

*VISUAL SCREENING: AN ALTERNATIVE METHOD
FOR REDUCING STEREOTYPIC BEHAVIORS*

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Visual screening, a mildly aversive response suppression procedure, was evaluated across two studies for its effectiveness in reducing topographically similar and dissimilar stereotypic behaviors of four developmentally disabled children. In the first study, a multiple baseline design across subjects and behaviors was used to assess the effectiveness of the procedure as a treatment for reducing the visual and auditory self-stimulatory responses of two 9-yr-old mentally retarded and behaviorally disturbed children. A multiple baseline design across subjects was used in the second study to evaluate the effectiveness of visual screening as a treatment for reducing stereotypic fabric pulling and self-mutilative ear bending, respectively, of two 13-yr-old mentally retarded, autisticlike adolescents. Long-term follow-up data for both studies were reported. The results suggested that visual screening was an easily administered, effective, and exceptionally durable treatment procedure for controlling a variety of stereotypic behaviors commonly associated with the developmentally disabled.

DESCRIPTORS: stereotypic behaviors, self-stimulation, self-injury, mental retardation, autism, visual screening, sensory extinction

Stereotypic acts are among the most salient behavioral characteristics of mentally retarded and autistic children (Baumeister & Forehand, 1973). Such behavior has been demonstrated to interfere with learning (Dietz, Repp, & Dietz, 1976), to be negatively correlated with measured intelligence (Baumeister, 1978), and to be inversely related to the acquisition of new and appropriate behaviors (Koegel & Covert, 1972; Koegel, Firestone, Kramme, & Dunlap, 1974).

Various treatment procedures have been used to suppress stereotypic responding. Foremost among these are differential reinforcement of other (DRO) behavior (e.g., Harris & Ersner-Hershfield, 1978; Homer & Peterson, 1980), punishment (Koegel & Covert, 1972; Lovaas, Schaeffer, & Simmons, 1965), and overcorrection

(e.g., Foxx & Azrin, 1973). Although each of these procedures has demonstrated success on suppressing stereotypic behavior, generalized durable elimination of this response class has not always been achieved (Rincover & Koegel, 1977).

An alternative procedure that has received increased attention in the current literature is facial screening. This procedure has involved the use of a terry cloth bib to cover the subject's entire face, briefly, contingent on the occurrence of a target behavior and has been used effectively to suppress a wide variety of self-injurious (Lutzer, 1978; Singh, 1980; Singh, Beale, & Dawson, 1981; Zegiob, Alford, & House, 1978) and disruptive behaviors (Zegiob, Jenkins, Becker, & Bristow, 1976) in developmentally disabled children. A variation of the facial screening procedure, termed visual sensory extinction, in which an eye screen was used rather than a terry cloth bib, has also been reported as an effective

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technique for the suppression of maladaptive self-stimulatory behavior in autistic children (Rincover, 1978; Rincover, Cook, Peoples, & Packard, 1979).

Although each method has been the subject of limited research, the results are encouraging and suggest that facial screening and/or visual sensory extinction procedures were quite effective in modifying a variety of maladaptive behaviors commonly associated with developmental disabilities. A possible shortcoming of each approach, however, is that both methods require special equipment (i.e., terry cloth bib; eye screen) that may prove inconvenient for staff to implement and thus hinder its use in applied settings.

The present study was designed to evaluate the effectiveness of a similar yet potentially more convenient procedure called visual screening on the reduction and elimination of both topographically similar and dissimilar stereotypic behavior. In the present study, visual screening involved briefly covering the child's eyes with the therapist's hand contingent on the occurrence of the target response, therein eliminating the need for special equipment such as bibs and eye screens.

METHOD

Children and Settings

Four developmentally disabled children, two males and two females, participated in this investigation. Maggie (age 9) and Michael (age 9) were diagnosed as moderately mentally retarded according to AAMD criteria (Grossman, 1977), whereas Dana (age 13) and Bob (age 13) scored in the profound range of mental retardation. All four children presented high rates of autisticlike self-stimulatory behavior and were enrolled in programs targeting mentally retarded children with severe behavior disorders. Maggie and Michael were residents in an intensive, short-term psychiatric hospital placement associated with a major medical school. Dana and Bob were residents in a Community Living Arrangement

(C.L.A.) specifically designed for severely mentally retarded/autistic children.

