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Materials & Books on Autism

**MATERIALS**


*Teaching Activities for Autistic Children: Vol. III,* by Eric Schopler, Margaret Lansing, and Leslie Waters, $59.00. Teaching activities to accompany Vols. I and II.

*Adolescent and Adult Psychoeducational Profile (AAPEP): Vol. IV,* by Gary Mesibov, Eric Schopler, Bruce Schaffer, and Rhoda Landrus, $29.00. Extends the assessment of the PEP-R to the adolescent and older age group.

**BOOKS**


*Teaching Autistic Children to Communicate,* by Paige Shaughnessy Hinerman, $29.00. A step-by-step guide to help children with autism master basic communication skills.

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on extinction procedures, works. For example, the teacher keeps right on teaching even if the person spits (McGee, 1987). Durand and Carr (1985, p. 175) suggest teaching appropriate assistance-seeking behavior, such as saying, "Help me." The last motivator of many self-injurious and stereotypic behaviors is biological or sensory. It is beyond the scope of this article to review all the biological literature on self-abuse and stereotypy in animals and people, but many studies indicate that self-abuse is pleasurable because the person gets high on his or her own brain opiates or endorphins (Barrett, Feinstein, & Hole, 1989). A biological cause is most likely if the self-abuse occurs when the person is alone. Recent research with the endorphin-blocking drug, Naltrexone, shows it has promise (Barrett et al., 1989). It has been effective in some cases and not effective in others. Recent research conducted in Austria indicates that the drug may lose its effectiveness at too high a dose (Jaak Panksepp, personal communication, 1989).

Lorna King, an occupational therapist in Phoenix, Arizona, has sometimes been successful in stopping self-abuse and reducing stereotypy by providing an alternate sensory stimulus, such as vibration or rubbing the involved body part. The alternative stimulus should be pleasurable and not forced on the person. However, some encouragement may be needed at first to introduce the person to the stimulus, because there may be a tendency to withdraw from it. According to King, pain sensation returns and self-abuse stops after the client starts to get pleasure from the alternative stimulus. This stimulation must never be contingent when self-abuse occurs. Contingent stimulation might inadvertently reward self-abuse.

What many therapists and teachers may not realize is that many self-abusive individuals like the feeling of restraints. The pressure is calming. Favell, McGimsey, and Jones (1978) found that they had to train their clients to tolerate longer and longer periods with the restraints off. Replacement of the restraints, contingent on self-abuse, rewarded self-injury. Sometimes the restraints can be used to reward nonabuse.

CONCLUSIONS

High functioning adults and adolescents with autism desperately need mentors, in high school, in the workplace, and in other settings. Some of these individuals with severe nervousness and anxiety could greatly benefit from some of the new, safer drug treatments. I think I would have had a nervous breakdown if I had not been treated with medication. All I can say is, thank God for my mentors and my mother; otherwise, I would not be where I am today.


bad. Individuals with autism need to be shielded from noises that bother them. Wearing a Walkman with music can mask disturbing noises in places such as shopping malls. Loud, sudden noises hurt my ears and cause my heart to race. A man with autism in Portugal writes, “I jumped out of my skin when animals made noises” (White & White, 1987, p. 225).

Carrying on a conversation in a noisy environment is often difficult or impossible. I am unable to talk on the phone in a noisy airport because I am unable to block out the background noise without blocking out the phone. I am not alone in this regard; Ornitz (1985) did an extensive review of sensory modulation problems in autism. Moreover, some cognitive problems may be caused by sensory modulation difficulties (Ornitz, 1985).

Some learning problems may also be associated with auditory processing problems. I will tune out and miss portions of a lecture unless I attend carefully. Some people with autism have involuntary tune-outs, which makes conversation difficult (White & White, 1987). Sometimes I tuned out when noise and confusion became too intense. My auditory system is like an open microphone set at full-blast volume. I can turn the mike on or off but the volume cannot be adjusted. When I tune out, my hearing is shut off. I have to be careful not to tune out at the airport and miss the announcement for my plane. Other people with autism also have visual tune-outs; certain visual stimuli hurt their eyes. One man with autism hated automatic sliding doors because the motion "hurt" his eyes.

My fixations had a sensory basis. The cattle chute fixation was based on the relaxing effect of deep pressure. Many people with autism find deep pressure relaxing. Problems with tactile supersensitivity are very common. Certain textures and tactile sensations cannot be tolerated. I cannot tolerate the feeling of skin against skin and prefer to wear long pants to deaden the sensation. It is like having raw nerve endings exposed. Oversensitivity to certain stimulation may be due to immature cerebellar development.

Many adults and teenagers with autism may benefit from sensory treatment. One of the best nondrug ways to calm down an overaroused nervous system is to desensitize the skin with vibration massage, deep pressure, and rubbing with different cloth textures. This treatment, along with exercise, enabled one violent man with autism to get out of solitary confinement.

