Helping Parents and Professionals
Make an Informed Decision:
An Evaluation of Current Treatment Methods
for Childhood Autism
by
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Abstract

Several programs and techniques for the treatment of autistic children are presented; each method is represented by a description of its philosophy and its program, followed by an evaluation of relevant research of the program and its efficacy. An account of current biological treatments is also included. It must be noted that the treatment methods presented here are by no means an inclusive list; the treatment of autistic children is a controversial and constantly changing field, and the treatments discussed represent only a sampling of those that parents and professionals may encounter in their search for a treatment method for their autistic child.
In recent years, many approaches to the treatment of autistic children have been developed, encompassing behavioral, biological, and educational realms, among others. This diversity among the methods of treatment has often resulted in frustration and confusion for parents who have discovered that their child is autistic, as well as for those professionals who attempt to assist them in their search for a treatment regimen. This paper will attempt to outline and evaluate the current treatments for autism, thus providing parents and professionals with a reference to the diverse treatment methods for autistic children.

One reason why the treatments for autistic children are so diverse is that, by nature, the disorder of autism encompasses many aspects of life. Most autistics experience deficits in social relationships, communication, and language, and display marked behavioral problems (Smith, 1990). Due to the difficulty of any single treatment method successfully correcting all of these impairments, most approaches focus on only one or two. As a result, choosing a treatment program from among the many that are available can be a harrowing process. The specific goal of each program often necessitates following several of them at the same time in order to achieve noticeable improvements in the child's behavior.

An additional difficulty in finding an appropriate treatment method for an autistic child is the complexity of the term "autistic" in itself as a diagnostic term. Autism is often a "catch-all" term applied to a variety of disorders which are more
accurately described as "autistic spectrum disorders" (Szatmari, 1992). The autistic spectrum disorders refer to forms of pervasive developmental disorder (PDD--of which autism is a part) that are not cases of classical autism. Some of these disorders are classified as autistic-like, autistic tendencies, Asperger syndrome, and others (Szatmari, 1992). Because these disorders share exceptionally similar symptoms, there is currently some controversy as to whether they should be considered separate disorders or simply differing degrees of autistic disorder.

Despite the conflicts over the correct diagnosis of autistic disorders, treatment methods have been devised which are applicable to the full range of pervasive developmental disorders. The treatment methods presented in this paper have been chosen because parents are likely to come across them in their search for an appropriate treatment method for their child, yet to the author's knowledge they have not previously been described and evaluated in one reference. The treatment methods outlined also share one important component: many of the techniques described can be used by parents as they attempt to develop their own home-based program or a supplement to their child's school program. Home-based schooling for autistic children has become fundamental as the importance of early intervention and constant learning opportunities in the treatment of autistic children have become apparent.

Several programs and techniques for the treatment of autistic children are presented; each method is represented by a description
of its philosophy and its program, followed by an evaluation of relevant research of the program and its efficacy. An account of current biological treatments is also included. It must be noted that the treatment methods presented here are by no means an inclusive list; the treatment of autistic children is a controversial and constantly changing field, and the treatments discussed represent only a sampling of those that parents and professionals may encounter in their search for a treatment method for their autistic child.

THE OPTION METHOD

The Family Therapy Program at the Option Institute in Massachusetts was founded by Suzy and Barry Kaufman after they found out that their own child was autistic. The recovery of the Kaufman’s son by this method of treatment is documented in the book Son Rise (1976); a detailed account of the Option Method also appears in the book When Snow Turns to Rain (1993) by Craig Schulze.

The Option Philosophy

The philosophical foundation of the Option Method is complete acceptance of the child, the belief that the child should be loved and respected just as he or she is. The focus of Option therapy is thus to convey this acceptance to the child, while attempting to gain trust and facilitate growth and change. As Craig Schulze (1993, p. 92) explains, "A session is a time for
gaining...trust by expressing verbally and nonverbally an unconditional affection." This trust is often gained by imitating or exaggerating the child's actions, by engaging in self-stimulation along with the child (hand-flapping, for example), and following the child's lead.

Several assumptions about the autistic child underscore Option's beliefs about the efficacy of this method. The first is that autistic children are extremely sensitive to the real feelings of others, such that negative emotions felt by others will be sensed by the child and that his or her reaction to those emotions will be reflected in his or her behavior. Secondly, the behavior of autistic children should not be criticized or judged; they should be seen as doing the best they can with the resources that they have. Finally, the child must perceive control over his or her own learning and environment for growth to occur (Jordan and Powell, 1993). Thus, according to the Option Method, an autistic child will experience optimal growth when the therapist unconditionally feels and shows genuine caring and acceptance of both the child and his or her behavior, and when the child sees himself or herself, rather than the therapist, as being in control of the therapy session.

In accordance with these assumptions, there is no set agenda of skills for the child to learn in the course of therapy. If the child is unconditionally accepted and feels in control of the therapeutic situation, social, cognitive, and behavioral growth should spontaneously occur (Jordan and Powell, 1993). To increase
the child's sense of control over his or her environment, it is strongly recommended that the child be confined to a room or rooms which would serve as a safe and predictable environment where all therapy would take place. By limiting therapy to one constant setting, the child is better able to achieve mastery of the situation and is expected to learn and want to communicate all the more quickly.

The Program

The Option Method requires a two week long training session for parents and their child at the Option Institute in Massachusetts, run by the Kaufmans themselves. According to Schulze (1993), the program is costly and emotionally intense, consisting of the child receiving one-on-one therapy for fourteen hours each day. After parents observe trained staff members working with their child, they then work with their child themselves and receive feedback from the staff members. Group meetings with parents and staff provide an open forum for discussing the child's progress; parents also receive counseling sessions to help them deal with any concerns they have which may influence the effectiveness of the program (Schulze, 1993). The final goal of the training session is to enable the family to set up a home-based Option program, using volunteers, which replicates the procedures taught at the Institute.
Evaluation

While the Option Method presents an attractive philosophy in the treatment of autistic children, there is very little evidence of its efficacy. At the present time the one documented successful case is that of the Kaufman’s own son (Kaufman, 1976); however, researchers are currently attempting to assess other cases in the United Kingdom (Jordan and Powell, 1993). Definitive research is needed to determine the extent of the program’s success, and, if it is found to be successful, exactly what components of the program contribute to its effectiveness.