Target Behaviors and Experimental Designs

For both Maggie and Michael, a multiple baseline design across subjects and behaviors (Hersen & Barlow, 1976) was used to assess the effects of the visual screening procedure on topographically similar and dissimilar stereotyped acts. Each child exhibited visual self-stimulatory responding with objects. This behavior was operationalized as the use of any available materials for the purpose of waving them in maladaptive, repetitive fashion in front of their faces while maintaining eye contact with the object. Maggie presented a second behavior (visual self-stimulation with hands) which consisted of gazing fixedly through the fingers of either hand and moving the hand slowly in a repetitive manner. Michael's second behavior (auditory self-stimulation) was operationally defined as spontaneous repetitive vocalizations (i.e., chirping, humming) and tongue clicking.

For Dana and Bob, the effect of the visual screening procedure was primarily assessed within a multiple baseline design across subjects (Hersen & Barlow, 1976). Although, for Dana only, a brief systematic withdrawal and restoration of treatment was also accomplished using an A-B-A-B-BC format (Hersen & Barlow, 1976).

Dana's stereotypic responding was defined by repetitive pulling of hairlike fibers from clothing, carpeting, furniture coverings, and other woven materials with her thumb and forefinger. Bob's stereotypic behavior was largely self-injurious in nature and involved the frequent and repetitive bending or "flapping" of both ears using his thumbs.

Behavioral Observations, Recording, and Reliability

Two graduate students in special education and a pool of four direct care staff members served as the behavioral observers/recorders. Each of the observers was instructed in the op-

erational definitions of the target behaviors and received individual in vivo practice across pre-baseline sessions, until interobserver agreement reached 85 %.

Because each of the target behaviors was a discrete act, having a clearly definable beginning and end, a frequency count was used to assess the magnitude of stereotyped responding for each child across all phases of their respective studies. For Maggie and Michael, behavioral observations were conducted using a one-way mirror to ensure that the children were unaware that they were being observed. However, given the observation setting for Dana and Bob (C.L.A. Group Home), the behavioral recorders needed to be present in the room with the children and therapist.

Reliability was assessed by independent raters similarly trained in the operational definitions of the target responses for each child. Reliability was computed using the percent agreement formula. Data recorded by the two observers were divided, the smaller frequency by the larger frequency, and multiplied by 100. Reliability checks for all children were nearly equally distributed across the baseline and treatment phases of both studies. The number of reliability checks ranged from 32% to 42% of the total observation periods for each study. Interrater reliability estimates ranged from 95% to 100% across all phases of both studies, including follow-up.

Treatment and Procedure

Baseline. For each child, the magnitude of the target behavior was assessed under baseline conditions which consisted of observing their natural frequency of occurrence within a specified time period. For Maggie and Michael, observations were made of stereotyped acts as they occurred within a 20-min free play period during daily classroom activities. Dana and Bob were observed during a 20-min unstructured leisure time period at the C.L.A. In each case, children had easy access to familiar and developmentally age-appropriate play materials such as dolls, blocks, coloring books, and other art materials.

The types of play materials available were standardized across all phases of each study. Potentially encouraging and reinforcing comments related to the play materials were not made during either the baseline assessments or any other condition within the studies.

Treatment. A graduate student in special education and a direct care staff member served as therapists in the classroom and group home settings, respectively. Each therapist received one week of in vivo practice applying visual screening with children outside the present study who received this treatment as part of their ongoing treatment plan. Training was supervised by the first and fourth authors. Visual screening was applied contingent on each observed instance of the target behavior across all children. The procedure consisted of the therapist placing one hand over the child's eyes so as to preclude any source of visual input, while holding the back of the child's head with the other hand. Duration of the visual screening treatment was a minimum of 5 sec for each child. Criterion for release from visual screening was contingent upon nondisruptive behavior following expiration of the minimum time requirement. Treatment settings were identical to those used during baseline assessments. The amount of time each child spent undergoing treatment with visual screening was compiled during each session and added to that session, so as to ensure a 20-min period of free response time comparable to that of the baseline phase.

