. It was found that children produced more accurate facial expressions when provided with photographic models of specific expressions, as opposed to labels for those expressions. In addition, the use of labels and/or a mirror -- to provide feedback -- in conjunction with the photographs did not improve the accuracy of the children's performance. The stated findings should be interpreted cautiously because the authors do not describe the manner in which the sample was selected and because they do not provide the data of individual children.

Even though there are very few studies that directly address teaching of affective behavior, there are many that address social-skills training. In some of those studies affective behavior forms part of the response definitions. Many studies have been successful in teaching social or

social-affective skills and have tested for generalization and maintenance of those skills (Acker, Acker, & Pearson, 1973; Berler, Gross, & Drabman, 1982; Brandy, Shores, McEnvoy, Ellis, & Fox, 1987; Cook & Appoloni, 1976; Field & Walden, 1982; Gaylord-Ross, Haring, Breen & Pitts-Conway, 1984; Hendrickson, Strain, Tremblay, & Shores, 1982; Keller & Carlson, 1974; Lancioni, 1982; La Greca, Santogrossi, 1980; Mesibov, 1984; O' Connor, 1969; O' Connor, 1972; Odom, Hoyson, Jamieson, & Strain, 1985; Ragland, Kerr, & Strain, 1978; Shafer, Egel, & Neef, 1984; Stokes, Baer, & Jackson, 1974; Strain, Kerr, & Ragland, 1979; Strain, Shores, & Kerr, 1976; Strain, Shores, & Timm, 1977; Strain & Timm, 1974; Twardosz, Nordquist, Simon, & Botkin, 1983; Whitman, Mercurio, & Caponigri, 1970). A review of those studies yields the following findings:

1. The three procedures used most frequently were reinforcement, modeling, and prompting. These were often used in combination with instructions, behavioral rehearsal, peer modeling, "symbolic" modeling, coaching, and homework assignments.

2. When peer confederates were used as models (Brandy, et al., 1987; Gaylord-Ross, et al., 1984; Hendrickson, et al. 1982; Lancioni, 1982; Odom, et al., 1985; Ragland, Kerr, & Strain; 1978; Shafer, et al., 1984; Strain, Kerr, & Ragland, 1979; Strain, Shores, & Kerr, 1976; Strain, Shores, & Timm, 1977), social responding was successfully taught,

but it did not generalize or the generalization results were highly inconsistent (e.g., did not generalize across all participants, did not generalize unless special training was introduced) with the exception of one study (Lancioni, 1982). Lancioni (1982) reported consistent generalization of social responding across therapists, settings, and untrained responses to the extent that they were similar to trained responses. Nevertheless, direct use of edible reinforcers was a necessary component to produce behavior change during training. In addition, only verbal (e.g., "that's good" and "thank you") as opposed to facial, responses relating to affect were trained in that study.

3. Symbolic modeling was sufficient to enhance social behavior in preschoolers who were described as isolates by their teachers (Keller & Carlson, 1974; O'Connor, 1969, 1972). Nevertheless, generalization of behavior change to new responses or under new stimulus conditions was not assessed, which limits the clinical importance of the reported findings (Stokes & Baer, 1977).

The relative paucity of intervention studies that address affective behavior, specifically, underscores the need for more research in this area. In addition, social-affective deficits appear to be: (a) primary to the diagnosis of autism, (b) persistent across the life span of individuals with autism, and (c) cutting across levels of intellectual functioning. Therefore, acquisition of social-

affective skills for individuals with autism is essential for promoting effective social interactions.

The purposes of the present study are the following:

1. To teach contextually appropriate affective behavior to youth with autism using the combination of contingent reinforcement, modeling, and prompting treatment procedures. Those procedures were selected because they were used most often in studies in which social or social-affective skills were taught successfully.

2. To use a design that allows us to demonstrate the effectiveness of the treatment package experimentally. Specifically, the effectiveness of intervention was assessed by presenting treatment sequentially across three or four topographically-defined response categories and determining whether treatment effects are specific to response categories for which intervention is introduced.

3. To assess generalization of treatment effects to new responses and under new stimulus conditions. Specifically, generalization was tested across untrained stimuli, new therapists, new settings, and during a one-month follow-up.

4. To train various affective responses that correlate highly with peer acceptance (La Greca & Santogrossi, 1980) and to provide a large number of training questions and scenarios as a means of promoting the generality of treatment effects.

5. To examine the social validity of the treatment outcome.

Method

Participants

The participants were four clients enrolled in the Princeton Child Development Institute's Education Program, a program with a behavior analytic orientation. All four participants were given a diagnosis of autism by an independent agency. They were also identified as having difficulties in expressing affect. During the first baseline session, Tony was 17 years 4 months, Alex was 14 years old, Ana was 18 years 4 months, and Dean was 12 years 4 months old. During the last generalization-across-settings sessions with therapist A, Tony was 18 years old, Alex was 14 years 7 months, Ana was 18 years 11 months, and Dean was 12 years 11 months old. The participants had received 9 to 13 years of educational intervention and treatment for inappropriate behavior at the Princeton Child Development Institute prior to this study.

Tony has attended special education classes from 3 to 17 years of age and resided with his natural family at the time this study was conducted. He was admitted at the Institute at the age of 5, and was nonverbal at the time of admission. Currently, he speaks in full sentences with clear articulation. He seems to have very good rote memory and shows great interest in music. Tony's facial expression

is often flat and accompanied by speaking in a monotone. He rarely uses gestures or vocalizations to communicate affect and often smiles or laughs noncontextually. He often produces noncontextual vocalizations and displays tics. During his latest psychological evaluation, Tony obtained a Test Composite of 49, on the Stanford-Binet Intelligence Scale: Fourth Edition.

Alex has attended special education classes only. He resides at a group home for people with autism, and visits his family on weekends. He has a history of self-injury, aggression, and fire setting. He presents behavioral problems such as noncontextual laughter, noise making, and screaming. Since Alex received behavior analytic treatment, he has improved greatly and displays the above responses rarely at the present time. He also has a diagnosis of Tourette's Syndrome which is currently in remission. Alex enjoys solitary activities, such as playing Nintendo games. He has good expressive and receptive language despite his poor articulation. He avoids physical contact with others and presents a flat facial expression most of the time. Alex's latest scores on the Wechsler Intelligence Scale for Children - Revised indicated that his organizational and visual-motor skills are significantly more advanced than his verbal-communicative skills. Specifically, he obtained a Verbal IQ below 45, a Performance IQ of 58, and a Full Scale IQ of 46.

Ana has attended special education classes only, and resides with her natural family. She has a history of displaying aggressive behavior (e.g., biting), noncontextual laughter, screaming, crying, and ritualistic behavior. Ana, however, has responded very well to behavior analytic intervention, and displayed minimal inappropriate behavior when this study was conducted. She often attends to therapists' and teachers' directions, but she attends very little to peers and she may be perceived as "bossy" at times. She also perseverates on certain topics or engages in noncontextual vocal behavior. Ana has hobbies and interests, such as listening to music and talking about jewelry, and she has a wide repertoire of general information that contributes to her good conversational skills. During pre-test sessions, she did not use appropriate facial displays, gestures, or vocalizations to communicate affect. Ana's latest scores on the Wechsler Intelligence Scale for Children - Revised. indicated that her organizational and visual-motor skills are significantly superior to her verbal-communicative skills. Specifically, she obtained a Verbal IQ of 58, a Performance IQ of 92, and a Full Scale IQ of 73.

Dean has attended special education classes since he was 3 years old, and resided with his natural family when this study was conducted. Nine years ago, when Dean was admitted to the Princeton Child Development Institute, he

was nonverbal and did not chew food. He also has a history of displaying aggressive behavior at home in combination with perseverating on negative echolalic statements (e.g., "you are no good", "oh no, don't do that"). Currently, his expressive language is often echolalic and dissociative, but he also has some functional language. That language is used most often to make requests and to address or greet others. Dean takes great interest in spelling and geography. He has a wide array of facial displays. Nevertheless, he frequently displays contextually incongruent affect. For example, he maintains a serious facial expression when greeting others, or he smiles and laughs in response to serious questions. Dean achieved a Test Composite of 36 on the Stanford-Binet Intelligence Scale: Fourth Edition. His adaptive skills, based on the Vineland Adaptive Behavior Scales, range from a mental-age equivalent of 2 years 6 months to 4 years 4 months, with his highest score obtained in the domain of daily-living skills and his lowest in the area of socialization.

All participants engaged in minimal stereotypic and disruptive behavior, they were very responsive to their token-exchange monetary motivational systems, and they responded very well to therapist-directed instructions. Before the onset of this study, the parents of all four participants signed an informed consent statement for their children's participation in the study.

Setting and Apparatus

All sessions were conducted at the Princeton Child Development Institute's Education Program where the participants attended classes. Experimental sessions during baseline and training were conducted in a classroom adjacent to the participants' regular classrooms at the Institute. The participants sat knee-to-knee with the therapist. Two desks, measured 64cm by 49cm, were placed 10cm away and to the right-hand side of the therapist. The data sheets, the motivational system, and materials (e.g., photographs and magazines) used for each session were placed on those desks. Two video recording cameras, mounted on tripods, were used. A Panasonic AG-450 video-camera was used to record the participant's front view and the therapist's side view, and was placed on the corner diagonally and across the participant's seat. A General Electric X8 video-camera was used to record the therapist's front view, and was placed facing the therapist and behind the participant. This arrangement permitted recording of the therapist and participant separately, which was necessary for social validity measures that were taken later on. In addition, it allowed for close-up shots of the therapist's and participant's faces, which was critical for scoring the appropriateness of their affective displays. During pre-testing, and after completion of treatment (post-test), a set of 14 sketches (Graphic Source, 1991) and 28 slides

depicting happy and sad faces from the Ekman and Friesen (1976) series, were presented to the participants. The purpose of this test was to assess whether the participants' ability to label those expressions would improve over the course of treatment. To assess transfer of treatment effects to new settings, post-treatment measures were taken in the participants' primary classrooms, in the recreation area, and in the dinning room of the Institute.

Therapists

The primary therapist conducted all baseline and treatment sessions with all four participants. To assess generalization of treatment effects across people, three of the participants' teachers (Therapists A, B, and C) conducted several experimental sessions. Originally, two therapists instead of one were selected for generalization testing for the following reasons: (a) If treatment effects had not generalized to Therapist A, she would have implemented the treatment procedures and then tested for generalization of treatment effects to Therapist B, and (b) because the generality of the treatment outcome is greater if generalization is demonstrated across two therapists instead of only one. While Therapist B was on maternity leave, Therapist C substituted her during Dean's final seven

sessions. Therapist C was the only male therapist to contact sessions during the present study.

Response Definitions

Appropriate affective responding consisted of judgments made by independent observers that a participant's affective responses were congruent with the scenario presented by the therapist. The response had to be emitted within 5 seconds of the presentation of a scenario. and it had to consist of both verbal and facial responses. Table 1 provides a description of the verbal and facial responses required for each of the five response categories. The definitions of the facial affective displays for all of the response categories are global, rather than detailed. Detailed descriptions of facial displays were not provided, because when global definitions of facial displays were used in prior research studies, high percentages of interobserver agreement were obtained (McGee, Feldman, & Chernin, 1991). Of the five response categories, data were collected on four response categories for each participant. Participants received training on either three or four response categories depending on whether they produced appropriate affective displays associated with showing sympathy. The two participants who did not produce such affective responses received training in four response categories. A

Table 1

The definitions of appropriate affective responding that correspond to the five response categories

Response Categories	Appropriate Affective Responses
A. Talking about favorite subjects with animation	1. directing eye gaze toward therapist; 2. providing appropriate verbal responses, i.e., "nice of you to ask..." or "good question...;"* 3. smiling or laughing.
Example: Therapist: "Who's your favorite person? Participant: "Nice of you to ask. My mother is my favorite person".	
B. Identifying and responding to absurdities	1. directing eye gaze toward therapist; 2. providing appropriate verbal responses,

Table 1 (continued)

		i.e., "that's funny/silly... question...," "that's funny..."
		3. laughing or smiling.
Example:	T: "Do you put your clothes in the refrigerator?"	
	P: "That's a funny question. I sure don't"	
C. Showing sympathy	1.	directing eye gaze toward therapist;
	2.	providing appropriate verbal responses, i.e., "that's sad", "that's too bad", or "I'm sorry to hear that;"
	3.	maintaining a serious facial expression.**
Example:	T: "I had a fight with my brother."	
	P: "I'm sorry to hear that."	

Table 1 (continued)

D. Showing appreciation	1.	directing eye gaze toward therapist;
	2.	providing appropriate verbal responses, i.e., "thank you," "no thank you," "thanks" "I'd love to," "yes please;"
	3.	Smiling or laughing.
Example:	T: "Would you like to borrow my magazine?"	
	P: "Thanks, I would like that a lot".	
E. Indicating Dislike	1.	directing eye gaze toward therapist;
	2.	providing appropriate verbal responses, i.e., "not really;"
	3.	maintaining a serious facial expression and shaking head.
Example:	T: "Do you like to be cold all the time?"	
	P: "Not really."	

Table 1 (continued)

---

* For Dean only, any verbal response that was contextually correct was considered appropriate.

** Because Dean's serious facial expressions were often accompanied by immature and exaggerated responses (e.g., he said boo hoo hoo and puts his fists to his eyes), an exclusion criterion for those responses was added for the response category of Showing Sympathy.

fourth response category (i.e., showing sympathy) was monitored only for the other two participants, because they displayed appropriate affective displays associated with showing sympathy during pre-testing and baseline. It was considered important to monitor that response category because showing sympathy requires contrasting facial displays from the response categories in training, and as such, provided a broader index of the participant's repertoire of appropriate affective responding.

Table 2 lists the response categories on which each participant received training. Even though the same response categories were used across participants, the specific scenarios presented by the therapists, as well as the target verbal responses, varied across participants. Scenarios and target verbal responses were tailored to the linguistic skills of each participant and corresponded to his or her preferences. For example, one of the participants who was interested in music, was offered audio tapes or music magazines during sessions. Thus, by providing a context that was as natural as possible, it seemed more likely that the responses trained during this study would transfer to similar and incidentally occurring events. Each response category consisted of 120 scenarios. A large number of scenarios was used to avoid frequent repetition of the same scenarios, which might result in habituation, and to maximize the generality of the results.

Table 2

The order of response categories in which treatment was introduced for each participant

Tony	Showing appreciation
	Indicating dislike
	Talking about favorite things
Alex	Indicating dislike
	Talking about favorite things
	Laughing about absurdities
Ana	Talking about favorite things
	Showing appreciation
	Laughing about absurdities
	Showing Sympathy
Dean	Talking about favorite things
	Showing sympathy
	Laughing about absurdities
	Showing appreciation

Scenarios were randomly divided into those used during training and probe trials. Training trials were associated with reinforcement and correction during treatment. Reinforcement and correction were withheld during probe trials throughout the study. The ratio of training to probe trials was two to one.

Procedure

General Procedure. The primary therapist accompanied the participant from his regular classroom to the experimental room, which was arranged as described above. At first, the therapist presented the reinforcement menu and asked the participant to choose two preferred objects or activities, such as magazines or playing a computer game, that he or she wanted to receive at the end of the session.

Experimental sessions were approximately 15 minutes in duration and were conducted 5 days a week. A session consisted of 24 trials, and it started when a therapist presented the first scenario. A trial did not begin until the participant displayed a neutral facial expression. During each trial the therapist presented a scenario, waited up to 5 seconds for the participant to respond, and delivered the consequences. Throughout the session, the therapist provided high rates of social praise and tokens contingent on participation and attending. All participants had received training and responded well to a token system similar to the one used during experimental sessions.

Tokens were exchanged at the end of each session for magazines, snacks, or favorite activities.

During each session, a Stimulus Set of 24 scenarios was used. A Stimulus Set consisted of 6 scenarios from each response category, 4 of which were presented during training trials, and 2 during probe trials. A controlled randomization procedure was used for the assignment of scenarios in the order in which they were presented. A total of 20 Stimulus Sets were produced according to the following randomization rules:

1. Each scenario appeared once throughout the 20 Stimulus Sets to avoid boredom from frequent repetition of scenarios.
2. Probe trials were not consecutive, they were interspersed among training trials to avoid long pauses between reinforcement deliveries.
3. The first two and the last two trials of each session were always training trials to ensure that the participants started and completed the sessions with opportunities to earn tokens.
4. No more than two scenarios from the same response category appeared consecutively within a Stimulus Set to minimize rote affective responding.

The Stimulus Sets were repeated starting with the first set after all 20 Stimulus Sets were used. A session was completed with the 24th trial unless the participant indicated discomfort or requested to terminate the session earlier.

Experimental Conditions and Design. The videotaped sessions were scored and the data were graphed individually for each participant. During baseline, the therapist presented each trial as described above and delivered tokens with a 5-sec delay following the participant's response to ensure that appropriate or inappropriate responses were not inadvertently reinforced. Such inadvertent reinforcement could affect baseline data. When the dependent measures were stable, as was determined by visual inspection of the graphs, treatment was introduced for the first response category. The order of response categories in which treatment was introduced for the four participants varied to control for order effects. Treatment was introduced for each participant in the order showed in Table 1. Treatment was introduced for each response category when the dependent measures were stable. During training trials, if the participant did not respond within 5 sec of the presentation of each scenario, or made an incorrect response, a correction procedure was used. In correction, the therapist modeled an appropriate verbal response and prompted the

participant verbally to match the model. If the participant did not match the model following verbal prompting, the therapist used physical prompts (e.g., tickles for smiling) to obtain a matching response. The correction procedure was used from 1 to 3 times per trial depending on the appropriateness of the participant's response. The therapist delivered tokens contingently upon unprompted appropriate affective responding produced within 5 sec of the presentation of each scenario. During probe trials, the therapist withheld tokens for 5 sec following the participant's response and, as in baseline, tokens were delivered contingently upon attending and participation. Affective responses emitted during probe trials were not reinforced throughout the study regardless of appropriateness. Tokens were exchanged for preferred magazines, snacks, or activities at the end of each session. Only when participants received 23 or 24 tokens, did they gain access to either of the two objects or activities that they chose at the beginning of each session. When they received fewer than 23 tokens, they were given access to a variety of other snacks, magazines, or activities.

An across-response-types multiple-baseline, single-case experimental design was used to assess the effects of contingent delivery of tokens, modeling, and prompting on emitting appropriate affective behavior.

Generalization Testing Across Therapists

Therapists A, B, and C tested for generalization across therapists by conducting experimental sessions under conditions identical to baseline. Three generalization sessions were conducted by each therapist during baseline. In addition, three to six sessions were conducted by each therapist following the introduction of treatment for each response category. More than three generalization sessions were conducted only when the data were variable.

One-Month Follow-Up

Three follow-up sessions per participant were conducted by the primary therapist one month after the last treatment session for all participants except Dean because summer recess followed his last session in new settings. During that month participants received no training regarding appropriate affective behavior. The follow-up setting and procedures were identical to those used during treatment.

Generalization Testing Across Settings with Primary Therapist and Therapist A

Following the last treatment session, the primary therapist tested for display of contextually appropriate affective behavior in the participants' regular classrooms, in the recreation area, and in the dining room of the Institute. The therapist presented each participant with 6 scenarios per day during a two-hour classroom time. Scenarios were not presented consecutively, rather, they

were interspersed among the participants' scheduled educational activities. Seventy two responses, which is equivalent to three experimental sessions, were presented to each participant. Reinforcement contingencies were not identical to those used during treatment. Tokens were delivered during training trials only if a motivational system was already in place for the designated activity. Namely, tokens were delivered only for training trials conducted in the participants' regular classrooms. Tokens were not delivered for any trials conducted in the recreational area or in the dining room because the participants' motivational systems were not typically used in those settings. In addition, during generalization sessions, the therapists used the motivational systems that were in place throughout the participants' day, which had a different format from the ones used during treatment. During generalization testing across settings, the changes in reinforcement schedules and in the motivational systems were made to approximate the naturally occurring contingencies during the participants' day at the Institute. Correction procedures were not used during generalization sessions. Generalization sessions across new settings with Therapist A were identical to those conducted by the primary therapist with the exception that no tokens were delivered.

Social Validity

Social validation of the treatment outcome for all four participants was examined using videotaped vignettes. Two groups of observers evaluated treatment outcome: the participants' parents and a group of graduate psychology students who were not familiar with the participants and were naive regarding the purposes of the present study. The questionnaires for parents and graduate students differed in the number of vignettes presented to each group and included 6 to 8 and 26 vignettes respectively. Only 6 to 8 vignettes were presented to each set of parents because they evaluated treatment outcome for their own child but not for the rest of the participants. The vignettes consisted of two scenes: scene A and scene B, each of which showed a participant responding to a scenario presented by the primary therapist. The scenes shown on parts A and B were randomly selected from the last three Baseline and Treatment sessions. An equal number of scenes from treatment and baseline conditions were presented in parts A and B. Two vignettes per response category and 6 to 8 vignettes per participant were presented. The observers responding to the social validity questionnaire were asked to identify the scene of each vignette during which the participant provided a more socially appropriate response.