Aggressive and Self-Injurious Behavior

There has been a lot of controversy recently about the use of aversives and I do not wish to take sides on this issue. My only suggestion is to try all the nonaversive alternatives first.

First of all, teachers and therapists need to determine the factors that are causing aggressive or self-injurious behavior. Durand and Carr (1985) presented a simple, straightforward method for determining the causes of bad behavior. There are four basic motivators for self-injurious or aggressive behavior and three of them involve problems with communication. Not being able to communicate is incredibly frustrating. I can remember the frustration of not being able to speak even though I could understand what people said to me. Providing communication methods, such as signing or picture boards, is essential for nonverbal people with autism. Durand and Carr’s (1985) four motivators for bad behavior are (1) social attention, (2) tangible, (3) escape, and (4) sensory. If a person is seeking social attention, then provide alternate appropriate methods for seeking attention. Some outbursts are caused by wanting tangibles, such as food. Again, teach appropriate ways to request food. Often, bad behavior is used as a way to escape from a task, such as schoolwork. Sometimes the Gentle Teaching method, based
posture is straight. Eye contact had improved and I no longer shifted around in my chair. I was also surprised to learn that I no longer seemed to be out of breath all the time and I had stopped constant swallowing. People with autism with similar behaviors (e.g., hand wringing and constant touching of the face, head, or hair) may really benefit from medication.

People I have met at autism meetings have told me that there has been steady improvement in my speech and mannerisms over the years. My old friend, Lorna King, also saw many changes. "Your speech used to seem pressured, coming in almost explosive bursts. Your old tendency to perseverate is gone" (Grandin & Scariano, 1986, p. 143).

Family Background and Depression

There is much that can be learned from family history. During my travels to autism conferences, I have found many families with affective disorder (depression or manic depression) in the family history. The relationship between autism and affective disorder has also been reported in the literature (Gillberg & Schau­man, 1981). The family histories of high functioning autistics often contain intellectual giftedness, anxiety or panic disorder, depression, food allergies, learning disorders, left handedness, and skin disorders. In many of the families I have interviewed, the disorders were never formally diagnosed, but careful questioning revealed them. If the family history contains evidence of panic disorder or depression, there is a tendency for the offspring with autism to have excessive nervousness.

My own family history contains nervousness and anxiety on both sides. My grandmother has mild depression and Tofranil has been very effective. Like me, she is also very sensitive to loud noise. When she was a little girl the sound of coal going down the chute tortured her ears. My sister is bothered by confusing noise from several sources. On my father's side, there is explosive temper, perseverance on one topic, extreme nervousness, and food allergies. Both sides of my family produced artists.

It appears that there may be a continuum between normalcy and abnormality. Many autistic traits can be seen in a mild form in the parents of children diagnosed as autistic. Aware adults with autism and their parents are often angry about autism. They may ask why nature or God created such horrible conditions as autism, manic depression, and schizophrenia. However, if the genes that caused these conditions were eliminated there might be a terrible price to pay. It is possible that persons with bits of these traits are more creative, or possibly even geniuses. Mild manic depressives tend to be more creative than the general population (Konner, 1989). If science eliminated these genes, maybe the whole world would be taken over by accountants.

Some people with autism have serious problems with depression: Tony W. reports, "I was verry [sic] derpressed [sic] and hyper at work" (Volkmar & Cohen, 1985, p. 51). I have talked to two adults with autism who have attempted suicide. Both these people have dead-end jobs; and their school years were the best years of their lives. Medication cannot solve their problems. They need interesting jobs to make life worth living.

Sensory Problems

Sensory problems are overlooked in many autism programs. Certain types of noise in school or in the workplace are often intolerable to persons with autism. The noise from high-pitched vent fans and other small motors is often especially
panic (Sheehan, 1980). The symptoms described in that paper sounded like my symptoms, so, after discussing my condition with a physician, I decided to try Tofranil. Fifty milligrams of Tofranil at bedtime worked like magic; within a week, the feelings of nervousness started to go away. After being on Tofranil for 4 years, I was switched to 50 mg desipramine, which has fewer side effects. These pills have changed my life. Colitis and other stress-related health problems were eliminated.

There are many different autism subtypes, and the brain abnormalities that cause each subtype may be different. A medicine that works for one subtype may be useless for another. Some people with autism are calm and will probably not benefit from medication. These people may have an autism subtype that has mainly cognitive deficits without anxiety, panic attacks, depression, rapid mood swings, or obsessive-compulsive disorder. Dr. Paul Hardy in Boston has found that desipramine and Prozac (fluoxetine) are both effective for treating high functioning autistic adolescents and adults that have anxiety and panic attacks. Both Dr. Hardy and Dr. John Ratey at Harvard Medical School (personal communication, 1988) have learned that very small doses of antidepressants must be used. The doses are much lower than those prescribed for depression. Too high a dose can cause agitation, aggression, or excitement, and too low a dose will have no effect. When an effective dose is found it should not be increased. Increasing the dose above the lowest effective dose can have disastrous results. Research has also revealed that if the person's EEG (brain waves) contains seizure activity, antidepressant medications should be avoided.