Verbal warning procedure. In the final phase of Dana's study only, a verbal warning ("No pulling") preceded the treatment procedure. If Dana complied with the therapist's request and immediately stopped pulling, visual screening was not implemented. However, the procedure was implemented for continued pulling following 3 sec of the verbal warning.

Follow-up. Follow-up data for Maggie and Michael were collected following discharge from residential psychiatric care and on enrollment in a public school special education classroom. Follow-up data were obtained at 3-, 6-,

and 18-mo intervals for Maggie and 12- and 18-mo intervals for Michael. Data were collected across a series of five consecutive daily behavioral observation periods at each follow-up interval, under free play conditions simulating those in effect during the baseline phases of the study.

Follow-up data for Dana and Bob were obtained under conditions identical with the baseline phase of their study. Data were obtained at 2-, 3-, and 6-mo intervals following the conclusion of active treatment.

RESULTS

Figures 1 and 2 represent the frequencies of stereotypic responding across all phases of study for Maggie/Michael and Dana/Bob, respectively. The results indicate the implementation of the visual screening treatment procedure was effective in significantly reducing the frequency of stereotypic responding for each child.

Figure 1 shows the effectiveness of the visual screening procedure for two types of topographically similar stereotypic behaviors presented by Maggie. When the visual screening procedure was applied to the use of objects for self-stimulation, there was an immediate increase in the magnitude of Maggie's stereotypic responding. This effect was not observed following the fourth treatment session and visual self-stimulation with objects showed a marked decrease (70%) relative to baseline rates. Figure 1 also indicates that as rates of visual self-stimulatory behavior decreased, there was a substantial increase in self-initiated (spontaneous) play, similar to the findings of Koegel *et al.* (1974).

The effect of the visual screening procedure across the topographically dissimilar (auditory) and similar (visual) self-stimulation behaviors of Michael is also presented in Figure 1. Immediate decreases in both behaviors were observed following implementation of treatment in multiple baseline fashion.

The result of the visual screening procedure for Dana was similar to that obtained with Mag-

gie and Michael. Figure 2 shows stereotypic responding was reduced to near-zero rates following only six treatment sessions. When treatment with visual screening was suspended following the 13th session, stereotypic responding recovered to within 65% of baseline rates with an upward trend in frequency observed. Restoration of visual screening following four sessions of baseline conditions resulted in the immediate decrease of the targeted response to near-zero rates. The near-zero frequency of stereotypic responding was also maintained across the verbal warning phase used exclusively with Dana. Figure 2 also shows that the procedure was effective in rapidly eliminating Bob's stereotypic ear bending behavior following only a single treatment. Conversely, when the visual screening procedure was discontinued for Bob, the targeted behavior did not reverse toward previous baseline rates.

Follow-up data were collected under baseline conditions for each child at various intervals ranging from 2 through 18 mo following the conclusion of active treatment. In each case, no observed instances of the targeted responses were reported.

DISCUSSION

The results of the present study were similar to those findings reported in studies using facial screening (e.g., Lutzker, 1978) and visual sensory extinction techniques (e.g., Rincover, 1978). Visual screening was effective in significantly reducing and eliminating a variety of maladaptive stereotypic responses commonly associated with the developmentally disabled. It is important to note that the positive results of the present study were obtained without the use of special equipment such as bibs or eye screens and that the two therapists concurred on the ease with which treatment was implemented in applied settings (e.g., classroom, group home).

Moreover, the data were suggestive that visual screening was a versatile and exceptionally durable treatment method for the suppression of high rate stereotypic responding of mentally re-