Social validity measures were also obtained for the facial expressions of the primary therapist to ensure that

her facial expressions did not differ systematically during baseline and treatment conditions. Such systematic differences could be confounding variables. For example, if the therapist produced more pronounced facial displays during treatment, as opposed to baseline, more pronounced facial displays by the therapist may have accounted for changes in the participants' affective displays, rather than the programmed independent variables. For the purposes of social validation, two naive observers scored 64 videotaped vignettes, which depicted the primary therapist presenting scenarios that provided the context for youths to respond. Each vignette was presented twice and the observers indicated whether it occurred during baseline or treatment. A controlled randomization procedure was used to ensure a selection of: (a) an equal number of vignettes in baseline and treatment, (b) 4 vignettes per response category, and (c) 16 vignettes per participant.

Data Analysis. The raw data were converted to percentages of trials in which participants emitted appropriate affective responding. Data were also collected on the dependent measures and analyzed as percentages of trials in which the therapist modeled the target responses, provided prompting, and delivered tokens contingent upon appropriate affective responding.

Interobserver Agreement. The primary therapist and four other observers scored 33% or more of the sessions corresponding to each experimental condition for each youth. Observers were trained to an 80% criterion before their data were used. Sessions for which interobserver agreement was lower than 80% were rescored independently by both observers a maximum of three times. Percentages of interobserver agreement scores were calculated by dividing number of agreements by the number of agreements and disagreements and multiplying by 100. Interobserver agreement was based on point-by-point calculations of occurrences of the target responses (Kazdin, 1982).

Across all participants, interobserver agreement on appropriate affective responding during baseline conditions was 96% (range = 96-100%) for training trials and 100% for probe trials. During treatment conditions, interobserver agreement was 99% (range = 98-100%) for training trials and 100% for probe trials (range = 99-100%). Interobserver agreement during follow-up, new-settings, and generalization-across-therapists conditions was invariably at 100%. Interobserver agreement measures were obtained for the independent variable (i.e., therapist modeling, prompting, and reinforcement delivery) and were invariably at 100%.

Results

Individual results for each participant are graphically plotted and presented in Figures 1 through 8. The vertical broken lines show the point at which treatment was introduced for each response category. The open circles represent data obtained during sessions with the primary therapist, the closed circles represent data obtained during sessions with Therapist A, and the closed triangles represent data obtained with Therapist B. Figure 1 shows the percentage of training trials in which Tony produced appropriate affective responding across four response categories over consecutive experimental sessions. Figure 2 shows the percentage of probe trials in which Tony produced appropriate affective responding over consecutive experimental sessions. During both training and probe trials, Tony's baseline performance was very stable. With the introduction of reinforcement and correction contingencies across response categories, Tony's affective responding increased systematically for both training and probe trials. Treatment effects were specific to the affective response categories under treatment. Specifically, during training trials, Tony's affective responses for Showing Appreciation increased from 0% during baseline to an average of 92% during treatment (range = 0-100%), for Indicating Dislike from 0% during baseline to an average of 98% during treatment (range = 25-100%), and for

Figure 1. Percentage of appropriate affective responding produced by Tony during training trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).

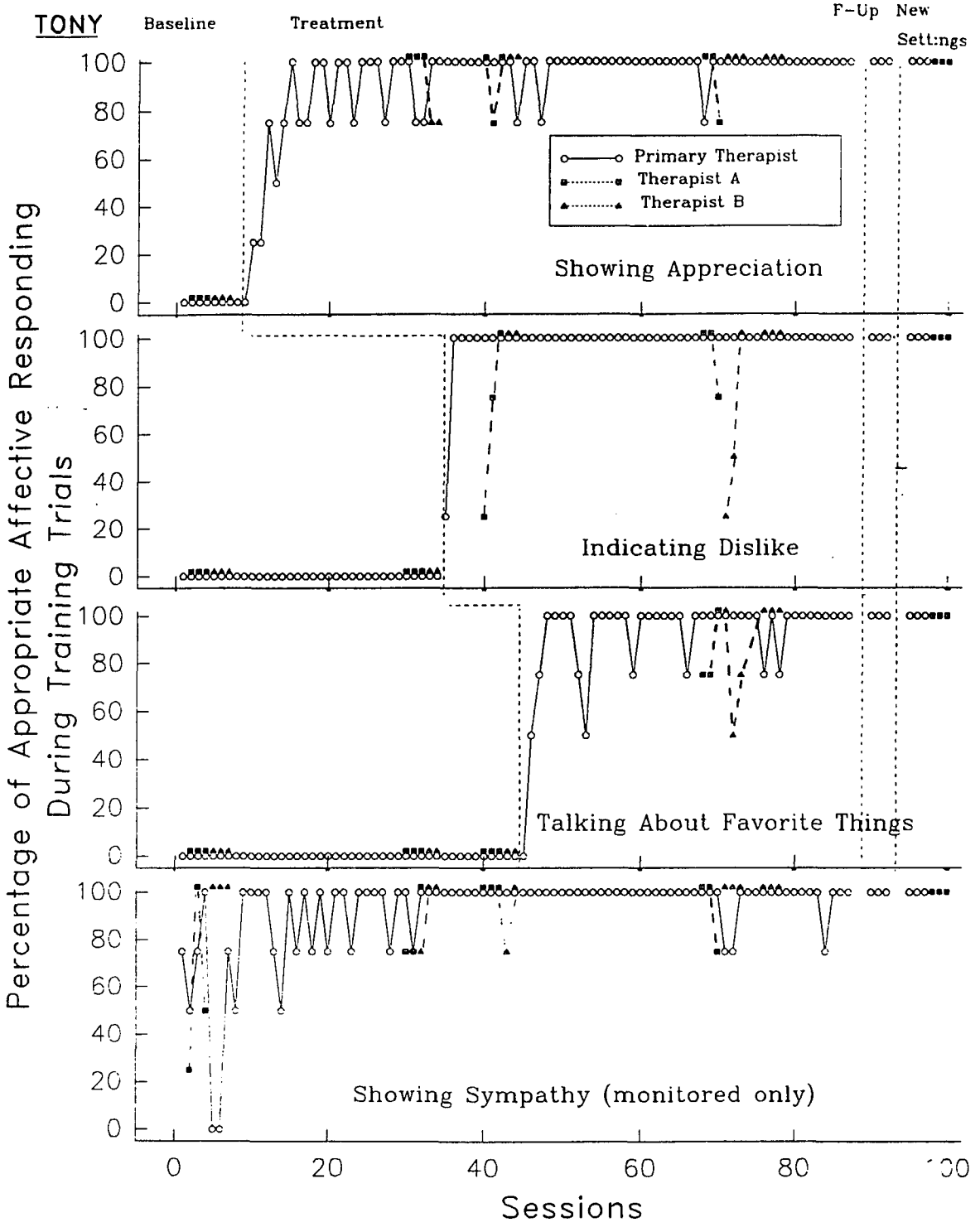
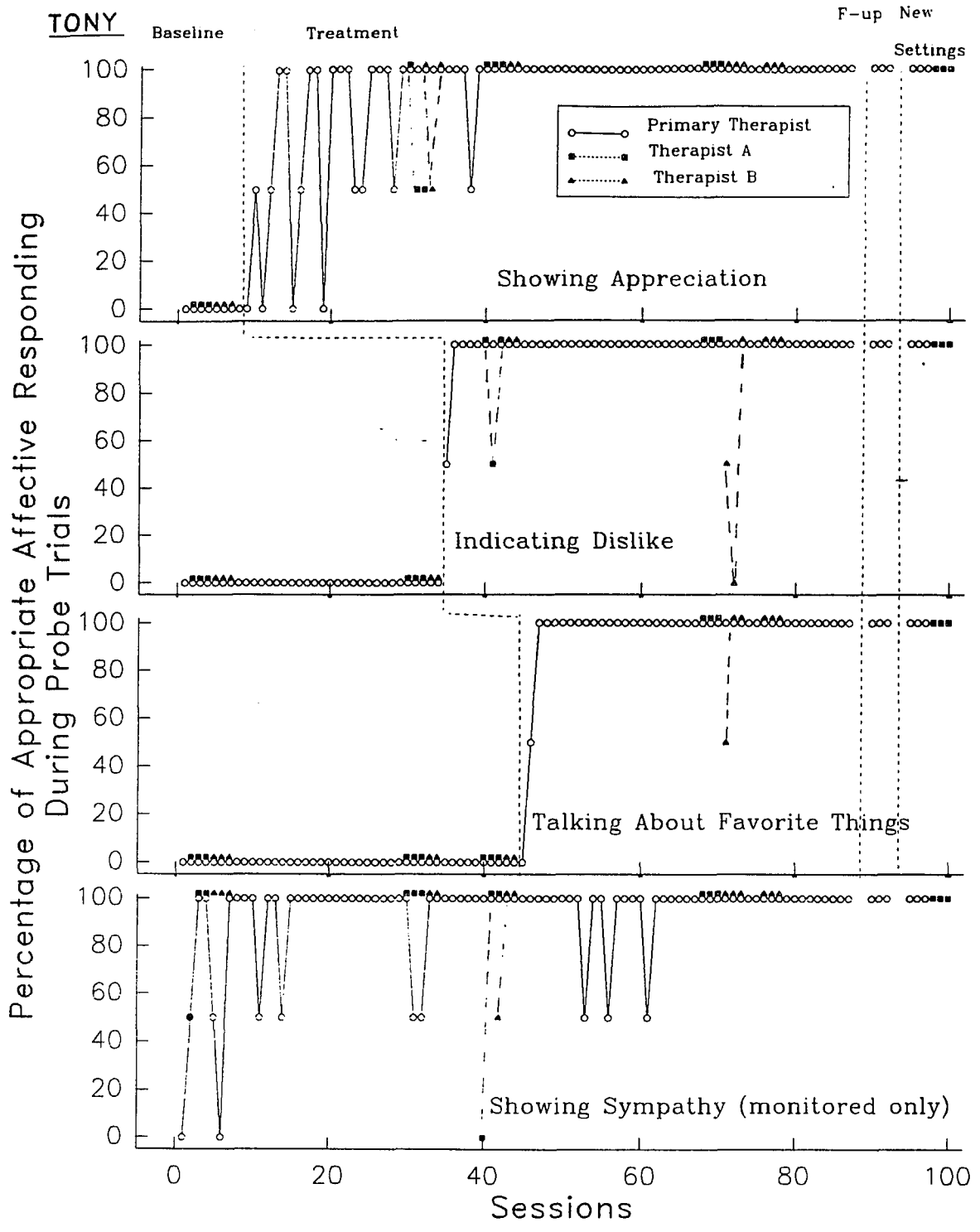

TONY
Baseline
Treatment
F-Up
New Settings
Primary Therapist
Therapist A
Therapist B
Showing Appreciation
Indicating Dislike
Talking About Favorite Things
Showing Sympathy (monitored only)
Percentage of Appropriate Affective Responding During Training Trials
0
20
40
60
80
100
Sessions

Figure 2. Percentage of appropriate affective responding produced by Tony during probe trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).


TONY
Baseline
Treatment
F-up
New Settings
Primary Therapist
Therapist A
Therapist B
Showing Appreciation
Indicating Dislike
Talking About Favorite Things
Showing Sympathy (monitored only)
Percentage of Appropriate Affective Responding During Probe Trials
Sessions
0
20
40
60
80
100

Talking About Favorite Things from 0% in baseline to 92% during treatment (range = 0-100%). During probe trials, Tony's affective responses for Showing Appreciation increased from 0% during baseline to an average of 90% during treatment (range = 0-100%), for Indicating Dislike from 0% during baseline to an average of 99% during treatment (range = 50-100%), and for Talking About Favorite Things from 0% in baseline to 96% during treatment (range = 0-100%). For Showing Sympathy, even though Tony's appropriate affective responding was monitored only, instead of being included as a treatment condition, it still increased following the introduction of treatment for Showing Appreciation. For training trials it increased from an average of 53% (range = 0-100%) to an average of 97% (range = 50-100%) and for probe trials it increased from an average of 62% (range = 0-100%) prior to the introduction of treatment for Showing Appreciation, to an average of 96% (range = 50-100%) following the introduction of treatment for responses associated with Showing Appreciation. Treatment effects maintained at 100% during training and probe trials for all four response categories during the one-month follow-up conducted by the primary therapist. In addition, treatment effects generalized at 100% during training and probe trials for all four response categories during sessions conducted by the primary therapist in new settings. Treatment effects also generalized to the

sessions conducted by Therapists A and B and to the sessions conducted by Therapist A across new settings.

Those findings were replicated with the other three participants. Alex also received training in three response categories: Indicating Dislike, Talking About Favorite Things, Laughing About Absurdities, and his appropriate affective responding for Showing Sympathy was monitored only

Ana's data are similar to Tony's and Alex's except for appropriate affective responding associated with Showing Sympathy, which decreased following the introduction of treatment for Talking About Favorite Things, and which did not increase again, until it was trained directly.

Dean was the only participant who did not display age-appropriate affective behavior associated with Showing Sympathy during pre-testing or baseline. Therefore, he received training in 4 instead of 3 response categories and he showed acquisition in all 4 response categories following the introduction of treatment for each category.

Qualitative aspects of the facial displays produced by the participants were not directly measured. Nevertheless, anecdotally, the quality of the participants' facial displays invariably improved following the introduction of treatment. During baseline, all four participants presented very flat facial displays. By the end of this study, they produced "natural-looking" facial displays with the

Figure 3. Percentage of appropriate affective responding produced by Alex during training trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).

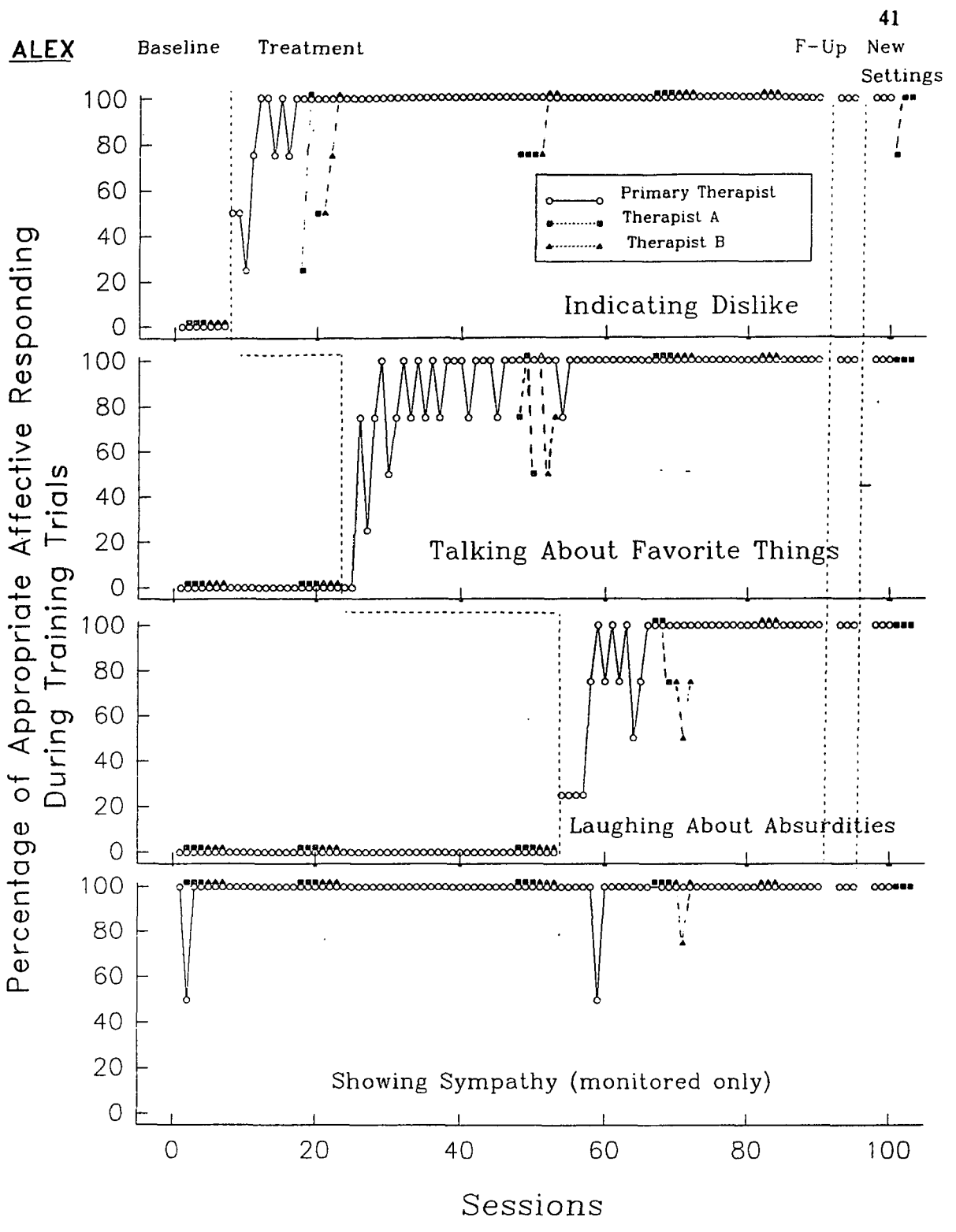

ALEX
Baseline
Treatment
F-Up
New Settings
Primary Therapist
Therapist A
Therapist B
Indicating Dislike
Talking About Favorite Things
Laughing About Absurdities
Showing Sympathy (monitored only)
Percentage of Appropriate Affective Responding During Training Trials
Sessions
0
20
40
60
80
100

Figure 4. Percentage of appropriate affective responding produced by Alex during probe trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).

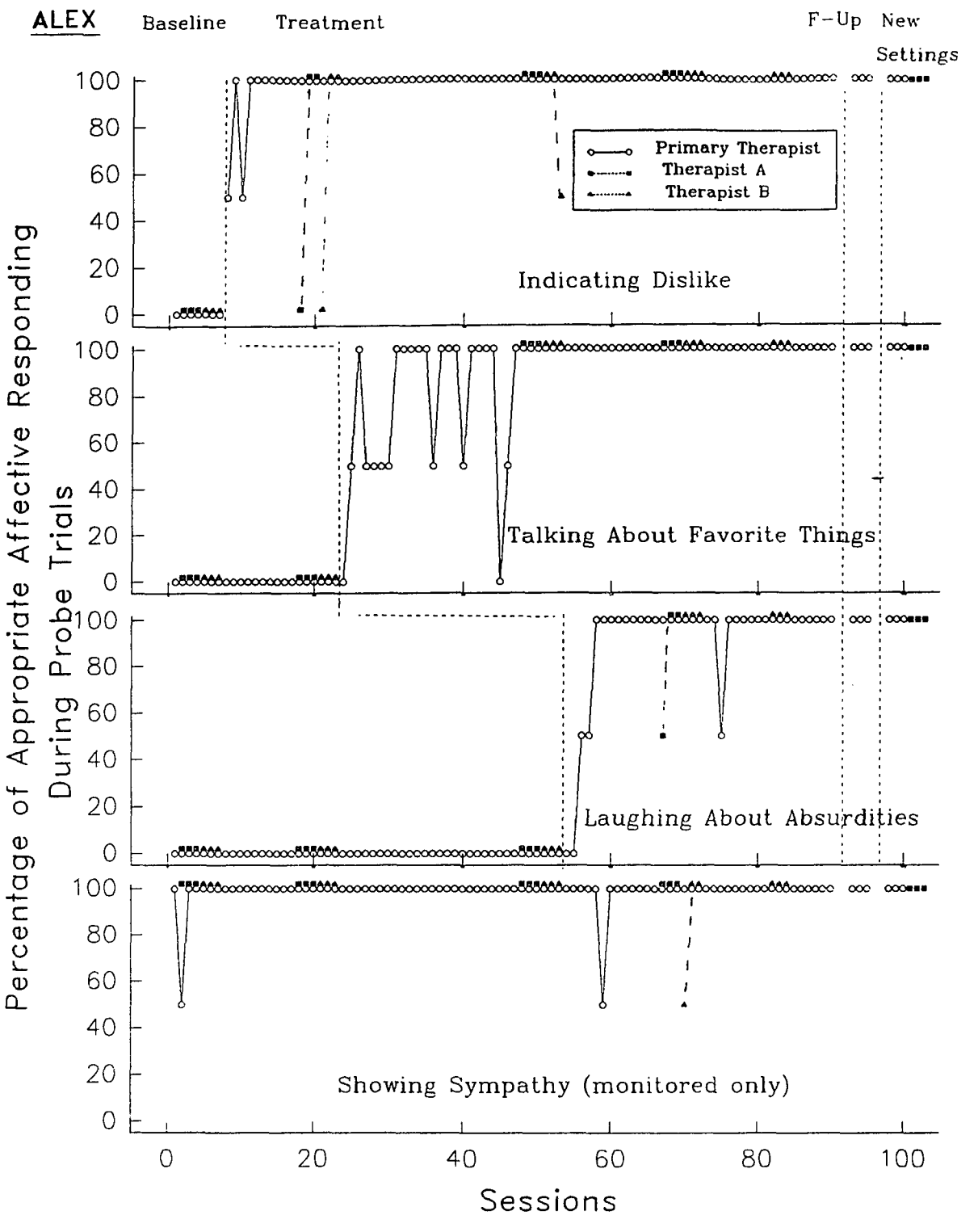

ALEX
Baseline
Treatment
F-Up
New Settings
Primary Therapist
Therapist A
Therapist B
Indicating Dislike
Talking About Favorite Things
Laughing About Absurdities
Showing Sympathy (monitored only)
Percentage of Appropriate Affective Responding During Probe Trials
Sessions
0
20
40
60
80
100

Figure 5. Percentage of appropriate affective responding produced by Ana during training trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).

