Review

Effective Treatments for Auditory Sensitivities in Autism

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ABSTRACT

Hypersensitivity to sound is a frequent symptom of autism spectrum disorders and can be difficult to manage. Because an individual with sound hypersensitivity may display disruptive behaviors for significant periods of time in response to the sound, the condition demands treatment. Behavioral and desensitization therapies, which employ some of the techniques of cognitive behavioral therapy, appear to be promising, efficient, and effective types of treatment for these symptoms.

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INTRODUCTION

Autism is a clinically-diagnosed developmental disorder characterized by qualitative impairment in social communication (Filipek et al. 1999) and communication, as well as by the presence of restricted repetitive behaviors and stereotypies (American Psychiatric Association, 2000). It is common for children on the autism spectrum to also display unusual reactions to sensory stimuli, in terms of both underarousal and overarousal. Kanner (1943) noted in his seminal paper that some children with autism showed an "aversion" to certain sounds. More recently, Rimland and Edelson (1995) claimed that approximately 40% of children with autism show some symptoms of auditory hypersensitivity, according to parent reports. Other figures for aversion to noises range from 30% to 53% of children with autism (Baranek et al. 1997, Volkmar et al. 1986, respectively). However, these figures generally apply to younger children under the care of parents or teachers. Figures for older children or adults with autism or other developmental disabilities are lacking. Likewise, research attempting to identify the specific etiology of auditory hypersensitivity in the context of auditory processing disorders has been inconclusive.

In individuals who suffer from auditory hypersensitivity, the reaction to sounds can be so severe that it results in extreme behavioral disturbance or even self-injury, though hearing thresholds are on average not different from normal in the autistic population or in the population of > those with auditory hypersensitivities. These behaviors are especially difficult for a family to tolerate when the reaction is to a common household sound, such as the sound of the toilet flushing. Regardless of the cause of these symptoms, parents and clinicians of children with autism search for ways to help these children tolerate the auditory world better. This paper will describe two recent approaches to reducing symptoms of hypersensitivity to sound and evaluate the literature in terms of its clinical relevance and effectiveness.

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SYMPTOMS OF AUDITORY HYPERSENSITIVITY IN AUTISM

A hyper-reaction to certain sounds is not unusual for children on the autism spectrum. This reaction can take the form of placing hands over the ears, screaming, crying, or running away when the sound is detected. Some children with autism become so averse to the sounds that they react to the sight of the object that makes the sound even if that object is silent at the moment. It is a severe disruption in family routines when, for instance, a parent is unable to vacuum the house for fear of a serious reaction from her child, or when a child is so averse to the sound of a toilet flushing that she will not use the bathroom at school and instead has accidents (Koegel et al., 2004). It is also upsetting for parents to see their child in such extreme distress.

There are two main methods used by some occupational therapists, speech-language pathologists, educators, and audiologists to treat auditory hypersensitivities. The more prevalent is Auditory Integration Training (AIT), a form of sensory integration therapy, though the best-controlled studies of it have repeatedly shown no clinical effect. A comprehensive review of the clinical literature on AIT is not included here, but one can be found in Sinha et al. (2004). The other is by the use of systematic desensitization paradigms, also used in cognitive behavioral therapy to treat anxiety disorders. Systematic desensitization paradigms are generally credited to Mowrer (1960), who theorized that through structured exposure to a feared stimulus, the fear response can be extinguished and the individual can habituate to the stimulus.

AUDITORY INTEGRATION THERAPY FOR AUDITORY HYPERSENSITIVITY

AIT was developed in the 1950s by a French otorhinolaryngologist named Alfred Tomatis. In the Tomatis method, "the stimuli include specially created compact discs of Mozart music and Gregorian chants. The acoustical signal modulation equipment attenuates low frequency sounds and amplifies higher frequencies (300-800 Hz).” (Corbett & Constantine 2006, p. 37). The treatment is hypothesized to “enhance auditory perception by stimulating middle ear hair cells” and the frequency modulation “allows the child to gradually focus listening on language frequencies” (Corbett & Constantine, 2006). These hypotheses represent fundamental misunderstandings in basic audiology and acoustics.

