

Change Your Brain, Change Your Life

The Breakthrough Program for Conquering Anxiety, Depression, Obsessiveness, Anger, and Impulsiveness

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Brain Pollution

The Impact of Drugs and Alcohol on the Brain

Robert

Robert, age thirty-nine, came to see me because he thought he had attention deficit disorder. He was forgetful, disorganized, and impulsive and had a very short attention span. However, he had not had these problems in school while he was growing up. They had come on gradually during his adult life. Most notably, he also had a twenty-year history of heroin abuse and had been in multiple treatment settings. It is hard to describe my personal feelings when I initially saw his SPECT study. This man was about my age, yet through abusing drugs his brain has assumed the functional pattern of an individual fifty years older with a dementialike condition.

When I showed Robert his SPECT study, he was horrified. Even though he had tried unsuccessfully to stop abusing heroin on many occasions, this time he went into treatment and was able to stop. Later he told me, "It was either the heroin or my brain. I wasn't giving any more of my brain to the drug".

Researchers consistently find that drug and alcohol abuse can cause serious brain damage. I often show Robert's studies and those of others like him to the teenagers I see in my office, as well as to groups of teenagers when I lecture around the country. I find these pictures much more powerful than pictures of fried eggs ("your brain on drugs").

Studying the effects of drugs and alcohol on the brain has been one of the most informative and fascinating parts of my work. While I was growing up I had a sense that drugs and alcohol weren't beneficial to my overall health. This notion was solidified by the results of getting drunk on a six-pack of Michelob and half a bottle of champagne when I was sixteen years old - I was sick for three days. After that, I luckily stayed away from drugs and alcohol. After what I've seen in my work, there's no way you could get me to use marijuana, heroin, cocaine, methamphetamine*, LSD, PCP, or inhalants or to drink more than a glass or two of wine or beer. These substances damage the patterns in your brain, and as you've gathered by now, without your brain, you are not you. In this chapter, I'll share with you some of the insights we have gained from SPECT about drug and alcohol abuse and tell you

how I apply this information with my patients. In the next chapter I'll look at the connections among drug abuse, violence, and the brain.

(* Methamphetamines are in a class of drugs known as psychostimulants. These medications are used to treat attention deficit disorder. In therapeutic doses these medications are helpful and do not cause brain damage. Drug abuse and addiction doses are typically 10-50 times what doctors prescribe, and in those high doses these drugs are dangerous and highly addictive.)

There is quite a bit of scientific literature on the physiological effects of drugs and alcohol on the brain. The most common finding among drug and alcohol abusers is that their brain scans display an overall toxic look. In general, their brains look less active, more shriveled, less healthy overall. A "scalloping effect" is commonly seen in the brains of drug abusers. Normal brain patterns show smooth activity across the cortical surface; scalloping is a wavy, rough sea-like pattern on the brain's surface. I see the same pattern in patients who have been exposed to toxic fumes or oxygen deprivation.

Cocaine and Methamphetamine

Cocaine and methamphetamine are rapidly taken up by the dopamine system in the basal ganglia, causing short-term brain activation. Over time, amphetamine and cocaine abusers show multiple perfusion defects across both hemispheres of the brain. On SPECT these areas look like mini-strokes across the surface of the brain. These effects appear both acutely and chronically. One study investigated the cerebral blood flow patterns and cognitive functioning in cocaine abusers. The patients had been drug-free for at least six months before evaluation. All showed regions of significant underactivity in the frontal and temporal-parietal areas. Deficits in attention, concentration, new learning, visual and verbal memory, word production, and visual-motor integration were observed. This study indicated that long-term cocaine use may produce sustained brain blood flow deficits and persistent intellectual compromise in some subgroups of cocaine-abusing patients. In another study, crack abusers showed a 23 percent decrease in cerebral blood flow compared to the control group, and crack users who were also cigarette smokers showed a 42 percent decrease overall compared to the control group. Cigarette smoking makes everything worse.

Jeff

Jeff, thirty-six, came to see me because he had severe problems abusing methamphetamines. Child Protective Services (CPS) had taken his three young children out of his home and placed them with his parents. He was also about to lose his job at a local warehouse because of chronic tardiness and erratic work performance. His parents had called CPS because they knew about the drug abuse and were afraid for the safety of the children. Jeff's wife, also a drug abuser, had left the family several years before and was nowhere to be found. His parents had tried to get Jeff help, but he had refused, denying that there were any problems. At first, when he was forced by the court to see me, he was in denial. It was everyone else's fault. He said that he used only a little bit and couldn't understand why every was so upset. To help break through his denial, I ordered a SPECT study. It showed multiple holes in activity across the surface of his brain. When I showed Jeff his brain on the computer screen, his mouth dropped open. He didn't say anything for about three minutes. "So much

for denial", I said. "You have serious brain damage caused by this drug. Keep doing it and you won't have any choices about what you do. You won't have enough brainpower to make good decisions".

Through Jeff's history, it was clear that besides the drug abuse he had underlying attention deficit disorder. He had a childhood history of hyperactivity, restlessness, and impulse control problems, and a short attention span. He had barely finished high school, despite having a high IQ. He had been treated with Ritalin for a brief period as a child, but his parents had felt uncomfortable about "drugging" their son. When he had started using methamphetamines as an adult, he said, they had helped him concentrate, he had had better energy and initially he had been better at work. In fact, Jeff had the right class of medication, brain stimulants. Yet he didn't know how to use them to treat his problems. His estimated usage was approximately 500 milligrams a day - ten to twenty times higher than a therapeutic dose of a brain stimulant. And odds are, they were made in someone's garage and laced with other toxic chemicals. I knew that in order to really help him I had to treat his underlying brain disorder as well as get him into a drug treatment program. I told him, "Let me do your drugs for you. I'm a lot better at it than you are, and my drugs don't cause this damage". I put him on a low dose of Adderall, which is a combination of amphetamine salts that are slowly released into the body and that, in prescribed doses, have little if any potential for abuse. I also saw him weekly and ensured that he attended a daily twelve-step program. After a year of maintaining sobriety and compliance with treatment, he was able to have his children come home.

Mark

Mark, twenty-four, was very different from Jeff. He had been abusing cocaine for two years when he decided he had had enough and came to my clinic. He told me, "When I first started using cocaine, I felt better around other people. I have always been shy and uncomfortable in group settings. From my first hit of cocaine, I felt more confident and was able to meet people without feeling anxious or uptight. But the more I used, the more I wanted to use. I want to stop". Mark was spending most of his paycheck on cocaine, and his parents were hassling him about never having any money, despite working full-time. As part of a research study I ordered a SPECT study on Mark. It showed increased activity in his basal ganglia on the right and left sides (corresponding to his anxiety) and multiple holes across the top surface of his brain (indicating multiple areas of decreased brain activity). He was very upset when he saw the scan. The first thing out of his mouth was "Will my brain get better if I stop?" I told him it was likely to get better, but there were no guarantees. One thing was certain: If he continued to use cocaine, things would get worse.

People frequently ask me what will happen if they stop abusing drugs. I answer, it depends. It depends on what drug you used, how long you used it, what other toxic substances might have been in what you used, and how sensitive your individual brain is. Some people are very sensitive to the effects of drugs and damage becomes evident after a short while. Other people have more resistance to drug damage and can use for longer periods of time without serious damage. It depends. But who is to know ahead of time? Seems to me like a stupid risk to take once you have this information!

I placed Mark in a drug treatment program and also saw him in individual psychotherapy. I taught him other ways to calm himself in social situations (using biofeedback and ANT therapy). Later Mark told me that seeing his brain had been the most powerful deterrent to doing cocaine. He said, "You could have told me all day long that cocaine was hurting me, but it felt so good. There was no getting around seeing my brain with holes in it". In my experience, having patients see their own drug-damaged brain is the most powerful way to break through the denial that typically accompanies drug abuse.

Alcohol

Alcohol abuse is also associated with cerebral blood flow abnormalities. Small doses of alcohol produce cerebral activation, while higher doses induce cerebral vasoconstriction and overall decreased brain activity. Chronic alcoholism is associated with reduced cerebral blood flow and cerebral metabolism, especially in the frontal and temporal regions of the brain. In one study, SPECT was used to study seventeen healthy volunteers and a sample of fifty patients dependent on alcohol, without other major physical or mental disorders. The SPECT studies were abnormal in thirty-four patients, but in only two volunteers. The main abnormality was decreased activity across the whole cortex. A genetic vulnerability to alcohol was suspected in the study because SPECT abnormalities were more frequent in patients with a family history of drinking problems.

Chronic alcohol abuse also decreases thiamine (a B vitamin essential for cognitive function) and puts patients at risk for Korsakoff's syndrome (KS). KS is an amnesic disorder in which the inability to record new memory traces often leads to confabulation (lying to make up for missed information) and a seemingly paradoxical situation in which the patient can carry out complex tasks learned before his illness but cannot learn the simplest new skills. In a study comparing alcoholics with and without KS, both had overall decreased activity, but the decreased activity in the KS group was much more severe. The study concluded that chronic alcohol abuse, in the absence of thiamine deficiency, reduces cerebral blood flow by causing direct toxic effects on the brain. If thiamine deficiency is also present, more severe blood flow reductions are superimposed.