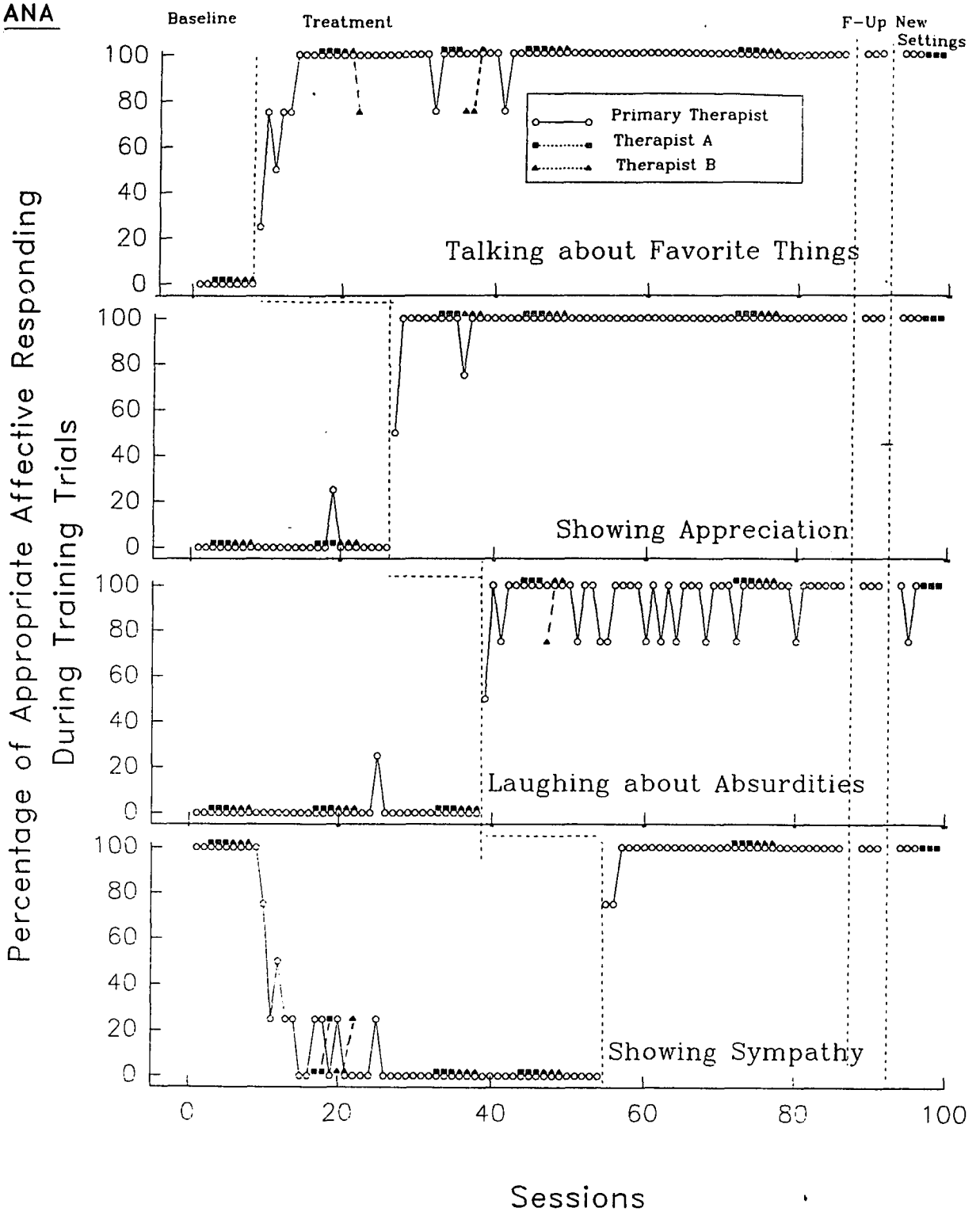

ANA
Baseline
Treatment
F-Up New Settings
Primary Therapist
Therapist A
Therapist B
Talking about Favorite Things
Showing Appreciation
Laughing about Absurdities
Showing Sympathy
Percentage of Appropriate Affective Responding During Training Trials
Sessions
0
20
40
60
80
100

Figure 6. Percentage of appropriate affective responding produced by Ana during probe trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapist B (closed triangles).

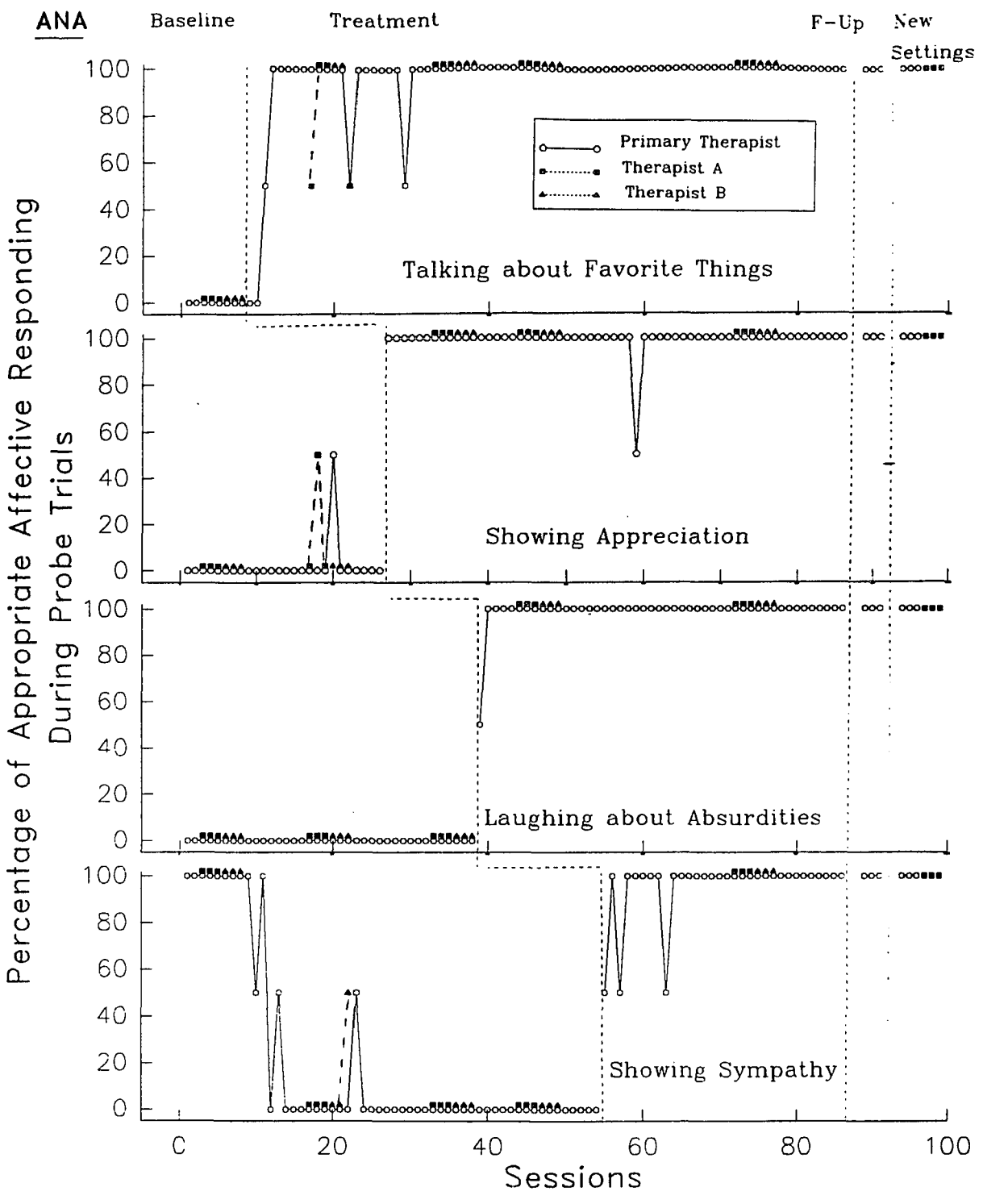
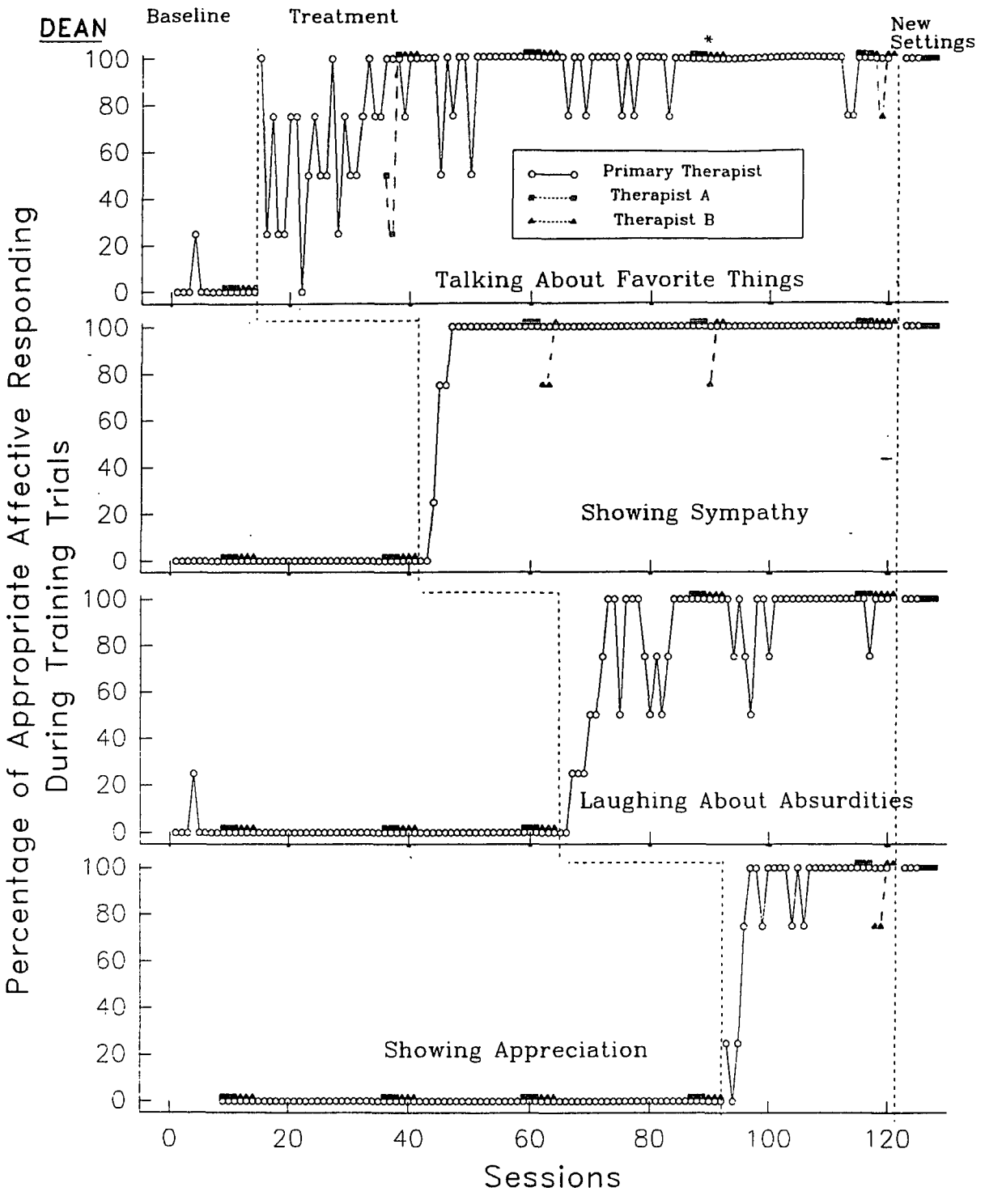
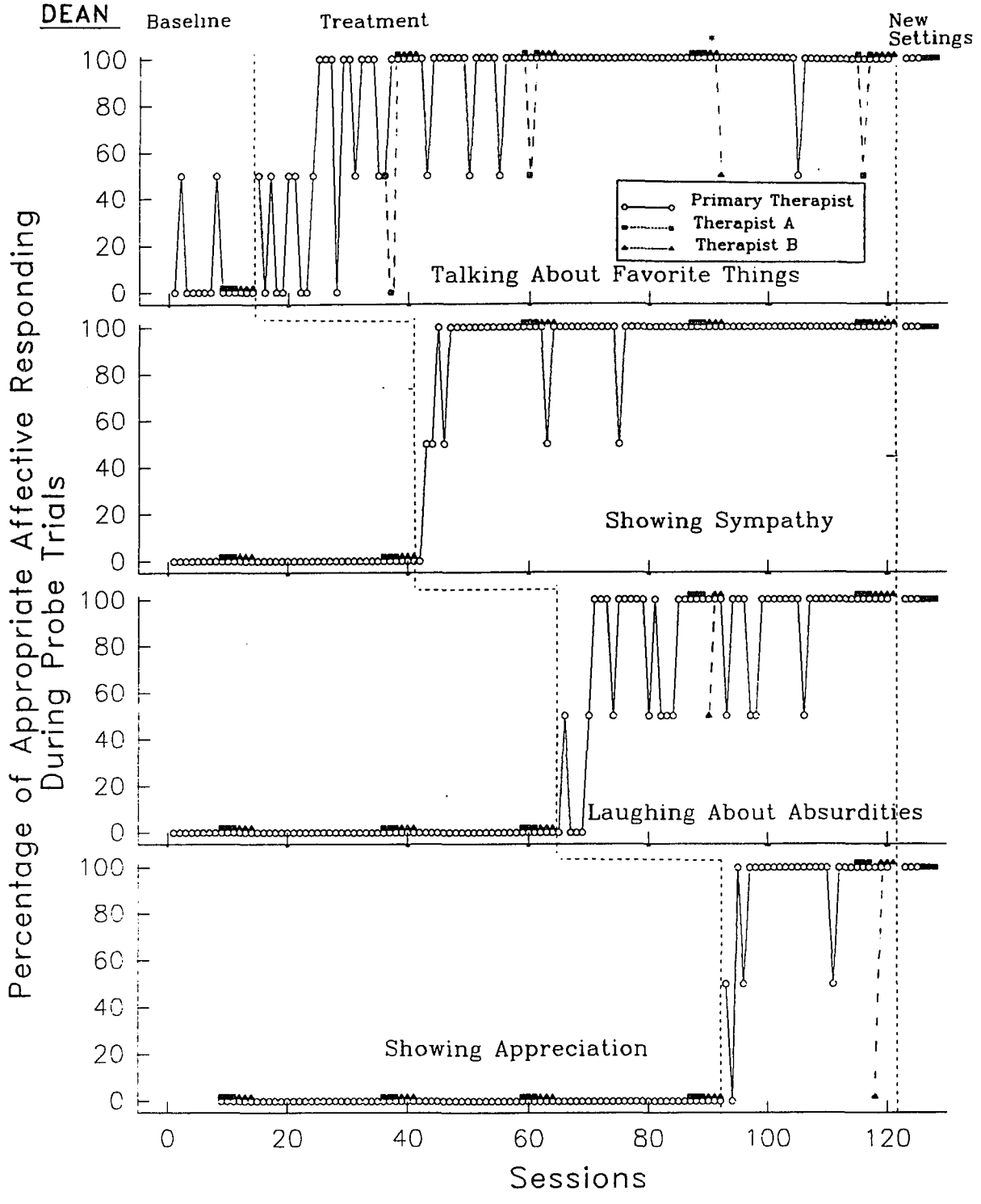

ANA
Baseline
Treatment
F-Up
New Settings
Primary Therapist
Therapist A
Therapist B
Talking about Favorite Things
Showing Appreciation
Laughing about Absurdities
Showing Sympathy
Percentage of Appropriate Affective Responding During Probe Trials
0
20
40
60
80
100
Sessions

Figure 7. Percentage of appropriate affective responding produced by Dean during training trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapists B and C (closed triangles).



* Therapist C substituted for Therapist B for the remaining sessions

Figure 8. Percentage of appropriate affective responding produced by Dean during probe trials across experimental sessions conducted by the primary therapist (open circles), by Therapist A (closed circles), and by Therapists B and C (closed triangles).



* Therapist C substituted for Therapist B for the remaining sessions

exception of one participants who occasionally did not smile "naturally." When that participant smiled, the corners of her mouth were always lifted upward and outward and her cheeks were raised, but she did not always close her eye lids enough while smiling. Even though improvement in the quality of the participants' facial displays was not measured directly, it might be inferred from the judgements of social validity described in the social validity section of this paper.

Measures of the independent variable revealed that during baseline and across all participants the primary therapist delivered tokens contingent on affective responding during 0% of training and probe trials. Modeling and prompting during baseline with the primary therapist were also provided during 0% of training and probe trials. During treatment and during the one-month follow-up, tokens were delivered contingent upon appropriate affective responding during 100% of training trials and during 0% of probe trials. Modeling and prompting during treatment and during follow-up with the primary therapist were provided contingent upon inappropriate affective responding during 100% of training trials and during 0% of probe trials. During generalization across settings with the primary therapist, tokens were delivered contingent upon appropriate affective responding during 65% of training trials and during 0% of probe trials. Modeling and prompting were

provided during 0% of training and probe trials. Therapists A, B, and C provided tokens contingent upon affective responding during 0% of probe and training trials across all experimental conditions. They also provided prompting and modeling during 0% of probe and training trials.

Table 3 shows the percentages of affective responses produced by each participant that were scored as more socially appropriate during treatment, as opposed to baseline, by each of the participants' parents and by 16 graduate students. The percentage of affective responses scored by parents as more socially appropriate during treatment ranged from 83% to 100% and the average across participants was 92%. Across all participants, the percentage of videotaped vignettes that were scored by graduate students as more socially appropriate during treatment, as opposed to baseline, was 82% of 416 observations (range = 73-90%). One-sample t-test of a sample mean was conducted to determine whether there were significant differences in graduate students' ovservations of the participants' affective responding between baseline and treatment (Ramsey & Ramsey, 1985). T-test results showed that according to graduate students the participants displayed significantly more socially appropriate affective responding during treatment. Specifically, $t(16) = 4.38$, $p < .01$.

Table 3

Percentages of affective responses produced by each participant that were scored as more socially appropriate during treatment, as opposed to baseline, by each of the participants' parents* and by 16 graduate students scoring independently.

	Parents		
	Number of Responses	Percentage	Range
Tony	11/12	92	83-100
Alex	10/12	83	83-83
Ana	11/12	92	83-100
Dean	16/16	100	100-100
Overall	48/52	92	

	Graduate Students		
	Number of Responses	Percentage	Range
Tony	4.4/6	73	50-83
Alex	5.3/6	88	67-100
Ana	4.6/6	76	33-100
Dean	7.2/8	90	75-100
Overall	21.4/26	82	65-92

*Parents scored the affective responses of their own children only.

Regarding social validation of the affective responses of the primary therapist, the percentage of responses scored accurately (i.e., accurate identification of whether the response occurred in baseline versus treatment) was 52% of 128 observations (range = 50-55%). The percentage of responses scored inaccurately was 48% (range = 45-50%). Therefore, the affective responses of the primary therapist did not differ systematically between baseline and treatment conditions.

Table 4 shows the percentages of affective displays, portrayed on sketches and slides, that the participants labeled accurately during pre- and post-testing. Six of the 8 post-test measures of accurate labeling of affective displays were higher than pre-test measures. A dependent samples t-test was conducted to examine whether accuracy of responding during post-testing was significantly higher than during pre-testing. A dependent samples t-test was considered appropriate, because the differences between two means from repeated measures (i.e., pre-test and post-test means) were evaluated (Ramsey & Ramsey, 1985). The t-test calculations indicated that the four participants, on the average, labeled affective displays with significantly higher accuracy during post- as opposed to pre-testing. Specifically, $t(8) = 2.7$, $p < .05$.

Table 4

Percentages of affective displays portrayed on sketches and slides that the participants labeled accurately during pre- and post-testing.

	Sketches		Slides	
	Pre-test	Post-test	Pre-test	Post-test
Tony	68	100	89	97
Alex	53	74	64	56
Ana	95	100	78	97
Dean	95	100	100	100

Discussion

This study demonstrated that for youths with autism reinforcement and correction procedures were sufficient to produce contextually appropriate affective responding across various response categories. In addition, it was demonstrated that the participants learned to respond appropriately to scenarios presented during probe trials, for which direct training was not provided. For example, when Tony received training on Showing Appreciation, the treatment effects generalized to probe responses of the same response category, but not to any responses from the category of Indicating Dislike or Talking About Favorite Things. The above example shows that for the response categories under treatment, affective responding generalized to probe trials within the response category for which treatment had been introduced, but not across categories. Thus, it may be concluded that those response categories formed a functional response classes (Baer, 1982).