Today, most versions of AIT are commercially available products based on Tomatis’ methods. They use digitally filtered music or speech as the active ingredient in their therapies. After initial testing to set filtering frequencies and levels, the individual would then be assigned some number of listening sessions, during which she listens over headphones. Traditionally, the sound level of the stimulus has been quite high and potentially damaging to the hearing mechanism, but in the past two decades practitioners have paid more attention to safe listening levels, keeping the average level at or below 80 dB SPL, or dB sound pressure level, which is a measure of absolute sound pressure level. 80 dB SPL is approximately the level of a loud alarm clock within arms’ reach (American Speech-Language-Hearing Association, 2009).

Dr. Guy Berard, a student of Dr. Tomatis, went on to develop his own version of AIT, which he used to treat a young autistic girl who later showed great improvement (Stehli, 1997). Both methods use audiometric data to locate frequency bands to which a child is “sensitive”. These are defined as frequencies in the audiogram where a child’s threshold is 5 dB lower than to the frequencies on either side. Music is then band-pass filtered at the “sensitive” frequencies to increase the relative amplitude of the signal in those frequency regions. For example, if a child’s audiogram showed a dip in threshold of 5 dB (a sensitivity) at 2000 Hz as compared to the thresholds at 1000 Hz and 4000 Hz, then music played to the child would be amplified in the region of 2000 Hz. However, many commercial audiometers can only be calibrated to within ± 3dB and the intensity level can only be changed in increments of ±5 dB.

The goal of Berard-style AIT is to achieve an audiogram that shows lower sensitivity for high-frequency (> 4 kHz) and low-frequency (< 1 kHz) sounds relative to mid-frequency (2-3 kHz) sounds. However, normal audiograms take many shapes and represent a point at which a response is elicited a specified percentage of the time, rather than an absolute boundary.

Berard-style AIT uses any type of music, always delivered through one of two proprietary devices, called the Earducator or the Audiokinetron. Both devices contain filters that change center frequency and attenuation level randomly. The goal of the therapy is ostensibly retraining of the stapedius muscle in order to normalize hearing. Again, this represents a misunderstanding of accepted audiological findings. The function of the stapedius muscle is to dampen the vibration of the stapes (stirrup), one of the middle ear bones. The stapedius, which is under reflex control only, stiffens the ossicular chain and effectively reduces the amplitude of sound reaching the cochlea. While it is possible for the stapedius to become paralyzed, as by Bell’s Palsy (a dysfunction of cranial nerve VII, the facial nerve), it is not possible to remediate the condition by “exercising” the stapedius muscle because the muscle has become denervated.

Both Berard and Tomatis listening sessions typically last for twenty minutes to one hour at a time, daily for a period up to twenty weeks. During the sessions, the child is monitored by a therapist who either engages the child in other enjoyable activities and encourages the child to keep the headphones on, or simply keeps the child quiet and calm.

A detailed review of the clinical literature on AIT can be found in Sinha et al. (2004). These authors report that the largest studies of AIT showed no difference on outcome measures between treatment and control conditions, while smaller trials reported clinically insignificant improvements in the total score of the Aberrant Behavior Checklist, which “is not, according to the instrument’s developer, a clinically meaningful outcome.” (p. 8)

TREATMENTS OTHER THAN AIT FOR AUDITORY HYPERSENSITIVITY

A. Desensitization Paradigm for Auditory Hypersensitivity

The non-AIT research on auditory hypersensitivities in autism takes a very different view of their causes and, thus, the treatment. In the view of Koegel et al. (2004) the problem of hypersensitivity to sounds in children with autism is that “the child’s extreme aversion to these stimuli may relate to an irrational fear of the stimulus rather than to pain associated with the stimulus” (p. 123); that is, a child with hypersensitivities may have a phobia. Koegel et al. therefore implemented a systematic desensitization program with three children with autism who displayed auditory hypersensitivities, to see if these children could become comfortable in the presence of the sounds. By the end of the study, all three children showed no reaction to the presence of either the sound or the object that made the sound.

The children in the Koegel et al. (2004) study presented with both autism, diagnosed according to DSM-IV criteria (American Psychiatric Association, 1994) and “apparently severe hypersensitivity to auditory stimuli”. Diagnoses of severe hypersensitivity to sound were made on the basis of parental report and clinical observation, and each child’s reactions to the particular sounds they found noxious were documented in the baseline condition. Sounds that caused distress included a toilet flushing (Child 1); animal sounds from toys (Child 2); and vacuum, blender, and hand mixer sounds (Child 3). Subjects were referred to the clinic where the authors work, for treatment of auditory hypersensitivity and other symptoms of autism; no randomization was used in this study because it was a repeated single-subject design.

