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Desensitization to Medical Examining Equipment through Learner Control in a Child with  
Severe Mental Retardation

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Abstract

While the psychological literature is replete with examples of desensitization to phobic stimuli, few studies have documented successful interventions conducted with individuals identified as mentally retarded. This study describes desensitization to basic medical examining equipment in a youngster with severe mental retardation and autistic tendencies. Following desensitization to feared stimuli through the repeated exposure of baseline, intervention was initiated on the remaining feared stimuli through a learner control technique which combined modeling, behavioral rehearsal, and a variation of contact desensitization (Ritter, 1968). Results of a return-to-baseline design suggested that the medical examinations feared most by the child were of the same functional response class and that they did respond positively to intervention. Discussion of the methods and results provides practical implications for health professionals as well as offering hypotheses regarding the potential communicative and adaptive functions phobic manifestations serve in persons who experience significant handicapping conditions.

## Desensitization to Medical Examining Equipment through Learner Control in a Child with Severe Mental Retardation

The health of any child is a goal that no one would dispute. Problems arise when children's phobic reactions result in refusal to allow health professionals to examine them with medical instruments for the purposes of diagnosis, prevention, or treatment. The impact of traditional procedures such as modeling, cognitive rehearsal, visual imagery, verbal mediation and relaxation may be of limited value in desensitizing persons with significant cognitive delays. This realization and the corresponding void of research on fear reduction in persons with mental retardation requires modification of existing strategies (Freeman, Roy, & Hemmick, 1976; Matson, 1981).

In the conclusion of their review article on children's fears, Graziano, DeGiovanni, and Garcia (1979) suggested that future research consider the adaptive value of children's fears. Phobic reactions may be viewed from the perspective that there is a lack of control over the anxiety producing situation. Horner's (1981) study of infant-stranger interactions suggested that children were less fearful when given control over an anxiety producing situation. Phobic manifestations in children with mental retardation may be adaptive behaviors which serve communicative or perceived self-preservation functions. This has relevance to many medical procedures which are not experienced routinely in daily life, may be invasive, and elicit anxiety in nondisabled children. This study explored the effects of desensitization on a phobic reaction to basic medical examining equipment with a youngster identified as autistic and functioning in the severe range of mental retardation. Implementation consisted of a learner control

variation of contact desensitization (Ritter, 1968). Techniques were modified to be concrete and placed the subject in control of the fear producing stimuli during the intervention phases. Fassler (1985) employed a similar procedure by allowing children to administer injections to a doll. In Fassler's study and in the current experiment, it was hypothesized that such control would reduce the child's fearful reactions. The present study also examined generalization effects across people to determine if the intervention carried out by the examiner would transfer to a school nurse.

## METHOD

### Subject

The subject, an 11 year old male, diagnosed as autistic and functioning in the severe range of mental retardation, displayed a high frequency and intensity of head banging, screaming, rocking, and other maladaptive behaviors. His speech and language was characterized by disfluency and echolalia. He was able to answer simple questions, identify common objects, and rote count to 10. He expressed physical and emotional states through nonspeech vocalizations and body movements. This youngster possessed generalized motor imitation skills.

The child was chosen for participation in this study due to his long history of phobic reactions toward medical examining equipment. Adults familiar with the child, described his reactions as fearful, as evidenced by simultaneous anguished facial expressions and vocalizations, the assuming of a protective/defensive body posture, and physical retreat from the threatening situation.

### Setting and Materials

Sessions were conducted in a classroom for children with multiple handicapping conditions. The examiner and child were seated in chairs facing each other, separated by one foot. A small desk positioned next to the examiner held data sheets, pencils, a stethoscope, blood pressure cuff, tongue depressors, an otoscope, and hygienic replacement caps to cover the speculum of the otoscope. A partition surrounded the examination area. A wall clock with an easily visible second hand was in view.