THE HANEN PROGRAM

The Hanen Centre is a non-profit organization located in Canada which offers training for parents in teaching their children to communicate more effectively. The program endorsed by the Hanen Centre is an easy to follow, common sense approach that parents can incorporate into their everyday interactions with their children. While the program is not designed specifically for use with autistic children, the techniques that it offers are deemed effective with all language-delayed children.

The Hanen Philosophy

The Hanen Program uses an interactive model of communication that is designed to enhance the child’s participation and enjoyment in naturally-occurring interactions (Girolametto, Tannock, & Siegel, 1993). Because of its emphasis on learning to communicate
in natural situations, the main focus of the Hanen Centre is educating parents and teachers of language delayed children on their interactive techniques. The center offers group training for parents combined with individual consultations through the Hanen Parent Program (T. Khan, personal communication, April 28, 1995). A number of books have also been written which outline the Hanen approach.

The Hanen Program

The Hanen Centre has published a book entitled *It Takes Two to Talk: A Hanen Early Language Parent Guidebook* (1990), which outlines steps for parents to follow in implementing the program. The following information was taken from an excerpt of that book entitled, "The Caring Connections that Help Children Communicate" (T. Khan, personal communication, February 13, 1995).

The two main concepts which the parent needs to utilize in the program are the "O.W.L." method and the "3A Way". The "O.W.L." method encourages parents to Observe their child, Wait for any attempts at communication by the child, and then Listen attentively and sensitively to him or her. According to the Hanen Program, this attentiveness and willingness to listen will be felt by the child and will encourage more attempts at communication. The "3A Way" urges parents to Allow their child to lead, to Adapt their own behavior to "share the moment", and to Add new language and experience to the child's existing knowledge.

In learning to allow their child to lead, parents should
assume the role of a responsive partner in their interactions with their child. Being a responsive partner involves encouraging the child to communicate by responding to his or her attempts in a sensitive and appropriate manner. This style stands in contrast to the "helper," who does not allow the child to take the initiative; the "mover," who does not follow the child’s lead, but attempts to lead the child; and the "teacher," who does not acknowledge that children learn best by doing and not by following. In order to become a responsive partner, the parent should be face to face with the child and wait for the child to express himself, either verbally or through an action. The child’s expressions should then be imitated and interpreted by the parent in a way that shows the child that the communication was understood and appreciated. This type of rewarding interaction becomes the prime motivator for the child as more attempts at communication are made.

Once the child has been allowed to lead, the parent must adapt his or her own behavior to follow the lead of the child. To give the parent an idea of the best way to respond to fully share the interaction with his or her child, the Hanen Program has identified four types of children and the most effective way of responding to each type. The passive child does not initiate contact with others, shows little interest in communication, and often appears not to understand when others attempt to communicate with him or her. The shy child responds only when spoken to, often avoids communication, and does not use the skills that he or she has. The child who has his or her own agenda appears uninterested in
communicating with others, preferring independent activities over interaction. The sociable child, in contrast, enjoys interaction with others, but does not have the abilities to express him or herself clearly.

The most effective way of reaching the passive or shy child, according to the Hanen program, is to create situations in which the child will be likely to attempt to communicate. Such situations include: engaging in activities that the child enjoys, stimulating the child’s curiosity by creating opportunities for exploration, and repeating such pleasurable activities until they become predictable. In all situations the parent should remember to "O.W.L.,” observe, wait, and listen to the child, and to be face to face with the child. When the child attempts to communicate, that attempt should be imitated and interpreted by the parent. The program highly stresses imitation as a means of connecting with the shy or passive child.

As with the shy and passive child, the most effective way of reaching the child who has his or her own agenda is to create opportunities for communication. New and exciting activities such as water play that the child will enjoy should draw attention away from his or her individual agenda and encourage interaction. Following a familiar routine is also suggested for this type of child, because it provides structure and discourages deviation from the routine. Once the child responds to these activities by attempting to communicate, the parent should immediately recognize and respond to the attempt by imitation and interpretation which
shows the child that the communication is accepted and respected.

While the parents have to adapt their behavior to encourage communication for the shy, passive, and own-agenda child, the adaptation for the sociable child simply involves teaching more effective ways of communication. The child’s attempts to communicate should be acknowledged and interpreted; the parent should repeat his or her interpretation of what the child said in the correct manner. The parent should then continue the conversation by adding more information about the child’s topic to encourage more interaction on the part of the child and to increase his or her conversation skills. The sociable child should also be included in daily routines and allowed the opportunity to participate in activities with the parent, but participation should always be the child’s choice.

Once the parent’s behavior has been adapted to suit the child’s style, information should be added to enhance the child’s communication. Just as the parent’s behavior is adapted to the child’s responding style, the amount and type of information that is added depends on the child’s development level. At stage I, the child does not intentionally make an effort to communicate, although his or her actions may be interpreted as such efforts. The child’s actions in Stage II are more easily interpreted as reactions to the environment, although they still are not deliberate attempts at communication.

At Stages I and II, the child’s actions or sounds should be imitated, then followed by new information. People and objects
should be labelled, those objects should be shown to the child, and key words should be emphasized. Exaggerated facial expressions and gestures, short, simple sentences and a slow rate of speech help to hold the child's interest and make the communication more understandable.

When the child passes into Stage III, he or she has now developed an interest in interacting and communicating. Speech and gestures begin to emerge as the child attempts to relate his or her interests to others. The parent should continue using strategies from Stages I and II, while encouraging the child to imitate short words. Longer phrases should also be added which the child may understand but not yet be able to express, and the subject matter should be more varied, including labels, feelings, and descriptions.

As Stage IV, the final stage, is reached, the child consistently uses words and phrases, but may be hard to understand. To further help the child's developing language skills, the parent should continue to encourage imitation of key words, and to add more information to the child's topic. In addition, creativity and reasoning skills should be exercised through imaginative and pretend play and by relating a topic of conversation to an experience in the past or future.

The Hanen Program emphasizes imitation, repetition, and respect for the child's attempts at communication, as well as following the child's lead and adapting to share the moment the child's attempts create. The steps outlined here should be
incorporated into everyday interactions with the child, allowing the child to take advantage of the opportunities for communication which exist in every situation.