My "nerve" attacks went in cycles and I have had "nerve" relapses while taking medication. It took willpower to stick with the 50mg dose of desipramine and let each relapse subside on its own. Gradually, during the last 8 years, while taking the medication, the "nerve" relapses have become milder and milder and farther and farther apart. Taking the medicine is like adjusting the idle screw on a car's carburetor. Before taking the drug my engine was racing all the time. Now it runs at normal speed. I no longer fixate and I am no longer driven.

Another promising treatment for autistic adolescents and adults is beta blockers. According to Ratey et al. (1987), beta blockers greatly reduced aggressive behavior. One woman with autism found that beta blockers changed her life and she has become more sociable. Two low functioning twin boys with autism were saved from a fate in the back ward of an institution with beta blockers. Dr. John Ratey (personal communication, 1989) also reports that the new antianxiety drug, Buspar, often works. Prozac has been effective in autistics with obsessions that involve constant checking of cleanliness. It is more effective than Tofranil or desipramine for these types of compulsions (Dr. Paul Hardy, personal communication, 1988). According to many experts, drugs such as Valium and Librium should be avoided. Sudden, rapid mood swings and aggressive outbursts can sometimes be controlled with Vitamin B6 and magnesium (Bernard Rimland, personal communication, 1987-1988).

**Improvement Takes Time**

During the 8 years I have been taking antidepressants, there has been a steady improvement in my speech, sociability, and posture. The change was so gradual that I did not notice it. Even though I felt relief from the "nerves" immediately, it took time to unlearn old behavior patterns.

About 2 years ago, I had an opportunity to visit an old friend who had known me before I started taking antidepressants. My friend said I was a new person. She said I used to walk and sit in a hunched-over position and that now my
At a carnival, I discovered that riding on the Rotor ride was relaxing. Intense pressure and vestibular stimulation calmed my nerves. Bhatara, Clark, Arnold, Gunsett, and Smeltzer (1981) found that spinning in a chair twice each week reduced hyperactivity in young children. Recent research by Courchesne, Courchesne-Young, Press, Hesselink, and Jernigan (1988) and Bauman and Kemper (1988) indicated that the cerebellum is abnormal and underdeveloped in many high functioning autistics. The cerebellum is involved with balance, sensory modulation, and arousal levels in the central nervous system. Magnetic resonance imaging (MRI) brain scans revealed that my cerebellum is smaller than normal. I am unable to balance when I place one foot in front of the other (tandem walking).

While visiting my aunt's ranch, I observed that cattle being handled in a squeeze chute sometimes relaxed after the pressure was applied. A few days later I tried the cattle squeeze chute and it provided relief for several hours. I built a squeeze machine that was modeled after a squeeze chute used on cattle. It consisted of two foam-padded boards that squeezed me along the sides of my body. It had two functions: (1) to help relax my "nerves" and (2) to provide the comforting feeling of being held. Prior to building the squeeze machine, the only other way I could get relief was strenuous exercise or manual labor. Research with autistic persons and mentally retarded clients revealed that vigorous, unstructured exercise decreased stereotypies and disruptive behavior (McGimsey & Favell, 1988; Walters & Walters, 1980). Exercise should always be conducted as a fun activity. It should not be used as a punishment or in an aversive manner.

I found that there were two ways to fight the "nerves": fixate on an intense activity or withdraw and try to minimize outside stimulation. Fixating on one thing had a calming effect. When I was livestock editor for the Arizona Farmer Ranchman, I used to write three articles in one night. While I was typing furiously I felt calmer. I was the most nervous when I had nothing to do. In my early years, the "nerves" served to motivate me to pursue my career. At age 34, they started destroying my health. Another adult with autism reported a similar experience: At first her "nerves" motivated accomplishments in the accounting field—until they became unbearable. Worsening of the "nerves" with age has been observed by the author in several adult autistics. Eight years ago, I had a disturbing eye operation that triggered the worst bout of anxiety in my life. I started waking up in the middle of the night with my heart pounding and thoughts racing about going blind.

In the forthcoming section, I will discuss medication that helped me and review some of the preliminary evidence on new drug treatments that may greatly improve the quality of life for about 40% of people with autism. This discussion relates to both teenagers and adults. Prior to puberty, drugs should be avoided if possible.

I read in the medical library that antidepressant drugs, such as Tofranil (imipramine), were effective for treating patients with endogenous anxiety and
begin to make a conscious effort to do something about them." A good teacher can be a mentor to help an adolescent with autism who wants to change.