### Baseline Procedures

During baseline, each of five examinations were performed on the subject following the same order: (a) use of a tongue depressor to view the throat, (b) use of the stethoscope to hear the heart, (c) use of a sphygmomanometer to measure blood pressure, (d) use of an otoscope with a clean hygienic cap to view the nasal cavity, and (e) use of the otoscope with a clean hygienic cap to view the ear drum. Baseline procedures began with the examiner displaying the instrument to be used, naming it, and stating his intention (e.g., "This is a tongue depressor. I am going to use it to look in your mouth. This shouldn't hurt."). An attempt was then made to use the instrument in the accepted fashion (Lewis, 1980). Use of the instruments was modeled by a nurse prior to their use by the examiner who was not a health professional. A maximum of two attempts, presented within 15 to 30 seconds of each other, were performed for each of the five tests. If the first or second attempt to examine the child was successful a plus was recorded. A correct response was defined as effective use of the instrument for 3 to 5 seconds consecutively, one of two attempts. Effective use meant achieving the intended

outcome, such viewing the ear drum or obtaining a blood pressure reading. If after the second attempt a correct response had not occurred, a minus was recorded. No reinforcement was delivered during baseline.

The school nurse provided generalizations probes three times during the study. Probes consisted of the nurse conducting the baseline battery as defined previously. At no time did the nurse carry out intervention procedures.

#### Learner Control Intervention Procedures

Following baseline, only two tests remained as suitable for intervention, the otoscope in the nose and ears. The stethoscope and blood pressure cuff were desensitized through the repeated exposure of baseline. The tongue depressor showed a strong ascending trend during baseline which hovered just below criterion. Baseline treatment effects interfered with the planned multiple baseline design across the five medical tests. Subsequently, the design was changed to a return-to-baseline (A-B-A-B) on the nasal examination with the otoscope. Throughout intervention phases, probes the same as those conducted during baseline were administered immediately prior to intervention sessions. Performance level data (number of seconds of correct responding) was recorded for the otoscope in the nose and ear on probes conducted during this and all subsequent phases.

Given the same setting and materials as baseline, the examiner named the plastic hygienic "cap" used to cover the speculum of the otoscope, handed it to the child, and encouraged him to examine it. The cap alone was used during this component of

intervention because its use involved less complex motor manipulations and it was more visually dissimilar to the fear producing otoscope while retaining major salient features, (i.e., shape and invasive characteristics of the speculum). The child was then encouraged to insert the cap into the examiner's nostril. The examiner and child slowly counted to a maximum of five as the child remained in control of the inserted cap. The cap was removed and the child was assured by the examiner that the insertion did not hurt. The child was then handed the complete otoscope with a clean hygienic cap. Following the opportunity to examine the instrument, the child was encouraged to insert the otoscope into his own nostril. Again the child and examiner slowly counted to a maximum of five in unison. Examining the examiner, followed by self-insertion was carried out in an alternating manner ten times during a session. Typically, intervention was completed in less than five minutes. Social praise, which included a restatement of what the child had done correctly, was used to reinforce the desired behaviors during intervention.

### Reliability

A special education teacher, classroom assistants, and school nurse were trained to record interobserver agreement a minimum of twice during each experimental phase. Fifteen such checks were made during the study, including checks for all generalization probes conducted by the nurse. Given an unobstructed view of the child's behavior from approximately 6 feet, the examiner and the independent observer simultaneously watched and recorded the child's behavior on separate data sheets. Using a matched trial



comparison, interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and converting to a percentage.

## RESULTS and DISCUSSION

Interobserver agreement on probes across all phases ranged from 60% to 100% with a mean of 95.55%. Interobserver agreement on the performance level data ranged from 90% to 100% with a mean of 95%. As depicted in Figure 1, the repeated exposure of baseline served to desensitize the child to the blood pressure cuff and stethoscope. While the tongue depressor followed a similar pattern of increasing tolerance, its performance level remained just below criterion levels until session 17. The otoscope in the nose and ears showed no signs of being desensitized through repeated exposure, simply the sight of the otoscope produced fearful reactions.

During the first intervention phase, the child continued to display fearful behavior, but to a lesser magnitude than during baseline. He was willing to touch the otoscope to his nose briefly when given control. Following ten trials (one session) of the learner control procedures, the youngster was willing to be examined with the otoscope by the examiner and nurse. At the same time, even though no intervention was employed on the examination of the ear with the otoscope, the number of seconds of functional use covaried in close relationship to the otoscope used for nasal examination (see Figure 2). This covariation remained consistent throughout all experimental phases. A return-to-baseline resulted in rejection to the otoscope in both the nose and ear. Reinstating intervention resulted in a renewed willingness to be examined.