**Evaluation**

The Hanen Centre conducts on-going research on its program and its effectiveness, and the results have been consistently positive (T. Khan, personal communication, May 8, 1995). Because the Hanen Program is a parent-based program, recent research has focused on parent's ratings of satisfaction with the program, along with a comparison of the parent's ratings to an objective measure of the program's efficacy. In one study (Girolametto et al., 1993), parents were given periodic questionnaires regarding their satisfaction with the program, including a follow-up questionnaire four months after the end of the study. Parents were also videotaped while working with their child; the videotapes were then rated by two objective examiners and compared with the parents' ratings. This was done to ensure objectivity of the results.

No significant difference was found between the parent's ratings of the program and the objective ratings of the examiners. The group meetings as well as the home-based instructional component of the program were both rated very highly by the parents. Furthermore, the follow-up revealed that four months after the end of the program, 100% of the parents were still using the techniques taught during the program. Over two thirds of the parents also reported that they had taught the techniques to other
caregivers as well. Thus, the Hanen Program was found to be both effective and useful for parents and their families.

In another study, the behavior of mothers who had gone through the Hanen program was found to be more facilitative of learning than the behavior of mothers in a control group (Girolametto, Greenberg, & Manolson, 1986). The mothers who had taken the program were more responsive and included more labelling and commenting in their speech than the control group; these behaviors have been associated with promoting increased responsiveness and interaction in the child. The children's use of verbal turns and vocabulary also improved as a result of the program.

Based on these studies, the Hanen Program appears to be a useful and easy to follow method of encouraging communication in language delayed children. The program's focus on training parents to teach their child seems to be essential in the program's success of teaching children to communicate in natural, everyday interactions.

**DAILY LIFE THERAPY**

Daily Life Therapy is an educational method for treating autism which was developed in Japan by Dr. Kiyo Kitahara; this method is available at the Boston Higashi School in Massachusetts. This school is unique in that the children are taught in a group setting, much like the classroom settings in traditional education. In addition, most of the children at the Higashi School are residential students.
Philosophy of Daily Life Therapy

Quill, Gurry, and Larkin (1989), in a preliminary observational study of Daily Life Therapy, outlined the five basic principles of this method. These five principles are: group oriented instruction, highly structured daily routines, learning through imitation, physical exercise, and instruction in the Arts. According to Quill et al., these five principles seem to form the basis for Kitahara's educational model; as such, each will be described here in detail.

As already mentioned, the Boston Higashi School focuses on group, rather than individual, instruction. The classrooms range from 6 to 10 children each, with an average student to teacher ratio of 8 to 1. The students are expected to respond to the teacher's instructions as a group; once an instruction is given by the teacher, the correct response is then modeled by him or her. If necessary, physical, verbal or nonverbal prompts are given to individual children who need assistance. Any child engaging in a challenging behavior, such as self-stimulation, is immediately redirected back into the group by one of the teachers; as the focus of the school seems to be on group performance, such disruptive behavior is discouraged (Quill et al., 1989).

Highly structured routines are embedded not only in the classroom, but in everyday life at the Higashi School as well. All activities, including eating and sleeping, are maintained by a rigid daily schedule. Classroom activities are conducted on a set schedule that the autistic children can easily learn and follow;
fixed transitions in between different activities also make it easier for the children to predict which activity they will engage in next. Within each activity only a limited amount of instructional materials are used, with very limited responses expected of the children. The children thus learn through these routines what is expected of them in each classroom situation, while achieving a sense of mastery over their environment (Quill et al., 1989).

Another of the basic principles of Daily Life Therapy as indicated by Quill et al. (1989), is an emphasis on learning through imitation. Gross motor, visual-motor, and verbal skills are all learned mainly through imitation. Gross motor imitation is encouraged through the extensive physical exercise program, which encompasses a number of skills. Visual-motor skills are developed through the use of worksheets and art lessons which the students are required to copy or trace; such worksheets are used for all classroom lessons. And finally, verbal skills are fostered through encouragement of imitation of speech and song, which is also included in all of the children's lessons. Learning through imitation is a vital aspect of the Higashi School's program.

Another aspect which seems just as important as imitation is the school's focus on vigorous physical exercise as a main part of the curriculum. In addition to running for 20 minutes 2-3 times a day, the students are also required to take part in a daily exercise session consisting of gymnastics, aerobics, and martial arts, as well as an additional hour of outside play. Less vigorous
exercise routines are followed for the preschool children, with their program consisting of walking, playing on playground equipment, and imitation games (Quill et al., 1989).

The final basic principle of the Boston Higashi School is a focus on art forms as a fundamental component of the curriculum. These art forms consist of lessons in art, music, and movement. As with all of the curriculum at the Higashi School, these lessons are highly structured and repetitious and involve copying and imitating (Quill et al., 1989).

The Program

The group-oriented classrooms of the Higashi School are conducted much like the traditional American classroom. Children are grouped together in classes based primarily on their age, and secondarily on their skill level (Quill et al., 1989). Grade levels run from preschool through secondary education.

Evaluation

While the program at the Higashi School itself has not been empirically studied, research has been generated which provides support for several of its principles, most notably physical exercise and learning through routine. While these studies support the efficacy of these general principles, they have not been conducted within the context of Daily Life Therapy, and may therefore be limited in their support of this program.

Research has shown physical exercise to have a positive
effect on the reduction of self-stimulation in autistic children (Kern, Koegel, Dyer, Blew, & Fenton, 1982; Kern, Koegel, & Dunlap, 1984; Watters & Watters, 1986, as cited in Quill et al., 1989), as well as on the facilitation of their learning abilities (Hardy, 1987, as cited in Quill et al., 1989). Daily Life Therapy’s emphasis on rigorous physical exercise seems warranted in light of this research evidence, and as noted by Quill et al., can provide researchers with a testing ground to examine the effects of physical exercise on the behavior and learning abilities of autistic children.

Research has also indicated that the predictability inherent in routine makes learning easier for autistic children and also reduces behavioral problems (Olley, 1987, as cited in Quill et al., 1989). However, rigid routines have been associated with a dependency on cues and difficulty with generalizing skills in other classroom settings (Quill, 1987, as cited in Quill et al., 1989). While the structured schedule of the Higashi School may make learning easier in the classroom, it seems it would be difficult for the students to apply that learning to other situations, such as the home, where daily life is not highly structured.

As Quill et al. (1989, p. 629) reported, "while behavioral control was established in the form of children following the flow of the group, active participation in group activities and production of desired responses was not observed in most of the children." Thus, while the Higashi School’s methods do seem to be effective in maintaining behavioral control of the children, there
is some question as to whether or not the children are actually learning new skills. The highly structured routines and the teacher's prompting seem to be responsible for the children's high level of behavioral compliance, rather than true learning.