Cognitive Differences

Persons with autism have cognitive differences that make social interactions difficult. It is very difficult for a person with autism to understand how others feel and think (Hobson, 1986). Bemporad (1979) stated that, even though an autistic man could understand intellectually how another person felt, he was unable to automatically sense another person's inner state. Studies by Baren-Cohen, Leslie, and Frith (1986) and Hobson (1986) indicate that children with autism have difficulty figuring out emotional intent. Compared to Down's children, they had inferior performance on a task that required an understanding of a person's intent or selecting appropriate cartoon faces to represent the emotion of a person on videotape. In a picture arrangement task that required an understanding of a sequence of mechanical events, such as a rock rolling down into the water, the autistic group was superior to nondisabled children (Baron-Cohen et al., 1986).

In my case, I got into trouble at the Swift plant because I did not understand that other people sometimes have big egos or need to protect their insecurities. I did not realize that sometimes certain people, in order to protect their egos, would not always act in the best interests of the Swift Company. I assumed that if I were always loyal to Swift and helped the company, I would always be rewarded. But sometimes the other engineers resented me. They installed equipment incorrectly and never consulted me. It hurt their egos to have this weirdo tell them how to build a system. Over the years I have learned to be tactful and diplomatic. I was too socially naive to determine in which situations my talents would cause resentment and in which situations they would be appreciated and respected. Another person with autism ran into a similar situation at a factory where she assembled medical equipment on a piecework basis. The other employees resented her when she was able to assemble hers twice as fast.

Big trouble occurred after I wrote a letter to the president of Swift about a terrible equipment installation that caused cattle to suffer. I thought the president would be pleased because I had informed him of the mistakes, but he felt threatened and told Tom Rohrer, the manager, to kick me out of the plant. Fortunately, Tom still let me come over when no one from the corporate office was there.

Constant Anxiety

At puberty, my condition worsened. Gillberg and Schauman (1981) described behavior deterioration at puberty in many autistics. Fortunately, some people with autism improve at puberty. Shortly after my first menstrual period, the anxiety attacks started. They were like a constant feeling of stage fright. I often tell people, "Just imagine how you felt when you did something really anxiety-provoking, such as your teacher's certification exam. Now just imagine if you felt that way most of the time for no reason." I had a pounding heart, sweaty palms, and restless movements. Chronic nervous system overarousal in autism is also mentioned by Bemporad (1979). Prior to puberty I was hyperactive, but the feeling of constant anxiety did not begin until puberty.

My brain was running at 200 miles an hour instead of 55 miles an hour. Many other adults with autism have also reported that thoughts race uncontrollably through their heads. Librium and Valium provided me no relief. The "nerves" followed a daily cycle and were worse in the late afternoon and early evening;
My interests are factual and my recreational reading consists mostly of science and livestock publications. I have little interest in novels with complicated interpersonal relationships, because I am unable to remember the sequence of events.

logic was that, since the helmet covered his head, nobody would recognize him, and therefore it was alright to look in her window.

Three women with autism have informed me that they were raped by acquaintances because they did not recognize social warning signs. One mother of a girl with autism wrote, after her daughter had suffered sexual assaults at work, “A very important part of her brain doesn't work, the part that interprets the thousands of social signals we give one another. Her communication, her world, is totally literal. It's a handicap that's obvious and invisible at the same time” (anonymous personal communication, 1988). Newson et al. (1982) stated that many people with autism avoid complicated sex issues by remaining celibate. The ones that do date often find other autistic eccentric or handicapped mates (Newson et al., 1982). Celibacy is the course I have taken. My career is exciting and my life is my work. Celibacy is much easier if one has an interesting, intellectually stimulating career. Persons with autism that do not have a good career are often terribly lonely. David Miedzianik, a man with autism from England, states, “Living is more or less a constant bore” (Miedzianik, 1986).

A recent long-term study of 16 high functioning adults with autism indicated that 1 got married and 3 others dated regularly (Szatmari et al., 1989). Three others had had occasional dates. In my case, I occasionally dated one boy while I was an undergraduate. When I was in boarding school as a teenager, the director discouraged dating because she was afraid the girls would get pregnant. I found that by avoiding dating and sex I could get extra privileges, because the director knew I would never get pregnant. I valued being allowed to go hiking in the woods and flying my kite on the hill more than I valued dating. The school’s policy strongly encouraged me to be celibate.

I do not fit in with the social life of my town or university. Almost all of my social contacts are with livestock people or people interested in autism. Most of my Friday and Saturday nights are spent writing papers and drawing. My interests are factual and my recreational reading consists mostly of science and livestock publications. I have little interest in novels with complicated interpersonal relationships, because I am unable to remember the sequence of events. Detailed descriptions of new technologies in science fiction or descriptions of exotic places are much more interesting.

My life would be horrible if I did not have my challenging career. Figuring out how to design things and then seeing them work gives me great satisfaction. People respect talent and many social doors opened for me when I made scenery for the college talent show. I was still considered a nerd, but now I was a “neat” nerd. People respected my talent even when they thought I was weird. Social life for another lady with autism was boosted when her paintings received recognition at an art show and were purchased by a local bank.