"But, Dr Amen", you might ask, "what about all of those studies that say that a little bit of alcohol is good for your heart?" A little bit of alcohol is probably good for your heart and maybe even for your brain. Some studies suggest that those who drink one to two drinks a day are psychologically healthier than those who don't drink at all. The operating phrase is "a little bit". Long term, "more than a little bit" of alcohol ingestion causes severe problems that on SPECT make the brain look shriveled. If you have any trouble at all stopping after one or two drinks, it is better not to drink at all.

Carl

Carl, a forty-six-year-old attorney, came to see me after his wife threatened to divorce him if he didn't stop drinking. He had been drinking for twenty-five years and heavily for the past ten years. Even though his drinking had just recently begun to affect his work, it had affected his family life for many years. His children stopped asking friends over because they never knew when Daddy would be drunk. They worried about him constantly. Carl fought regularly with his wife about his drinking. And his blood pressure had been elevated for

several years. His doctor could not find a medicine to bring it down. Typical of many substance abusers, denial was part of Carl's problem, even when he was confronted by his whole family. I ordered a scan as part of his workup. He reluctantly agreed. He saw the posters in my office about drug abuse and the brain. Before his scan he said, "Don't tell me if I have one of those brains with holes in it. I don't want to know". I thought to myself, "You better want to know. Otherwise you won't have enough brain left to care". Like many of my alcoholic patients, Carl had a shriveled brain that looked years older than it was. As Carl looked at the studies of his brain, he started to cry. His wife, sitting next to him, put her hand on his shoulder. I waited a few minutes for the impact to set in and then said, "Carl, you have a choice. You can look at your brain and think, 'Hell, I already have one screwed-up brain, I might as well go on drinking". Or you can say to yourself, 'Thank God I have this information now. Thank God my wife forced me to get help. My brain has a chance to heal if I get away from this stuff now'. Alcohol is clearly toxic to your brain". Carl didn't need much more. He stopped drinking completely, attended a twelve-step program, and started to rebuild his relationship with his wife and children.

Rob

Rob had been a brilliant geneticist, but in recent years he had been tired all the time and unable to concentrate, and his work had suffered. He sought therapy. The psychologist who saw him quickly sent him to see me. Rob had been drinking alcohol heavily for the past five years, and he was also using cocaine and methamphetamines for energy. The psychologist told him she couldn't help him until he stopped drinking and using drugs. Clearly a bright man despite the substance abuse, Rob just didn't understand how these substances could be the problem. "What will I do without them? I feel terrible when I try to stop. I feel agitated, depressed, and very anxious." I wondered if Rob weren't using the alcohol and drugs to treat underlying brain abnormalities. I convinced him to stop drinking and using drugs for two weeks (I helped him detox from the alcohol with some medication) so that I could get some pictures of his brain. He clearly had a drug-affected brain with holes across the cortex and the shriveled appearance that comes from alcohol abuse. In addition, off his substances for two weeks, he had markedly increased activity deep in his basal ganglia and temporal lobe and then using the cocaine and methamphetamines as a way to counteract the alcohol. I showed Rob his scan. I was surprised at how nonchalant he was in viewing his brain. He said, "Do I really have to stop drinking? What am I going to do?" During our session I stressed the need for him to completely stop alcohol and drugs lest his brain deteriorate further. I also told him I would give him some medication to calm his overactive areas, and odds were that he would be feeling better shortly. Concerned that Rob didn't understand the seriousness of his situation, I called his therapist and reiterated how important it was for him to totally abstain from the drugs polluting his brain. She worked intensively with him. The more he stayed away from the drugs and alcohol (and the better he felt with his medication, which was more effective for his problems than alcohol mixed with cocaine and methamphetamines), the more he understood the importance of the scan and the need to stay away from the substances he had been abusing. A year later, he was dramatically improved. His work was better. His relationships were more stable, and his overall attitude toward life was very positive. In fact, he sent me many other people to treat. I decided to get a follow-up SPECT study on Rob to see what progress we made with his brain. It had dramatically improved, just as he had.

Karen

Karen, forty-eight, had waged a twenty-year battle with alcohol abuse. She had gone through three marriages, five alcohol treatment programs, and multiple medications. She complained of feeling tired, depressed, and angry. Without the alcohol she just didn't feel right. In addition, she had a terrible problem with impulsivity. Whenever she was placed on a new medication, her doctor could give her enough of it for only two or three days at a time. Otherwise she would take a whole month's worth of medication, no matter what it was for, within a few days. Surprisingly, no one had ever examined her brain to see if it held any keys to why Karen was so resistant to treatment. Her doctor, after hearing one of my lectures, sent her to see me for a scan. It showed overall decreased activity consistent with the alcohol abuse, but it also showed markedly decreased activity in the prefrontal cortex. The part of her brain that controlled impulses was damaged. On my intake form she reported that she had never had a head injury. I knew that many alcoholics, during blackouts, have head injuries they are not aware of. I asked her doctor to check further into her history for head injuries. When he asked her to check with her mother, her mother remembered a time when Karen had been kicked in the head by a horse at age seven and had been unconscious for about ten minutes. Given her history, I recommended that Karen be given a small dose of a slow-release stimulant medication to help her with impulse control. Slow-release stimulants, such as Ritalin-SR, enter the system slowly and are not associated with any sort of high, thus are not typically abused. I also made Karen poster-size pictures of her brain to put on her wall, which effectively reminded her that she really didn't want to keep drinking.

Opiates

Opiate abuse has also been associated with severe blood flow abnormalities. Some of the worst brain damage I have seen was caused by heroin abuse. Robert's story at the beginning of this chapter illustrates how serious it can become. In my experience, heroin and other opiates (such as methadone, codeine, Demerol (meperidine), Dilaudid (hydromorphone), Percodan (oxycodone), and Vicodin (hydrocodone)) consistently cause overall decreased activity throughout the brain. These medications are very addictive and can literally take away your brain and your life. I often use the term "brain melt" to describe the SPECT appearance of opiate abusers. I have also seen similar serious brain damage in methadone users. Many heroin addicts are medically administered methadone as a way to help treat their addiction, decrease crime (if they get their drug legally, they don't need to commit crimes to get money to buy it), and eliminate the spread of infection from dirty needles. Even though I understand the logic behind methadone treatment centers, we must do a better job. Dosing drug addicts with methadone perpetuates the ongoing drug brain damage, and I fear these patients will be unable to ever get better.

Doug

Doug, age forty, was referred to me by a doctor who worked in a San Francisco drug treatment clinic. Doug had been addicted to heroin and had subsequently been in a methadone maintenance program for seven years. The doctor continued to see Doug go downhill, despite treatment. He wondered what seven years of methadone had done to his brain. He had wanted to get him off the methadone, but Doug was panicked by the idea and other members of the treatment team were resistant. Doug's SPECT study showed significant overall decreased

activity. As I showed Doug his brain, his attitude about methadone changed. "I need to get off this stuff", he said, "otherwise I won't have much brain left". He, and the treatment team, agreed to take him completely off opiates using a new rapid-detox protocol developed at Yale University. It worked for Doug, and he was grateful to be free of the drugs.

Marijuana

Marijuana use is common among Americans. It is estimated that 67.4 million Americans have tried marijuana, 19.2 million in the past year and 9.7 million in the past month. Many teenagers and young adults believe that marijuana is safe, despite a number of studies demonstrating cognitive, emotional, and social impairment with chronic or heavy usage. Marijuana has also been described as a "gateway" drug by several researchers, with one study reporting that 98 percent of cocaine users started with marijuana. Despite these studies, there is controversy both in the mind of the general population and in the medical community about whether marijuana use is harmful. Legalizing marijuana has been a social/political topic for decades.

I am truly amazed by the nonchalant attitude our country has toward marijuana usage. Even my home state of California passed a law in 1996 legalizing marijuana as medicine. I think many people misunderstood Proposition 215, feeling that by voting for it they were allowing people dying from cancer to have marijuana to soothe their pain and increase their appetites. What they got was a law that basically says a doctor can write a prescription for marijuana for anything including anxiety, stress, moodiness, or irritability. The biggest problem with the law, as I see it, is that the perception of marijuana's dangerousness has gone way down. Teenagers tell me that it's medicine, not a problem. Drug abuse expert Mark Gold, MD, put it succinctly: "As the perception of a drug's dangerousness goes down, its use goes up".

SPECT has been used to study both the short-term and long-term effects of marijuana on the brain. These studies report that inexperienced marijuana smokers had an acute decrease in cerebral blood flow and that chronic marijuana users had overall decreased perfusion when compared to a nonusing control group.

In performing many SPECT studies on marijuana abusers I noticed decreased temporal lobe activity that was not mentioned in the above studies, most likely because of the lesser sensitivity of the SPECT resolution in older scans. I wondered if our newer findings were the cause of the memory and motivation problems often associated with marijuana usage. I decided to study the effects of marijuana on the brain, comparing patients who had ADD and chronic marijuana usage with people who had ADD with no drug usage. I did this for three reasons: First, the functional brain-imaging studies of ADD have not shown temporal lobe abnormalities. Utilizing a control group with the same diagnosis rather than a general psychiatric control group eliminates the possibility of contaminated findings. Even a normal control group adds an uncertainty because so many marijuana users have additional diagnoses. Second, I felt that comparing them to a population with the same, common diagnosis would give useful information. Finally, 52 percent of people with ADD have been reported to have problems with substance abuse, a high number of them with marijuana abuse.