The behavior of all three children in response either to the noxious sound or the object associated with that sound was assessed at baseline, as a matter of course during the study, and at a follow-up session after treatment. The structure of the baseline and follow-up sessions was identical and consisted of videotaped visits to the locations (home, school, stores) where the children encountered the noises that caused them discomfort. During these visits, an interval recording system was used, in which raters rated the behavior of the child in continuous 10-second intervals. Behavior was classified as "comfortable" (score of 0), "mild anxiety" (1), "high anxiety" (2), or "intolerable reaction" (3). The authors define each of these categories operationally and rated each child's behavior every ten seconds. Behavior rating scores were averaged every three minutes to obtain mean anxiety scores for the sessions, and a hierarchical step was deemed completed if the child's behavior averaged "comfortable" for two to four consecutive three-minute intervals. Agreement was defined as the two raters giving the child's behavior the same label for the interval. Inter-rater agreement was assessed and ranged from 83% to 100%, with a mean across all sessions of 96.8%. Two raters of the child's behavior were involved in coding, one of whom was blind to the treatment portion of the paradigm. The blinded rater scored the child's behavior from videotapes presented in random order. The high mean inter-rater reliability suggests that the lack of blinding for one rater did not introduce measurable bias into the scores.

The dependent measures used in this study were the number of hierarchical steps per week where the child's anxiety level was judged as "comfortable" and the mean anxiety level during a session. Follow-up probes were conducted approximately three weeks after the end of treatment (i.e., after the child had experienced at least one session in the presence of the sound, during which the mean level of anxiety was "comfortable" in conditions identical to baseline). At both baseline and follow-up, the child was in the same room with the stimulus sound and its source, and mean anxiety levels were rated. As the anxiety levels were reduced until they reached and remained at a certain criterion, tests of statistical significance are not relevant and were not employed in the analysis.

The only negative effects alluded to in the study were that the children would be put in a position to show anxiety during the baseline condition. However, the criterion for advancing a child from one step in the desensitization hierarchy to the next was fairly conservative: a step was deemed completed if the child spent two to four consecutive three-minute intervals of time at a "comfortable" level of anxiety. This meant that the child showed no anxiety relating to the stimulus and appeared to be relaxed, playing happily, and unaffected by the sight or sound of the stimulus for six to twelve minutes at a time.

B. Behavioral Modification Paradigm for Auditory Hypersensitivity

In contrast with Koegel et al., who considered the auditory hypersensitivity to be a phobia, Devlin et al. (2008) treat the issue of hypersensitivity to sound in children with autism as a purely behavioral problem. Specifically, the child who was studied in their paper "emitted problem behaviors such as feet stomping, aggravated delayed echolalia, and covering his ears when exposed to various selections of music." (p. 673). Devlin et al. investigate the effectiveness of a DNRO, or "differential negative reinforcement procedure", to reduce the problem behavior.

The sole participant in this single-subject study was a six-year-old boy with diagnoses of Autism Spectrum Disorder and Learning Disability. The authors do not specify who made the diagnosis or according to which criteria. Neither is the method of finding the subject and entering him into the study described, and no blinding methods were mentioned. A control condition was used in which the participant had free access to preferred toys in the absence of musical stimuli.

Pre-and post-baseline measures consisted of identifying "disruptive behavior". This was defined as covering ears, displaying aggravated delayed echolalia, agitated finger spelling, or foot-stamping. Agreement statistics on identification of the behavior averaged 97% over two raters and ranged from 91% to 100%. Mean levels of disruptive behavior were plotted for all stimuli for all sessions, until a total of 16 or 17 sessions, comprising approximately five minutes of therapy. No negative side effects were discussed, except for the need to expose the child to the music in response to which he was displaying disruptive behavior.