Further research is needed to assess the effects of the highly routinized structure, as well as the group oriented instruction, on the autistic children's learning in the Higashi classrooms. The Daily Life Therapy program of the Boston Higashi School is aptly named, as it encompasses and is applied to all aspects of the residential students' lives. Given the far-reaching nature of the program, it is important that its efficacy in improving the quality of its students lives is explored. As already mentioned, concerns have been raised as to whether the Higashi School actually teaches new skills to the children, or if they are simply responding to situational cues inherent in the rigid structure of the program (see also Schulze, 1993). Further study is indicated to answer this question and others, and to assess the program offered at the Boston Higashi School.

THE TEACCH PROGRAM

The TEACCH program (Treatment and Education of Autistic and related Communication handicapped Children) is a statewide program in North Carolina based at the University of North Carolina. The state has been divided into five regions, each region having its own TEACCH center to serve that area of the state (Schopler, Mesibov, Shigley, & Bashford, 1984). Each center is also located
near a campus of the University of North Carolina, thus forming an integrated network for the treatment of autistic children.

The TEACCH Philosophy

The TEACCH program began as a research project in 1966, which sought to disprove the then prevailing view of autism "as a form of social withdrawal from pathological parenting" (Schopler, et al., p. 65, 1984). From the results of that project and others, as well as many years of experience with autistic children and their families, the TEACCH program maintains and promotes autism as an organic, rather than learned, disability. Recognizing the cognitive limitations that normally accompany such an organic disability, the program's primary goal is teaching its students the skills necessary to function in society, rather than "normalizing" the students (Mesibov, in press). The students' limitations are accepted, while their strengths are enhanced and improved upon.

One of the most important factors in ensuring that these limitations and strengths are properly assessed is the involvement of parents in the TEACCH program. The program is best described as a collaboration between parents and professionals, with parents being active in every step of the program. Parents are trained as "cotherapists" in their child's treatment and engage in a give and take relationship with the professionals of the TEACCH program; the parents are trained by the professionals regarding the autistic disorder and its treatment, while the professionals are trained by the parents regarding their individual child's skills and
development (Schopler, et al., 1984). Parents are encouraged to carry out teaching sessions at home, which are guided by the same principles used in the TEACCH classrooms. Some parents even become assistant teachers in the classrooms, while many more volunteer to act as chaperones during field trips (Schopler, et al., 1984). Through this collaborative effort, each child receives an individualized treatment program designed to enhance his or her existing skills at his or her current developmental level.

The individualized program that each child receives further reflects the eclectic, or generalist, nature of TEACCH. The purpose of the program is to address the child as a whole, rather than a specific behavior or language problem (Mesibov, in press). The TEACCH professionals are trained in a variety of disciplines which are relevant to the treatment of autism, including education, psychology, counseling, and speech and language (Schopler, et al., 1984). This eclectic nature of the staff allows them to address all aspects of the child's life, and to help the child's parents better manage day to day with a handicapped child.

The final component of the TEACCH philosophy is that autism is such a pervasive disorder that the family of an autistic child will need comprehensive, life-long services (Mesibov, in press). TEACCH has established many community-based programs in North Carolina for autistic adolescents and adults, including four adolescent group homes, respite care programs, vocational training, and social skills training (Schopler et al., 1984). In conjunction with the TEACCH program, these services provide continuous and consistent
opportunities for learning and growth as autistic children become autistic adults.

The TEACCH Program

There are currently 55 classrooms for autistic children affiliated with the TEACCH program throughout the state of North Carolina (Wooten & Mesibov, 1986). These classrooms utilize the TEACCH philosophy outlined in the preceding section through following an individualized program for each child depending on his or her developmental level. The curriculum of the TEACCH program is designed to teach its students the social, language, communication, and prevocational skills which will help them live life more effectively (Watson, 1985).

In order to determine an appropriate individual program for each student and to ascertain each student’s level of functioning at the time of enrollment into the TEACCH program, a series of diagnostic steps are taken. TEACCH has devised a measuring instrument, the Psychoeducational Profile (PEP), which is used to determine each child’s developmental level on several dimensions (Watson, 1985). The PEP has been shown to be both a valid and reliable instrument, yielding an interrater reliability correlation of .92 and demonstrating high concurrent validity with other measures of intelligence (Schopler, Reichler, Bashford, Lansing, & Marcus, 1990). The results of this assessment, along with parental interviews and observations of the child, aid in determining "developmentally appropriate objectives" for each child, which are
then accomplished through a unique, individualized program for that child.

This individualized program involves only adding or learning one new skill at a time. If a child is attempting to learn a new word, for example, every effort will be made to ensure that the word comes from a category whose meaning the child already knows, that it is taught in a context and form the child is familiar with, and that it serves a communication function which the child already expresses (Watson, 1985). In this way the child is able to build upon skills that he or she already knows, rather than attempting to learn a completely new skill, which may be more difficult and cause frustration.

These skills are made even easier to learn by the unique structure of the TEACCH classrooms. The physical layout of the classroom itself visually delineates areas which are specified for different activities; for example, the work area is surrounded by shelves and storage cabinets, while the play area is designated by a brightly colored carpet (Mesibov, Schopler, & Hearsey, 1994). This physical structure enhances the consistency of the autistic children's environment, and allows them to feel more in control of their situation. The amount of physical structure for each individual student is tapered as more independent functioning is achieved (Mesibov et al., 1994).

Just as the physical space of the classroom is structured, so too are the students' daily schedules. The daily schedule is generally stable from week to week, with the exception of the
occasional field trip or special event (Mesibov, et al., 1994). Within the daily schedule, each child also has his or her own individual schedule, comprised of the individual activities each child will perform during each work session. These work sessions are also very structured and routine; for each activity the child is given the following information: "(1) what work they are supposed to do, (2) how much work there is, (3) how they will know when they have finished, and (4) what happens after the work has been completed" (Mesibov, et al., p. 200, 1994).

Normally after a child's work has been completed, he or she is allowed to play or engage in some other enjoyable activity that is a direct consequence of completing the desired task. For example, a child who learns to identify the word "ride" is allowed a ride on a skateboard (Watson, 1985). This type of rewarding activity serves as both a reinforcer and as a motivator for the child. Knowing that an enjoyable activity will follow a work session motivates the child to complete the work assignment, while also reinforcing the child once the work is done. This routine of "first work and then play" (Mesibov et al., 1994) is very important in teaching the autistic child that his or her actions have direct consequences in shaping his or her environment.