For one of the participants, percentages of appropriate affective responding in the response category that was monitored only did change with the introduction of treatment for the first response category. Specifically, Ana's appropriate affective responding for Showing Sympathy decreased with the introduction of treatment for the response category of Talking About Favorite Things. The

latter was not differentiated from the response class of Showing Sympathy until the introduction of treatment for Showing Sympathy. In addition, regarding Tony's responding, with the introduction of treatment for the response category of Showing Appreciation, there was a slight increase in his appropriate affective responding for Showing Sympathy, which was monitored only. It is not clear, however, whether that change was already in progress before treatment began.

Additionally, the findings indicate that the affective displays of people with autism are modifiable using an operant paradigm. Even though universal patterns of affective behavior have been identified through studies comparing facial expressions of emotion across different cultures (e.g., Ekman, 1984; Ekman & Oster, 1979; Ekman & Oster, 1982), virtually no one doubts the importance of cultural and other environmental factors in shaping affective behavior. Examples of the importance of environmental factors may be drawn from both studies of individual differences within a culture, and studies of cross-cultural differences. Malatesta (1982) provides a thorough analysis of environmental variables that contribute to individual differences in affective behavior. Some of those variables include "rules" dictated by chronological age, gender, and familial background; parental or peer modeling; and one's reinforcement history regarding affect.

Examples from cross-cultural studies that point to the importance of environmental factors in shaping affective behavior include the various culturally-determined "display rules" (Ekman 1984), and cultural variations in the topography of affective displays (Davitz, 1964). "Display rules" refer to cultural rules that dictate what are socially appropriate facial displays in various contexts (Ekman, 1980). Ekman (1984) provides an example of differences in "display rules" between the Americans and the Japanese, regarding the expression of affect in the presence of an authority figure. For Japanese, contrary to Americans, displaying negative affect (such as frowning or showing dislike) in the presence of an authority figure is not socially acceptable. Cultural variations in affective displays are also reflected by the ability to judge the affective expressions displayed by members of one's own culture more accurately than those displayed by members of a different culture (Davitz, 1964). Even though the question of which aspects of affective behavior are elicited and which are evoked by environmental stimuli is beyond the scope of this study, the present findings demonstrate that contextually appropriate affective behavior may be treated as operant behavior.

The clinical importance and the generality of the treatment outcome were amplified because treatment effects transferred to new therapists and settings, and they

maintained through time. Baseline measures were obtained only in the training setting, rather than all settings where post-treatment effects were tested. If one assumes that the participants would not have displayed contextually appropriate affect in any settings before the introduction of treatment, then one could consider post-treatment testing across settings to be a generalization measure. Such an assumption was made in the present study.

The clinical importance of the treatment outcome was further examined using social validity measures. The social validity procedures were designed to assess whether parents and naive observers could detect a positive change in the participants' affective displays from baseline to treatment. Both groups considered the participants' affective displays to be more socially appropriate after treatment was introduced. The social validity measures used in the present study were relatively gross, because they provided only comparisons between the participants' affective displays during baseline and treatment conditions. No social validity measures were used to assess the extent to which those displays were socially appropriate. Unfortunately, no reliable measures of the appropriateness of affective displays of people with autism were devised or identified in the literature review conducted for the present study. Assessing the appropriateness of the affective displays of people with autism is rather complex,

because it is difficult to separate affective deficits from other deficits associated with autism. For example, the present study did not address the speech impediments or language delays that the participants presented. Because of those impediments, even if the affective displays of the participants were as socially appropriate as those of their non-disabled peers, they might still not be judged to be as appropriate as those of their peers. Therefore, unless other deficits associated with autism are separated from affective deficits, an unbiased assessment of the appropriateness of the affective skills of people with autism, per se, may be difficult to obtain. Nevertheless, there is a relevant social-validity question that the present study did not address that might be easily addressed in future research. That question would be to ask parents and naive observers, given that there are changes in affective behavior caused by treatment, whether and to what extent they considered those changes to be important for the participants (D. M. Baer, personal communication, March 22, 1993).

Teaching youths with autism to display contextually appropriate affective behavior was considered important for the following reasons: First, a deficit in displaying contextually appropriate affect is one of the primary factors in the diagnosis of autism. The vocal, gestural, and facial aspects of the affective behavior of people with

autism have often been characterized as bizarre or idiosyncratic (e.g., Hobson, 1989; Mundy & Sigman, 1989). Second, for people with autism affective deficits tend to persist across the life span, if treatment is not provided (American Psychiatric Association, 1987; Grossman, 1977). And third, affective deficits limit the ability of people with autism to communicate with others effectively and to develop relationships with parents, familiar and unfamiliar adults, and with peers (McGee, Feldman, & Chernin, 1991; Snow, Hertzig, & Shapiro, 1987). For an extensive discussion on the affective deficits and the importance of acquiring appropriate affective behavior for people with autism see Appendix A.

Displaying contextually appropriate affect requires complex discriminations based on other people's verbal and nonverbal affective behavior as antecedents and consequences. Although no experimental analysis was made of the discriminative stimuli that controlled responding in the present study, it is clear that the facial displays and voice intonation of the therapist had a greater effect on evoking contextually appropriate affective responding than context alone. The content alone of the scenarios presented by the therapist may not have been sufficient to produce discriminated responding for some of the response categories. For example, some scenarios associated with Laughing About Absurdities could be nondiscrminable in

content from scenarios associated with Showing Dislike. Nevertheless, the facial display and the intonation of the therapist when presenting scenarios that corresponded to those response categories had been highly discriminable from one another as the data indicate. A scenario, such as "Do you like to put your clothes in the refrigerator?" could have evoked either a humorous response or a response that showed dislike. Therefore, if participants were attending to the content of the scenarios alone, they would have not been able to display discriminated affective responding. Because the participants produced contextually appropriate affective responding across four response categories, it may be concluded that content of the scenarios, as well as the therapists' facial displays and voice intonations served as discriminative stimuli. Learning such complex discriminations can be challenging for people with autism. An example from Ana's data demonstrates the need for explicitly teaching people with autism contextual discriminations. Ana's appropriate affective responding associated with Showing Sympathy decreased following the introduction of treatment for Talking About Favorite Things. That decrease resulted from Ana's failure to produce discriminated affective behavior for scenarios that corresponded to different response categories. With the introduction of treatment for the response category of Talking about Favorite Things, Ana produced similar

affective responses for all four response categories. For example, in response to a scenario such as: "I lost my wallet and I' m very upset about it," she would smile and say: "Nice of you to ask, that's too bad." Because people with autism often present such discrimination deficits, it is important for the purposes of affect training to consider two aspects associated with affect: (a) the topography of affective displays and (b) the context in which specific affective responses are displayed. Many observational studies document that people with autism present affective deficits in either or both topographic and contextual aspects of affective behavior (e.g., McGee, Feldman, & Chernin, 1991; Yirmiya, et al., 1989). Learning to identify contextual variables relevant to affect requires that one makes discriminations based on other people's verbal (which includes content and prosody of speech), gestural, and facial displays. Ultimately, discriminated affective responding combines contextual discrimination with producing facial, gestural, and verbal affective responses that are recognizable by other people.

Prior to the onset of the present study, the participants displayed affective behavior that is consistent with the affective profile of people with autism described in the literature (e.g., Shah and Wing, 1986). Specifically, even though the participants produced topographically appropriate affective displays, those

displays were considered aberrant because they were evoked by socially inappropriate stimuli. For example, one of the participants often smiled or laughed while completing non-humorous homework assignments or maintained a serious facial expression while watching comedy on TV. During baseline, the participants responded to most of the scenarios presented by the therapists with a correct statement, yet those statements did not meet the criteria of the target verbal responses (see Appendix B). In addition, most of the participants' facial displays were not contextually appropriate. With the introduction of treatment, the participants showed rapid acquisition on the verbal components of appropriate affect. The facial aspects of appropriate affective displays were acquired at a somewhat slower pace. Because Figures 1 through 8 depict only the data that show the combination of appropriate facial and verbal affective responding, the reader is referred to Appendix B. The figures in Appendix B depict the verbal and facial aspects of the participants' affective responding separately. The purpose of the present study was to transfer stimulus control of affective responding from stimuli that are not typically associated with various affective displays to socially appropriate stimuli. All four participants learned to discriminate contextual variables associated with each response class within one to twenty sessions. Such rapid acquisition of discriminated

affective responding may be attributed to the following:

1. The participants were not taught novel responses. Instead, they learned to display already acquired affective responses, under socially appropriate stimulus conditions.

2. All four participants had received extensive training prior to this study, in attending to teacher-directed instructions, in performing various discrimination tasks, and in responding to a token exchange system.

In addition to teaching participants to discriminate contextual variables, shaping was sometimes required to teach "natural-looking" affective behavior. During baseline, all four participants presented flat facial displays irrespective of the scenarios presented by the therapists. During the initial treatment sessions, the participants' produced discriminated affective displays across response classes. Nevertheless, some of those responses did not match the topography of the more "natural-looking" affective behavior that they produced spontaneously outside the sessions. Most people, other than professional actors, would encounter similar difficulties when called upon to produce appropriate affective responding during repeated trials. Shaping the affective displays that each participant produced during sessions to match or to approximate his or her spontaneous affective displays required much more training than teaching contextual discriminations. Examples of topographically inappropriate

affective responses included: exaggerated facial expressions (e.g., exaggerated smiling and shaking the head rapidly); speaking with a high pitch and high volume; and producing a facial display either before or after, rather than concurrently with the corresponding vocal response. By the end of this study, the affective responses of the participants invariably improved. For one of the participants the quality of smiling was not always optimal. Failure to slightly close her eye lids while smiling resulted in a smile that looked somewhat "staged," rather than "natural". The rest of the affective displays of that participant along with the affective displays produced by the other three participants, during the final experimental sessions, were indistinguishable in topography from the "natural-looking" affective responses that they produced spontaneously.

The present study did not address the prosodic features of vocal responding that may be important when judging the overall appropriateness of affective displays (Knapp, 1960). That would be an appropriate direction for future research. Another aspect that would be important to explore in future research is whether all components of treatment used in the present study are necessary for producing the target outcome. Modeling alone has been shown to be sufficient to enhance social behavior among preschoolers described as isolates (Keller & Carlson, 1977; O'Connor, 1969, 1972).

The data obtained in the present study, however, indicate that for youth with autism modeling alone may not be sufficient to produce contextually appropriate affective behavior. Specifically, even though the therapists modeled contextually appropriate facial affective displays during baseline, the participants did not routinely imitate the therapists' affect until reinforcement contingencies were introduced. Furthermore, an important consideration regarding the treatment package of the present study is whether it would be sufficient to produce behavior change in the home environment with parents serving as therapists. Identifying procedures that may improve affective displays in the home environment is essential for individuals with autism, because they tend to avoid physical and eye contact with care-givers from a very early age (Sigman et al., 1986). To the extent that individuals with autism avoid social interactions because they lack social skills, learning to display appropriate affect is a social skill that may promote interactions. Finally, it would be important to replicate the present study with younger individuals with autism. Such a replication would extend the generality of the present findings.

APPENDIX A

Communicative Aspects of the Affective Behavior of People with Autism: A Review of the Literature

Abstract

People with autism often present deficits in displaying appropriate affective behavior, which interferes with their ability to communicate with others effectively. Given the acknowledgement that appropriate affect is important in achieving effective communication and that people with autism often lack appropriate affect, the purpose of this review was twofold: (a) To provide a description of some important functions that affective behavior may serve toward achieving successful social interactions for people with disabilities and (b) to review and analyze research findings pertaining to the description of the affective characteristics of people with autism. Research findings regarding the importance of displaying appropriate affect point consistently to a direct correlation between affective skills and effective communication or other social skills. Nevertheless, further experimental studies analyzing the role of displaying appropriate affect in achieving effective social skills may be crucial to an assessment of the precise relationship between affect and overall social skills. In assessing the affective characteristics of people with autism, an important question to ask is whether their affective displays are appropriate both topographically and contextually. The findings of this review may provide useful information for the purposes of assessing and

identifying training goals in the area of affect for people with autism.

Communicative Aspects of the Affective Behavior of People with Autism

Lack of appropriate affect is one of the characteristics that has been consistently associated with autism from the time the syndrome was identified (Kanner, 1943) to the present time (American Psychiatric Association, 1987, McGee, Feldman, & Chernin, 1991). Affect includes facial configurations and may also include gestures and verbal behavior that often serve a communicative function (Knapp, 1960). It is widely acknowledged that appropriate affect is important for effective communication and that people with autism present deficits in the area of affective displays. Yet, descriptions of the affective characteristics of people with autism are often unclear and sometimes contradictory across studies (Howlin, 1986; Trad, Bernstein, Shapiro, & Hertzig, 1993). This problem may be partly attributed to the small number of observational studies that address the affective deficits of people with autism (Sigman, Mundy, Sherman, & Ungerer, 1986; Yirmiya, Kasari, Sigman, & Mundy, 1989), and the even smaller number of studies that are conducted in natural settings (Dawson, Hill, Spencer, Galpert, & Watson, 1990; Dissanayake & Crossley, 1989; Stone & Caro-Martinez, 1990). Many

researchers consider social-affective difficulties to be the primary deficit in autism (e.g., Hobson, 1989), yet, for people with autism, research in the area of social-affective skills is very limited compared to research conducted in the areas of cognitive and linguistic skills (Snow, Hertzig, & Shapiro, 1987).

The purposes of this review are to identify some important functions that appropriate affective behavior served for people with autism, and to provide a thorough description of the affective characteristics that people with autism display. For the purposes of this review, the following questions will be addressed:

1. For people with disabilities, what is the importance of displaying appropriate affective behavior for achieving successful social interactions?

2. What characteristics do people with autism display with regard to affective behavior and how do they differ in that respect from people with other disabilities or people of typical development?

Answering the first question will provide an assessment of the communicative functions that affective behavior serves for people with disabilities. The second question addresses the affective deficits that people with autism present, which result in ineffective communication with others. A thorough understanding of both communicative functions of affective behavior and the affective deficits

associated with autism may help to identify remedial goals in the areas of affect and communication for people with autism.

To identify articles that address the importance of displaying appropriate affective behavior for people with disabilities and that describe the affective characteristics of people with autism, the author reviewed all issues of the Journal of Applied Behavior Analysis and the Journal of Autism and Developmental Disorders published through January of 1994. She selected and reviewed the abstracts of articles whose titles contained the word "social" or named a social skill, such as interaction with mothers. In addition, a computer literature search on the topics of affect and autism was conducted, using the Eric database (from January of 1966 to September 1993) and the PsycLIT database (from January of 1974 to September of 1993). The criteria for including an article in this review were that it either: (a) addressed the importance of displaying appropriate affective behavior or (b) described affective deficits associated with autism. Articles that did not meet either criterion were not included in this review. The present literature search yielded 47 articles and book chapters.

For People With Disabilities, What is the Importance of Displaying Appropriate Affective Behavior for Achieving Successful Social Interactions?

Learning to display appropriate affective behavior may contribute to an overall improvement in social competence. An example of the importance of appropriate affective behavior may be drawn from the work of Strain, Cook, and Appoloni (1976), who described the potential communicative and reinforcing functions of smiling for infants and children. Specifically, smiling may draw positive attention, social contact, positive affective behavior from adults, and it may also enhance social interactions, which would increase one's opportunities to use and develop his or her social-affective skills.

For people with autism, improvement in social competence has had collateral effects on disruptive or aberrant behavior (Carr & Durand, 1985; Hunt, Alwell, and Goetz, 1988). Namely, with improvement of social skills, there was a systematic decrease in disruptive behavior.

To analyze the importance of displaying appropriate affect for achieving effective social interactions two topics will be explored in detail: (a) The correlation between affective displays and overall social skills and (b) the functions that appropriate affect serves in the realm of social interactions.

Affective Displays and Overall Social Skills

The correlation between affect and overall social skills has been studied with both children of typical development and children with autism. Feldman and his colleagues have conducted a series of studies that explored the relationship between overall social competence, assessed by the Achenbach Child Behavior Checklist (Achenbach & Edelbrock, 1982), and the ability to understand and display contextually appropriate affect. Those experiments showed, invariably, that children of typical development who received the highest scores in social competence, were also the ones who understood and displayed affect most accurately (for a review of those studies, see Philippot, Feldman, & McGee, 1992).

Similar findings were obtained by Wilczenski (1991) who studied the social skills of adults with mental retardation. Specifically, she compared the overall socialization skills of adults with mental retardation to the accuracy of their facial affective displays. Socialization skills and affective displays were assessed by work supervisors using the Socialization section of the AAMD Adaptive Behavior Scales (1981). The subjects that produced more accurate affective displays, also received higher scores in the socialization domain. In addition, children with a history of abuse, compared to nonabused children, were found to be less competent socially, and particularly less skilled in

recognizing affective facial displays (Campras, Grow, & Ribordy, 1983). Also, children who were "poorly adjusted" (i.e., with a clinical diagnosis) had greater difficulties, than children of typical development, in understanding and in responding to stressful events with appropriate affect (Morrison & Bellack, 1981). The research findings, regarding the relationship between overall social skills and the ability to recognize and display affect accurately, indicate that appropriate affective behavior is an integral part of social skills and that it may be viewed as an index of overall social competence.

One of the limitations of the reviewed studies is that "social competence" and "social adjustment" were assessed by standardized behavior checklists or scales, rather than by direct observations of specific behavioral characteristics that may describe social competence or adjustment. Thus, the findings reported in the reviewed studies may have been subject to biased or subjective interpretations of behavioral characteristics associated with social competence. To achieve a more accurate and reliable measure of social competence in future research, it would be useful to consider using both behavior-specific descriptions of the characteristics of social competence and interobserver agreement procedures to assess the measures of social competence. In addition, the reviewed studies do not provide an analysis of the relationship between social

competence and the ability to display appropriate affect. Namely, because those studies are correlational, rather than experimental, they simply point to a positive correlation between affect and social competence, but they do not indicate whether improvement in social competence would lead to improved affect or vice versa, or whether a third variable impacts on both social competence and affective behavior. An experimental analysis of the relationship between appropriate affective behavior and overall social competence may address those questions.

Functions that Affective Behavior Serves for Social Interactions

The functions of appropriate affective displays for people with autism may be seen as twofold. With an improvement in displaying appropriate affect, overall social competence may increase and disruptive or inappropriate behavior may decrease simultaneously. The role of appropriate affect in achieving successful social interactions will be addressed first, followed by a discussion of the covariation between improved social skills and decreased disruptive behavior.

The Role of Displaying Appropriate Affect in Parent-child and Peer Interactions

Data based on both direct observations and parental reports indicate that children with autism display minimal or inappropriate affective behavior in response to parental

affection, during social interactions, and during social play (e.g., Dissanayake & Crossley, 1989; Dawson, et al., 1990). Parents of children with autism have reported that they showed less affection toward children with autism than toward other members of their family (DeMyer, 1979). In addition, Dawson and her colleagues (1990) found that mothers of children with autism were less likely than mothers of children of typical development to smile in response to their child's smile. Dawson and her colleagues (1990) attributed that difference to the fact that children with autism did not combine smiling with eye contact, which is what makes smiling a social response. The decreased reciprocal affective behavior between children with autism and their parents generalizes to interactions with other people. For example, 4-year old children with autism, who were observed in various social contexts, did not use gestures to display affect while interacting with others (Shah & Wing, 1986). Unlike children of typical development, children with autism tend to display affect more frequently while engaged in solitary activities, as opposed to when interacting with others (Snow, Hertzig, & Shapiro, 1987). In addition, Howlin (1986) found that children with autism did not reciprocate or adapt their affective displays according to changes in social contexts, and that they displayed positive affect in lower frequencies than children of typical development. Those findings

indicate that children with autism may have decreased opportunities to use and to develop appropriate social-affective skills.

There is very little information available regarding the interactions between children with autism and their peers. Yet, successful peer interactions are very important for one's overall social functioning. Difficulties in peer interactions during early school years has been positively correlated with "emotional" problems and "social maladjustment" (e.g., alcohol and drug addiction problems) in later years (Alschuler & Ivy, 1972; Stone & La Greca 1986). For children with autism, appropriate social-affective skills are of primary importance for their successful integration into community and educational settings (L. Koegel, Koegel, Hurley, & Frea, 1992; McHale & Gamble, 1986).

Tremblay and her colleagues (1981) have examined specific functions of affective behavior in preschool children of typical development. They found that during 50% of the occasions on which a child displayed physical affection toward a peer, the peer responded with positive affect. Children with autism, in contrast to children of typical development, use affective gestures very infrequently, and they use idiosyncratic "physical means" (e.g., inappropriate facial expressions and gestures) to communicate affect (Shah & Wing, 1986). This may limit

their opportunities to receive affection from others. Displaying positive affective behavior, such as smiling or laughing, was also correlated with "peer acceptance" (La Greca & Santogrossi, 1980) in typical elementary-school children, and with successful social interactions in adult psychiatric patients (Trower, 1980). The affective characteristics that people with autism display during interactions with peers will be described in detail later in this review.