I compared the scans of thirty teenage and adult marijuana smokers (who had used it for a minimum of one year at least on a weekly basis) who had been diagnosed with ADD, with ten control group subjects also diagnosed with ADD, matched for age, sex, and handedness, who had never abused any drugs. In the marijuana/ADD group, by clinical history, marijuana was the primary drug of choice and no other drugs of abuse had been used in the prior year; again by history, there was no significant alcohol use by these patients (significant alcohol use in this study meant more than three ounces of hard liquor or six beers a week). The interval between the most recent marijuana use and the SPECT scan was one to six months, by clinical history. Anyone who met the diagnostic criteria for alcohol or other substance abuse or dependence was eliminated from the study. Marijuana usage ranged from daily to weekly, and from one year to twenty-two years. All patients were medication-free at the time of the study, and participants reported being at least thirty days free from any marijuana usage. In addition, patients who were taking stimulant medication for ADD had been medication-free for at least one week.

The only abnormality seen in the ADD control group was decreased activity in the prefrontal cortex in eight of the ten subjects. A similar number of marijuana/ADD subjects had decreased prefrontal cortex activity - twenty-five of thirty (83 percent) - but overall, this decreased activity in the prefrontal cortex was more severe. In addition, twenty-four marijuana/ADD subjects showed decreased activity in the temporal lobes; five (21 percent) were rated as severe, seven (29 percent) were rated as moderate, and twelve (50 percent) were rated as mild. The severe and moderate ratings were in the heaviest users (use had been greater than four times a week in the preceding year), but not necessarily the longest users. One teenager who had been a daily user for two years showed some of the most profoundly poor temporal lobe perfusion among the group. Clinically, four patients had an amotivational syndrome (severe lack of interest, motivation, and energy). All four had decreased perfusion in their temporal lobes; three were rated as severe, one was rated as moderate.

This study was consistent with previous study mentioned above demonstrating that frequent, long-term marijuana use has the potential to change the perfusion pattern of the brain. While prior studies showed global decreased brain activity, I found focal decreased activity in the temporal lobes. (This may be accounted for by the increased sophistication of the imaging camera used.) Abnormal activity in the temporal lobes has been associated with problems in memory, learning, and motivation - common complaints of teenagers (or at least their parents) and adults who chronically abuse marijuana. Amotivational syndrome, marked by apathy, poor attention span, lethargy, social withdrawal, and loss of interest in achievement have been attributed to marijuana abuse for many years. One teenage male in the study, who had used daily for two years, had one of the most severe cases of temporal lobe underactivity. He had symptoms consistent with amotivational syndrome and had dropped out of school in the eleventh grade.

Inhalants

Inhalants, such as gasoline, correction fluid, paint thinner, lighter fluid, and glue are also seriously abused. I once had a four-year-old patient who was addicted to inhalants. His mother told me that he would go into the garage, take the gas cap off the lawn mower, put his mouth over the opening, and take a deep breath, becoming intoxicated by the fumes. His mother reported that he inhaled many different substances. I first evaluated this child in the

playroom of my office. He was very hyperactive. During the middle of our session he went over to a white marker board and took the top off a marker. He put the marker up to his nose and inhaled deeply. He then gave me a big smile like "Yeah, this feels good".

Inhalants are processed directly into the brain and can cause damage to the brain, lungs, and liver. They are dangerous! Most inhalants and solvents are short-term vasodilators; chronic abuse, however, is often accompanied by serious decreased cerebral blood flow.

The accompanying SPECT scan shows the brain of a forty-nine-year-old patient who had used inhalants over a twelve-year period. It looks much like a cocaine- or methamphetamine-affected brain.

Caffeine and Nicotine

I know this next section may make many people uncomfortable, but I have to tell it as I see it. Published research indicates that caffeine, even in small doses, is a potent cerebral vasoconstrictor (decreases brain blood flow). My experience also suggests this to be true. The more caffeine you consume (caffeine is found in coffee, tea, most sodas, chocolate, and many cold remedies), the more underactivity occurs in your brain. Many people, especially my ADD patients, use caffeine as a brain stimulant. They use it to get going and keep going through the day. The problem with caffeine is that even though in the short run it may help, in the long run it makes things worse. Then you begin chasing the underactivity caused by the caffeine with more caffeine, worsening an already tough brain condition. Periodic caffeine usage is probably not a big problem. Heavy daily usage (more than three cups of coffee a day) is a problem and needs to be stopped in order to maintain a healthy brain. Of interest, the brain stimulants such as Ritalin and Adderall in therapeutic doses to treat ADD enhance brain activity.

There are so many reasons to stop smoking, you probably don't need another one. Yet in my experience, if you want to have full access to your brain, don't smoke. Shortly after you stop smoking, blood flow to the brain increases, although long-term smokers have overall marked decreased activity.

A successful businessman whom I knew socially come to visit me. He said that he had recently had trouble concentrating and his energy was low. I knew that he smoked three packs of cigarettes and drank at least three pots of coffee every day. For a long time I had suspected he had ADD (he had underachieved in school, did impulsive things, and could never sit still) and that he was medicating himself with the stimulant effects of caffeine and nicotine. He was the CEO of a very successful corporation and not used to taking advice from others. I told him about ADD and said that it would be a good idea to treat it and stop self-medicating with high-dose caffeine and nicotine. His first comment was that he didn't want to take medication. Didn't I have a natural treatment for it? A bit amazed, I said, "You are taking two 'natural' treatments for ADD - caffeine and nicotine - but they might kill you. The medication I prescribe is more effective, and when it is used properly, it doesn't kill anyone".

I suggested that SPECT images of his brain might help him see the reality of the situation and encourage him to stop. Even I was surprised by how bad his brain looked. He had markedly decreased activity across the whole cortex, especially in the areas of the

prefrontal cortex and temporal lobes. I told my friend that he needed to find some way other than using caffeine and nicotine to stimulate his brain or it was unlikely he would have much of a brain left to enjoy his success. He took my advice for a few weeks, but shortly went back to his old ways. I wondered whether his poor temporal lobe activity made him unable to hold the SPECT images in his memory or his very poor prefrontal cortex activity prevented sufficient impulse control. Even though I recommended he try a brain stimulant, such as Ritalin or Adderall, he maintained that he wanted to treat his ADD "naturally".

What Happens When You Stop Abusing Drugs?

Many people ask me what happens to the brain when alcohol or drug abuse is stopped. It depends. Generally, the longer a substance has been abused, the more toxic its effect. Certain drugs are clearly more toxic than others. It depends on what other toxic substances were also in the drug and on the sensitivity of the user's brain. There are rare individuals who can abuse drugs for a long time before stopping with few if any lasting ill effects. Others can incur brain damage after a very short period of time. In either case, the sooner you stop, the better chance your brain has to heal.

The Poster: Which Brain Do You Want?

In 1997 I developed a drug education poster titled: "Which Brain Do You Want?" based on my work with drug abusers and SPECT, it was intended to break through the perception that drugs are not dangerous. The poster compares a normal brain to those of a heroin addict, a cocaine abuser, an alcoholic, and a chronic marijuana abuser. The damage caused by substance abuse is immediately apparent:

- *Normal brain is smooth, symmetrical, and full.*
- *The heroin brain shows massive areas of decreased activity throughout.*
- *The cocaine brain shows multiple small holes across the cerebral cortex.*
- *The alcoholic brain looks shriveled.*
- *The marijuana brain looks as though areas are eaten away, especially in the temporal lobe region, the seat of language and learning.*

After seeing these images, many of my patients tell me that they have no more interest in using drugs. They want the use of their whole brain. "Not one with holes in it", as a nineteen-year-old stated as he saw his brain scan after coming out of a sentence to juvenile hall due to marijuana abuse.

I use these brain images day to day in my work with drug addicts, especially teenagers and young adults who are starting to experiment with drugs. Showing someone his or her own drug-damaged brain has a powerful impact. Many of my patients begin the process of recovery immediately.

In testing the effectiveness of the poster, one hundred people, ages twelve to forty, filled out a questionnaire. Over 50 percent of the people who participated in the study said that the poster had changed the way they thought about drugs. Sample comments from the study included:

"I had no idea marijuana could be harmful to the brain. Why did they just legalize it in California?"

"I don't want any holes in my brain. I'm staying away from drugs."

"Drugs affect your brain in a serious way."

"This really changed the way I think about alcohol use and marijuana."

"If they harm me, I want nothing to do with them."

"No one at school told me about this part. They just said drugs were cool to do. Seems pretty stupid to me."

The poster now hangs in over one hundred prisons, hundreds of schools across the country (the LA County School District bought one for each school), drug treatment centers, and hospitals. The criminal court system in Cleveland bought six hundred posters to give to people who came through the system. The chief judge said he needed to educate people on the real effects of drugs.

for more information on this poster, call 707-429-7181, write me at 350 Chadbourne Road, Fairfield, CA 94585, or see my website at www.amenclinic.com.