The work sessions in themselves also help give the student a sense of accomplishment and of achieving mastery over the environment. Much of the work that is encountered in the TEACCH classrooms is practice with situations that the student will encounter in everyday life. Activities such as learning how to
request help or information, calling a person by name, and increasing the child's vocabulary are typical in the work sessions (Watson, 1985). The situations in which the child is expected to perform the desired act or communication are gradually increased, with the goal of the child eventually performing it spontaneously.

Teachers initially help their students during their work sessions by giving prompts or cues to the correct response. These prompts can take the form of physical assistance, modelling, or verbal instructions (Mesibov et al., 1994). The prompts are gradually reduced, removing first the most intrusive, such as physical assistance, and fading to less direct prompts, such as verbal or sign-language instructions (Watson, 1985). Again, the ultimate goal is for the child to perform the desired act spontaneously without needing any type of prompt.

One of the aspects of the TEACCH program that helps autistic children act more spontaneously is the use of nonhandicapped students as peer models (Wooten & Mesibov, 1986). In several of the autistic classrooms, fifth grade nonhandicapped students are brought in to form a 45 minute long play group with the autistic children three times weekly. The fifth graders are paired up with an autistic student and tutor them in one of three areas: cooking, table games, and outside games (Wooten & Mesibov, 1986). During these activities the autistic students learn to model the behavior of a nonhandicapped youngster their own age, participate in age-appropriate conversations, and learn the skills that they have already learned in their classrooms in a social setting (Wooten &
This program has had much success in teaching the autistic children appropriate behaviors; one student was even able to join his family in playing weekly Bingo after having learned to play with a group of nonhandicapped peers (Wooten & Mesibov, 1986). The use of nonhandicapped children as tutors seems to add a dimension to the program that cannot be achieved with adult teachers alone.

**Evaluation**

Division TEACCH, in conjunction with the University of North Carolina, has generated substantial research support for its program. Several studies have shown the structured teaching method used by the TEACCH program to be effective in facilitating learning in autistic children (Lockyer & Rutter, 1969; Rutter, Greenfield, & Lockyer, 1967; Schopler, Brehm, Kinsbourne, & Reichler, 1971, as cited in Mesibov, 1994). Research conducted to determine the efficacy of using parents as cotherapists has also had positive results (Marcus, Lansing, Andrews, & Schopler, 1978; Short, 1984, as cited in Mesibov, 1994).

The overall effectiveness of the TEACCH program has also been evaluated, based largely on parental reports of satisfaction. Schopler, Mesibov, DeVellis, and Short (1981) found that parents consistently cited the TEACCH program as being "positive, productive, and extremely helpful" (as cited in Mesibov, 1994). This study also found that 96% of the autistic adolescents and adults who had gone through the TEACCH program as children were
still functioning in community-based programs. This stands in contrast to the 39% to 74% of autistic adults reported to be functioning in residential programs outside of their communities (Mesibov, 1994).

The program of Division TEACCH in North Carolina has received international recognition as a model of effective services for handicapped children, and the program's leaders have also received many prestigious awards (Mesibov, 1994). With its individualized curriculum, community-based programs, and tradition of research support, the TEACCH program provides a model of successful statewide services for autistic children.

THE LOVAAS METHOD

The Lovaas Method is a behavioral modification therapy for autistic children developed by Dr. O. Ivar Lovaas at UCLA. Dr. Lovaas has explained his treatment method in Teaching Developmentally Disabled Children: The ME Book (1981), which is a guide for parents and teachers to setting up a behavioral modification program. A detailed account of Dr. Lovaas' method is also presented in Let Me Hear Your Voice (Maurice, 1993), an autobiography of a woman who successfully used the Lovaas method to treat her two autistic children.

Philosophy of Behavioral Modification Therapy

The Lovaas Method is deeply rooted in the theory of operant conditioning, which proposes that behavior can be shaped through
its consequences. In other words, a behavior that is rewarded will be performed again, while one that is punished or ignored is unlikely to be repeated. The Lovaas Method uses this operant model in a discrete trial format which consists of a discriminative stimulus, or the command of the teacher, the child's response, and an immediate reinforcing stimulus—either a reward if the child's response is correct, or the word "no" if the response is incorrect (Bancroft Young Autism Project, 1995).

The skills that are taught to the child in the Lovaas program encompass personal, social, and academic realms. These skills are arranged hierarchically, such that the easiest skills are taught first and subsequent skills build on those already mastered. Each skill is further separated into component skills; a hierarchy of successive small steps, or approximations, to the final goal are taught until the child finally learns and masters the desired skill. For example, if a child is being taught how to wave, he or she will first be physically prompted to perform the act, that is, the child's arm will be physically moved by the therapist, who will also give the child a visual prompt by performing the desired action, while giving a verbal command, usually "Do this." Once the child has mastered waving using a visual prompt only, meaning that the child can wave correctly 90% of the time when given the verbal command and seeing the therapist wave, this skill that the child learned as non-verbal imitation will then be taught as a receptive command. Rather than giving the child the command of "Do this" and modelling the behavior, the therapist will now give the command
"wave" without a visual prompt, and the child will learn this command using the same steps outlined above. The final step is for the child to generalize the behavior and use it appropriately outside of therapy. In this example, this would be accomplished when the child waves goodbye or hello spontaneously in his or her natural environment without prompting.

This type of system is used in teaching all of the skills the child needs to function appropriately in his or her environment, including language. The child learns each of these skills by being rewarded at first for approximations of the behavior, then for behavior performed with a prompt, and finally the prompts are faded and the child is rewarded only for performing the desired action unprompted (Lovaas, 1981). This process is called shaping the child's responses and is the basis of the Lovaas method. For this reason, it is very important to choose a reward that is motivating to the child.

Rewards may be either extrinsic or intrinsic. Extrinsic rewards are those controlled by the therapist, while intrinsic rewards are found in an activity or behavior that the child enjoys (Lovaas, 1981). Extrinsic rewards provided by the therapist normally fall into two categories: primary reinforcers are food items or favorite activities, such as jumping on a trampoline, while social reinforcers are signs of approval provided by the therapist, such as giving the child a hug, tickling him or her, or saying, "Good job!" When a new skill is being taught, primary reinforcers are generally given first and in great quantity to
motivate the child, followed by social reinforcers with only a few primaries when the skill becomes mastered. The ultimate goal is for the desired skill to become rewarding in itself (Lovaas, 1981); a skill or activity is usually performed spontaneously only when it is intrinsically rewarding to the child.