Five months after the study an anecdotal report by the nurse indicated that for the first time, the child allowed the school doctor to administer a partial physical examination. The blood pressure cuff, stethoscope, and tongue depressor were used effectively by the doctor. The child did not allow the use of the otoscope to view the ear drum or nasal cavity. In the past phobic reactions to the instruments were so severe that the examination could not be continued. This time, despite rejection of the otoscope, the youngster was able to be calmed after which additional tests were attempted. The child allowed the physician to administer other tests that previously provoked phobic responses such as measuring the child's height and weight, using the stethoscope on the back, and use of a ophthalmoscope for visual a examination.

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Insert Figure 1 about here

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Insert Figure 2 about here

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Throughout this study, the subject reacted differentially to various medical examining instruments. The blood pressure cuff and stethoscope which were desensitized through repeated exposure alone, involved external contact. The most feared tests involved internal use of the otoscope to examine the nose and ears. While the tongue depressor, which eventually was desensitized through repeated exposure, also represented an internal procedure, it was believed to hold a less feared status because it involved the mouth. The child was accustomed to having objects inside his mouth (e.g., eating utensils, food, toothbrush), whereas he was unaccustomed to having objects in

his nose and ears. As depicted in Figure 2, the child's reaction to the ear examination covaried with the nasal examination despite the fact that intervention was never initiated on the otoscope in the ear. This generalization suggested that the behaviors may be of the same functional response class (Garcia, Baer, & Firestone, 1971). These data seem to support the notion that the child's phobic reactions were communicative and adaptive. He communicated rejection of the instruments which he apparently perceived as threatening. In doing so, he was acted in self-protection capacity.

In this case, the most feared examinations did not respond to repeated exposure. Intervention procedures served as a method of communicating the painless nature of the intrusion. Allowing the child to insert the hygienic cap into the nostril of the examiner required attention to the task and provided a participatory, concrete model for the child to observe. Practicing self-insertion provided additional control and allowed the youngster to gain information. When the child realized that there was nothing to be afraid of with the use of the otoscope in the nose, he generalized this newly gained knowledge to the otoscope in the ear. The return-to-baseline condition demonstrated that the behavior change was not retained when intervention was withdrawn abruptly. In this case, lack of retention emphasized the highly feared status of the otoscope and indicated that acquisition had not stabilized. The responsiveness of the child to the reintroduction of intervention was demonstrated by a quick return to criterion performance levels. In a more in-depth study, a longer acquisition phase with systematic fading of intervention and a multiple baseline or multiple probe design across subjects would be preferable to an A-B-A-B design.

The results highlight implications for health professionals working with children

who are cognitively delayed. If a child manifests anxiety or phobia, it is recommended that professionals proceed based on the assumption that the phobic behavior is communicative and adaptive. In the absence of other data (e.g., that phobic behaviors are prompted by attention seeking), such a response is more likely to lead to positive, minimally intrusive interactions. Freeman, Roy, and Hemmick (1976) found the presence of a familiar person served a deconditioning role during a physical examination. In more severe cases, such a step can be augmented by learner control strategies described herein. Since intervention procedures took five minutes or less to carry out, were not complex, and required no special equipment, they are seen as practical strategies. This approach has limited applicability for medical procedures which are uncomfortable or painful. Secondly, some medical techniques do not lend themselves to human modeling or learner control (i.e. use of hypodermic needles, suturing, use of a dental drill).

Methodologically, a concern was present relating to interobserver agreement. Defining a correct response in terms of observable subject behavior becomes problematic when measures of correctness relies on skillful examiner performance as well as correct subject performance. Reliability observers only could observe the amount of time the examiner appeared to be using the instruments successfully. This examiner performance variable may account for the nurse's successful use of the tongue depressor during baseline while the examiner did not experience a criterion level response until session 17. Speculation was that the nurse simply was a more skilled user of the instruments than was the nonmedical examiner. If this is true, achievement

rates of the learner control procedures may be accelerated when employed by skilled medical personnel.

Learner control variations of modeling and behavioral rehearsal presented in this study are meant to be employed as an augmentative strategy to reduce the phobic manifestations of children. The participatory and concrete nature of the procedures are seen as particularly appropriate for children with significant cognitive delays. Such interventions offer practical strategies for health professionals addressing this issue. Further research is indicated to fill the current gap in approaches to reducing fears in children with significant cognitive delays.