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The Missing Links

Drugs, Violence, and the Brain

There is a well-established connection between substance abuse and violence. Understanding the intricacies of this connection is essential to finding effective interventions and solutions. Much has been written about the psychosocial causes of drug abuse and violence, but there have been few studies of the biological relation of drugs and violence to the brain.

Through our brain-imaging work, we have recognized several clinical and SPECT patterns that may help further the understanding of the connection between substance abuse and violence and the brain. These observations have been made from our clinical database of over five thousand SPECT studies on a wide variety of neuropsychiatric patients, including more than 350 patients who had had problems with aggressive behavior during the six months before evaluation. (They had either destroyed property or physically attacked another person.) In addition, our clinic has been involved in approximately thirty forensic neuropsychiatric evaluations of violent offenders who have committed murder, rape, armed robbery, assault, torture, and stalking, many of whom had significant substance abuse problems as well. In this chapter, I examine the connection between substance abuse and violence through the lens of our work with SPECT.

In reviewing the literature on substance abuse it is important to note that substances traditionally linked with violence (eg, cocaine, methamphetamine, and alcohol) cause abnormal perfusion patterns in the areas that have been associated with violent behavior. Nicotine and caffeine may also be involved and may magnify the negative effects of other substances.

Here are five patterns connecting the links between drugs, violence, and the brain.

1. Using drugs, especially alcohol, cocaine, methamphetamines, phencyclidine, and anabolic steroids, may directly elicit aggressive behavior.

This may be especially true when the user is prone to violence due to underlying brain vulnerabilities (such as a combination of problems in the prefrontal, cingulate, dominant temporal lobes, and dominant limbic and basal ganglia areas).

John

John, a right-handed seventy-nine-year-old contractor, had a long-standing history of alcohol abuse and violent behavior. He had frequently physically abused his wife over forty years of marriage and had been abusive to their children when they were living at home. Almost all of the abuse occurred when he was intoxicated. At age seventy-nine, John underwent open-heart surgery. After the surgery he had a psychotic episode that lasted ten days. His doctor ordered a SPECT study as part of his evaluation. The study showed markedly decreased activity in the left-outside frontal-temporal region, a finding most likely due to a past head injury. When the doctor asked John if he had ever had any significant head injuries, John told him that at age twenty he'd been driving an old milk truck that was missing its side rearview mirror. He had put his head out of the window to look behind him, and his head had struck a pole, knocking him unconscious for several hours. After the head injury he had more problems with his temper and memory. There was a family history of alcohol abuse in four of his five brothers. None of his brothers had problems with aggressive behavior.

Given the location of the brain abnormality (left frontal-temporal dysfunction), John was likely to exhibit violent behavior. Alcohol abuse, which did not elicit violent behavior in his brothers, did contribute to John's violence. If John had seen and understood his SPECT scan earlier, he could have sought help and prevented hurt to his family.

2. Drug or alcohol usage may impair executive function and increase the likelihood of aggression.

Bradley

Bradley was diagnosed with attention deficit/hyperactivity disorder (ADHD) and left temporal lobe dysfunction (diagnosed by EEG) at the age of fourteen. Before then (from grades one through eight) he had been expelled from eleven schools for fighting, frequently cut school, and had already started drinking alcohol and using marijuana. He had a dramatically positive response to 15 milligrams of Ritalin three times a day. He improved three grade levels of reading within the next year, attended school regularly, and had no aggressive outbursts. His grandmother (with whom he lived) and his teachers were very pleased with his progress. However, Bradley hated taking medication. He said that taking it made him feel stupid and different, even though it obviously helped him. Two years after starting his medication, he decided to stop it on his own without telling anyone. His anger began to escalate again, as did his drinking and marijuana usage. One night while he was intoxicated, his uncle came over to his home and asked Bradley to help him "rob some bitches". Bradley went along with his uncle, who forced a woman into her car, then made her

go to an ATM and withdraw money. The uncle and Bradley then raped the woman twice. Bradley was apprehended two weeks later and charged with kidnapping, robbery, and rape.

As the psychiatric forensic consultant, I agreed with the clinical diagnosis of ADHD and also suspected left temporal lobe dysfunction because of Bradley's chronic aggressive behavior and abnormal EEG. I ordered a series of brain SPECT studies: one while he was doing a concentration task on Ritalin. The resting study showed mildly decreased activity in the left prefrontal cortex and the left temporal lobe. While he was performing a concentration task, there was marked suppression of the prefrontal cortex, a common finding in ADHD, and both temporal lobes. The third scan was done one hour after Bradley took 15 milligrams of Ritalin. This scan showed marked activation in the prefrontal cortex and both temporal lobes, although there was still some mild deactivation in the left temporal lobe.

It was apparent that Bradley already had a brain vulnerable to long-term behavioral and academic difficulties. His substance use may have further suppressed an already underactive prefrontal cortex and temporal lobe, diminishing executive abilities and unleashing aggressive tendencies. It is possible that if someone had explained the underlying metabolic problems to Bradley and provided him with brief psychotherapy to address the emotional issues surrounding the need to take medication, his crime spree might have been averted. In prison, he was placed on Cylert (a brain stimulant similar to Ritalin) and Depakote. He has had no aggressive outbursts in the past two years.

3. Drugs or alcohol may be used as self-medication for underlying brain problems involved in aggression.

Many substance abusers have dual psychiatric diagnoses, and we believe they may be using their substances as a way to medicate underlying psychiatric or neurological problems, such as depression, panic symptoms, posttraumatic stress anxiety, and even aggressive behavior.

Rusty

Twenty-eight-year-old rusty was brought to see me by his parents. He had a severe methamphetamine problem that had wreaked havoc in his life. He was unable to keep steady work; he was involved in a physically abusive relationship with his girlfriend (he had been arrested four times for assault and battery); he was mean to his parents even though they tried to help him; and he had failed five drug treatment programs. In the last program the counselor had recommended a "tough love" approach: He had told the parents to let Rusty "hit bottom" so that he would want help. The parents read about my work and decided to do one more thing before going the "tough love" route. Rusty's lack of responsiveness to traditional treatments made me suspect an underlying brain problem. We scheduled a SPECT scan with the parents, but Rusty didn't know about it until the morning he was supposed to have it. He showed up at the clinic loaded on high-dose methamphetamine from the night before. Rusty told me about his drug abuse. He said, "I'm sorry for messing up the scan. I'll come back next week. I promise I won't use anything". I had often wanted to do SPECT studies on people intoxicated with illegal substances to see their effects on the brain, but due to ethical concerns I hadn't. But if a person shows up for the scan on drugs there isn't an ethical issue. I decided to scan Rusty that morning with the effects of the methamphetamine still in his system and

then a week later off all drugs. It turned out to be a very fortuitous decision. When Rusty was under the influence of high-dose methamphetamine, his brain activity appeared suppressed. A week later, however, off all drugs, he had a terribly overactive left temporal lobe, probably causing his problems with violent behavior. Likely, Rusty was unconsciously self-medicating an underlying temporal lobe problem with high-dose methamphetamine. As I probed deeper into any history of a head injury, which initially both Rusty and his parents did not remember. When pressed, Rusty remembered a time when he had been in second grade and had run full speed into a solid metal basketball pole and briefly been knocked unconscious. That could have caused his temporal lobe problem. Given this finding, I put Rusty on Tegretol (an antiseizure medication that stabilizes activity in the temporal lobe). Within two weeks Rusty felt better than he had in years. He was calmer, his temper was under control, and for the first time in his life, he was able to remain gainfully employed. An additional benefit of the scan was that I was able to show Rusty the serious damage he was doing to his brain by abusing the methamphetamines. Even though the drugs helped his temporal lobe problem, they were clearly toxic to his brain. Rusty, like others who abuse drugs, had developed holes in activity across the surface of his brain. Seeing these pictures was even more incentive to stay away from the drugs and get proper treatment for his problem. SPECT worked both as a powerful diagnostic tool to better assess one of the root causes of Rusty's problem and also as a therapeutic tool to address his denial. *A picture is worth a thousand denials.* Often, having this type of information is valuable in helping patients make a more positive move toward sobriety. I wondered how many people with severe nonresponsive drug problems are self-medicating an underlying problem, yet are labeled by their families and society in general as weak-willed or morally defective. "Tough love" for Rusty wouldn't have solved his problem.

4. Cingulate problems, in conjunction with prefrontal cortex and temporal lobe problems, can exacerbate addictions and potentially violent situations.

As mentioned, the cingulate part of the brain is associated with attention shifting and cognitive flexibility. When it is overactive, people can get locked into negative thoughts or behaviors.

Jose

Jose, a sixteen-year-old gang member, was arrested and charged with attempted murder after he and another gang member beat another teenager nearly to death. Their gang claimed the color red. One evening, when they were in an intoxicated state (from both alcohol and heavy marijuana usage), they approached a boy who was wearing a red sweater while walking his dog. They asked, "What colors do you bang?" (asking him about his gang affiliation). When the boy said he did not know what they were talking about, Jose replied, "Wrong answer," and he and his companion hit and kicked the boy repeatedly until he was unconscious. Other gang members described pulling Jose off the boy because once he had started, he wouldn't stop. They were afraid he would kill the boy.