Collateral Effects of Appropriate Affective Displays

The importance of improving social-affective behavior for people with autism is amplified by the collateral effects it has on inappropriate or disruptive behavior. The covariation of appropriate social skills and disruptive behavior in people with autism has been demonstrated experimentally (e.g., Carr & Durand, 1985; Hunt, et al., 1988). Hunt and his colleagues (1988) demonstrated that disruptive behavior in children with autism was maintained by attention, and that acquisition of appropriate social skills resulted in a decrease in disruptive behavior. Functional analyses of disruptive behavior and appropriate social skills indicate that they both may serve similar communicative functions, such as signaling a request for attention (Carr & Durand, 1985; Koegel & Frea, 1993; L. Koegel, et al., 1992). As Hunt and his colleagues (1988) demonstrated, children with autism, who did not have

appropriate social skills, often received staff attention for engaging in disruptive behavior. After the children acquired appropriate social skills, they received attention for displaying those skills. Thus, disruptive behavior decreased, because the display of appropriate social skills served as a substitute for getting staff attention.

Summary

The importance of displaying appropriate social-affective skills for one's overall social and affective functioning is supported by research findings. Social-affective skills are of primary importance for the purposes of integrating children with autism into community and educational settings successfully (L. Koegel, et al., 1992; McHale and Gamble, 1986). In addition, lack of appropriate social-affective skills results in difficulties in peer interactions during the early school years, which has been positively correlated with "emotional problems" and "social maladjustment" (e.g., alcoholism and drug addiction) in later years (Alschuler & Ivy, 1972; Stone & La Greca, 1986).

Attempting to answer the question of the importance of displaying appropriate affect provided information about social functions that affective behavior may serve. Once those functions are identified, one may ask: (a) whether people with autism have the social-affective skills needed to serve those functions, and (b) what means do they use to compensate for the social-affective skills they may lack.

For example, if children with autism lack the appropriate social-affective skills needed to obtain attention, what behavior are they likely to display to get attention? Research findings indicate that aberrant or inappropriate behavior may often be used to compensate for the absence of appropriate social-affective skills (Carr & Durand, 1985; Hunt, Alwell, & Goetz, 1988; Koegel & Frea, 1993). Therefore, acquiring appropriate social-affective skills may contribute both to an improvement in overall social competence and to a decrease in inappropriate and disruptive behavior.

The findings regarding the importance of displaying appropriate social-affective skills and the correlation between displaying appropriate affect and being "socially adjusted" are consistent across studies, but were obtained mostly from correlational, rather than experimental studies. Continuing to analyze experimentally the relationship between affect and the ability to communicate with others effectively, may provide a more precise assessment of the variables that are important in acquiring and maintaining appropriate social-affective skills.

What Characteristics Do People with Autism Display with Regard to Affective Behavior and How Do They Differ in That Respect from People with Other Disabilities or People of Typical Development?

To describe affective characteristics of people with autism two sources were used: (a) the DSM-III-R description of autism with respect to affect and (b) the 29 articles yielded by this literature search that address the affective behavior of people with autism. Twenty of those articles reported original empirical data and 9 provided reviews of the literature.

The DSM-III-R classifies affective deficits associated with autism under the areas of "Qualitative impairment in reciprocal social interaction" and "Impairment in communication and imaginative activity." Those deficits are attributed to receptive (understanding of other's feelings) and expressive (producing facial expressions, gestures, and verbal behavior) deficits in social interactions. The DSM-III-R description of the nonverbal expressions of individuals with autism as abnormal is not entirely clear. It is not clear whether the term "abnormal" describes: (a) the topography or (b) the contextual congruence of affect of individuals with autism. The following section is an attempt to identify what is distinctive about the affective behavior of people with autism.

The 29 articles that the literature search yielded are dated from 1971 to 1993. The 20 empirical studies were analyzed according to the following parameters: (a) diagnosis and age of the population(s) that was studied, (b) setting, (c) target-response definitions, (d) assessment and measurement procedures, (e) interobserver agreement measures, and (f) findings. The 9 papers that review the literature will be included only in the "findings" section of this paper to discuss empirical findings that were not accessible through primary sources.

Population

The aforementioned studies included infants, children, adolescents, and adults. Each study included one or more age groups of people with autism. Specifically, 18 of the 20 empirical studies included children, 3 included adolescents, and another 3 included adults. The number of studies in which different age and diagnostic groups were compared to people with autism, in terms of affective behavior, are presented on Table 1.

By far, the majority of studies included children. Regarding affective behavior, children with autism were compared most frequently to children of typical development and to children with mental retardation. Adolescents and adults with autism were each included in only 3 studies. Infants with autism were not included in any of the reviewed studies, which is justified because the diagnosis of autism

Table 1

Number of studies in which different age and diagnostic groups were compared to people with autism in terms of affective behavior.

	Age Group			
Diagnostic Group	Infants	Children	Adolescents	Adults
No clinical diagnosis	1	11		2
Mental retardation		9		
Unspecified develop-mental disability		3	1	1
Unspecified learning disability		1	1	1
Down's Syndrome		1	1	
Developmental delay		1		
Developmental language Disorder		1		
Psychosis		1		1

is not usually validated before the first 2 years of age. To provide a thorough description of the social-affective characteristics of people with autism across the life-span, additional research with adolescents and adults with autism is needed.

Setting

Observations regarding the display of affective behavior were conducted in two types of settings. Fifteen of the 20 reviewed studies were conducted in settings that were unfamiliar to the participants, and 5 were conducted in familiar/natural settings. Unfamiliar settings included: (a) offices, classrooms, or playrooms located in hospitals or schools (10 studies) and (b) laboratories located in universities or research centers (5 studies). Natural settings included: (a) schools in 3 studies, (b) home in 1 study, and (c) various settings in 1 study in which descriptions of the affective profiles of people with autism were based on parental ratings, rather than direct observations. The majority of studies were conducted in settings unfamiliar to the participants. The number of studies conducted in natural/familiar settings is relatively small and disproportionate to the time people with autism actually spend in familiar settings. To study certain types of affective behavior, such as responding to separation from the mother, it is important to set up conditions under which such responses usually occur. Nevertheless, it is also

important to study the characteristics of the affective behavior of people with autism in natural contexts, and particularly at home and school, to understand what are the natural contingencies that govern and maintain that behavior.

Target Responses

The target responses reported in the reviewed articles involve the display of affective and social behavior. Those responses were described topographically and in relation to social context. Topographic descriptions included the following aspects of affective behavior: (a) facial responses, such as smiling and frowning; (b) gestural responses, such as giving a hug or touching another person to show sympathy; (c) gross motor responses, such as initiating to sit on someone's lap, walking toward one's caregiver; and (d) vocal responses, which included using words to show affection or using preverbal vocalizations associated with affect-evoking stimuli.

The topography of affective responding was defined in molar terms in 17 studies and in molecular terms in three. Descriptions of affective behavior in molar terms consisted of commonly used labels such as smiling, frowning, or giving a hug. Descriptions in molecular terms were derived from standardized coding systems (e.g., Maximally Discriminative Movement Coding System, Izard, 1979) and included detailed descriptions of facial and gestural configurations. Yirmiya

and her colleagues (1989), considered a definition of affective responding in molecular terms to be advantageous in terms of minimizing subjective interpretations of affective displays. Nevertheless, the interobserver agreement reported on studies that used molar terms to define affect (e.g., McGee, et al., 1991) was quite high. In addition, one may question the social validity of affective responses that are not reliably recognized by their common labels.

Positive affective responses (e.g., smiling, laughing) were addressed in all the reviewed studies, and, in addition, negative affective responses (e.g., frowning, screaming) were addressed in 16 of the 20 studies. Children with autism, like children of typical development, displayed positive affect in congruence with context more frequently than they displayed negative affect (McGee, et al., 1991). Therefore, observations of positive or negative affective displays, alone, may skew a profile on affective behavior. Most of the reviewed studies incorporated both positive and negative affective displays, which is important for an accurate and comprehensive description of the affective behavior of people with autism.

The context in which the affective displays of people with autism was studied can be analyzed in terms of the following parameters: a) people present, b) familiarity of context, and c) structure of the social interactions.

Table 2 shows the number of studies that addressed the affective displays of children with autism in the presence of various people in unfamiliar and familiar settings. Familiarity of context was discussed in detail earlier in this review.

Regarding the other 2 parameters, in most of the studies the affective displays of children with autism were observed in the presence of unfamiliar adults (15 studies), and next most in the presence of mothers (12 studies). Interactions with familiar adults were included in 5 studies and with peers in 2 studies. Observations of affective displays of children with autism in the presence of unfamiliar adults were invariably conducted in unfamiliar settings under structured or unstructured conditions. Most of the studies that included mothers were also conducted in unfamiliar settings. Mothers were present in familiar/natural contexts in only 2 studies. In one of those studies only vocalizations associated with affect-eliciting stimuli were analyzed (Ricks, 1979), and in the other study, ratings of children's affective behavior were based on retrospective parental ratings, rather than on direct observations (Stone & Lemanek, 1990). In none of the reviewed studies were all aspects of the affective behavior of children with autism directly observed in natural settings and in the presence of the children's primary care-takers. If one assumes that care-takers are the primary

Table 2

Number of studies that address the affective displays of children with autism in the presence of various people in unfamiliar and familiar settings.

Settings		People			
		Mother	Familiar Adult	Unfamiliar Adult	Peers
Unfamiliar	Structured	4		8	
	Unstructured	7	3	7	
Familiar/ Natural	Direct Observations	1	1		2
	Rating Scales	1	1		

recipients of children's affective behavior, it is important for future research to address the affective behavior of children with autism toward their care-takers in natural contexts. Familiar adults were also present only in two of the reviewed studies that were conducted in natural settings. Because children with autism spend a large portion of their time at school, it might be important to study their affective behavior in the presence of teachers, a social context that has so far been ignored.

Direct observations were conducted in the 2 studies that addressed the affective behavior of children with autism in the presence of peers. Only one study, though, yielded a comprehensive profile of the affective behavior of children with autism (McGee, et al., 1991). Because its sample consisted of children with autism that were mainstreamed in regular classes, it is possible that those children had developed more appropriate affect than children with autism who do not have daily interactions with children of typical development. In the other study, it is reported that only 13% of children with autism displayed affect during a 3-hour observation period (Stone & Caro-Martinez, 1990). For a comprehensive description of the affective behavior that children with autism display in the presence of peers, we need studies with samples representative of a wide spectrum of children with autism that will be conducted in different natural settings.

The present literature search yielded no studies that address the affective behavior that children with autism display in the presence of their siblings. Siblings are not only primary recipients of affect, but may also serve as appropriate models for children with disabilities. Therefore, it is important to find out whether children with autism display appropriate affect toward their siblings and whether they imitate the affective behavior of their siblings.

Only two of the reviewed studies addressed the display of affective behavior by adolescents with autism. Retrospective ratings were used in one study (Volkmar, et al., 1987) and direct observations in the other study (Attwood, Frith, & Harmelin, 1988). Even though the findings of the two studies were consistent, additional studies, in natural settings and with a broad index of affective behavior, are needed to reach a comprehensive profile of the affective behavior of adolescents with autism.

The affective behavior displayed by adults with autism was addressed in three of the reviewed studies. A partially-standardized interview, retrospective ratings, and non-standardized tests were used in those studies. No studies that assess the affective displays of adults with autism by direct observation and in natural settings were identified in this literature search. Further observations

of the affective behavior that adults with autism exhibit at home and at vocational settings may provide a broad and representative index of their affective displays.

Assessment and Measurement Procedure

In the 20 reviewed studies, the affective displays of people with autism were assessed or measured using at least one of the following procedures: (a) direct observation (18 studies), (b) rating scales such as the Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984) (4 studies), and (c) the Early Social Communication Scale, a partially-standardized test, was used by Mundy, Sigman, Ungerer, & Sherman (1986) (1 study). The following measures of target responses were obtained when direct observations were conducted: (a) frequency in 7 studies, (b) per opportunity measures in 5 studies, (c) duration in 5 studies, and (d) rating of the quality of responses in 1 study. Measures based on direct observations usually require reliable descriptions of the target behavior, whereas, ratings that are based on retrospective impressions may be less reliable. Therefore, it is advantageous that 18 of the 20 reviewed studies used measures of affective behavior that were based on direct observations.

Interobserver Agreement

Interobserver agreement data on measures of affective behavior were reported in 12 of the 20 research studies. In 6 of those 12 studies, the procedures for calculating

interobserver agreement measures were not specified. In 2 of the remaining 6 studies (Dawson & Adams, 1984; Trad, Shapiro, Hertzig, & Bernstein, 1992), it was reported that interobserver agreement was calculated point by point and that agreements were divided by agreements plus disagreements. In 2 other studies (Kasari, Sigman, Mundy, & Yirmiya 1990; Yirmiya et al., 1989), it was reported that interobserver agreement was obtained during 1-sec time intervals on a point-by-point basis using the MAX scoring code (Izard, 1979). It was not indicated in any of those studies whether agreement was obtained strictly on occurrences of the target responses. In only 2 studies (DeMyer, Norton, & Barton; McGee, et al., 1991) it was reported that interobserver agreement was based on point-by-point calculations of occurrences of the target response, a more stringent criterion for interobserver agreement calculations.

Discussion of Findings

Despite the diversity of the subjects, observational procedures, and methods of measurement across the reviewed studies, some affective characteristics were commonly and consistently assigned to individuals with autism. Those characteristics, along with less common and inconsistent findings regarding the affective behavior of people with autism, will be discussed next. Observations and ratings

of affective behavior were conducted by professionals, lay people, and mothers of children with autism.

The reviewed articles yielded the following findings regarding people with autism and their affective characteristics in comparison to people of typical development and to people with other developmental disabilities.

Response Topography

Characteristics. People with autism often used idiosyncratic or unconventional means to communicate feelings and needs (Hobson, 1989; Shah & Wing, 1986; Mcdonald, et al., 1989; Prizant, & Wetherby, 1987; Ricks, 1979; Yirmiya, et al., 1989). Communication of feelings and needs was described in terms of facial, gestural, and vocal responses associated with affect. Those responses were not described thoroughly in most of the reviewed articles. Specifically, the affective behavior of people with autism was described only in general terms, such as odd, unconventional, not recognizable by others, abnormal, and inaccurate (i.e., incongruent with context). Yirmiya et al. (1989), however, provided a thorough description of how children with autism were distinctive with regard to the topography of their affective behavior. Specifically, children with autism displayed incongruous affective blends (i.e., blends composed of both negative and positive affective expressions) and thus, a greater variety of

affective responses than other children. An example of an incongruous affective blend was the simultaneous expression of "anger" and "joy", which were described in terms of "discrete movement changes associated with expressions of affect in three regions of the face" (p. 728).

Even though the affective behavior of people with autism was considered idiosyncratic, Ricks (1979) found that pre-verbal children with autism, like children of typical development, produced affective vocalizations that were context specific. For example, in the context of blowing up a balloon, Ricks described the children's vocalizations as showing "pleasure", and in the context of withholding food, as showing "frustration". The difference between the two groups of children was that the affective vocalizations of children with autism were idiosyncratic and recognized only by their parents, whereas those of children of typical development were similar across children and recognized by all parents. Ricks' findings are very important because they indicate that children with autism discriminate environmental cues associated with affect early on and produce discriminated affective responses accordingly, despite the idiosyncratic nature of their affective displays.

Children with autism displayed both positive and negative affective responses such as smiles and frowns with the same frequency and duration as typical children

irrespective of social context (Dawson, et al., 1990; Kasari, et al., 1990; McGee, et al., 1991; Snow, et al., 1987). By contrast, Snow and her colleagues (1987) compared children with autism to developmentally delayed children and concluded that children with autism displayed positive affect with significantly lower frequency. A comparison group of children of typical development was not included in that study. Therefore, we may not ascertain which group displayed responses closer to the norms. Prior studies regarding the affective behavior of children with developmental delays (i.e., mental retardation) have showed that they displayed affective behavior with greater frequency than people of typical development in certain social contexts (Kasari, et al., 1990; Yirmiya, et al., 1989). Therefore, comparing children with autism to children with other disabilities, in the absence of children of typical development, may not be very informative as to which group displays more socially appropriate affective behavior.

DeMyer and his colleagues (1971) reported that children with autism, compared to children of typical development, were more "withdrawn" and "negativistic" toward an unfamiliar adult and presented the most "pathological affective expressions" such as flat affect, inappropriate laughter and smiling, irritability, and labile mood. Even though the stated findings cover a wide array of affective

displays, they are difficult to interpret and to replicate because the affective characteristics of people with autism were not always described in observable terms.

Discriminability. Children with autism were less successful than typical children in imitating or producing recognizable facial expressions upon request (Rumsey, Andreasen, & Rapoport, 1986; Shah & Wing, 1986;). Even when children with autism displayed facial expressions as distinct as happy and sad, independent observers did not recognize those expressions (Langdell, 1981, as described by Shah & Wing, 1986).

Range. People with autism displayed the full spectrum of affective behavior typical of their age group (McGee, et al., 1991; Ricks, 1979; Trad, et al., 1992). Measures of affect included facial, gestural, and vocal responses associated with affect. The affective displays studied were associated with surprise, pleasure, frustration, anger, sadness, and happiness. Even as young as 3- to 5-year-old preverbal children with autism produced a wide range of affective vocalizations that were context specific (Ricks, 1979). During interactions with familiar adults, children with autism displayed more variable affective behavior than children of typical development. Affective variability was attributed to extreme negative and positive affective displays (Trad, et al., 1993; Yirmiya, et al., 1989).

Context

People with autism displayed positive affective behavior, such as smiling, more often in the context of solitary, rather than interactive activities (DeMyer, et al., 1971; Dawson, et al., 1990; Kasari, et al., 1990; McGee, et al., 1991; Mundy, & Sigman, 1989; Snow, et al., 1987; Trad, et al., 1993; Yirmiya, et al., 1989). The opposite was true for people with other developmental disabilities and for people of typical development. Those differences were detected even when children with autism displayed affective behavior that was similar in topography, frequency, and duration to the affective behavior of other children (Dawson, et al., 1990; Kasari, et al., 1990; McGee, et al., 1991). Therefore, context is an important variable in analyzing the affective behavior of people with autism. In studies in which lower rates of affective responses are reported for children with autism, in comparison to typical children, affective behavior was studied exclusively during social interactions and in contrived settings (Snow, et al., 1987; Trad, et al., 1992).

In contexts that evoke affective behavior associated with attachment to the caregiver, young children with autism responded appropriately (Dissanayake, & Crossley, 1989; Mundy & Sigman, 1989; Shapiro, Sherman, Calamary, & Koch, 1987; Sigman, & Ungerer, 1984). Attachment was defined as: (a) close physical proximity to the caregiver in the

presence of a stranger and (b) social behavior, such as touches, looks, and vocalizations, directed toward the caregiver after a period of child-caregiver separation. Regarding attachment toward the caregiver, Shapiro and her colleagues (1987) rated the affective responses of children with autism as socially appropriate, but immature, for their chronological age. Sigman & Ungerer (1984) reported that children with autism who engaged in "diverse symbolic play" were also more interactive with their mothers during reunion.

During interactions with one's mother, familiar adults, and strangers, young children with autism differed significantly from children with other developmental disabilities only when interacting with their mothers. Specifically, they did not appear to be as happy as children with mental retardation and other developmental disorders (Trad, et al., 1993). In the absence of a control group of children with typical development, those results should be interpreted with caution. In addition, Sigman and her colleagues (1986) did not find significant differences in the positive (e.g., smiling) and negative (e.g., fretting) affective behavior of young children with autism and children of typical development during play activities with the caregivers.

Retrospective assessment of the social-affective behavior of people with autism, across a wide range of

social contexts, yielded a profile that differed significantly from the norms. Specifically, on the Vineland Scales of Adaptive Behavior (Sparrow, et al., 1984), people with autism received scores that were significantly below average in all scales that assess social-affective skills (i.e., Social Skills, Socialization, and Communication Scales). Those findings were consistent for 2- to 32-year old people with autism (Volkmar et al., 1987).

Reciprocity

People with autism reciprocated or responded to other people minimally during social interactions or social play (Dawson & Adams, 1984; Dawson, et al., 1990; Dissanayake & Crossley, 1989; Hobson, 1989; Howlin, 1986; Rutter, & Schopler, 1987; Shah & Wing, 1986; Trad et al., 1993). Reciprocating may be defined as the modulation of one's affective displays according to social context (Rutter & Schopler, 1987). Affective displays included facial expressions, gestures, and vocal responses. Social contexts and interactions varied across age groups (i.e., young children to adolescents) and included: for very young children, (a) activities that involve play and physical contact such as rocking or sitting on an adult's lap, (b) interacting with one's mother in the presence or absence of a stranger, (c) interacting with familiar or unfamiliar adults; for school-age children, peer interactions at school during group games, or during transition periods, which

requires rapid adjustments to changing environmental demands; for adolescents, interacting with others during group games or during a family dinner. For children with autism, social responsiveness was found to be positively correlated with imitative skills (Dawson & Adams, 1984). In addition, children with autism increased their rate of affective responding with increased peer-mediated social initiations and during interactions with non-disabled peers, as opposed to peers with disabilities (Mundy & Sigman, 1989).