Recognize Need for Change

Many people with autism do not realize how their behavior appears to others. Videotapes may be extremely helpful. One person with autism did not realize that her table manners were terrible and that she had her face in her plate like an animal. Another problem area is clothes and grooming. I used to dress like a slob and I did not want to change. In order to force me to change, my friends just came out and told me. They gave me a can of deodorant and said I had to use it.

Persons with autism who are successful have to accept that they are different and then take steps to improve themselves; Kanner (1973, p. 209) stated, “Unlike most other autistic children, they become uneasily aware of their peculiarities and
by visualization of the cards dealt out on a table in a pattern. As a savant becomes socialized, he or she may lose the ability for sustained concentration that enables him or her to hold the visual image completely steady. Objects that I attend to can be remembered with crystal clarity; objects that I do not attend to will be hazy or forgotten. Since I have been on antidepressants, I have done some of my best design work. I still have all of my visualization skills. If an autistic with savant capabilities loses his or her talent, it might be possible to revive it and broaden it into a constructive activity or career.

Reading and Language

Like the symbols on the Visual Auditory Learning subtest, words are too abstract for me to remember them. I would never have learned to read by the method that requires memorization of hundreds of words. Old-fashioned phonics enabled me to learn reading. After I laboriously learned all the sounds, I was able to sound out words. Learning less than 100 sounds is easier than attempting to remember thousands of incomprehensible groups of symbols. Mrs. David W. Eastham in Canada taught her autistic son to read in a similar manner, using some Montessori methods. Many teachers thought Mrs. Eastham's nonverbal boy was retarded. He learned to communicate by typing and he wrote beautiful poetry. Many nonverbal people with autism can understand speech, and some are capable of reading and writing.

A visualized reading method, developed by Miller and Miller (1989), may be beneficial for some persons. For learning verbs, each word has letters drawn to look like the respective action. For example, *fall* had the letters falling over, and *run* had letters that looked like runners. This method also needs to be developed for learning speech sounds. Learning sounds would have been much easier if I had had a picture of a choo choo train for *ch* and a cat for the hard *c* sound. For long and short vowels, long *a* could be represented by a picture of somebody praying. This card could be used for both *pr* and long *a* by having a circle around *pr* on one card and the *a* on another.

At first, reading out loud was the only way I could read. Today, when I read silently, I use a combination of instant visualization and sounding words. For example, this phrase from a magazine, "stop several pedestrians on a city street," was instantly seen as moving pictures. Sentences that contain more abstract words, like *inundate* or *failure*, are sounded out phonetically, but visual images of a flood and a bridge collapsing, to represent *inundate* and *failure*, immediately come to my mind.

Social Problems

Inappropriate behavior gets many people with autism into trouble. Even though a person with autism may have a college degree, he or she may not understand the subtleties of proper social behavior. The literal, concrete thinking that is characteristic of autism makes it difficult to understand social situations. A mentor is desperately needed to help with social complexities.

The first words a well-educated man with autism said to me were, "Where are your earrings?" He did not realize that asking a lady about her earrings is inappropriate and has sexual connotations, whereas asking her about her computer does not. Possibly, an earring fixation could be directed into crafting and selling jewelry, because asking a strange lady to buy earrings is socially acceptable.

Another man, who is a talented composer, nearly got arrested when he went to a girl's house and looked in her window while wearing a football helmet. His
problems. New research findings indicate that verbal thought and visual thinking work via different brain systems (Farah, 1989). Studies of patients with brain damage indicate that one system can be damaged while another system may be normal. The brain is designed with modular systems. These systems may work either together or singularly to perform different tasks. For example, people with certain types of brain damage can recognize objects with straight edges but they cannot recognize objects with irregular edges. The brain module that recognizes irregular shapes has been damaged (Weiss, 1989). In autism, the systems that process visual-spatial problems are intact. There is a possibility that these systems may be expanded to compensate for deficits in language. The nervous system has remarkable plasticity; one part can take over and compensate for a damaged part (Huttenlocher, 1984). In autism, facial recognition may be impaired even though other visual skills are at a superior level. Remembering faces is a problem for me.

I used to think all people thought in pictures. There are some brilliant people who have very little visual thought and are totally verbal. One professor told me that facts just come out of his mind instantly. To retrieve facts, I have to read them off a visualized page of a book, or “play a video” of some previous event. Farah (1989, p. 399) concluded that “thinking in images is distinct from thinking in language.”

Albert Einstein was a visual thinker who failed his high school language requirement and relied on visual methods of study (Holton, 1971-1972). His theory of relativity was based on visual imagery of moving boxcars and riding on light beams. Einstein’s family history includes a high incidence of autism, dyslexia, food allergies, giftedness, and musical talent, and he himself had many autistic traits—an astute reader can find evidence of them in Einstein and Einstein (1987) and Lepscky (1982).

Intellectual giftedness is common in the family histories of many persons with autism. In my own family history, my grandfather on my mother’s side was co-inventor of the automatic pilot for airplanes, and, on my father’s side, my great-grandfather was a maverick who started the largest corporate wheat farm in the world. One sister is dyslexic and is brilliant in the art of decorating houses.