Lovaas (1981) also discusses using punishment as a means of shaping the child’s behavior. He suggests using physical punishment sparingly and only when necessary; however, in the author’s experience, physical punishment has not been a part of a behavioral modification program. Punishment in the Lovaas program frequently involves taking away a positive stimulus rather than adding a negative one (Lovaas, 1981). For example, if a child is being fussy he or she will not be allowed to go play, or if he or she is not cooperating during a drill a reinforcer will not be given. The strongest aversive used is generally the word "no" when the child does not respond correctly or is misbehaving.

The Lovaas Program

The Lovaas Program is often undertaken as a home-based therapy program. Parents may contact UCLA to request a trainer who will help them set up a program and teach basic Lovaas techniques, but there is a very long waiting list. Parents often must become self-trained experts in behavioral modification techniques to successfully implement a Lovaas program for their child. The program consists of intensive one-on-one therapy for 40 hours each week (Rimland, 1987). In order to accomplish this feat, many
parents enlist other "therapists," usually college students, friends, and relatives, to assist in conducting therapy sessions with their child.

Each session is conducted using the discrete trial format as described in the preceding section. The child is given a command, then responds to the command, and is either rewarded if the response is correct, or told "no" if it is incorrect. Every skill is taught using this format, in the hierarchical structure as previously outlined. In this way, the child slowly learns new skills by being rewarded for each approximation to the skill, until the final skill has been mastered. Mastered skills are reviewed in each session, but primary emphasis is given to teaching new skills. The skills themselves are also arranged in a hierarchical order, ranging from receptive language and non-verbal imitation to self-help skills (Bancroft Young Autism Project, 1995). Each new skill builds on previously mastered skills, so that learning is gradual. The ultimate goal of the program is for the child to generalize the skills learned in therapy to his or her natural environment and to perform them spontaneously in that environment (Lovaas, 1981).

Evaluation

Lovaas and his colleagues have conducted an impressive study of the effects of intensive behavioral modification treatment on autistic children. In the original study (Lovaas, 1987), 19 autistic children received 40 hours per week of behavioral therapy for two years, while a control group received only 10 hours per
week of such therapy. When these subjects were evaluated at seven years of age, it was found that nine of the experimental subjects who had received the intense behavioral treatment were functioning normally and had completed first grade in a normal level class. In contrast, only one of the children in the control group had achieved this level of functioning (Lovaas, 1987).

A second follow-up (McEachin, Smith, & Lovaas, 1993) was completed when the experimental subjects averaged 13 years of age. This follow-up study found that eight of the nine subjects who had functioned normally at the time of the original evaluation had maintained their high level of functioning. These eight subjects were still enrolled in normal schooling, scored in the high end of the normal range of IQ's on the Weschler Intelligence Scales for Children, and were indistinguishable from normal peers by objective examiners (McEachin et al., 1993).

This study provides evidence of unprecedented success in the treatment of autistic children. Behavioral Modification Therapy, now popularly referred to as "The Lovaas Method," has shown that recovery from autism is possible. However, less than 50% of the subjects in the experimental group recovered, and further research is needed to address why these children did not respond as favorably to the treatment as did the recovered group (McEachin et al., 1993). In addition, the efficacy of a treatment regimen cannot be decisively established by the results of a single study. Replication efforts are in progress (Smith, McEachin, & Lovaas, 1993), and are anxiously awaited by the professional population.
SENSORY INTEGRATION THERAPY

Sensory Integration Therapy is a fairly new, controversial technique which is employed with autistic and mentally handicapped children. It is based on the principles of sensory integration which were developed by Dr. Jean Ayres (Kaye, 1992) and outlined in her book, Sensory Integration and the Child (1987).

Philosophy of Sensory Integration

Sensory Integration Therapy is based on three assumptions about the nature of learning. The first assumption states that learning is dependent on the child’s ability to take in, process, and use sensory information from the environment and from his or her own body movements. Following from the first, the second assumption proposes that if the child is deficient in his or her ability to take in, process, or use sensory information, learning will suffer as a result. The third assumption asserts that, in order to enhance learning in a child who is deficient in such abilities, the child must be provided with repeated exposures of sensory information in order to develop those abilities. In other words, the child’s potential for learning will be enhanced by presenting different types and amounts of sensory information in various contexts (Kaye, 1992).

The sensory information that is presented to the child during therapy has been classified into seven distinct types: tactile, the sensation of touch; proprioceptive, sensations in the muscles and joints; vestibular, the position and movement of the body and its
relationship to gravity; visual; auditory; gustatory, the sense of taste; and olfactory, the sense of smell (Anderson, 1992; Cook, 1990; Kaye, 1992). Each child’s unique strengths and weaknesses are determined in each of these seven areas, and sensory integration therapy is then used to develop the child’s areas of weakness.

Children with autism often appear to overrespond or underrespond to sensory information (Cook, 1990) in many of these seven areas. Autistic children are often oversensitive to sounds, such as a ticking clock, or to certain food textures. Many autistic children also resist being touched or hugged; such tactile defensiveness can be viewed as the child having an oversensitive tactile system (Cook, 1990). Some autistic children engage in constant movement, such as spinning or hand flapping, while the behavior of others is quite calm, suggesting different levels of vestibular stimulation. Research has also suggested that self-stimulation, including self-injurious behavior, is the child’s attempt to provide his or her own sensory information (Cook, 1990).

Sensory Integration Therapy attempts to provide the child with sensory information which the child can process successfully and respond to appropriately, in order to eliminate the child’s tendency to over or under respond to that type of information. The ultimate goal of the therapy is to allow the child to interact with a variety of people and environments in a more appropriate and satisfying manner (Cook, 1990).
**Therapeutic Techniques**

Before therapy begins, the child's strengths and weaknesses in the seven sensory areas discussed in the preceding section must first be assessed. This assessment often includes interviews with parents about their child's behavior and clinical observations of the child by a therapist (Cook, 1990; McClennen, 1992). A checklist of behaviors is often completed by the therapist during these observational sessions and by the parents at home to determine a baseline of the child's behavior (Cook, 1990); this baseline will serve as a comparison by which the child's behavioral improvement will be determined.