The public defender ordered neuropsychological testing on Jose, which found frontal lobe dysfunction and evidence of ADHD, depression, and learning disabilities. The psychologist suggested a resting and concentration SPECT series for independent verification. The SPECT series was significantly abnormal. Both studies showed markedly increased activity in the cingulate gyrus, consistent with problems in shifting attention. At rest, Jose's

SPECT study also showed mildly suppressed prefrontal cortex activity. While he was doing a concentration task, there was also marked suppression of the prefrontal cortex and both temporal lobes, consistent with ADHD, learning disabilities, and aggressive tendencies.

Jose had a long history of problems in attention shifting. He was described by others as brooding, argumentative, and oppositional. "Once he got a thought in his head", his father said, "he would talk about it over and over". In prison, he was placed on Zoloft (a serotonergic antidepressant to calm his cingulate). He felt calmer, more focused, and less easily upset.

5. Drug or alcohol usage may be involved in poor decision-making processes or provocative behaviors that put a person in high-risk situations.

It may also decrease a person's ability to accurately perceive a threatening situation. The probability of aggression between two people is the greatest when both are intoxicated and least when both are sober.

Jonathan and Carol

Jonathan and Carol had been married for two years. Both were employed, and they had no children. Both drank heavily, and Jonathan also used marijuana and cocaine periodically. From the first month of marriage they had fought constantly, mostly over little things. Carol would start complaining about something over and over again, and Jonathan would react violently toward her. Drinking and drug use made their problems worse. On five occasions the police had been called to their home by neighbors because of fighting. On the last two occasions Jonathan had been arrested for striking his wife. Growing up, Jonathan had had difficulty in school, exhibiting both aggression and learning problems. Carol had grown up in an alcoholic home and had experienced periodic obsessiveness and depression. Through counseling it became clear that substance abuse increased Jonathan's aggressiveness and impulsivity and made Carol more irritable and more provoking.

As part of a research protocol on difficult couples, Jonathan and Carol underwent rest and concentration brain SPECT studies. Jonathan's scan showed decreased activity in his left temporal lobe at rest and marked deactivation of his prefrontal cortex when he performed a concentration task (consistent with ADHD, aggression, and learning problems). Both of Carol's scans showed markedly increased activity in the anterior cingulate gyrus, consistent with problems in shifting attention and getting locked into negative thoughts or behaviors.

The information from the SPECT studies, along with their clinical history, proved to be helpful. In addition to couples counseling and substance abuse treatment, Jonathan was placed on Depakote (to stabilize his left temporal lobe) and sustained-release Dexedrine (for the impulsivity and ADHD symptoms), and Carol was placed on Zoloft (for overfocus and depressive issues). Over the course of treatment, their relationship improved significantly and there were no more aggressive outbursts.

Strategies for Effectively Dealing with Substance Abuse and Violence

This chapter highlighted some of the ways that brain dysfunction is intimately connected with violent behavior and substance abuse. Understanding this connection is critical to developing more effective treatment strategies and policies in dealing with this national problem. Based on this work I offer several suggestions:

1. Consider the brain. Too often, brain dysfunction is thought of too late in the evaluation and treatment process. Evaluating brain function through clinical history, neurological exams, and sophisticated brain-imaging studies when indicated is key to proper diagnosis and effective early intervention.

2. Violent individuals and substance abusers should be screened for a history of head injuries, since even minor ones can unleash aggressive tendencies (especially when they occur in the left frontal-temporal regions of the brain), and these conditions of the brain can and should be treated.

3. Violent individuals and substance abusers should be screened for underlying psychiatric and neurological conditions that may contribute to or exacerbate their problems (such as ADHD, bipolar disorder, learning disabilities, temporal lobe dysfunction, etc). In Washington state, the criminal court system under Judge David Admire, in conjunction with the Learning Disability Association of Washington, set up a program for those convicted of crimes to be screened for ADD and dyslexia. If they met a high level of suspicion for these disorders on screening, they were sent through a fourteen-week "Life Skills" program to help them to be more effective in dealing with these problems. Outcome data presented recently indicated that the recidivism rate had been decreased by 40 percent.

4. Do not be shy about obtaining medication for underlying medical and psychiatric problems when they are present with either substance abuse or violence. Effective medication is likely to make anger management programs and substance abuse treatment more effective. However, in our experience, many substance abuse treatment programs and anger management programs shy away from the use of medication, and patients are made to feel "inferior" for considering medication as an option. This attitude hampers appropriate treatment and leaves many individuals at higher risk for relapse.

5. Explore whether victims of crimes may be unwittingly contributing to their situation by their own substance use or underlying neuropsychiatric problems. I know this is a controversial suggestion, but it is my clinical experience that some victims have made bad decisions or exhibited provocative behavior based either on their own substance abuse or on their own underlying brain patterns. I am certainly not suggesting that victims are in any way responsible for what happened to them. It is my hope that by addressing any underlying problems, they won't become victims again.

6. In complicated cases, brain SPECT imaging may be an adjunctive diagnostic tool that can give more information than previously available. In my experience, SPECT can be helpful in the following ways:

- *by showing cerebral drug damage to abusers to enhance drug treatment compliance*
- *by uncovering past brain trauma that may be contributing to the clinical situation*
- *by providing help to clinicians in choosing appropriate medications (these include anticonvulsant medications for temporal lobe abnormalities, serotonergic medications for anterior cingulate hyperactivity, and stimulant medications for prefrontal cortex deactivation. SPECT is not a "doctor in a box", and the SPECT findings always need to be correlated with the clinical condition)*
- *by allowing family members and others (judges, probation officers, etc) to see the medical contribution to problems so they will encourage appropriate treatment.*

The brain of every individual has a violence "set point" determined by a large number of interconnected factors: brain system function, genetic factors, metabolic factors, psychodynamic and emotional issues, overall health, history of brain trauma, and the effects of prescribed medications and abused substances. These factors and their complex interplay, unique to each person, inhibit or encourage a person's responses to assaults on his or her equilibrium. Any drug - including physician-prescribed - has an effect on this set point by either increasing or decreasing its reactivity to an insult. The degree of reactivity results from the unique response of any given brain to the metabolic changes induced by a chemical. The very short-term, moderately short-term, and long-term changes in brain function, combined with preexisting factors, result in a greater or lesser propensity for an individual to act on violent impulses.

When someone is healthy, he or she has a high degree of control and usually needs intense provocation to elicit a violent reaction. Over time actual changes in brain metabolism as a result of drug or alcohol abuse lead to a diminished ability to regulate aggressive impulses. Finally, a new and lower (more easily triggered) set point is reached, resulting in more violent, inappropriate behavioral responses.

16

I Love You and I Hate You, Touch Me, No, Don't, Whatever

Brain Patterns That Interfere with Intimacy

Over the past eight years I have conducted a series of SPECT studies on couples who have had serious marital difficulties. I have been fascinated, saddened, and enlightened by this research. I now look at marriages and marital conflict in a whole new way, as involving compatible and incompatible brain patterns. I have come to realize that many marriages do not work because of brain misfires that have nothing to do with character, free will, or desire. Many marriages or relationships are sabotaged by factors beyond conscious or even unconscious control. Sometimes a little bit of medicine can make all the difference between love and hate, staying together and divorce, effective problem solving and prolonged litigation.

I realize many people, especially some marital therapists, will see the ideas in this chapter as radical, premature, and heretical. Frankly, I know of no marital therapy system or school of thought that seriously looks at the brain function of couples who struggle. But I wonder how you can develop paradigms and "schools of thought" about how couples function (or don't function) without taking into account the organ that drives behavior. Seasoned therapists who see couples day to day in their offices will recognize the truths in this chapter, and I hope they will gain new insights into their most difficult cases through the lens of the brain. The stories are real (although I've disguised identifying characteristics to protect patients' privacy). The problems are real. And the missing link in understanding the "couples from hell" is often the brain.

Mike and Gerry (A Couples Primer)

Mike and Gerry had been in marital therapy for four years when they first came to see me. Their therapist had heard me lecture in their hometown. After my talk, she'd gone straight to her office, called Mike and Gerry, and told them to make an appointment to see me. "Mike", she said, "I think you need to take care of some biological brain problems before we can make any progress." This couple had been in trouble for most of their twelve-year marriage. They fought constantly. Mike had had two affairs, seemed prone to pick fights, and had to work excessively long hours because he performed inefficiently. Gerry had a tendency toward depression, was angry that their marriage was such a struggle, and would hold on to hurts from years in the past. The therapist had tried all the techniques she knew. She even went to a conference on "the resistant couple" as a way to find help for Mike and Gerry. She was frustrated because she couldn't make any progress with them.