Gestures

Children with autism used gestures to express affect in social contexts infrequently (Attwood, et al., 1988; Hobson, 1989; Shah & Wing, 1986). They used gestures when requesting preferred objects or activities, but they did not use gestures associated with affect, such as touching another person to show sympathy and giving a loved one a kiss or a hug (Attwood, 1984, described by Shah & Wing, 1986; Attwood, et al., 1988).

Summary

People with autism, in contrast to non-disabled people, often display affect when engaged in solitary activities, rather than when interacting with others. In addition, the topography of the affective displays of people with autism can be idiosyncratic and not readily recognized by other people. Therefore, for the purposes of assessing the

affective behavior of people with autism, one may ask the following questions: (a) Do they display contextually appropriate affect? and (b) are their affective displays recognized by other people?

Regarding the aforementioned questions, it is important to note that people with autism do not lack the physical mechanisms that produce recognizable affect (e.g., Shah & Wing, 1986). Rather, they display the full spectrum of affective behavior that people of typical development display (e.g., Trad, et al., 1992). Thus, failure to produce contextually appropriate affect may be attributed either to difficulties in adapting their affective responding to changing environmental demands, or to difficulties in discriminating social or contextual cues. Contextual cues associated with affect may include facial expressions, gestures, and verbal behavior, which involves both the content and the prosodic features of speech. For people with autism, learning to discriminate such cues may be very complex and as such may require explicit teaching. When attempting to teach people with autism to display appropriate affective behavior, it is important to ensure that they can discriminate the contextual cues associated with affect.

Concluding Summary

The present review provided an analysis of the importance of displaying appropriate affective behavior and

a description of the affective characteristics of people with autism. Analyzing the importance of appropriate affect yielded information regarding the functions that affective displays may serve in social interactions. For people with autism, acquiring appropriate affective behavior contributes to both: (a) an improvement in overall social competence and (b) a decrease in aberrant or disruptive behavior.

Analyzing the research findings regarding affect and autism provided a thorough description of the affective characteristics of people with autism. For people with autism, the most challenging areas in the affective domain appear to be the following: (a) Displaying affect that is topographically and contextually appropriate and (b) providing reciprocal affective displays during social interactions. Considering the importance of displaying appropriate affective behavior, and having identified prevalent affective deficits associated with autism, may provide an impetus to much-needed remedial efforts in this area.

References

Achenbach, T. M., & Edelbrock, C. S. (1982). Manual for the Child Behavior Checklist and Child Behavior Profile, Burlington, CT: Department of Child Psychiatry, University of Vermont.

Alschuler, A. S., & Ivy, A. (1972). The human side of competency-based education. Educational Technology, 12, 53-55.

American Association on Mental Deficiency. (1981). Adaptive Behavior Scales. Monterey, CA: Publishers Test Service.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed., rev.). Washington DC: author.

Attwood, A., Frith, U., Hermelin, B. (1988). The understanding and use of interpersonal gestures by autistic, and Down's syndrome children. Journal of Autism and Developmental Disorders, 18, 241-257.

Camras, L. A., Grow, J. G., & Ribordy, S. C. (1983). Recognition of emotional expression by abused children. Journal of Clinical Child Psychology, 12, 325-328.

Carr, E. G., Durand, V. M. (1985). Reducing behavior problems through functional communication training. Journal of Applied Behavior Analysis, 18, 111-126.

DeMyer, M. K. (1979). Parents and children in autism. New York: Wiley.

DeMyer, M. K., Norton, J. A., & Barton, S. (1971). Social and adaptive behaviors of autistic children as measured in a structured interview. In D. W. Churchill, G.D. Alperin, & M. K. DeMyer (Eds.), Infantile Autism (pp. 29-70). Springfield, Ill.: Charles C. Thomas.

Dawson, G. & Adams, A. (1984). Imitation and social responsiveness in autistic children. Journal of Abnormal Child Psychology, 12, 209-22.

Dawson, G., Hill, D., Spence, A., Galpert, L., Watson, L. (1990). Affective exchanges between young autistic children and their mothers. Journal of Abnormal and Child Psychology, 18, 335-345.

Dissanayake, C. & Crossley, S. A. (1989). Behaviour in children with early infantile autism: Responsiveness to people. Clinical and Abnormal Psychology, 221-232.

Hobson, R. P. (1989). Beyond cognition: A theory of autism. In G. Dawson (Eds.), Autism: Nature, diagnosis, and treatment (pp. 22-48) New York: Guilford Press.

Howlin, P. (1986). An overview of social behavior in autism. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 103-131). New York: Plenum Press.

Hunt, P., Alwell, M., & Goetz, L. (1988). Acquisition of conversational skills and the reduction of inappropriate social interaction behaviors. Journal of the Association for Persons with Severe Handicaps, 13, 20-27.

Izard, C. (1979). The Maximally Discriminative Facial Movement Coding System. Newark: Instructional Resource Center, University of Delaware.

Kanner, L. (1943). Autistic disturbances of affective contact. Nervous Child, 2, 217-50.

Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1990). Affective sharing in the context of joint attention interactions of normal, autistic, and mentally retarded children. Journal of Autism and Developmental Disorders, 20, 87-100.

Knapp, P. H. (1960). Expression of the emotions in man. New York: University Press.

Koegel, R. L., & Frea, W. D. (1993). Treatment of social behavior in autism through the modification of pivotal social skills. Journal of Applied Behavior Analysis, 26, 369-377.

Koegel, L. K., Koegel, R. L., Hurley, C., & Frea, W. D. (1992). Improving social skills and disruptive behavior in children with autism through self-management. Journal of Applied Behavior Analysis, 25, 341-353.

La Greca, A. M., Santogrossi, D. A. (1980). Social skills training with elementary school students: a behavioral group approach. Journal of Consulting and Clinical Psychology, 48, 220-227.

Mcdonald, H., Rutter, M., Howlin, P., Rios, P., Le Conteur, A., Evered, C., & Folstein, S. (1989). Journal of Child Psychology and Psychiatry, 30, 865-877.

McGee, G. G., Feldman, R. S., Chernin, L. (1991). A comparison of emotional facial display by children with autism and

typical preschoolers. Journal of Early Intervention, 15, 237-245.

McHale, S. M., & Gamble, W. C. (1986). Mainstreaming Handicapped children in public school setting. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 191-212). New York: Plenum Press.

Morrison, R. L., Bellack, A. S. (1981). The role of social perception in social skills. Behavior Therapy, 12, 69-79.

Mundy, P., & Sigman, M. (1989). Specifying the nature of the social impairment in autism. In G. Dawson (Eds.), Autism: Nature, diagnosis, and treatment (pp. 3-21). New York: Guilford Press.

Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the social deficits of autism: The contribution of non-verbal communication measures. Journal of Child Psychology and Psychiatry, 27, 657-669.

Philippot, P., Feldman, R. S., & McGee, G. (1992). In R. S. Feldman (Eds.), Behavior Theories and Research (pp. 191-213). Hillsdale, NJ: Lawrence Erlbaum Associates.

Prizant, B. M., Wehterby, A. M. (1987). Communicative intent: A framework for understanding social-communicative behavior in autism. Journal of the American Academy for Child and Adolescent Psychiatry, 26, 472-479.

Ricks, D. M. (1979). Making sense of experience to make sensible sounds. In M. Bullowa (Ed.), Before speech: The beginning of interpersonal communication (pp. 245-268). London: Cambridge University Press.

Rumsey, J. M., Andreasen, N. C., Rapoport, J. L. (1986). Thought, language, communication, and affective flattening in autistic adults. Archives of General Psychiatry, 43, 771-777.

Rutter, M. & Schopler, E. (1987). Autism and pervasive developmental disorders: Concepts and diagnostic issues. Journal of Autism and Developmental Disorders, 17, 159-186.

Shah, A., & Wing, L. (1986). Cognitive impairments affecting social behavior in autism. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 153-169). New York: Plenum Press.

Shapiro, T., Sherman, M., Calamari, G., Koch, D. (1987). Attachment in autism and other developmental disorders.

Journal of the American Academy of Child and Adolescent Psychiatry, 26, 480-484.

Sigman, M., Mundy, P., Sherman, T., Ungerer, J. (1986). Social interactions of autistic, mentally retarded and normal children and their caregivers. Journal of Child Psychology and Psychiatry, 27, 647-656.

Sigman, M. & Ungerer, J. (1984). Attachment behaviors in autistic children. Journal of Autism and Developmental Disorders, 14, 231-244.

Snow, M. E., Hertzig, M. E., Shapiro T. (1987). Expression of emotion in young autistic children. Journal of the American Academy of Child and Adolescent Psychiatry, 26, 836-838.

Sparrow, S., Balla, D., & Cicchetti, D. (1984). Vineland Adaptive Behavior Scales (Survey Form). Circle Pines, Minn: American Guidance Service.

Stone W. L. & LaGreca, A. M. (1986). The development of social skills. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 35-59). New York: Plenum Press.

Stone W. L. & Caro-Martinez, L. M. (1990). Naturalistic Observations of spontaneous communication in autistic children. Journal of Autism and Developmental Disorders, 20, 437-453.

Stone, W. L. & Lemanek, K. L. (1990). Parental report of social behaviors in autistic preschoolers. Journal of Autism and Developmental Disorders, 20, 513-522.

Strain, P. S., Cook, T. P., & Apolloni, T. (1976). Teaching exceptional children: Assessing and modifying social behavior. New York: Academic Press.

Trad, P. V., Bernstein, D., Shapiro, T., & Hertzig, M. (1993). Assessing the relationship between affective responsivity and social interaction in children with pervasive developmental disorder. Journal of Autism and Developmental Disorders, 23, 261-377.

Trad, P. V., Shapiro, T., Hertzig, M., & Bernstein. (1992). Kiddie-infant descriptive instrument for emotional states (KIDIES): Use in children with developmental disorders. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 728-734.

Trower, P., (1980). Situational analysis of the components and processes of behavior of socially skilled and unskilled

patients. Journal of Consulting and Clinical Psychology, 48, 327-339.

Twardosz, S. & Jozwiak, W. (1981). The expression of affection: Suggestions for research with developmentally disabled children. Analysis and Intervention in Developmental Disabilities, 1, 217-238.

Twardosz, S. & Nordquist, V. M. (1983). The development and importance of affection. In B. B. Lahey & A. E. Kazdin (Eds.) Advances in Clinical Child Psychology (pp. 129-168). New York: Plenum Press.

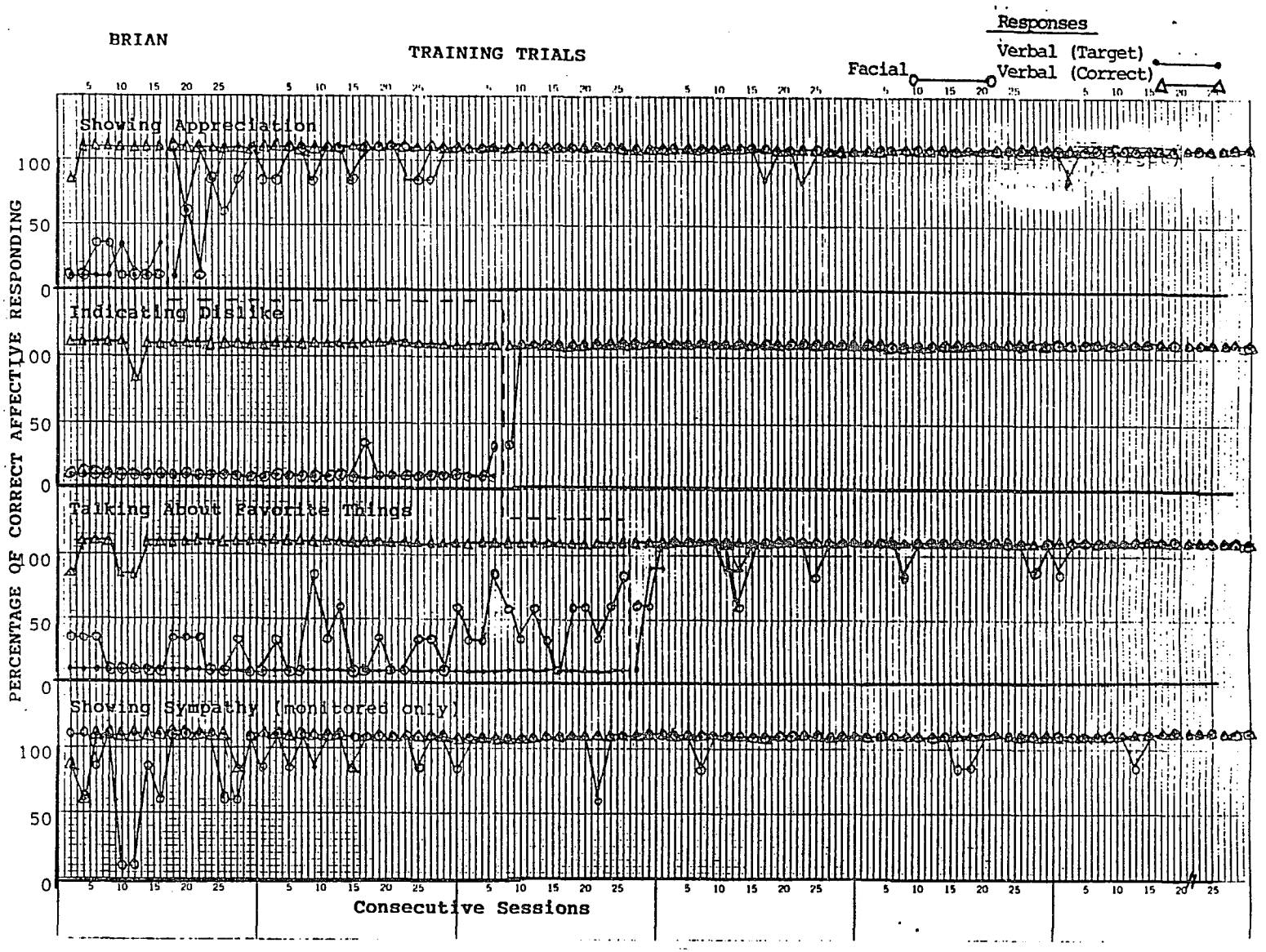
Volkmar, F. R., Sparrow, S. S., Gourdeau, D., Cicchetti, D. V., Paul, R., & Cohen, D. J. (1987). Social deficits in autism: An operational approach using the Vineland Adaptive Behavior Scales. Journal of the American Academy of Child and Adolescent Psychiatry, 26, 156-161.

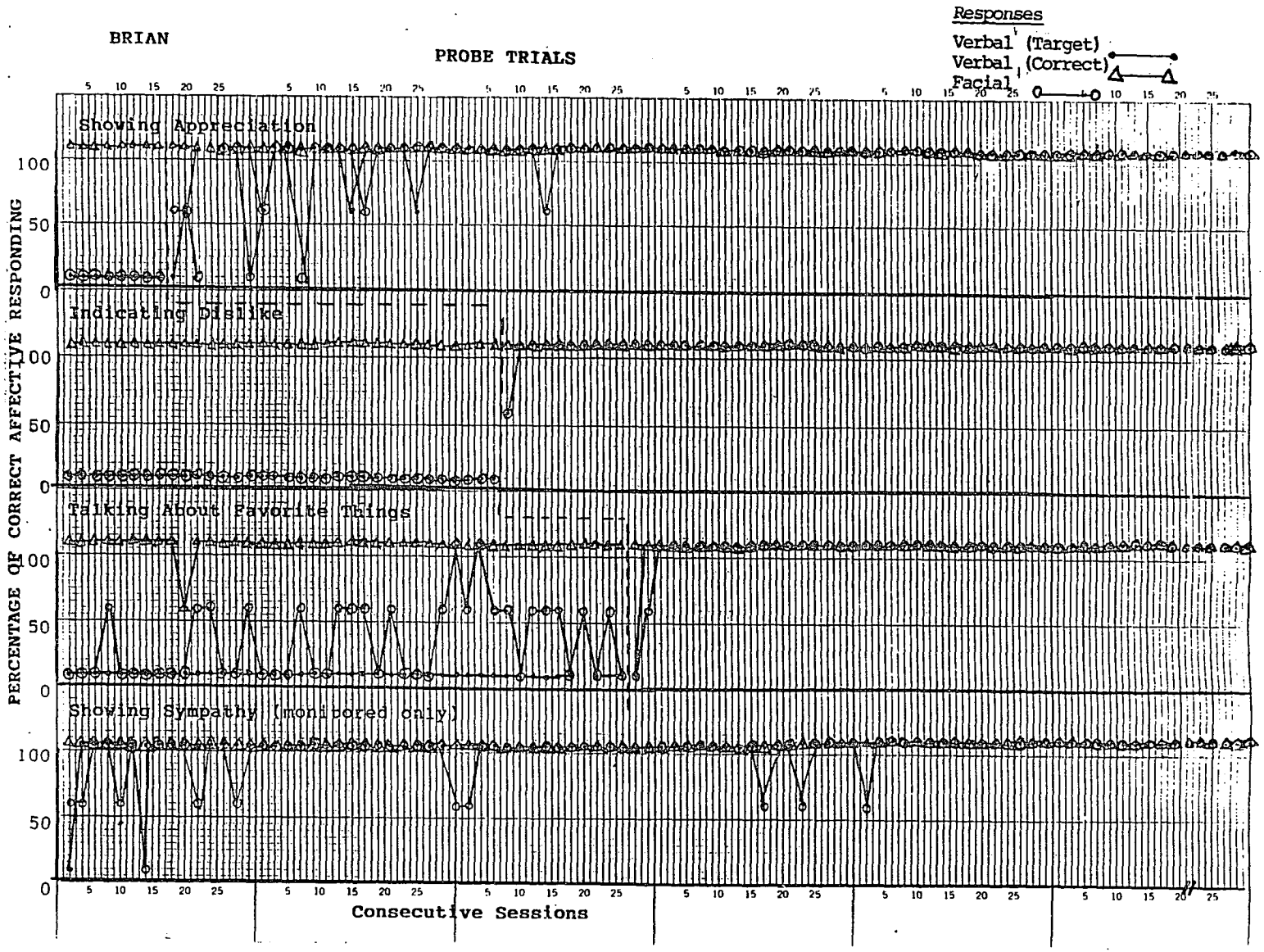
Wilczenski, F. L. (1991). Facial emotional expressions of adults with mental retardation. Education and Training in Mental Retardation, 26, 319-324.

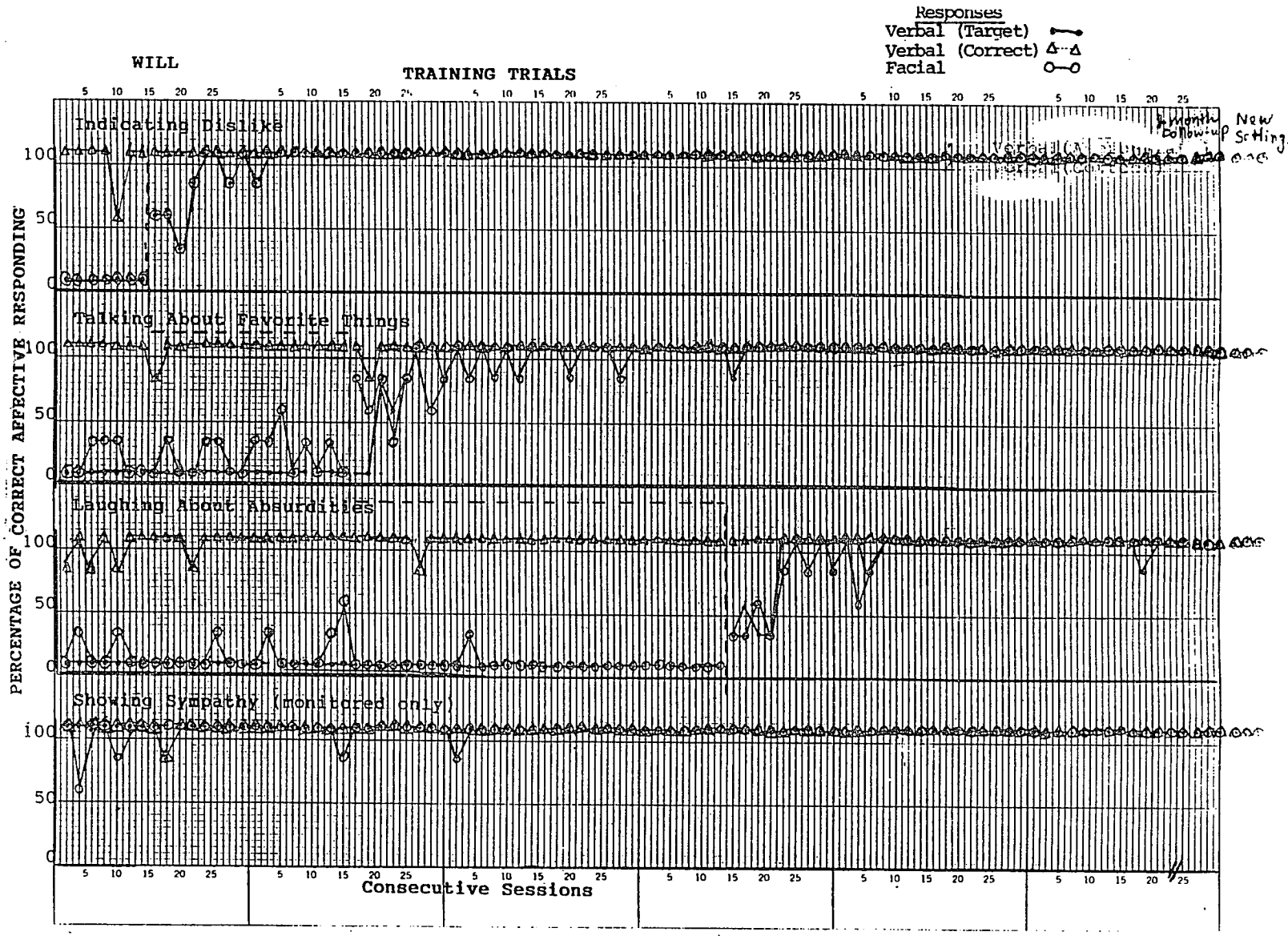
Yirmiya, N., Kasari, C., Sigman, M., & Mundy, P. (1989). Facial expressions of affect in autistic, mentally retarded and normal children. Journal of Child Psychology and Psychiatry, 30, 725-735.