Drafting elaborate drawings of steel and concrete livestock stockyards and equipment is easy. I can visualize a video of the finished equipment in my imagination. Discussions with other people with autism have revealed visual methods of thinking on tasks that are often considered sequential and nonvisual. A brilliant autistic computer programmer told me that he visualized the entire program tree in his mind and then just filled in the code on each branch. A gifted autistic composer told me that he made “sound pictures.” In all these cases, a hazy whole or gestalt is visualized and the details are added in a nonsequential manner. When I design equipment I often have a general outline of the system and then each section of it becomes clear as I add details.

As a child and as a young adult, I was good at building things, but it took time to learn how the symbolic lines on a set of blueprints related to the “video” of a house or a piece of equipment that was in my imagination. After I learned to read plans, I could then instantly translate the symbols on the plans into a visualization of the finished structure. When I was 28, my drafting ability suddenly improved after I watched a skilled draftsman. I bought a pencil just like his, and then I copied his style, but the drawing I made was a new design.

It has been known for years that autistic savants sometimes lose their skills as they become more socialized. Based on my own experiences, I speculate that socialized savants lose their ability for sustained attention but they still have all their visualization skills. I still have my perfect pitch skill, even though I do not use it. The card-counting skills that were shown in Rainman are probably done
At night I climbed through a trapdoor on the roof of the dormitory to sit on the roof and think about life after college. The trapdoor symbolized graduation.

I looked at the other cards. If I had been allowed to write the concept down, I would have done much better.

Thinking in Pictures

All my thinking is visual; I have almost no verbal thought. When I think about abstract concepts, such as relationships with people, I use visual images, such as a sliding glass door. Relationships must be approached gently because barging forward too quickly may shatter the door. Thinking about the door was not enough; I had to actually walk through it. When I was in high school and college I had actual, physical doors that symbolized major changes in my life, such as graduations. At night I climbed through a trapdoor on the roof of the dormitory to sit on the roof and think about life after college. The trapdoor symbolized graduation. The doors were a visual language for expressing ideas that are usually verbalized.

The use of visual symbols such as doors to describe abstract concepts is also reported by Park and Youderian (1974). Visualization enabled me to understand the Lord’s Prayer. The power and the glory are high-tension electric towers and a blazing rainbow sun. The word “trespass” is visualized as a “No Trespassing” sign on the neighbor’s tree.

I no longer use sliding doors to understand personal relationships, but I still have to relate a particular relationship with something I have read. For example, a fight between my neighbors was like the United States and Europe fighting over customs duties. All my memories are visual images of specific events. New thoughts and equipment designs are combinations and rearrangements of things I have previously experienced. I have a thirst to see and operate all types of livestock equipment because thatprograms the “visual computer.” If somebody says, “Think about cats,” my images are of individual cats I have known or read about. I do not have a generalized, verbal, generic cat concept.

I still have difficulty with long strings of verbal information. If directions from a gas station contain more than three steps, I have to write them down. Many autistics have problems with remembering the sequence of a set of instructions. Children with autism perform best with written instructions that they can refer to, compared to verbal instructions or a demonstration of a task, which require remembering a sequence of steps (Boucher & Lewis, 1989). However, a demonstration of the task is superior to verbal instruction. Performance of a sequence of tasks was worse if the child with autism was distracted just before he or she was given the directions for the task (Boucher & Lewis, 1989). The detrimental effects of distraction may be due to difficulties in shifting attention. Courchesne and his colleagues in San Diego found that autistics require more time to shift their attention from one task to another (Courchesne, 1989).

Algebra is almost impossible, because I can’t make a visual image and I mix up steps in the sequence. Learning statistics was extremely difficult because I am unable to hold one piece of information in my mind while I do the next step. I had to sit down with a tutor and write down the directions for doing each test. Every time I do a t test or a chi-square, I have to use notes. I have no problem understanding the principles of statistics, because I visualize the normal or skewed distributions. The problems is, I cannot remember the sequence for doing the calculations.

I also have many learning disability traits, such as reversing numbers and mixing up similar-sounding words, such as “over” and “other.” Right and left are also mixed up. Visual thinking is an asset for an equipment designer. I am able to “see” how all the parts of a project will fit together, and to see potential
repairing bikes, which uses his mechanical talents. Another person is employed doing graphic arts. Many people with autism perform extremely well at piano tuning because they have perfect pitch and at shelving library books because they excel in memorizing numbers. This same principle can be applied to moderate-functioning autistics.

Talent and Deficit Areas

I have a career where I can maximize my talents and minimize my deficits. It is well known that people with autism often score well on the performance part of the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1967) IQ test (block design, puzzles) and have mechanical abilities.

A review of the literature indicated that autistics do best at spatial, perceptual, and matching tasks and are most impaired at verbal tests that require comprehension and language expression (McDonald, Mundy, Kasari, & Sigman, 1989). My thought processes are completely visual. I would like to explain them in detail because it will help you to understand people with autism. Many, but not all, people with autism are visual thinkers. Interviews with other people with autism revealed visual thinking patterns.