When I first met with them, Mike was the IP (identified patient). The therapist felt that if she "fixed" Mike, they would make progress. Mike, in fact, had ADD. He had underachieved in school. He was restless, fidgety, inattentive, disorganized, and impulsive. He had trouble listening to Gerry. His marital affairs had not been planned but impulsive. He tended to seek conflict from others and often inflamed situations by making thoughtless comments. In the first few meetings with the couple, however, I felt that Gerry also contributed to the marital turmoil. She tended to voice the same complaints over and over. She argued over insignificant things. She had a strong tendency toward repetitive worry, and when things weren't "just so", she'd be upset for hours.

I decided to scan both Mike and Gerry. Mike had markedly decreased activity in his prefrontal cortex (consistent with ADD symptoms), and Gerry had a significantly overactive cingulate gyrus (consistent with overfocus issues). I placed Mike on Adderall (a brain stimulant to treat his ADD) and Gerry on Zoloft (a serotonergic antidepressant to decrease her tendency to overfocus). Within several days, Mike felt more focused. He was more organized at work, and he acted in a more positive, thoughtful way toward Gerry. Even Gerry noticed a difference. After several weeks (Zoloft takes longer to be effective than Adderall), Gerry also felt a significant difference within herself. Her thoughts no longer tended to loop. She was better able to hold on to positive thoughts. She was more playful, less easily set off. Mike and Gerry could spend time together without fighting constantly. They began to use effectively the marital techniques they had learned in therapy.

Their therapist was ecstatic to see the couple's progress. She was initially surprised that both of them had brain misfires. Although she had at first attributed the failure solely to Mike, after seeing the brain pictures, she was struck by how "cingulate" Gerry had been, recalling how she overfocused and had trouble letting go of hurts.

The missing link for this couple was in their brain pattern and neurotransmitter irregularities. They continued in therapy for several more months to solidify their gains. It was important that they really understand the magnitude of the biological contribution to their problems and that they see each other through new eyes. This allowed them to be more forgiving of each other and to heal the painful memories associated with twelve years of marital struggle. If I had treated just Mike and not Gerry, she might very well have stayed stuck in the pain and frustration of the past, seeing herself as a victim of Mike and being unable to let go of the past.

In my work I have seen all of the five brain systems discussed in this book interplay within couples. I have found that by properly diagnosing which pattern or patterns are present I can develop proper medical and behavioral strategies to intervene effectively. *I want to emphasize that I do not scan every couple I see.* I am often able to pick out these patterns from the clinical presentation and will often intervene based on knowledge without a scan. My hope is that this book will help you be more effective in identifying these patterns in yourself or in those you love and get proper intervention, *not a scan.* When I have a particularly resistant couple, I'll order a scan because I want to know what their brain patterns look like, especially if there is violence in the relationship.

Since, as far as I know, this is the first time any psychiatrist has presented a model of marital discord based on brain misfires, you might want to share this book with your marital therapist and see if he or she is open to new ideas.

How do the five brain systems influence intimate relationships? How does one problem interact with another? What happens when multiple systems are involved in one or both couples? Is medication always necessary in this system of marital therapy? These are some of the questions addressed in this chapter.

Let's start by looking at the relational traits of each brain system when they work right and when they misfire.

Limbic Relational Traits

When the limbic system functions properly, people tend to be more positive and more able to connect with others. They tend to filter information in an accurate light and they are more likely to give others the benefit of the doubt. They are able to be playful, sexy, and sexual, and they tend to maintain and have easy access to positive emotional memories. They tend to draw people toward them with their positive attitude.

When the limbic system is overactive, people tend toward depression, negativity, and distance from others. They are more likely to focus on the most negative aspects of others, filter information through dark glasses, and see the glass as half empty, and less likely to give others the benefit of the doubt. They tend not to be playful. They do not feel sexy, and they

tend to shy away from sexual activity due to a lack of interest. Most of their memories are negative, and it is hard for them to access positive emotional memories or feelings. They tend to push people away from their negativity.

Positive Limbic Relational Statements

"We have a lot of good memories."

"Let's have friends over."

"I accept your apology. I know you were just having a bad day."

"Let's have fun."

"I feel sexy. Let's make love."

Negative Limbic Relational Statements

"Don't look at me that way."

"All I can remember is the bad times."

"I'm too tired."

"Leave me alone. I'm not interested in sex."

"You go to bed. I can't sleep."

"I don't feel like being around other people."

"I don't want to hear you're sorry. You meant to hurt me."

"I'm not interested in doing anything."

Statements from the Partners of People with Limbic Problems

"She's negative."

"He's often depressed."

"She looks on the negative side of things."

"He doesn't want to be around other people."

"She tends to take things the wrong way."

"He's not interested in sex."

"She can't sleep."

"There's little playfulness in our relationship."

Sarah and Joe

Sarah's limbic system negatively affected her relationship. She and Joe had been married for five years. They both worked and did not have any children. At the end of the day, Sarah was frequently very tired. Most often she liked to be on her own and didn't want to do anything after work. She usually wasn't interested in sex, except for one or two days after she started her menstrual cycle. Sarah also tended to look at the negative side of any situation. Joe complained about the lack of companionship in their relationship. He was very upset by her lack of interest in sex and her nonchalant attitude toward it. He felt she was too negative, and their lack of connectedness made him feel lonely. Joe tried to talk to Sarah, but she said she didn't have any problems and he just expected too much from her. Joe made an appointment with me. He said, "I wanted to see if there was anything I could do before I saw a divorce attorney". I encouraged him to bring Sarah with him to see me. I first got Sarah's reading on the situation. She admitted to feeling chronically tired, overwhelmed, and negative.

She just figured she had a low libido and was destined to live with it. She had experienced a major depression when she was a teenager. Her mother had been depressed, and her parents had divorced when she was five years old. I explained the limbic system to her and all about depression. I then placed her on the antidepressant Wellbutrin (bupropion) and saw the couple in counseling. Over two months, Sarah felt much better. She had better energy and more focus, and she also felt more social. In addition, her libido increased and she was more sexually receptive to Joe.

Basal Ganglia Relational Traits

When the basal ganglia system functions properly, people tend to be calm and relaxed. They tend to predict the best and, in general, see a positive future. Their bodies tend to feel good, and they are physically free to express their sexuality. They are not plagued by multiple physical complaints. They tend to be relaxed enough to be playful, sexy, and sexual. They are able to deal with conflict in an effective way.

When the basal ganglia are overactive, people have a tendency toward anxiety, panic, fear, and tension. They tend to focus on negative future events and what can go wrong in a situation. They filter information through fear and seldom give others the benefit of the doubt. They tend to have headaches, backaches, and a variety of other physical complaints. They have lowered sexual interest because their bodies tend to be wrapped in tension. They often do not have the physical or emotional energy to feel sexy or sexual, and they tend to shy away from sexual activity. Most of their memories are filled with anxiety or fear. They tend to wear out people by the constant fear they project.

Positive Basal Ganglia Relational Statements

"I know things will work out."

"I can speak out when I have a problem. I don't let problems fester."

"I usually feel physically relaxed."

"I'm usually calm in new situations."

Negative Basal Ganglia Relational Statements

"I know this isn't going to work out."

"I'm too tense."

"I'm scared."

"I'm too afraid to bring up problems. I tend to avoid them."

"I can't breathe. I feel really anxious in this situation."

"I can't make love - I have a headache (chest pain, backaches, muscle aches, etc)."

"You're going to do something to hurt me."

Statements from the Partners of People with Basal Ganglia Problems

"She's anxious."

"He's nervous."

"She's uptight."

"He cares too much about what others think."

"He predicts the worst possible outcomes to situations."

"She complains of feeling bad a lot (has headaches, stomachaches)."

"He won't deal with conflict."

"She won't deal with problems head-on."

Ryan and Betsy

Ryan was a nervous wreck. He tended to see the worst in situations and often predicted failure. He was anxious, nervous, and sickly (frequently complaining of headaches, backaches, and muscle tension). He had been married to Betsy for fifteen years. When they had first been married, Betsy had mothered him, taking care of his aches and pains and soothing his fears and negativity. She liked to feel needed. After years of this, however, she had gotten tired of Ryan's whining and his tendency to be afraid in even the most benign situations. Ryan's anxiety and medical problems were taking over their relationship. She felt isolated and alone. She became irritable, less understanding, and distant from him. Seeing the love go out of their relationship, she made an appointment for me to see them both. Ryan was angry with her about the appointment. He complained that they didn't have the money, counseling wouldn't help, his problems were physical and not psychological (actually he was right; this was a basal ganglia problem), and all psychiatrists were crazy anyway (I wouldn't say all of us are crazy, just a bit odd). When I first saw Ryan and Betsy, it was clear to me that Ryan's basal ganglia were overactive. The basal ganglia hyperactivity was interfering with their relationship. When I explained his behavior in medical/brain-physiology terms to Ryan, he relaxed. I helped the couple with communication and goal setting and then engaged Ryan in his own therapy. I taught him how to kill fortune-telling ANTs (his were very strong). I worked with him using biofeedback (teaching how to warm his hands, relax his muscles, and

breathe diaphragmatically). And I taught him self-hypnosis. Ryan was a very fast learner and quickly soaked up the basal ganglia prescriptions. He no longer used Betsy as his doctor; he began to work with his medical doctor to address his physical issues and started to predict positive things rather than fear in his conversations with his wife. Once we treated Ryan's basal ganglia problems, the marital therapy became more effective and the marriage improved.