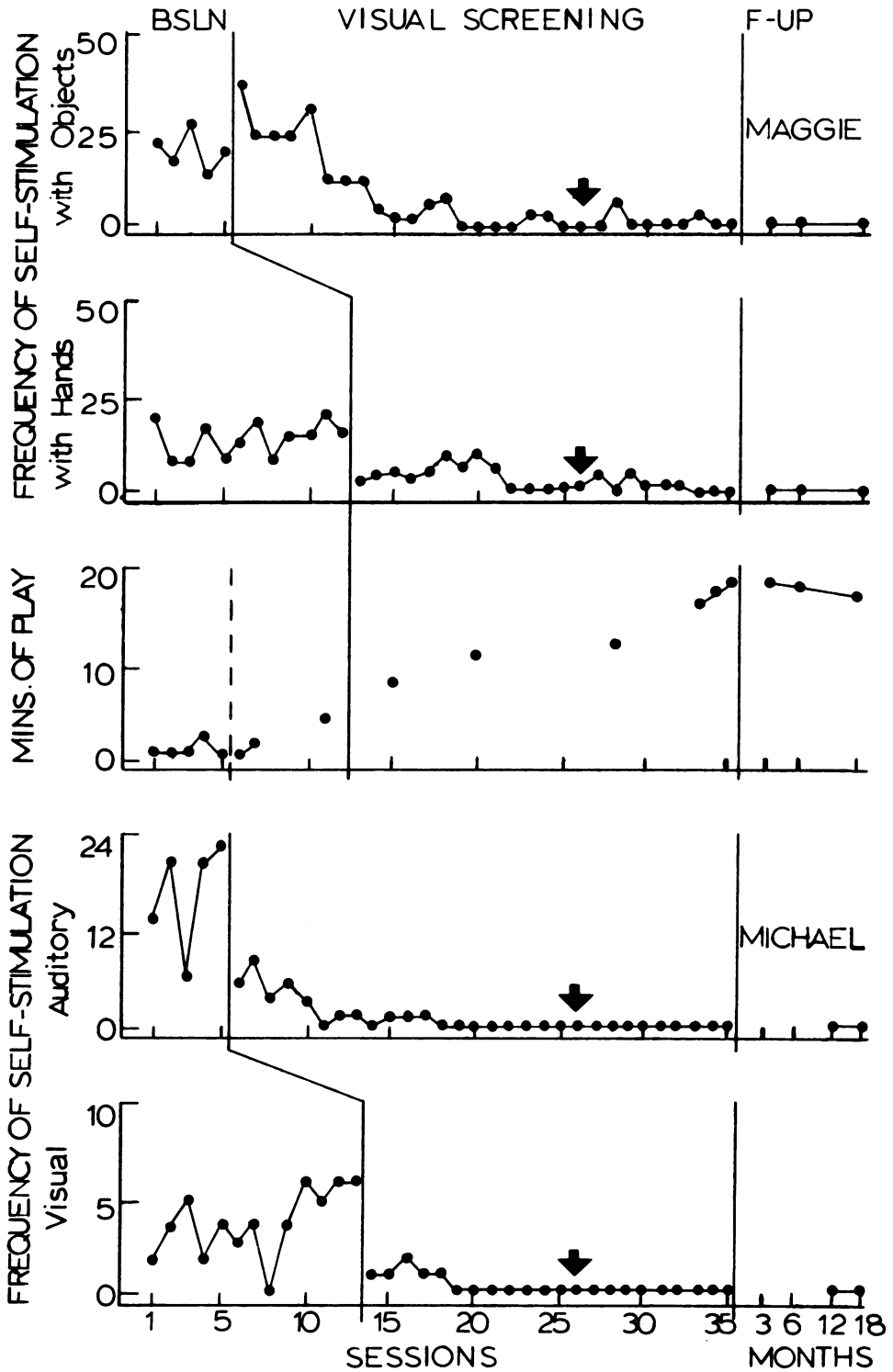


Fig. 1. Frequency of Maggie's visual self-stimulatory responses (spinning objects and hand waving) plus duration of self-initiated appropriate play and frequency of Michael's auditory and visual self-stimulatory responses across baseline, treatment, and follow-up phases of study. The arrows at session 26 indicate when visual screen was applied on a unit-wide basis.