Once the child's behavioral strengths and weaknesses have been assessed, the parents and therapist together choose specific goals for the child. These goals are prioritized according to their significance to the well-being of the child (Cook, 1990). Higher priority would be given to a goal of extinguishing self-injurious behaviors, for example, than to learning to dress independently. These goals are further categorized into daily living, visual motor, and sensory motor skills, all of which are achieved through therapeutic interventions of the child's weaknesses in the seven sensory areas (Kaye, 1992).

These therapeutic interventions consist of specific treatments for each of the seven areas, which are further adapted to suit the individual needs of the child. A child who is tactile defensive, or who resists touch, for example, will be gradually introduced to different textures and sensations of touch, using media such as
brushes, creams, cloths, bandages, and even massage (Kaye, 1992). This type of intervention should result in the child being more tolerant to touch, and eventually result in the child exploring tactile stimulation independently (Kaye, 1990). Similar techniques are used to increase the child’s tolerance or decrease overresponsiveness to the other sensory areas; a detailed description of treatment methods in each of the seven sensory areas is presented in Kaye (1990).

**Evaluation**

Support for Sensory Integration Therapy has come mainly from case studies, which have reported this type of therapy to be especially useful in decreasing self-stimulatory and self-injurious behaviors. In one case (McClure & Holt-Yotz, 1991), arm-splints were worn by an autistic child to prevent him from hurting himself. These splints also provided tactile input to the client’s forearms, which seemed to calm him considerably. Based on four observational sessions in which the client’s behavior was recorded with his arms both wrapped and unwrapped, it was concluded that the sensory input provided by the arm-wrappings not only reduced his self-stimulatory and self-injurious behaviors, but also increased his level of social interaction (McClure & Holt-Yotz, 1991). A carry-over effect of these behaviors was also observed, in that the client continued the desirable behavior after his arms had been unwrapped.

Another study (Bright, Bittick, & Fleeman, 1981) reported
similar results using vestibular and tactile stimulation to decrease self-injurious behavior. Vestibular stimulation was provided to the client by rocking him in a hammock and by sitting him on a trainer's lap in a rocking chair, while tactile stimulation was provided by stroking the client's back. Over a five month period of this type of treatment for 50 minutes daily, the client's self-injurious behaviors decreased from an average of 13.1 self-injurious behaviors per minute to only 1.02 such behaviors per minute (Bright et al., 1981). The client also generalized these improved behaviors to perform them outside the therapy sessions after the fourth month of treatment (Bright et al., 1981).

There has also been some evidence that Sensory Integration techniques facilitate the development of language. One study (Ayres & Mailloux, 1981) found that vestibular stimulation increased the language comprehension of four children who received such treatment. An interesting finding was that two of the four children who were most severely impaired at the start of the study showed more growth than the other two children not only in language comprehension, but in expressive language as well (Ayres & Mailloux, 1981).

Another study also found that vestibular stimulation increased the expressive language of an autistic child (Ray, King, & Grandin, 1988). Vestibular stimulation was provided to this child by means of a swing, with sessions occurring daily for four weeks. The subject's amount of vocalization, defined by the experimenters as
any sounds emitted by the child, increased dramatically during the four week period of the experiment, and decreased to baseline level when the treatment was discontinued (Ray et al., 1981). In addition to the increased level of vocalization, the subject also spontaneously learned 13 new words during the course of the experiment (Ray et al., 1981).

These case studies suggest that Sensory Integration techniques are effective in the treatment of autistic children, especially in the reduction of self-stimulation and self-injurious behavior. While case studies such as those presented here have been generally supportive of this treatment approach, more research is needed to assess Sensory Integration Therapy and the precise nature of its effects on the behavior of autistic children.

BIOLLOGICAL TREATMENTS

The realm of biological treatments for autism is both complex and controversial. Autism is now widely accepted as a biologically caused disorder; however, researchers to this date have been unable to identify a definitive biological origin of the disorder (Campbell, Perry, Small, & Green, 1987). Given the wide range of the autistic spectrum disorders, it is possible that each distinct autistic-type disorder results from a particular biological abnormality or set of abnormalities, which may in themselves vary from child to child. The complexity of the autistic disorders often makes finding a suitable biological treatment a laborious task.
In addition to medical treatment through the use of psychoactive drugs, two other biological treatments for autism have recently been implicated in research: Vitamin Therapy (Rimland, 1987), and dietary changes (Raiten, 1987). Each of these methods of treatment will be discussed in the following sections.

Drug Treatments

The types and amounts of drugs which have been used to treat autistic children (and adults) are many, and a detailed discussion of all such treatments is beyond the scope of this investigation. Most drug treatments have met with little to moderate success, according to parental reports (Autism Research Institute, 1994), and controlled trials (Campbell et al., 1987). However, Campbell et al. (1987) have identified three drugs which are frequently used in the treatment of autistic children and which warrant further research: Haloperidol, Fenfluramine, and Naltrexone.

Campbell et al. (1987) report that Haloperidol has been effective in decreasing autistic behaviors and in facilitating learning. However, Haloperidol has been associated with serious side-effects in the form of tardive dyskinesia, a disorder associated with bizarre involuntary movements, in approximately 8 to 51% of children who received the drug (Campbell et al., 1987). Although the side-effects ended when the drug was discontinued, tardive dyskinesia is a serious disorder which should not be taken lightly.

Fenfluramine has been indicated as capable of reducing serotonin
levels; approximately 30 to 40% of autistic children have been shown to have higher than normal levels of serotonin (Autism Research Institute, 1987; Campbell et al., 1987). However, results have been mixed as to whether reduction of serotonin levels produces behavioral or cognitive improvements in autistic children. According to Dr. Bernard Rimland of the Autism Research Institute (1991), of the 31 studies conducted on the effects of fenfluramine on autism between 1982 and 1991, only 30% of the subjects showed improvement in functioning, while 65% of the subjects in the studies actually became worse as a result of the fenfluramine treatment. Campbell et al. (1987) cite three fenfluramine studies which used the same experimental design, yet only one of these studies reported positive effects of the drug on the behavior of autistic children. This drug is often prescribed by physicians for autistic children (Campbell et al., 1987), despite the apparent discrepancies in the research literature on the efficacy of the drug in improving autistic symptoms.