Prefrontal Cortex Relational Traits

When the prefrontal cortex functions properly, people can engage in goal-directed behavior and effectively supervise their words and deeds. They are able to think before they say things and tend to say things that affect their goals in a positive way. They also tend to think before they do things, and their actions are consistent with their goals. They tend to learn from mistakes and don't make the same ones over and over. In addition, they are able to focus and attend to conversations, follow through on commitments and chores, and organize their actions. They are also able to be settled and sit still. They are able to express what they feel. And they tend not to like conflict, tension, and turmoil.

When the prefrontal cortex is underactive, people tend to be impulsive in what they say or do, often causing serious problems in relationships (such as saying hurtful things without forethought). They tend to live in the moment and have trouble delaying gratification ("I want it now"). They tend not to learn from their mistakes and to make repetitive mistakes. They also have trouble listening and tend to be easily distracted. They often have difficulty expressing thoughts and feelings, and their partners often complain of a lack of communication in the relationship. It is often hard for people with prefrontal cortex underactivation to sit still. They tend to be restless and fidgety. In addition, they tend to be especially sensitive to noise, smells, lights, and touch. They have difficulty staying on task and finishing projects, commitments, and chores. They are often late. In addition, many people with prefrontal cortex problems have an unconscious tendency to seek conflict or to look for problems when none exist. I call this tendency the game of "let's have a problem". They also tend to seek stimulation or indulge in highly stimulating behaviors that upset or frighten their partner (driving too fast, bungee jumping, getting into the middle of a fight between strangers).

Positive Prefrontal Cortex Relational Statements

"You're important to me. Let's do something tonight."

"I love you. I'm glad we're together."

"I love to listen to you."

"I'll be on time for our date."

"Let's get these chores done so that we'll have more time together."

"I don't want to fight. Let's take a break and come back in ten minutes and work this out."

"I made that mistake before. I'm not making it again."

Negative Prefrontal Cortex Relational Statements

"I'm only a half hour late. Why are you so uptight about it?"

"If you want the checkbook balanced, do it yourself."

"I'll do it later."

"I find it hard to listen to you."

"Go ahead and talk to me. I can listen to you while I'm watching TV and reading this book."

"I can't express myself."

"My mind goes blank when I try to express my feelings."

"I didn't mean to have the affair (overspend, embarrass you at the party, make hurtful comments, etc.)."

"I just can't sit still."

"The noise bothers me."

"I get so distracted (while listening, during sex, when playing a game, etc.)."

"I need the answer now."

"I want it now."

"I'm so mad at myself. I've made that mistake too many times."

Statements from the Partners of People with Prefrontal Cortex Problems

"He's impulsive."

"She blurts out and interrupts."

"He doesn't pay attention to me."

"She won't let me finish a comment. She says she has to say whatever thought comes into her head or she'll forget it."

"He has to have the fan on at night to sleep. It drives me crazy."

"She often seems to start a problem for no particular reason."

"He loves to challenge everything I say."

"She gets so distracted during sex."

"He teases the animals, and it makes me furious."

"She can't sit still."

"He puts things off and tends not to finish things."

"She's always late, rushing around at the last minute."

Ray and Linda

Ray and Linda came to see me on the advice of their marital counselor. Two of their three children had been diagnosed with ADD, and the counselor felt that Ray had it as well. Even though Ray owned a very successful restaurant, he was restless, impulsive, and very easily distracted. He spent excessive time at work due to inefficiency, and he had frequent employee problems (often because he hired impulsively without adequate screening). Marital counseling was Ray's idea, because he saw his wife turning away from him. He told the counselor that his wife was chronically stressed, tired, and angry. "She's not the woman I married," he said to their counselor. In my first session with this couple, Linda clearly explained that it was true; she has changed. It was all-too-familiar story to me. She had married Ray because he was fun, spontaneous, thrill-seeking (she was actually a bit reserved), and hardworking. She now felt her life had been taken from her. Her ADD children were a handful, and she felt she had no support from Ray. She said, "When he's home, he's not with me. He's always working on projects that don't get finished. He stirs up the kids after I get them settled down. And I can't get him to pay attention to me. He's so restless. When I try to talk with him, I have to follow him around the house." In addition, Ray had made several bad financial business decisions and the family was struggling with debt, despite Ray's successful business. He had had an affair several years before they entered counseling, and Linda didn't believe she could trust him. She felt isolated, alone, and angry.

There was no question in my mind that Ray had ADD. As a child and teenager he had been restless, impulsive, hyperactive, and disorganized. He had underachieved in school and barely finished high school, despite obviously being very bright. The chronic stress of living in an ADD home was beginning to change Linda's personality. She had gone from being a relaxed, happy person to being depressed, angry, and withdrawn. Something had to change. I put Ray on Adderall, a stimulant medication, which helped him be more thoughtful, more attentive, and more efficient at work. I encouraged the couple to continue to see their counselor to work on healing the hurts from the past. I got involved with the children's treatment to make sure they were on the right dosages of medication and that Ray and Linda used effective parenting strategies (many of Ray and Linda's fights were over disciplining the children). I encouraged Linda to use Saint-John's-wort (the herbal antidepressant discussed in the cingulate prescription chapter) to reset her limbic system back to normal. Over the next four months, this couple dramatically improved; even the kids noticed a big difference.

Cingulate Relational Traits

When the cingulate functions properly, people are able to shift their attention easily. They tend to be flexible and adaptable. They are likely to see options in tough situations. They are usually able to forgive the mistakes of others and tend not to hold on to hurts from the past. They encourage others to help but do not rigidly control situations. They tend to have a positive outlook and see a hopeful future. They are able to roll with the ups and downs of relationships.

When the cingulate is overactive, people have a tendency to get locked into thoughts, thinking them over and over. They tend to hold grudges, hold on to hurts from the past, and be unforgiving of perceived wrongs. They tend to be inflexible, rigid, and unbending. They often want things done a certain way (their way), and they may get very upset when things

do not go their way. They have difficulty dealing with change. They tend to be argumentative and oppositional.

Positive Cingulate Relational Statements

*"It's okay."
"I can roll with this situation."
"How would you like to do this."
"Let's collaborate."
"Let's cooperate."
"What would you like to do."
"That was in the past."*

Negative Cingulate Relational Statements

*"You hurt me years ago."
"I won't forgive you."
"It'll never be the same."
"I'm always worried."
"I get stuck on these bad thoughts."
"Do it my way."
"I can't change."
"It's your fault."
"I don't agree with you."
"No. No. No."
"I won't do it."
"I don't want to do it."
"I have a lot of complaints about you."
"I've never hated anyone more than you."
"This will never change."*

Statements from Partners of People with Cingulate Problems

*"Nothing gets forgiven or let go."
"She brings up issues from years and years ago."
"Everything has to be the way he wants it."
"He can't say he's sorry."
"She holds on to grudges forever."
"He never throws anything away."
"She's rigid."
"If things aren't perfect, he thinks they are no good at all."
"I don't help her because I have to do it exactly her way or she goes ballistic."
"He argues with everything I say."
"She tends to be oppositional."
"He doesn't like to try new things."*

Rose and Larry

Rose and Larry had been married for twenty-two years. They had been unhappy for twenty-one of them. I was the sixth marriage counselor they had seen. They were a very persistent couple. Larry had heard me speak in San Francisco at a local conference on children of alcoholics. He said when I talked about problems associated with the cingulate gyrus, I was talking about things that affected his wife. He bought one of my videotapes and took it home for Rose to see. Rose was stunned when she recognized herself when I talked about some of my work with couples who had incompatible brains. She had grown up in an alcoholic home. As a teenager she had also had problems with alcohol and marijuana. As an adult she had periodic bouts of depression. More damaging to the marriage was her inflexibility: She had to have things a certain way or she'd explode (even though she didn't know it and even though she didn't want to be that way). She was "the world's worst worrier" according to her husband. Her house looked perfect. "The president could visit any time of the day or night," her husband said. "I don't know why she cleans so much. It's not like we're dirty people." She held grudges. Things would get brought up multiple times over the years. If she liked someone, she was a wonderful friend. If someone rubbed her the wrong way, she would write that person off and never let go of her anger. She hadn't talked to her own mother for eighteen years because of a trivial fight one Christmas. Rose never said she was sorry. She tended to oppose whatever Larry wanted to do, and their arguments were frequently over nothing. Larry said, "We argue just to argue." Sex was often an ordeal. The setting had to be just right in order for anything to happen. "God help me if I ask for it directly," Larry said.

When I asked Larry what kept him in the relationship, he said he didn't know. He had grown up Catholic and felt it was his obligation to stay. He found gratification at work and just spent more and more time away. Plus, he felt Rose really tried. She always set up the counseling appointments, and she was committed to staying with him. I was very surprised that no one had sent Rose to see a psychiatrist. None of her previous therapists had considered the brain to be an important factor in this couple's struggles. They wanted to help this couple with their behavior and never wondered if the hardware that runs behavior was working properly. Amazing.