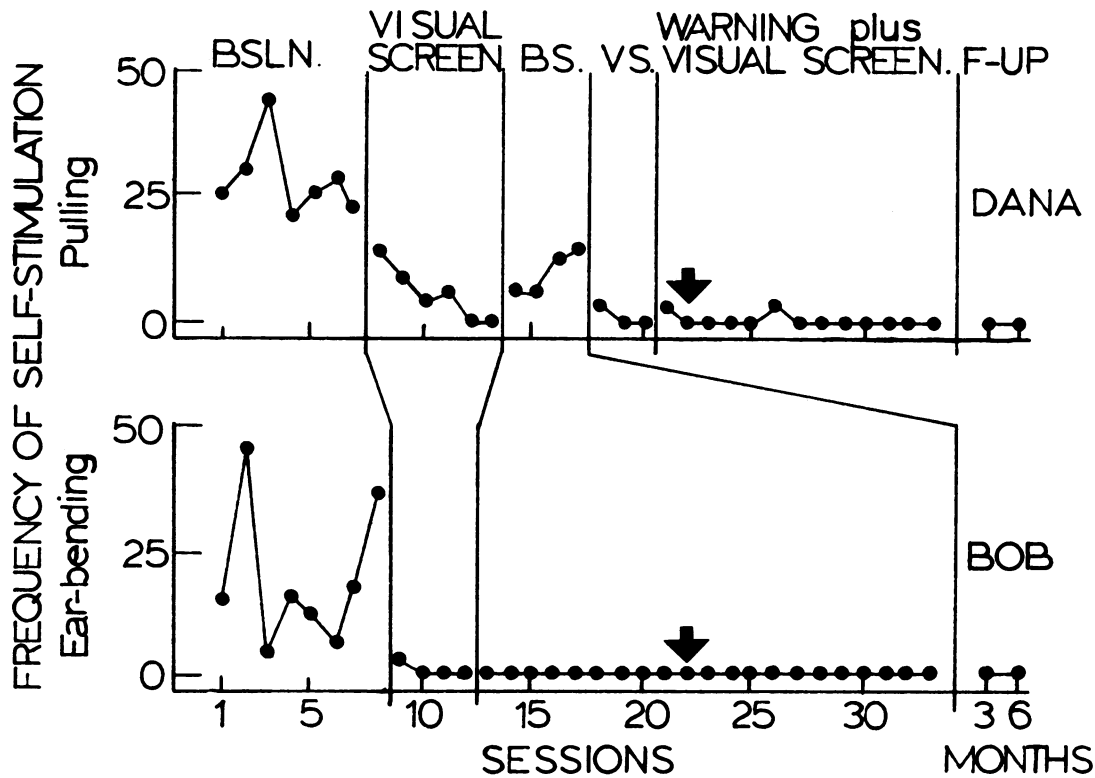


Fig. 2. Frequency of Dana's stereotyped fabric pulling responses and Bob's self-mutilative ear bending behavior across baseline, treatment, and follow-up phases of study. The arrows at session 22 indicate when visual screening was applied throughout the entire day in the group home setting.

tarded/autistic children. The treatment procedure was equally effective across features of topographic similarity and dissimilarity, with the continued suppression of targeted responses being observed from 6 to 18 mo following the conclusion of active treatment. Anecdotally, visual screening was also noted as being equally effective in reducing stereotypic responding when applied as a treatment plan and expanded for use throughout the entire day.

The reactions of each child to the treatment procedure was also of interest to note, particularly since a response suppression method was used. Michael and Dana reacted quite similarly to the visual procedure. Initially, both children resisted treatment by trying to pull the therapist's hand away from their eyes. Maggie's reaction to visual screening took a similar course, although, initially, her rate of self-stimulation with objects increased as she engaged in the tar-

geted response and look immediately for the therapist to implement the procedure. Following several treatment sessions (ranging from three to 12), all the children learned the criterion for release and stood passively with arms at their sides throughout the 5-sec visual screening procedure.

Judging from his reactive behavior, the visual screening program appeared to be more aversive for Bob than for any of the other children. Bob attempted to escape visual screening by crying, pulling away from the therapist, and pulling the therapist's hand from his eyes. For Bob, the visual screen procedure was implemented only once; however, because of his disruptive response, the procedure was applied for 2.5 min before he met the criterion for release from treatment. Bob's reaction to the visual screening procedure and the length of the initial application of treatment may, in part, explain the fail-

ure of his target response (self-mutilative ear bending) to revert to baseline rates following discontinuation of active treatment.

In sum, visual screening appeared to be an easily administered and quick procedure for effectively controlling stereotypic behaviors. It required minimal training and was administered without special equipment in both a classroom and group home setting. Visual screening was found to be a mildly aversive treatment procedure (judging by subject reactivity) which imposed no physical risk to the child. No atypical side effects were observed and one child (Maggie) showed a collateral increase in spontaneous play relative to decreases in stereotyped behavior. The effectiveness of the procedure was demonstrated with a variety of topographically similar and dissimilar stereotypic behaviors and the follow-up results were encouraging relative to treatment durability with near-zero rates of stereotypic behavior being observed at 6-, 12-, and 18-mo intervals following the conclusion of active treatment.