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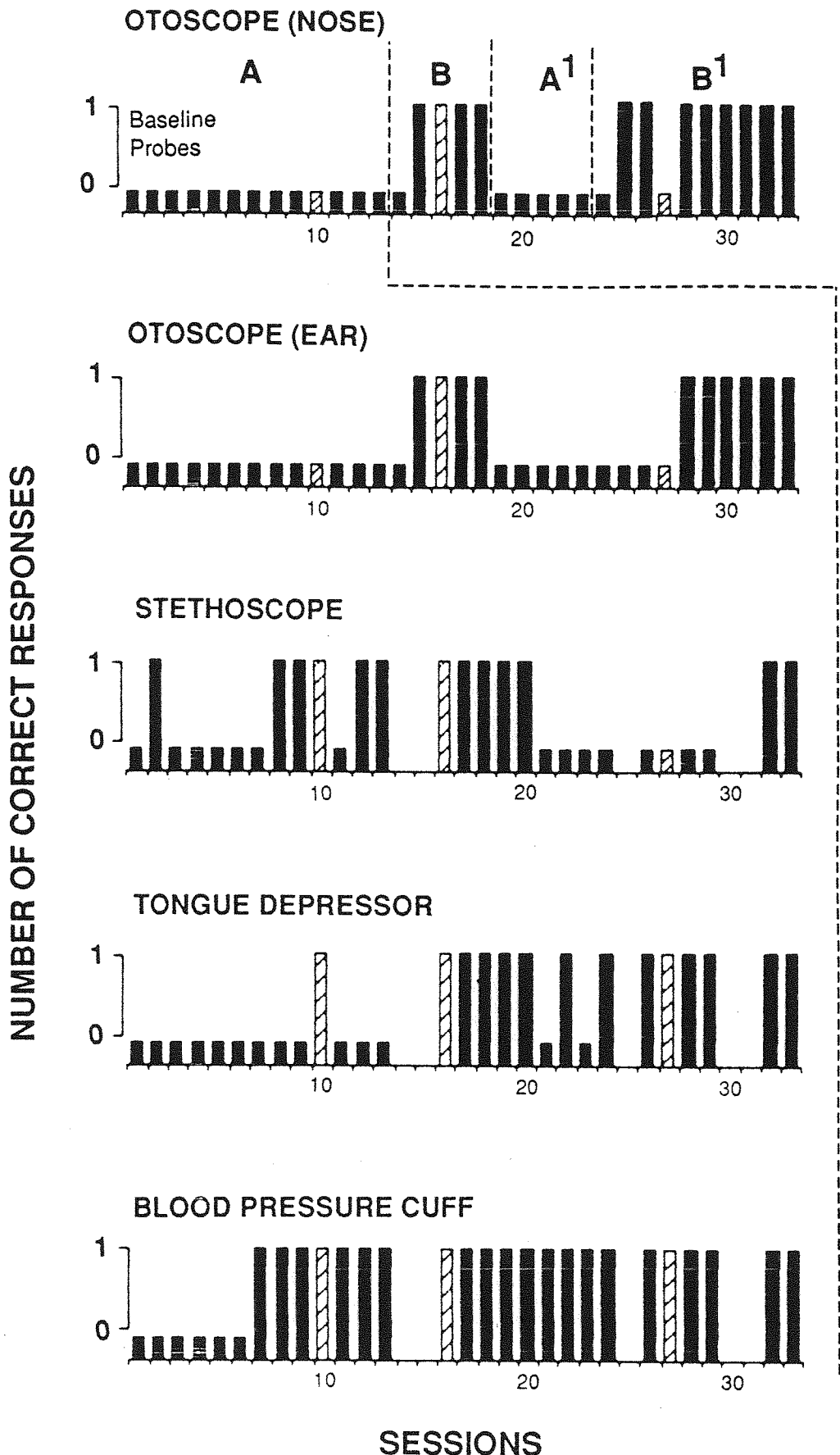
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## Figure Captions

Figure 1. Probe data reflecting desensitization to basic medical examining equipment.

Data includes a return-to-baseline design for desensitization to the use of an otoscope for a nasal examination.