Six years ago I took some tests to determine my abilities and deficits. On the Hiskey-Nebraska Test of Learning Aptitude (Hiskey, 1955) Spatial Reasoning subtest, my score was at the top of the norms. On the Woodcock-Johnson Psycho-Educational Battery (Woodcock & Johnson, 1977) Spatial Relations Test, I got a middle range score because it was a timed speed test. I am not a quick thinker, it takes time to create the visual image. When I survey a site for equipment at a meat-packing plant, it takes 20 to 30 minutes of staring at the building to fully imprint the site in my memory. Once this is done, I have a “video” I can play back when I am working on the drawing. Research by Boucher and Lewis (1989) suggests that being able to look at a picture for a long period of time may aid an autistic person’s memory.

When I was a child I scored 120 and 137 on the Wechsler Intelligence Scale for Children. My adult scores on the Memory for Sentences, Picture Vocabulary, and Antonyms-Synonyms subtests of the Woodcock-Johnson were superior. On the Memory for Numbers subtest, I beat the test by repeating the numbers out loud. I have an extremely poor long-term memory for things such as phone numbers, unless I can convert them to visual images. For example, the number 65 is retirement age and I imagine somebody in Sun City, Arizona. If I am unable to take notes, I cannot remember what people tell me unless I translate the verbal information to visual pictures.

At age 36, I got a second-grade score on the Woodcock-Johnson Blending subtest, for which I had to identify slowly-sounded-out words. My performance on the Visual Auditory Learning subtest of the Woodcock-Johnson was very poor. I had to memorize the meaning of arbitrary symbols, such as that a triangle means horse, and read sentences composed of symbols. I could only learn the ones where I was able to make a picture for each symbol. For example, I imagined the triangle as a flag carried by a horse and rider. The Concept Formation subtest of the Woodcock-Johnson was another test, with fourth-grade results. I am good at forming concepts of the real world. My ability to visualize broad unifying concepts from hundreds of journal articles has enabled me to outguess the “experts” on many livestock subjects. The Concept Formation subtest involved picking out a concept, such as “large, yellow,” and then finding it in another set of cards. The problem was, I could not hold the concept in my memory while I
Out of his original 11 cases, Kanner had 2 successes. The most successful person became a bank teller—the resourceful farmer who had raised him found goals for his number fixation. For example, he told the child that he would be allowed to count corn rows if he plowed the field.

Automatic sliding glass doors were another adolescent fixation of mine. A creative teacher could easily take this fixation and use it to motivate science interests. A career in electronics could have been promoted by challenging me to figure out how the electronic box over the door makes it open when a person approaches. A repair manual for sliding doors could be used to motivate reading. Fixations on cars, flags, lawnmowers, maps, airplanes, and so forth could all be used in a similar manner. Fixations are tremendous motivators. Teachers need to use fixations to motivate schoolwork, instead of trying to eliminate them. A narrow fixated interest can be broadened out into reading, mathematics, writing, and history. For example, have your autistic student with an airplane fixation write a paper on the history of aviation or calculate the travel time from New York to Chicago in a jet or a Piper Cub. A lawnmower fixation could be used to initiate a career in small-motor repair; a person with autism could repair a few motors as a sideline while working at a conventional job. As the motor repair business grew, he or she could possibly develop a full-time business.

Gradual Introduction to a Career

My career started gradually, one step at a time. This brings out the importance of gradually introducing a person with autism to a new job. Mr. Carlock could only help me while I was in high school and working on my undergraduate degree. When I moved to Arizona to pursue graduate studies, he was gone. I was still fixated on cattle chutes, which led me to visit the local feedlots and the Swift meat-packing plant. This enabled me to learn the industry. Ted Gilbert of Red River Cattle Company (John Wayne's ranch) and Tom Rohrer, manager of Swift, were instrumental in the development of my career. Tom tolerated my eccentricities and allowed me to visit his plant every week. Tom was my second crucial mentor. At the same time, I had an article accepted by the Arizona Farmer Ranchman magazine and I started to freelance for them. This grew into the Livestock Editor's job, which further educated me about the industry. I want to re-emphasize the gradual nature of my introduction to livestock industry. All of the events discussed above happened while I was going to graduate school. It shows the vital importance of having these experiences BEFORE graduation.

Shortly before graduation I got a job at a feedlot construction company, managing advertising and designing equipment. From this position I made the contacts to start my own freelance design business. My business was built up slowly, one project at a time. I gradually moved from one phase of my life to the next. Other people with autism have had similar gradual introductions to successful careers. Dee Landry is a successful psychologist who almost fell into the perpetual-student trap; but she also built up her clientele one case at a time. A brilliant computer programmer in California is starting his freelance business with one program client at a time. Another lady with autism is starting a motor repair business. The computer programmer and the motor repair woman both needed help getting their businesses started. Parents served as the mentors in one case, and the staff of Bittersweet Farms (a community for people with autism) helped get the motor business started; to help that woman achieve independence, the staff gradually switched her from residence status to a maintenance position.