The DNRO procedure consisted of exposing the child to music for short, gradually-increasing intervals. If the child refrained from showing the behavior for, say, five seconds while the stimulus was present, the music only lasted 30 more seconds, after which the teacher turned it off. If the child did display the behavior during that five-second interval, the music was left on and the interval restarted. The length of the interval increased from five seconds to two minutes, over seven non-equal steps. Devlin and colleagues used four types of music and three playback sources (CD, iPod, and *a capella* from one of five singers; Disney songs, pop tunes, TV theme songs, and classical music), randomly selected for each interval, yielding 12 conditions. The number of 10-second intervals in one-minute sessions during which the child displayed the behaviors was assessed before and after treatment. All lessons lasted for five minutes total and were conducted three to six times per day at the child's school. A control condition was also monitored for the same problem behaviors which consisted of a five-minute block of free play, during which the child had free access to favorite toys, with no music present. At baseline, over all music type/playback device conditions, the mean number of 10-second intervals with problem behavior per minute of music was 4.5 (out of six; i.e., six 10-second intervals per minute). Mean number of intervals per minute with disruptions with no music was 0.8. After an average of 10.2 lessons over all playback/music types, the average number of intervals per minute with disruptions while music was present was 0.2. The authors report that “no incidents of problem behavior were recorded for each of the {listening} conditions following treatment session 6.” (p. 676). The authors state that “treating individuals with developmental disabilities to tolerate multiple forms of auditory stimulation is important because this may act as a form of desensitization to auditory sounds that occur readily in the natural environment.” (p. 679)

PERCENTAGE OF NON-OVERLAPPING DATA ANALYSIS

A “percentage of non-overlapping data” (PND) analysis can be used to quantitatively evaluate treatment effectiveness in studies using single-subject designs such as the Koegel and Devlin studies. Scruggs et al. (1987) define PND as “the percentage of data points during the treatment phase that exceed the most extreme data point in the baseline phase.” A PND analysis can be interpreted as a treatment effect, according to Mastropieri & Scruggs (2001): greater than 90% PND indicates a very effective treatment, 70%-90% PND indicates an effective treatment, 50%-70% PND indicates a questionable treatment, and less than 50% PND an ineffective treatment. For example, imagine that the number of coughs per minute for ten consecutive minutes was used as an evaluation of the effectiveness of an antitussive drug. If, while the antitussive was not being used, the number of coughs per minute for ten minutes was always between five and ten; but while the antitussive was present, only one 1-minute interval in ten minutes contained more than four coughs, the PND value would be (20-1)/20, or 95%.

PNDs for both the Koegel and Devlin studies were calculated. In the Koegel study, the baseline level of anxiety each child showed in response to their feared stimulus was “intolerable” (3). Therefore, the number of treatment intervals, or steps in the desensitization hierarchy, during which a child showed an anxiety level of (0), (1), or (2) was counted. The number of steps at 0, 1, or 2 was then divided by the total number of hierarchical steps to yield the PND value. In fact, every child’s anxiety level was rated as “comfortable” (0) during the treatment phase in Koegel’s study, since the goal was for the child not to experience anxiety in the increasingly close presence of the feared noise.

For Devlin’s study, during the baseline condition, the child showed disruptions during one 10-second interval. For each playback (treatment) condition, the number of intervals during which the subject showed more than one interval with disruptions was tallied and divided by the total number of treatment intervals to yield the PND percentage. Then, the results were combined across all playback conditions for a total for this subject. All of these figures are tabulated in **Table 1**.

Study	**Child/Condition**	**Tx Intervals > Baseline**	**Total Tx Inter vals**	**%**
Koegel et al.	Child 1, toilet	16	18	89%
	Child 2, animal noises	17	20	85%
	Child 3, vacuum	17	20	85%
	Child 3, blender	22	25	88%
	Child 3, mixer	3	4	75%
	All conditions	**75**	**87**	**86%**
Devlin et al.	CD + TV themes	5	5	100%
	CD + pop tunes	1	3	30%
	a capella + Disney	5	5	100%
	a capella + pop tunes	5	5	100%
	a capella + TV themes	5	5	100%
	iPod + TV themes	5	5	100%
	iPod + pop tunes	0	4	0
	TV + Disney	5	5	100%
	TV + pop tunes	5	5	100%
	TV + TV themes	5	5	100%
	All conditions	**41**	**48**	**85.4%**

Table 1. PND Analysis for Behavioral Studies.