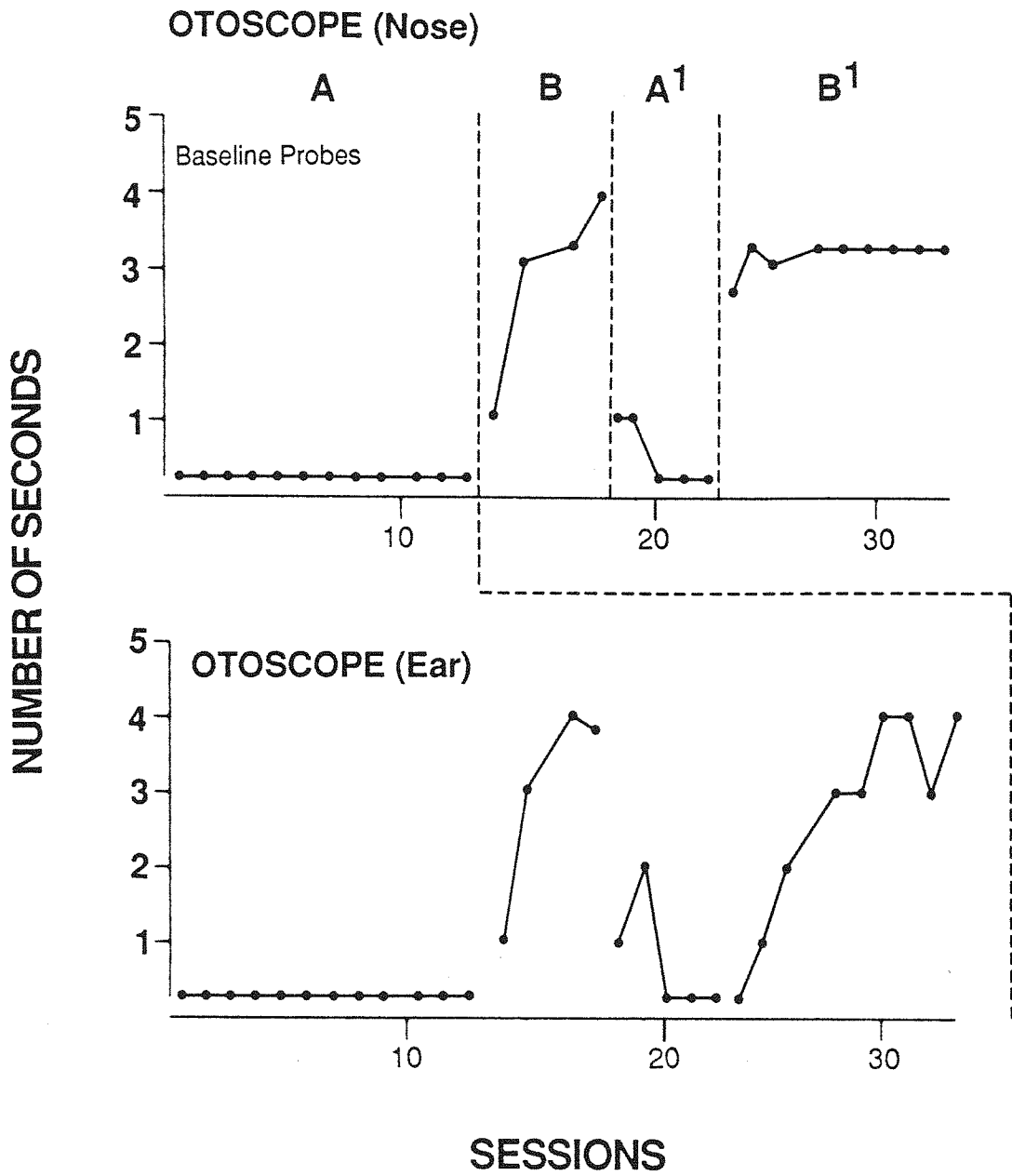
Figure 2. Performance level data on probes of the otoscope used for nasal and ear examinations. Shows return-to-baseline design and generalization effect as the ear examination performance covaried without intervention.



Key :

■ = Probes by the examiner	▨ = Generalization probes by nurse
A = Baseline Probes	A <sup>1</sup> = Return-to-Baseline Probes
B = Intervention Probes	B <sup>1</sup> = Return-to-Intervention Probes





Key: **A** = Baseline Probes  
**B** = Intervention Probes

**A<sup>1</sup>** = Return-to-Baseline Probes  
**B<sup>1</sup>** = Return-to-Intervention Probes