When a person with autism is employed at a conventional job, it will be more successful if the person's talents are utilized. One man has a job in a bike shop
thetetic business owners who are willing to employ people with autism. This service is needed for both higher and lower functioning autistics. Marcie Datlow-Smith in Maryland has done an excellent job of hunting down employers. Several autistic people are employed at a print shop whose owner has taken a real interest in them. Somebody has to go around knocking on doors to find the right employers.

The transition from school to job will be easier for a person with autism if it is done gradually. Some people with autism will benefit from extra years in high school because they are still developing. Interviews with parents indicated that cases with a good outcome often improved during late adolescence (Szatmari et al., 1989). About 2 years prior to graduation from high school or college, students with autism should start learning job skills and spend a few hours each week doing their future job.

Some high functioning autistics develop marketable expertise in a specialized area, such as computers, art, auto repair, or math. They are able to work on a freelance basis doing programming, repairs, designing equipment, tutoring, and so forth. The successful autistics usually had a mentor to help develop their talent area when they were in school, then someone else in the community assisted them with starting a career. The mentor would help sell the autistic person’s expertise to the local business community. In many cases, persons with autism will need to take a job that does not fully utilize their talents, in order to support themselves. If a person had a mentor after graduation, he or she could gradually learn the skills needed to find a job that would be intellectually satisfying.

Direct Fixations

I was lucky to have the right mentors. As stated previously, an autistic person’s fixations should be directed into constructive channels (Grandin, 1988; Grandin & Scariano, 1986). For example, Mr. Carlock used my fixation on cattle squeeze chutes to motivate me to study science and learn how to use the scientific indexes. He told me that in order to really learn about my interests I had to learn scientific methods and study in school. The psychologists and the counselors wanted to get rid of my weird interest, but Mr. Carlock broadened it away from a narrow fixation into the basis of a lifelong career. Today I travel all over the world designing stockyards and chutes for major meat-packing firms. Recently, I designed a more humane cattle restraint device that will probably be adopted by most of the major beef-packing plants. Now I am a leader in my field and have written over 100 technical papers on livestock handling. If the psychologists had been successful in taking away my cattle chute fixation, maybe I would be vegetating somewhere, watching soap operas.

Childhood fixations have become the basis of a career for many successful people with autism (Bemporad, 1979; Grandin & Scariano, 1986; Kanner, 1971).
In this article I will cover several broad areas that can mean the difference between success or failure for a high functioning autistic. Some of the areas covered include the need for a mentor, gradual introduction to a career, utilization of special talents, visual methods of learning, problems with nervousness and anxiety, and sensory oversensitivity.

High functioning teenagers and adults with autism need a “mentor” to help them develop their interests, assist them with social skills, and motivate them to succeed. “A skilled and imaginative teacher prepared to enjoy and be challenged by the child seems repeatedly to have been a deciding factor in the success and educational placement” of high functioning children with autism (Newson, Dawson, & Everard, 1982, p. 29). Bemporad (1979) also mentioned the need for a mentor. My high school mentor was Mr. Carlock, the science teacher. He motivated me to study science by broadening my narrow fixations into a wider interest in science. It is my opinion that structured behavior modification procedures that are effective with small children are useless with a high functioning teenager or adult with normal intelligence.

During my travels to autism conferences I have observed many sad cases where a person with autism successfully graduated from high school or college and then ended up in a dead-end job, dissatisfied with life. Others become perpetual students, taking course after course because they thrive in the structured, but intellectually stimulating, college environment. For many able autistics, the college years were their happiest (Szatmari, Bartolucci, Bremner, Bond, & Rich, 1989). Sometimes they are unable to make the transition from school to a satisfying career. Szatmari et al. reported that half of high functioning autistics with normal intelligence graduated from high school or college.

After college I was fortunate to find an interesting career. Three other high functioning people with autism were less fortunate. One man with a PhD in math has not had a job for years. He had no mentor to steer him into an appropriate job. An attempt at teaching math was not successful. A research position, which requires less interaction with people, would have been more appropriate. Another lady has a bachelor’s degree in history, but she is currently employed in a boring telemarketing job. She needs a career where she can fully utilize her education. She also needs a mentor to help her locate a challenging job. Both these people needed support after college and they did not receive it. A third man successfully graduated from high school but now he sits at home or does odd jobs. He has a talent for library research. If somebody worked with him he could possibly find work at a newspaper, researching background information for articles. All three of these people need jobs where they can make maximum use of their talents and minimize their deficits.

A mentor is needed in several different areas. A creative teacher is an ideal mentor to motivate the student in high school or college. A second mentor in the business community would be extremely helpful to direct the teenager or adult into a career. There is a desperate need for a “mentor finder,” to locate sympa-