For the Koegel study, for Child 1 and toilet flushing noises, 16 of the 18 hierarchical steps were completed with the child’s behavior rated as “comfortable” (this includes three follow-up sessions at the last step in the hierarchy). Only during the two first sessions was the child’s behavior rated as anything but “comfortable”. Child 2 completed 17 of 20 hierarchical steps with “comfortable” behavior in the presence of an animal noise toy, again including follow-up sessions after treatment was finished. Child 3 had a more complex case. With vacuum noise, 17 of 20 steps were completed at the “comfortable” level. With blender noise, 22 of 25 steps were completed comfortably, including sessions with the same stimulus at a novel location. If that treatment sequence were broken into two sections, those conducted at home and those conducted at the alternate location, the figures would be 16/18 “comfortable” at home (89%) and 7/8 “comfortable” at the alternate location (87.5%) instead of 22/25 sessions overall at “comfortable” (88%). On first analysis, the outlier appears to be the hierarchical steps with mixer noise. However, it is important to remember that Child 3 independently generalized to this condition. Once he had shown habituation to the sound of the mixer, therapy was discontinued, even though more sessions at which his behavior in the presence of the mixer sound could have been rated "comfortable" would have improved the PND score. Thus, the number of steps during which Child 3's behavior in the presence of mixer noise could have been rated "comfortable" was, in essence, artificially low. The first session with mixer noise was the baseline condition, and the last three were essentially follow-up sessions, conducted 30 weeks after the baseline condition with the mixer.

In any case, the PND values for the Koegel study all fall within the "effective" range. Remembering that the goal of the treatment was to extinguish symptoms of distress in the presence of the feared sounds, that each child was kept at a comfortable level during all hierarchical steps, and that no child demonstrated any symptoms of anxiety in the presence of the sounds after treatment, it appears that the treatment was indeed successful.

In the Devlin et al. study, the control/no-treatment condition was effectively the opposite of that in Koegel et al. (2004). In Koegel et al., the children's behavior during treatment was compared to the level of distress shown during the baseline condition with the feared stimulus. In the Devlin et al. article, the child's behavior was compared to a free-play condition when no music (i.e., the feared stimulus) was present. This illuminates a great difference between the two studies. In the Koegel et al. study, the aim was to keep the child comfortable throughout the therapy. In the Devlin et al. study, no attempt was made to keep the child comfortable, but instead to teach the child not to display certain behaviors. Presumably, by the end of the therapy, the child in the Devlin study also became desensitized to the previously feared stimulus, but the Koegel et al. approach seems much more humane to implement because the child is always kept in a calm state. On the other hand, one can imagine Devlin's methods as being more amenable to the teaching of coping strategies.

In the Devlin study, all conditions except for pop tunes played on an iPod and or CD showed no overlap, meaning that the child showed more intervals of distress during treatment than during free play (control). Most interesting are the pop tunes conditions. While pop tunes were playing, whether from CD, iPod, or *a capella* recordings, the child showed the lowest number of intervals with disruption – similar numbers to the free-play condition. This would suggest that the pop tunes bothered the child least of all the types of music. Over all conditions, the average PND for the Devlin study was approximately 85%, again well within the "effective" range.

TREATMENT EFFICIENCY ESTIMATES

This section examines the amount of time required to achieve the results demonstrated in the literature, as an indication of how efficiently the treatment delivered the effects it promises.

The shortest amount of time that complete desensitization took Child 1 in the Koegel et al. study was approximately two and a half hours, over five days. For Child 2, the course of therapy lasted approximately one week from baseline to follow-up, or a total of approximately two hours of therapy over seven days. Therapy for Child 3, who had three sounds needing treatment, was conducted in one-hour sessions, once per week for 34 weeks. This included five weeks of baseline to sounds 1 and 2, four weeks of follow-up to sound 1, three weeks of follow-up to sound 3, and an additional five weeks of extra therapy designed to desensitize the child to sound 2 in a different environment. Excluding the follow-up sessions, this child required a total of 22 weeks of therapy for three sounds in two different locations. At follow-up, all children were judged by both raters to be comfortable with the sound playing and the object that made the sound present and in view.

It is more difficult to ascertain the amount of treatment time used in the Devlin study. The child in question was given therapy during the school day, for five minutes at a time, three to six times per day. Twelve combinations of playback source and music were employed, so it would seem that twelve therapy sessions were used and that the total number of days of therapy was approximately ten.