REFERENCES

- Baumeister, A. A. Origins and control of stereotyped movements. In C. Edward Meyers (Ed.), *Quality of life in severely and profoundly mentally retarded people: Research foundations for improvement*. Washington, D.C.: American Association on Mental Deficiency, 1978.
- Baumeister, A. A., & Forehand, R. Stereotyped acts. In N. R. Ellis (Ed.), *International review of research in mental retardation*. Vol. 6. New York: Academic Press, 1973, 6, 55-96.
- Deitz, S. M., Repp, A. C., & Deitz, D. E. Reducing inappropriate behavior of retarded students through three procedures of differential reinforcement. *Journal of Mental Deficiency Research*, 1976, 20, 155-170.
- Fox, R. M., & Azrin, N. H. The elimination of autistic self-stimulation behavior by overcorrection. *Journal of Applied Behavior Analysis*, 1973, 6, 1-14.
- Grossman, H. D. *Manual on terminology and classification in mental retardation*. Washington, D.C.: American Association on Mental Deficiency, 1977.
- Harris, S., & Ersner-Hershfield, R. Behavioral suppression of seriously disruptive behavior in psychotic and retarded patients: A review of punishment and its alternatives. *Psychological Bulletin*, 1978, 85, 1352-1375.
- Hersen, M., & Barlow, D. H. *Single-case experimental design: Current strategies for studying behavior change*. New York: Pergamon Press, 1976.
- Homer, A., & Peterson, L. Differential reinforcement of other behavior: A preferred response elimination procedure. *Behavior Therapy*, 1980, 11, 449-471.
- Koegel, R. L., & Covert, A. The relationship of self-stimulation to learning in autistic children. *Journal of Applied Behavior Analysis*, 1972, 5, 381-387.
- Koegel, R. L., Firestone, P. B., Kramme, K. N., & Dunlap, G. Increasing spontaneous play by suppressing self-stimulation in autistic children. *Journal of Applied Behavior Analysis*, 1974, 7, 521-528.
- Lovaas, O. T., Schaeffer, B., & Simmons, T. O. Experimental studies in childhood schizophrenia: Building social behavior by use of electric shock. *Journal of Experimental Research in Personality*, 1965, 1, 99-109.
- Lutzker, J. R. Reducing self-injurious behavior in three classrooms by facial screening. *American Journal of Mental Deficiency*, 1978, 510-513.
- Rincover, A. Sensory extinction: A procedure for eliminating self-stimulatory behavior in developmentally disabled children. *Journal of Abnormal Child Psychology*, 1978, 6, 299-310.
- Rincover, A., Cook, R., Peoples, A., & Packard, D. Sensory extinction and sensory reinforcement principles for programming multiple adaptive behavior change. *Journal of Applied Behavior Analysis*, 1979, 12, 221-233.
- Rincover, A., & Koegel, R. L. Research on the education of autistic children: Recent advances and future directions. In B. B. Lahey & A. E. Kazdin (Eds.), *Advances in clinical child psychology*. Volume 1. New York: Plenum Press, 1977, 329-359.
- Singh, N. N. The effects of facial screening on infant self-injury. *Journal of Behavior Therapy and Experimental Psychiatry*, 1980, 11, 131-134.
- Singh, N. N., Beale, I. L., & Dawson, M. J. Duration of facial screening and suppression of self-injurious behavior: Analysis using an alternating treatments design. *Behavioral Assessment*, 1981, 3, 411-420.
- Zegiob, L. E., Alford, G. S., & House, A. Response suppressive and generalization effects of facial screening in multiple self-injurious behavior in a retarded boy. *Behavior Therapy*, 1978, 9, 688.
- Zegiob, L. E., Jenkins, J., Becker, J., & Bristow, A. Facial screening: Effects on appropriate and inappropriate behaviors. *Journal of Behavior Therapy and Experimental Psychiatry*, 1976, 7, 355-357.

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