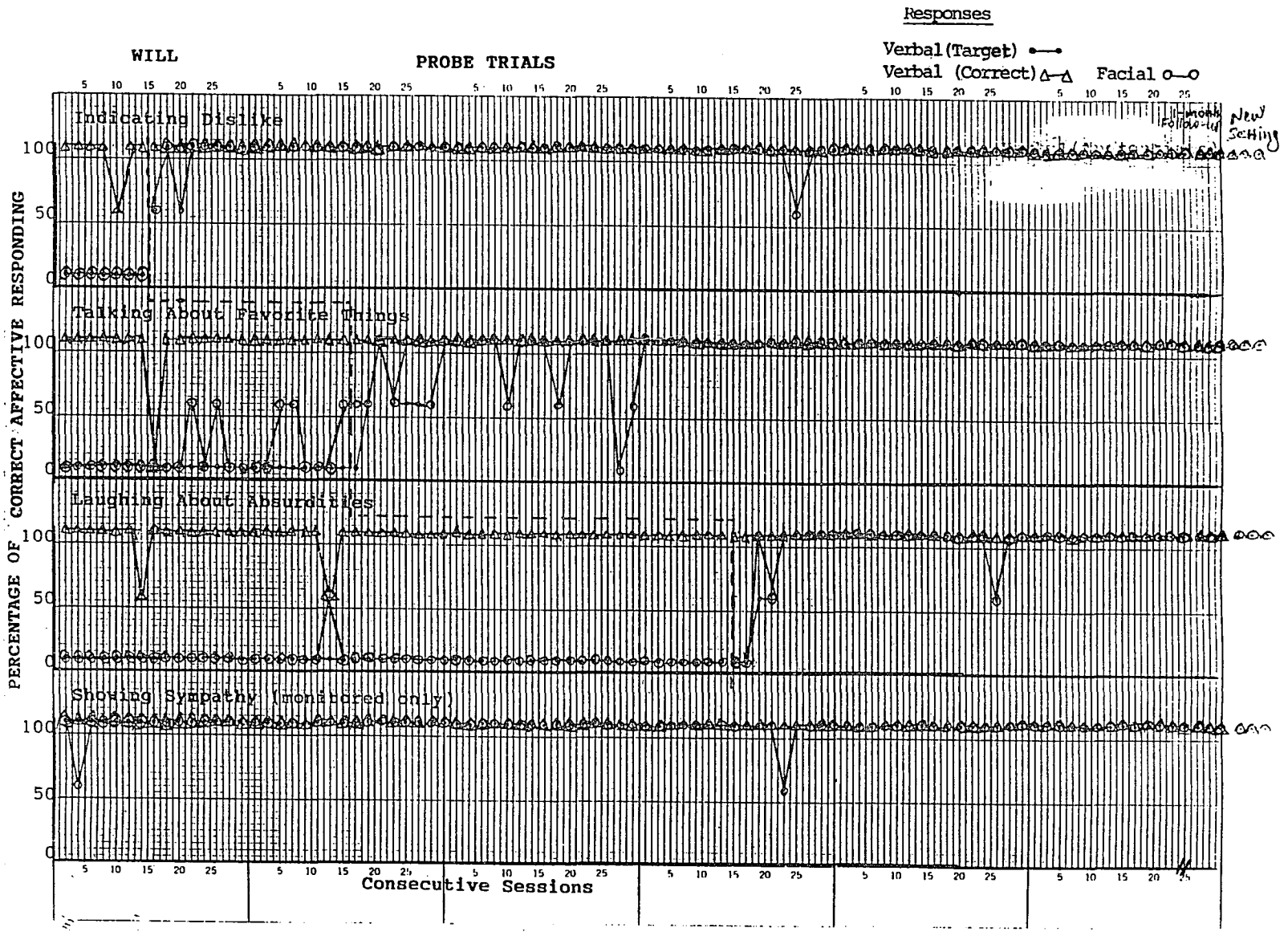
APPENDIX B:

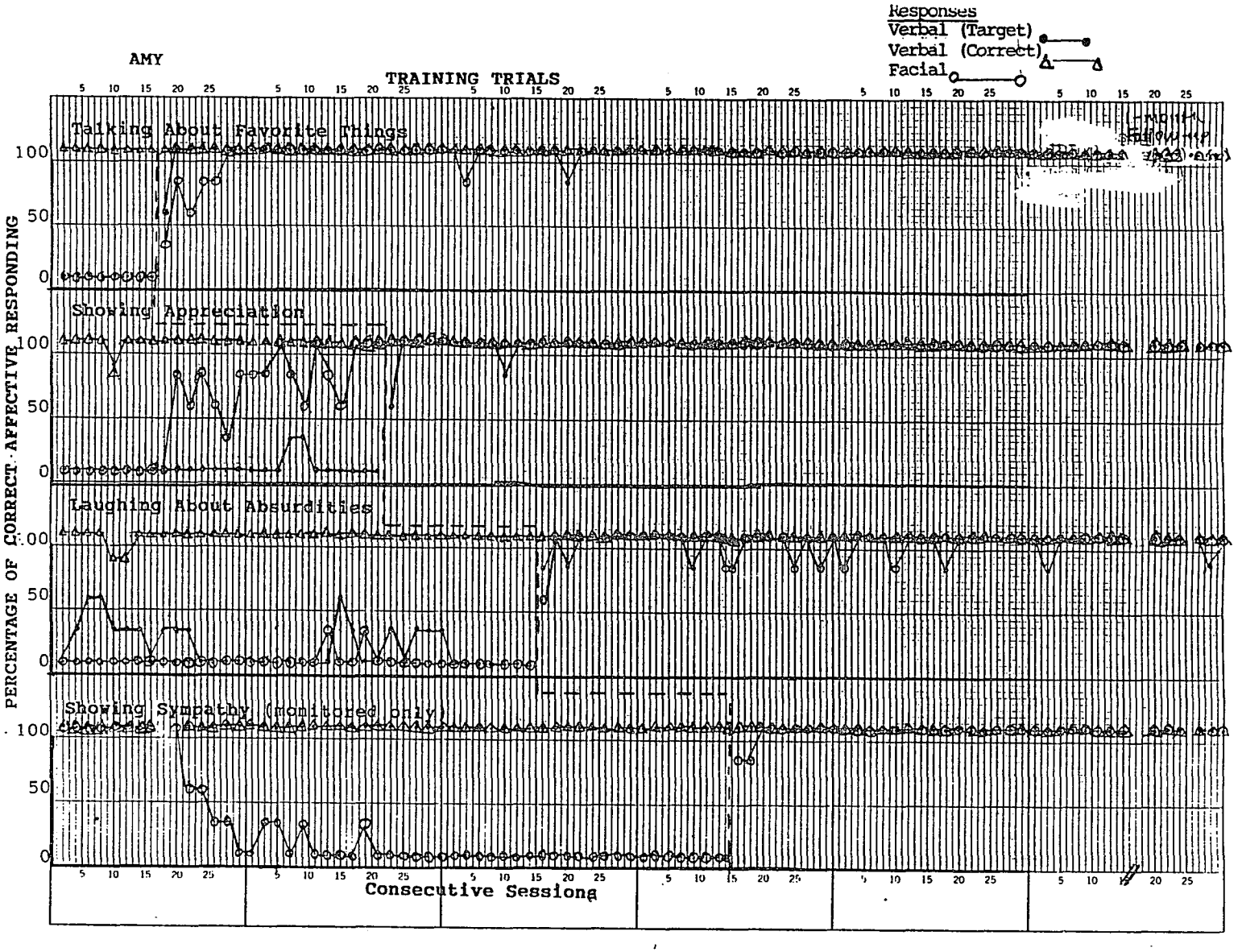
Supplementary data separating facial and verbal aspects of affective behavior for the participants in the above study.

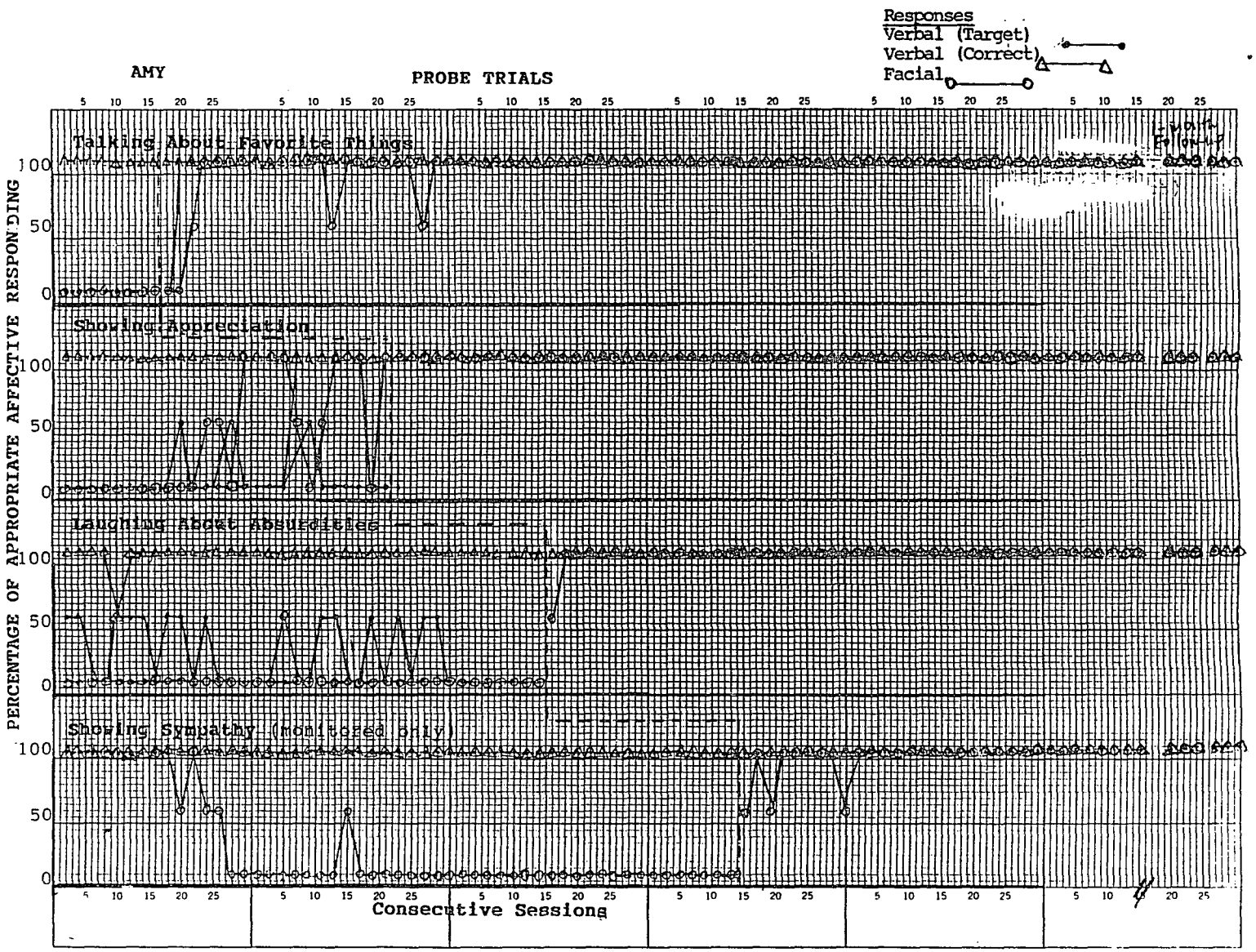

BRIAN
TRAINING TRIALS
Responses
Facial
Verbal (Target)
Verbal (Correct)
Showing Appreciation
Indicating Dislike
Talking About Favorite Things
Showing Sympathy (monitored only)
PERCENTAGE OF CORRECT AFFECTIVE RESPONDING
100
50
0
5 10 15 20 25
Consecutive Sessions

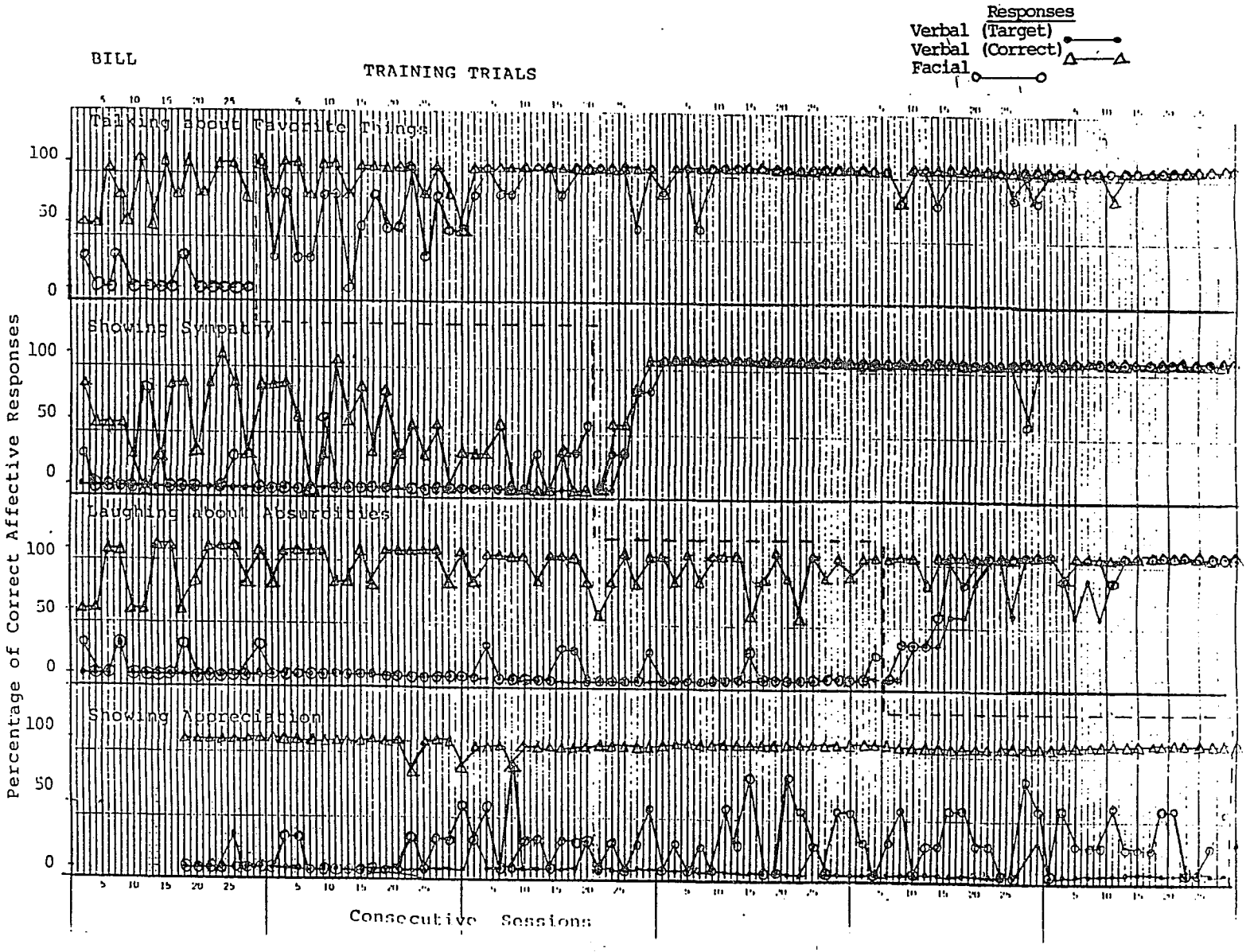

BRIAN
PROBE TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Showing Appreciation
Indicating Dislike
Talking About Favorite Things
Showing Sympathy (monitored only)
PERCENTAGE OF CORRECT AFFECTIVE RESPONDING
100
50
0
Consecutive Sessions

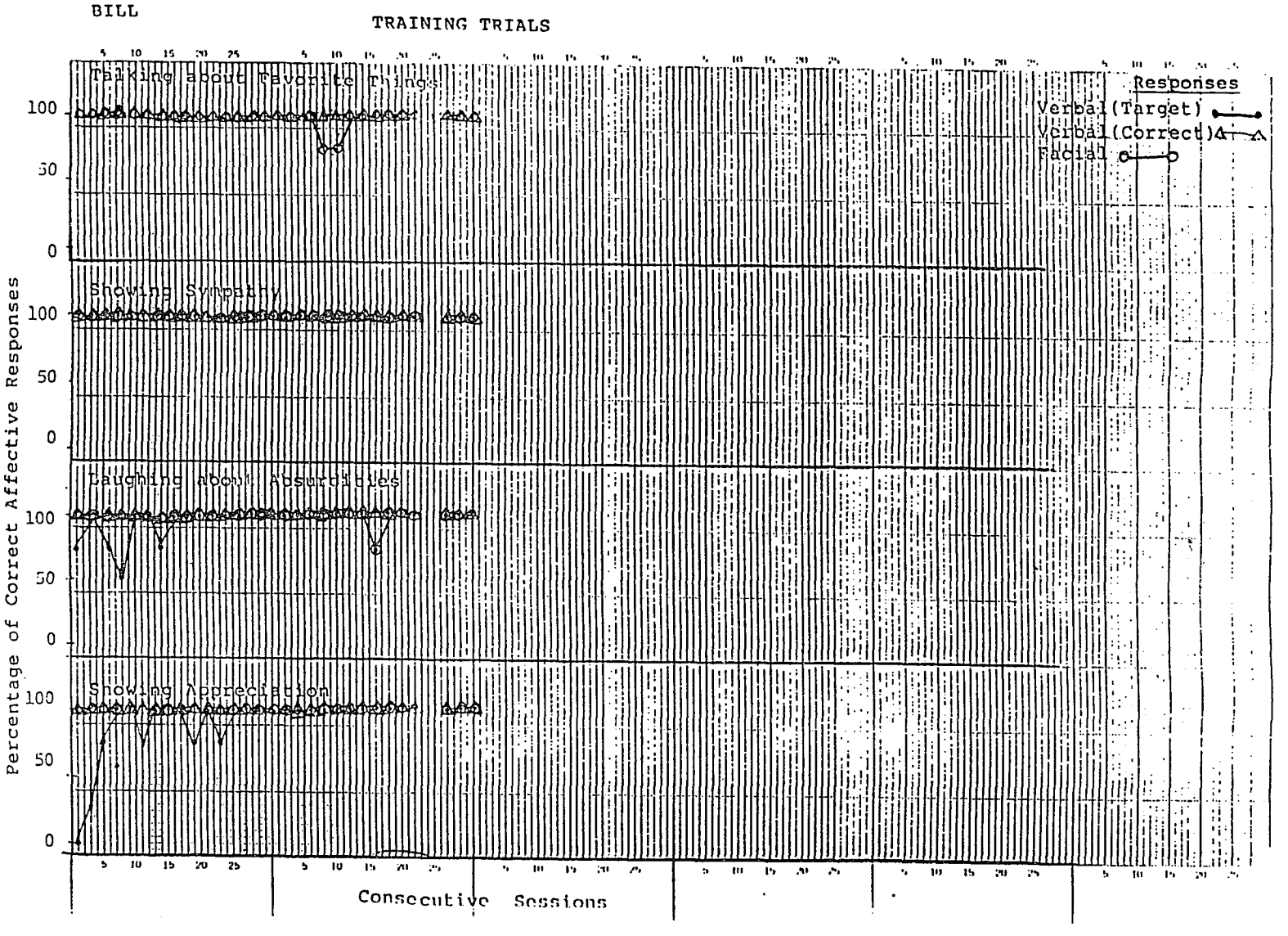

WILL
TRAINING TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Indicating Dislike
Talking About Favorite Things
Laughing About Absurdities
Showing Sympathy (monitored only)
PERCENTAGE OF CORRECT AFFECTIVE RRSPONDING
Consecutive Sessions
New Settings