For both the Koegel et al. and Devlin et al. studies, requiring five to 34 treatment sessions to completely eliminate the problem behaviors associated with auditory hypersensitivity in all four subjects, to all sounds, objects, and environments contrasts sharply with the mixed clinical results from AIT, which according to Sinha et al. (2004) show little to no clinical effect. The spontaneous generalization that Koegel's Child 3 showed to the final sound in his hierarchy also indicates that he internalized an important lesson and learned some sort of coping strategy. In the studies reporting on AIT, by contrast, 10 to 100 hours of therapy were required, despite clinically insignificant improvements in aberrant behaviors. (Most published studies use a 10-hour course of therapy, given twice per day in 30-minute blocks). Madell (Madell & Rose 1994, Madell 1999), a proponent of AIT, states clearly that "the goal of the therapy is to *reduce* auditory symptoms that that may be interfering with a child's auditory functioning," (1999, p. 372) and that "{AIT} is a treatment (not a cure) for auditory symptoms." (1994, p. 16) In addition, another proponent of the therapy cautions readers that "typically only 60% of children with autism respond" to auditory integration training (Neysmith-Roy 2001).

It is clear that Devlin's (2008) and Koegel's (2004) methods provide much better efficiency than AIT. Neither required specialized training or equipment and therefore resulted in no extra cost to the clinician; yet both completely eliminated the disruptive behavior they were designed to treat. A drawback of the Devlin approach is that it appears to be punitive and is less child-centered than Koegel's desensitization therapy, in which the child is kept comfortable at all steps in the hierarchy. On the other hand, allowing a child to experience discomfort in a safe, controlled situation where coping strategies can be explicitly taught is more educational than avoiding discomfort. By contrast, AIT therapy, child-centered or not, generally yielded no results and cost the clinicians money for equipment and training (and, thus, lost therapy hours).

DISCUSSION

Hypersensitivity to sounds is a difficult symptom of autism or other developmental disorders. This is especially true when a child's reaction is extreme, prolonged, or involves injury to himself or others. It causes significant disruption in family life and creates a tremendous amount of extra stress on families who already have many concerns. Hyposensitivity to auditory stimuli, perhaps a more complicated condition, can also cause great sadness for parents who wish to engage with a child who does not respond to his or her name. It is therefore vitally important to find effective treatments for both conditions. Auditory integration training is a popular therapy, offered by many therapists, but behavioral or desensitization therapies are another option.

Because there are so few peer-reviewed studies on behavioral treatment for auditory hypersensitivity, a variety of criteria must be considered when evaluating the literature. Thus, this paper examined the effectiveness of behavioral therapies according to a "percentage of non-overlapping data" (PND) analysis, an estimate of treatment efficiency in terms of time-to-completion and proportion of symptoms remitted, and an estimate of the burden to the clinician for different types of therapy.

According to a PND analysis, the behavioral studies' treatment paradigms were both in the "effective" range. Behavioral methods took approximately five hours, but all children who received this type of therapy showed complete extinguishment of symptoms after treatment, in contrast to the approximately 60% of individuals in whom symptoms of auditory hypersensitivity are reduced (Madell 1999). AIT therapies impose a significant financial and training time burden on the clinician who wishes to employ them, while behavioral therapies do not.

The two behavioral studies cited in this paper describe a version of their therapy given to nonverbal or minimally verbal children, but is not difficult to imagine how to modify the therapy for children with better communication skills. Devlin et al. comment, "Alternative forms of treatment (e.g., teaching one to walk away from sources of aversive auditory stimulation) could have been considered for the participant in this study. In addition, when circumstances allow the termination of music, the strengthening of a communicative response presents as an attractive alternative to the intervention used in the present investigation." (p. 679) In other words, combining behavioral or desensitization methods with child-initiated requests, verbal reinforcers, positive self-talk, or other methods from cognitive behavioral therapy would be appropriate for more verbal children and could enhance the effects by explicitly teaching a child effective coping skills. At the same time, cognitive behavioral techniques can improve self-awareness, communication skills, and adaptive behavior.

Regardless of the theoretical implications of the clinical results, Koegel et al. point out that "the children's ability to become comfortable with stimuli that were judged to be intolerable is socially significant… Following intervention, they were able to participate in all settings and the families did not need to avoid specific settings or alter their lifestyles because of possible negative effects they may have had on their child." (p. 133.) Reducing parents' stress helps not only the parent, but also the child with a disability and any siblings as well.

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