Naltrexone has also yielded mixed research results, although slightly more encouraging than those of fenfluramine. Naltrexone is hypothesized to exert its effects by lowering the level of natural opiates which exist in the body; it is believed that some autistic children may overproduce these substances, leading to a decreased sensation of pain, and a possible increase in self-injurious behaviors (Campbell et al., 1987). A large number of studies have shown that naltrexone does indeed decrease self-injurious behaviors; in some of these studies the drug has also
induced improved eye contact, social behaviors, and language (Autism Research Institute, 1992). Some side effects have been noted, but these have been relatively few and generally mild. Naltrexone seems to be a promising treatment for autism, especially for the reduction of self-injurious behaviors.

It must be noted that the use of psychoactive drugs in the treatment of autistic children is generally discouraged as the sole treatment method. As Bernard Rimland, director of the Autism Research Institute, explains, "they cannot cure the underlying disorder but are merely intended to mask or suppress some of the most visible symptoms, while often causing new and often serious problems of their own" (1993). These problems are quite evident in the side-effects that many of the drugs cause. Dr. Rimland further cautions that drugs should only be used when all other treatment methods have failed, and when the behavior to be corrected is extreme. Drug treatments under these conditions can allow the unwanted behavior to be controlled, while enabling the child to better learn new behaviors without the disruptive behavior present.

**Vitamin Therapy**

Although much safer and much more effective than most drug treatments, vitamin therapy is not widely recognized by most professionals (Rimland, 1987; Rimland, 1991). The most common and most effective vitamin used to treat autistic children is vitamin B6. To date, 16 studies have been published on the efficacy of this vitamin, and all of them have shown it to be helpful to many
autistic children (Autism Research Institute, 1993b). Approximately 45% of the children included in those 16 studies improved as a result of vitamin B6 treatment, commonly referred to as Megavitamin Therapy.

This treatment is so called because it has been hypothesized that some autistic children are actually deficient in vitamin B6; in fact, the dosages that are most effective exceed 200 times the Recommended Dietary Allowance (Rimland, 1987). This may seem like a lot of vitamins to give to a child, but even at high dosages vitamin B6 is safer than psychoactive drugs. Very few, extremely mild side effects (such as irritability and sleeplessness) were reported in the aforementioned studies, but the improvements were dramatic. Many children showed definite behavioral improvement while taking the vitamin B6, and some even spoke for the first time while taking the vitamins (Rimland, 1987). Furthermore, these improvements promptly deteriorated when the vitamin therapy was stopped (Rimland, 1973), thus providing evidence that the vitamins were the cause of the improvement, and not some other factor.

One important caution must be taken when using vitamin therapy. When large amounts of one vitamin in the B family are taken, deficiencies in the other types of B vitamins can occur, leading to effects such as numbness and tingling of the extremities (Rimland, 1987). Vitamin B6 should also be supplemented by magnesium, which can also become deficient when taking large quantities of B vitamins. When accompanied by a B complex and magnesium supplement, vitamin B6 therapy is safe and effective for
many autistic children.

Dr. Rimland of the Autism Research Institute suggests that parents experiment with vitamin B6 to determine the optimum dosage for their child. A 60 to 90 day trial period is sometimes necessary to ascertain whether or not vitamin B6 is helpful to the child, although in many cases improvement is seen in just a few days (Autism Research Institute, 1993b). If after 90 days no improvement is seen in the child's behavior, the vitamins should be slowly tapered and then stopped. If these instructions are followed and the vitamin B6 is administered along with supplemental B complex and magnesium, vitamin therapy can be an important part of treatment for the autistic child.

**Dietary Changes**

A relatively new and controversial issue in autism is that some cases of autism are caused by food allergies; consequently, the child may be treated by removing the offending food from his or her diet. Wheat and milk have often been implicated as being the most problematic foods, although corn, chocolate, and chicken are also common (Rimland, 1972). Raiten (1987) has pointed out that autistic children often have unusual food cravings and preferences, while Rimland (1972) has suggested that the craved food is often the very substance that is the offender.

Others have suggested that autism and related disorders, including hyperactivity, from which autistic children often suffer, may be caused by food additives. This was first suggested by Dr.
Ben Feingold in 1973, and has been the subject of heated debate ever since (Rimland, 1983). Dr. Feingold called for an all natural diet, now dubbed the "Feingold Diet," to help control the symptoms of hyperactivity. This was based on the fact that packaged foods contain over 3,000 additives whose behavioral effects have not been studied (Rimland, 1983). Although studies have failed to provide evidence of the harmfulness of these additives, they have been criticized due to faulty experimental designs (Rimland, 1983). In any case, an all natural diet is undoubtedly better for a child's health than one filled with unnatural substances, whether it helps to control the child's autistic symptoms or not.

Rimland (1972) suggests several approaches that parents can take to determine if a certain type of food is contributing to their child's autistic symptoms. The first is to watch for food cravings—if the child consistently craves one food, it may be wise to remove the food from the diet for a few days and watch for any effects. The second approach is to watch for unusually bad behavior, then determine if anything unusual was eaten in the few days prior. Once a food is suspected, the third approach may be used to determine if it is the culprit. Do not give the child any of the suspected food for ten days, and observe the child's behavior. Then give him or her large amounts of the suspected food during two consecutive meals and again observe the child's behavior. Any marked difference in behavior can be seen as a pretty clear indication that the food was the offender.

Although it sounds strange to think that such a far-reaching
disorder could be caused by an allergic reaction to food, several cases have been documented in which autistic children improved after removing the food from their diets. One mother tells of the incredible improvements her autistic daughter experienced after being placed on a strict diet (Philpott & Kalita, 1980). Approximately one year after the diet change, the mother reports that her child began speaking and had improved dramatically. With so little known about the causes of the autistic disorder, the professional community can hardly afford to discount any treatment method until it is shown to be ineffective. Dietary changes have proved helpful for many autistic children, and await further systematic study to empirically determine their effectiveness.

CONCLUSION

The treatments for autistic children differ greatly from one method to the next, and more research is needed to determine the effectiveness of many of the treatment methods. Parents are encouraged to conduct their own experiments with their child, and to try as many methods as possible until one or a combination of treatments is found to be most effective with that particular child. The results of the studies presented in the preceding analyses of the treatment methods, particularly for the biological treatments, clearly show that not all children respond to the same method of treatment. This may be an effect of diagnostic discrepancies, differing biological origins of the disorder, or some other factor that has yet to be isolated. The day is eagerly
awaited when treatments for autism are developed which are reliable and effective. Until that day, parents and professionals are forced to rely on a trial and error approach to the treatment of their autistic child.
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