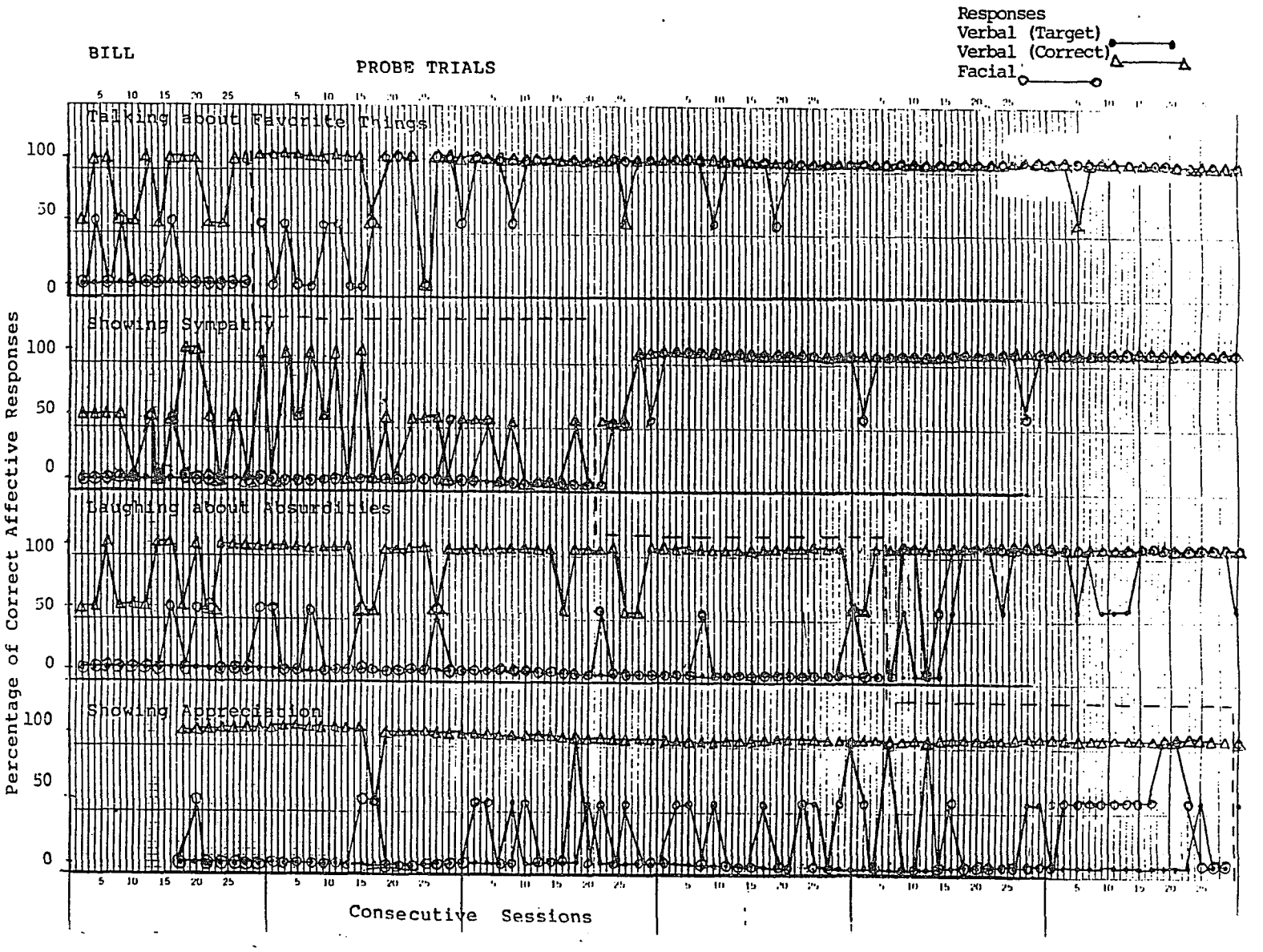

Responses
Verbal (Target)
Verbal (Correct)
Facial
WILL
PROBE TRIALS
Indicating Dislike
Talking About Favorite Things
Laughing About Absurdities
Showing Sympathy (monitored only)
PERCENTAGE OF CORRECT AFFECTIVE RESPONDING
Consecutive Sessions

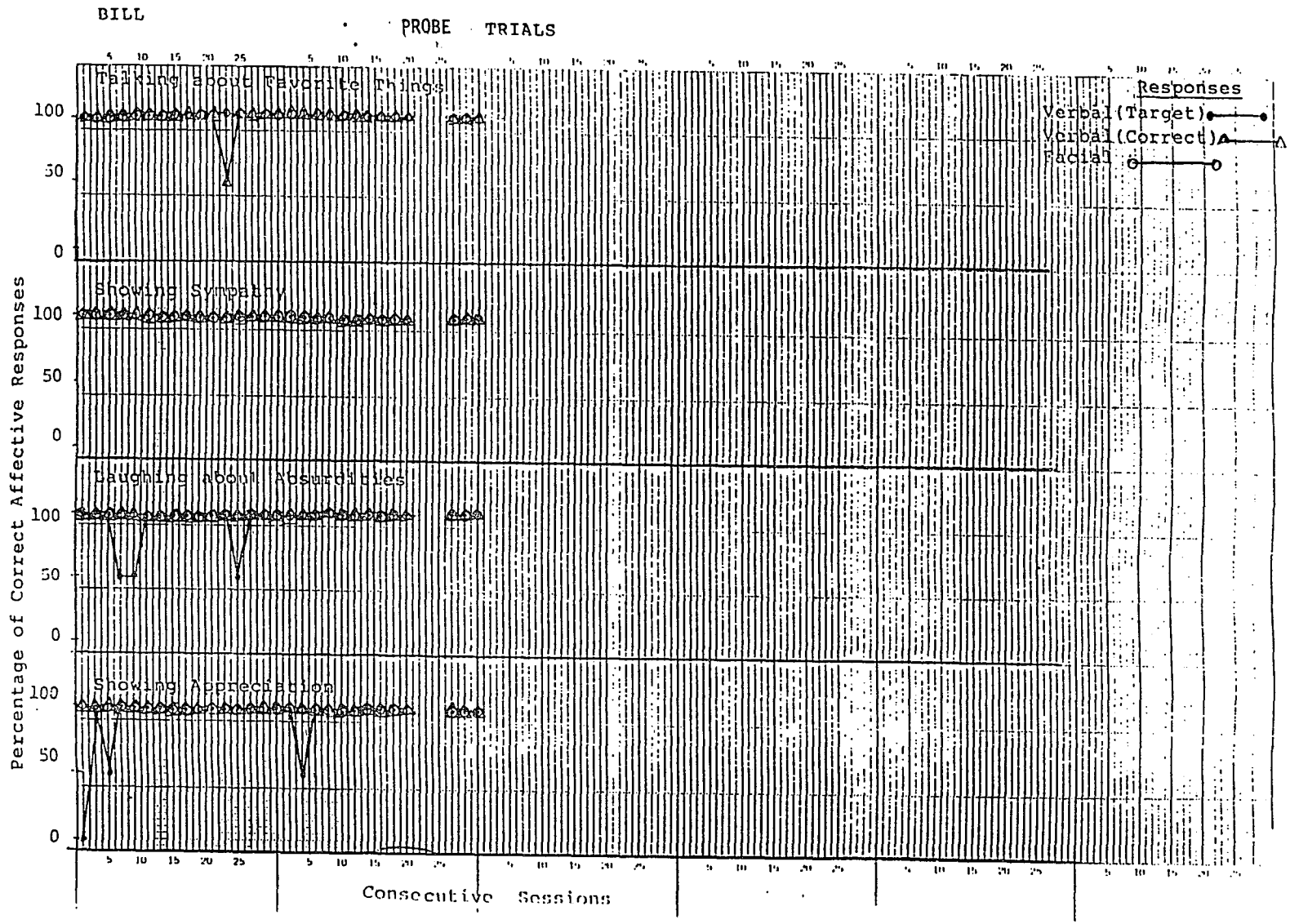

AMY
TRAINING TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Talking About Favorite Things
Showing Appreciation
Laughing About Absurdities
Showing Sympathy (monitored only)
PERCENTAGE OF CORRECT AFFECTIVE RESPONDING
100
50
0
Consecutive Sessions


AMY
PROBE TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Talking About Favorite Things
Showing Appreciation
Laughing About Absurdities
Showing Sympathy (monitored only)
Follow-up
PERCENTAGE OF APPROPRIATE AFFECTIVE RESPONDING
100
50
0
5 10 15 20 25
Consecutive Sessions


BILL
TRAINING TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Talking about Favorite Things
Showing Sympathy
Laughing about Absurdities
Showing Appreciation
Percentage of Correct Affective Responses
100
50
0
Consecutive Sessions


BILL
TRAINING TRIALS
Talking about Favorite Things
Showing Sympathy
Laughing about Absurdities
Showing Appreciation
Responses
Verbal(Target)
Verbal(Correct)
Facial
Percentage of Correct Affective Responses
100
50
0
Consecutive Sessions


BILL
PROBE TRIALS
Responses
Verbal (Target)
Verbal (Correct)
Facial
Talking about Favorite Things
Showing Sympathy
Laughing about Absurdities
Showing Appreciation
Percentage of Correct Affective Responses
100
50
0
Consecutive Sessions


BILL
PROBE TRIALS
Talking about Favorite Things
Showing Sympathy
Laughing About Absurdities
Showing Appreciation
Responses
Verbal(Target)
Verbal(Correct)
Facial
100
50
0
Percentage of Correct Affective Responses
5 10 15 20 25
Consecutive Sessions

References

Abrahamsen, E. P., & Mitchell, J. R. (1990). Communication and sensorimotor functioning in children with autism. Journal of Autism and Developmental Disorders, 20, 75-85.

Acker, L. E., Acker, M. A., & Pearson, D. (1973). Generalized Imitative affection: relationship to prior kinds of imitation training. Journal of Experimental Child Psychology, 16, 111-125.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed., rev.). Washington DC: author.

Baron-Cohen, S. (1988). Social and pragmatic deficits in autism: cognitive or affective? Journal of Autism and Developmental Disorders, 18, 379-402.

Baer, D. (1982). The imposition of structure on behavior and the demolition of behavioral structures. In D. J. Burnstein (Eds.), Response structure and organization (pp. 217-254). Lincoln: University of Nebraska Press.

Berler, E. S., Gross, A. M., & Drabman, R. S. (1982). Social skills training with children: proceed with caution. Journal of Applied Behavior Analysis, 15, 41-53.

Brady, M. P., Shores, R. E., McEvoy, M. A., Ellis, D., & Fox, J. J. (1987). Increasing social interactions of severely handicapped autistic children. Journal of Autism and Developmental Disabilities, 17, 375-390.

Cooke, T. P., Apolloni, T. (1976). Developing positive social-emotional behaviors: a study of training and generalization effects. Journal of Applied Behavior Analysis, 9, 65-78.

Davitz, J. R. (1964). A review of research concerned with facial and vocal expressions of emotion. J. R. Davitz (Eds.), The communication of emotional meaning (pp.13-29). New York: McGraw-Hill.

Dawson, G. & Adams, A. (1984). Imitation and social responsiveness in autistic children. Journal of Abnormal Child Psychology, 12, 209-226.

Dunlap, G., & Koegel, R. L. (1980). Motivating autistic children through stimulus variation. Journal of Applied Behavior Analysis, 13, 619-627.

Ekman, P. (1980). Biological and cultural contributions to body and facial movement in the expression of emotions. In A. O. Porty (Eds.), Explaining emotions (pp. 73-101). Berkeley: University of California Press.

Ekman, P. (1984). Expression and the nature of emotion. In K. R. Scherer, & P. Ekman (Eds.), Approaches to emotion (pp. 319-343). New Jersey: Lawrence Erlbaum.

Ekman, P., & Friesen, W. V. (1976). Pictures of Facial Affect. Palo Alto, CA: Consulting Psychologists Press.

Ekman, P., & Oster, H. (1979). Facial expressions of emotion. Annual Reviews of Psychology, 30, 527-554.

Ekman, P., & Oster, H. (1982). Review of research, 1970-1980. In P. Ekman (Eds.), Emotion in the human face (pp. 147-173). London: Cambridge University Press.

Feldman, R. S., Philippot, P., & Castrini, R. J. (1991). Social competence and nonverbal behavior. In R. S. Feldman, & B. Rime (Eds.), Fundamentals of nonverbal behavior (pp. 329-350). New York: Cambridge University Press.

Field, T. M., & Walden, T. A. (1982). Production and discrimination of facial expressions by preschool children. Child Development, 53, 1299-1311.

Gaylord-Ross, R. J., Haring, T. G., Breen, C., & Pitts-Conway, V. (1984). The training and generalization of social interaction skills with autistic youth. Journal of Applied Behavior Analysis, 17, 229-247.

Gena, A. (1994). Communicative aspects of the affective behavior of people with autism. Unpublished manuscript. Queens College, Psychology Department, New York.

Graphic Source. (1991). Expressive Faces. Wheeling IL: Graphic Products Corp.

Grossman, H. (Ed.). (1977). Manual on terminology and classification in mental retardation. Washington, D.C.: American Association on Mental Deficiency.

Hendrickson, J. M., Strain, P. S., Tremblay, A., & Shores, R. E. (1982). Interactions of behaviorally handicapped children. Behavior Modification, 6, 323-353.

Hobson, R. P. (1989). Beyond cognition: A theory of autism. In G. Dawson (Eds.), Autism: Nature, diagnosis, and treatment (pp. 22-48) New York: Guilford Press.

Howlin, P. (1986). An overview of social behavior in autism. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 103-131). New York: Plenum Press.

Keller, M. F., & Carlson, P. M. (1974). The use of symbolic modeling to promote social skills in preschool children with low levels of social responsiveness. Child Development, 45, 912-919.

Knapp, P. H. (1960). Expression of the emotions in man. New York: University Press.

La Greca, A. M., Santogrossi, D. A. (1980). Social skills training with elementary school students: a behavioral group approach. Journal of Consulting and Clinical Psychology, 48, 220-227.

Lancioni, G., E. (1982). Normal children as tutors to teach social responses to withdrawn mentally retarded schoolmates: training, maintenance, and generalization. Journal of Applied Behavior Analysis, 15, 17-40.

Malatesta, C. Z. (1982). The expression and regulation of emotion: A lifespan perspective. In T. Field, & A. Fogel (Eds.), Emotion and early interaction. Hillsdale NJ: Lawrence Erlbaum.

Mcdonald, H., Rutter, M., Howlin, P., Rios, P., Le Conteur, A., Evered, C., & Folstein, S. (1989). Journal of Child Psychology and Psychiatry, 30, 865-877.

McGee, G. G., Feldman, R. S., Chernin, L. (1991). A comparison of emotional facial display by children with autism and typical preschoolers. Journal of Early Intervention, 15, 237-245.

Mesibov, G. B. (1984). Social skills training with verbal autistic adolescents and adults: A program model. Journal of Autism and Developmental Disorders, 14, 395-404.

Mundy, P., & Sigman, M. (1989). Specifying the nature of the social impairment in autism. In G. Dawson (Eds.), Autism: Nature, diagnosis, and treatment (pp. 3-21). New York: Guilford Press.

Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the social deficits of autism: The contribution of non-verbal communication measures. Journal of Child Psychology and Psychiatry, 27, 657-669.

O'Connor, R. D. (1969). Modification of social withdrawal through symbolic modeling. Journal of Applied Behavior Analysis, 2, 15-22.

O'Connor, R. D. (1972). Relative efficacy of modeling, shaping, and the combined procedures for modification of social withdrawal. Journal of Abnormal Psychology, 79, 327-334.

Odom, S. L., Hoyson, M., Jamieson, B., & Strain, P. S. (1985). Increasing handicapped preschoolers' peer social interactions: Cross-setting and component analysis. Journal of Applied Behavior Analysis, 18, 3-16.

Philippot, P., Feldman, R. S., & McGee, G. (1992). In R. S. Feldman (Eds.), Behavior Theories and Research (pp. 191-213). Hillsdale, NJ: Lawrence Erlbaum Associates.

Prior, M., Dahlstrom, B., & Squires, T-L. (1990). Autistic children's knowledge of thinking and feeling states in other people. Journal of Child Psychology and Psychiatry, 31, 587-601.

Ragland, E. U., Kerr, M. M., & Strain, P. S. (1978). Behavior of withdrawn autistic children. Behavior Modification, 2, 565-578.

Ramsey, P. H., Ramsey, R.P. (1985). Introduction to applied statistics. Unpublished manuscript

Rutter, M. & Schopler, E. (1987). Autism and pervasive developmental disorders: Concepts and diagnostic issues. Journal of Autism and Developmental Disorders, 17, 159-186.

Shafer, M. S., Egel, A. L., & Neef, N. A. (1984). Training mildly handicapped peers to facilitate changes in the social interaction skills of autistic children. Journal of Applied Behavior Analysis, 17, 461-476.

Shah, A., & Wing, L. (1986). Cognitive impairments affecting social behavior in autism. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 153-169). New York: Plenum Press.

Sigman, M., Mundy, P., Sherman, T., Ungerer, J. (1986). Social interactions of autistic, mentally retarded and normal children and their caregivers. Journal of Child Psychology and Psychiatry, 27, 647-656.

Sigman, M., Ungerer, J., Mundy, P., & Sherman, T. (1987). Cognitive functioning in autistic children. In D. Cohen, A. Donnelan, & R. Paul (Eds.), Handbook of autism and atypical development. New York: Wiley.

Snow, M. E., Hertzig, M. E., Shapiro T. (1987). Expression of emotion in young autistic children. Journal of the American Academy of Child and Adolescent Psychiatry, 26, 836-838.

Sokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. Journal of Applied Behavior Analysis, 10, 349-367.

Stokes, T. F., Baer, D. M., & Jackson, R. L. (1974). Programming the generalization of a greeting response in four retarded children. Journal of Applied Behavior Analysis, 7, 599-610.

Stone W. L. & LaGreca, A. M. (1986). The development of social skills. In E. Schopler & G. B. Mesibov (Eds.), Social behavior in autism (pp. 35-59). New York: Plenum Press.

Strain, P. S., Kerr, M. M., & Ragland, E. U. (1979). Effects of peer-mediated social initiations and prompting/reinforcement procedures on the social behavior of autistic children. Journal of Autism and Developmental Disorders, 9, 41-54.

Strain, P. S., Shores, R. E., & Kerr, M. M. (1976). An experimental analysis of "spillover" effects on the social interaction of behaviorally handicapped preschool children. Journal of Applied Behavior Analysis, 9, 31-40.

Strain, P. S., Shores, R. E., & Timm, M. A. (1977). Effects of peer initiations on the behavior of withdrawn preschool children. Journal of Applied Behavior Analysis, 10, 289-298.

Strain, P. S., & Timm, M. A. (1974). An experimental analysis of social interaction between a behaviorally disordered preschool child and her classroom peers. Journal of Applied Behavior Analysis, 7, 583-590.

Trager, G. L. (1958). Paralanguage: A first approximation. Studies in Linguistics, 13, 1-12.

Twardosz, S. & Jozwiak, W. (1981). The expression of affection: Suggestions for research with developmentally disabled children. Analysis and Intervention in Developmental Disabilities, 1, 217-238.

Twardosz, S. & Nordquist, V. M. (1983). The development and importance of affection. In B. B. Lahey & A. E. Kazdin (Eds.) Advances in Clinical Child Psychology (pp. 129-168). New York: Plenum Press.

Twardosz, S., Nordquist, V. M., Simon, R., & Botkin, D. (1983). The effect of group affection activities on the interaction of socially isolate children. Analysis and Intervention in Developmental Disabilities, 3, 311-338.

Volkmar, F. R., Sparrow, S. S., Gourdeau, D., Cicchetti, D. V., Paul, R., & Cohen, D. J. (1987). Social deficits in autism: An operational approach using the Vineland Adaptive Behavior Scales. Journal of the American Academy of Child and Adolescent Psychiatry, 26, 156-161.

Weeks, S. J., & Hobson, R. P. (1987). The salience of facial expression for autistic children. Journal of Child Psychology and Psychiatry, 28, 137-152.

Whitman, L. T., Mercurio, J. R., & Caponigri, V. (1970). Development of social responses in two severely retarded children. Journal of Applied Behavior Analysis, 3, 133-138.

Yirmiya, N., Kasari, C., Sigman, M., & Mundy, P. (1989). Facial expressions of affect in autistic, mentally retarded and normal children. Journal of Child Psychology and Psychiatry, 30, 725-735.