Before I tackled this couple, I wanted to see how Rose's brain functioned. This couple had long-term marital dissatisfaction and multiple failures at marital counseling. I was betting there were brain patterns interfering with intimacy. As I suspected, Rose had one of the most active cingulates I had ever seen. No wonder she had so many problems shifting her attention! Her brain's gearshift was stuck, unable to shift into new and different modes of thinking. I put her on Zoloft (a serotonergic antidepressant) to help her mood and flexibility. I taught the couple about how the brain works and how it can interfere with intimacy. I taught them the functions and problems of this part of the brain, along with cingulate prescriptions. In addition, I worked with them on developing a new perspective about their past behavior and healing the memories of pain. After four months of medication and therapy, they were much better. They were able to have fun together. Larry was able to ask for sex without fear of rejection. He no longer had to play "cingulate games". He spent more time at home, because the atmosphere was so much more relaxed. Rose called her mother and reconnected with her. Ultimately Rose stayed on Zoloft for three years and then slowly tapered off. When some of her problems resurfaced, she resumed taking it.

Temporal Lobe Relational Traits

When the temporal lobe function properly, people tend to be emotionally stable. They are able to process and understand what others say in a clear way. They can retrieve words for conversations. They tend to read the emotional state of others accurately. They have good control over their temper. They have access to accurate memories. Because of their memory, they have a sense of personal history and identity.

When the temporal lobes do not function properly, people tend to have memory struggles. They don't have clear access to their own personal history and identity. They are often emotionally labile (up and down). They tend to be temperamental and have problems with anger. They often have violent thoughts and express their frustration with aggressive talk. They often take things the wrong way and appear to be a little paranoid. They may have periods of spaciness or confusion and misinterpret what is said to them.

Positive Temporal Lobe Relational Statements

"I remember what you asked me to do."

"I have a clear memory of the history of our relationship."

"I feel stable and even."

"I can find the words to express my feelings."

"I can usually tell when another person is happy, sad, mad, or bored."

"I have good control over my temper."

"My memory is good."

Negative Temporal Lobe Relational Statements

"I struggle with memory."

"I blow things way out of proportions."

"I get angry easily. I have a bad temper."

"My moods tend to be volatile."

"I tend to get scary, violent thoughts in my head."

"It's hard for me to read."

"I often misinterpret what others say."

"I tend to be too sensitive to others or feel others are talking about me."

"I tend to misread the facial expressions of others."

"I frequently have trouble finding the right words in a conversation."

Statements from Partners of People with Temporal Lobe Problems

"He can be physically or verbally very aggressive."

"She's volatile."

"His memory is very poor."

"She misreads situations."

"He's very moody."

"She takes things the wrong way."

"He spaces out easily."

"She doesn't seem to learn by reading something or hearing directions. You have to show her what to do."

Don and Shelley

Don and Shelley had been married for only four years when they sought therapy. Don had a terrible problem with his temper. He had physically abused Shelley on three occasions and had been charged with felony assault against her. During one of those times he had been drunk, but during the other two he had not been drinking at all. Shelley's family and friends thought she was crazy for staying with him. Shelley said she loved Don and wanted the marriage to work. She was afraid when she thought about staying and sad when she thought about leaving, but she knew the violence had to stop. Don was always so sorry after the attacks. He always cried for a long time and seemed truly sorry. When the therapist learned that Don had had a significant head injury from a motorcycle accident at the age of seventeen, he suggested that Don see me as part of his evaluation. Don and Shelley seemed to truly love each other. Don did not have a good explanation for his problems, and he denied that he ever wanted to hurt Shelley. "I just get out of control," he said. I found out that Don saw shadows. He had many periods of spaciness. He had difficulties finding the right words. He was very forgetful. He was moody, volatile, and temperamental, and he had odd sensations of déjà vu. Don often took things the wrong way, and he thought many other people were out to hurt him. In Don's motorcycle accident, he had swerved to avoid a deer and fallen against the left side of his helmet. His helmet (with head inside) had slid for approximately eighty feet. I was convinced he had temporal lobe problems (probably on the left), which was confirmed by his SPECT scan. I placed Don on Tegretol (an antiseizure medication) to stabilize the activity in his left temporal lobe. Within three weeks, he reported he was calmer, less angry, and less easily agitated. "It takes much more to get me upset," he said. Shelley noticed an almost immediate difference. "He is more relaxed. He's calmer, and he's much more mellow. Things don't upset him like before." Their therapist continued to see Don and Shelley for several more months and taught them about forgiveness and understanding based on this new information.

It is important to remember that there's no rule that says people get only one problem. Some of the toughest couples have multiple system problems in both partners. It is always important to consider the brain when thinking about couples who struggle.

Better Relationships Through Biochemistry?

One of the underlying messages of this chapter is that many couples struggle not because they want to, but because they have underlying brain patterns that interfere with intimacy. Sometimes medication can help alleviate these problems. The appropriate medications for each of the brain systems have been discussed in the chapters on individual brain system prescriptions. I have seen many relationships literally saved by the use of medication. Here are several additional tips about the use of medication in couples:

1. Be aware of when the medications will wear off and be especially cautious about conflict then. Some medications, such as stimulants, work for defined periods of time. If the medication's effectiveness wears off around 8:00 pm, do not bring up emotionally loaded topics at 10:30 pm. Be sensitive to the effectiveness cycle of the medication.

2. Be sensitive to the sexual side effects of medication. Some of the medications we use to treat brain abnormalities can alter sexual function and libido. Medications that enhance serotonin production in the brain, such as Prozac, Paxil, Zoloft, Anafranil, Effexor, and Luvox, often decrease libido or delay the ability to achieve orgasm. If this occurs, there are strategies your doctor can use to counteract these problems, such as adding ginkgo biloba or the antidepressant Wellbutrin. Talk these problems over with your doctor. Also, let your partner know that there may be medication side effects and not to take them personally.

3. Be persistent when medication is required. Too often people will try medication, then abandon it too early if it isn't immediately effective. Sometimes it takes several trials of medication for prolonged periods of time. Be patient.

Relational Therapy Brain Prescriptions

It is clear that using medications is only part of the solution to people's problems. Based on my brain-imaging work, I have developed a number of effective nonmedication brain system prescriptions to help couples. I break them into the different systems we've discussed. Of course, there is overlap between systems, but I think this is a useful way to think about helping couples. The "Self" prescriptions here are for those affected by these problems, and the "Partner" prescriptions are for the partners of those affected.

Limbic Relational Prescriptions for Self

1. Spend time together: Bonding is essential to all human relationships. You need to spend physical time with your partner. The less you are around each other, the less bonded or limbically connected you become.

2. Smell good: Choose scents your partner likes and wear them. The limbic system directly processes the sense of smell, and it can have a positive or negative effect on your relationship.

3. Build positive memories: Focus on the times you have enjoyed each other. The limbic system stores highly charged emotional memories. When you focus on the negative in a relationship, you feel more distant from each other. When you focus on the positive in your relationship, you feel more connected.

4. Touch each other: Touch is healing, and couples need to have their hands on each other. Sexual and nonsexual touching is essential to intimacy. It is likely that touch cools the limbic system and is involved with the stabilization of mood.

5. Kill the ANTs: Automatic negative thoughts (ANTs) infest and destroy relationships (see chapter 4). Do not believe every thought you have. Focus on positive, uplifting, nurturing thoughts about your partner. It makes a difference to your brain function and subsequently affects your relationship.

Limbic Relational Prescriptions for Partner

1. Don't let your partner isolate himself or herself. Even though isolation is a natural tendency in depression, it makes the situation worse. Encourage activity and togetherness.
2. Touch your partner. Back rubs or a touch on a shoulder or hand can be very reassuring to someone who feels alone. Connectedness is very important.
3. If your partner has a loss of sexual interest, do not take it personally. Often depression is accompanied by sexual problems. Work on getting him or her help.
4. Help your partner around the house, with the children, and so on. Often limbic problems are associated with low energy and poor concentration. Your partner may feel overwhelmed and need your help. Many partners, not properly understanding the reality of the situation, become critical and make the situation much worse. Your partner needs understanding, love, and support, not criticism.
5. Make sure you help get your partner to the doctor if the limbic problems interfere with functioning. Limbic problems are often very treatable.
6. Take care of yourself. It is stressful to be married to someone who is depressed. Take time to replenish yourself.

Basal Ganglia Relational Prescriptions for Self

1. Kill the fortune-telling ANTs: Predicting failure, pain, or an unhappy outcome often causes erosion in relationships. Clear thinking is essential in relationships. Do not believe every thought you have.
2. Predict the best: Looking to the future in a positive manner is a key to happiness. Your mind helps to make happen what it sees. People with basal ganglia issues have a natural tendency to predict the worst and thus help to make bad things happen by their predictions. Fight that tendency. When you see good things happening in your relationship, act in ways to make them even more likely to happen. Hope for the best.
3. Get control of your breathing: Anxiety, tension, and out-of-control behavior are often preceded by shallow, rapid breathing. Before responding to your partner in an anxious or tense situation, take a deep breath, hold it for three seconds, and then very slowly exhale (taking up to five to eight seconds to exhale). After three or four deep breaths of this type, your brain will be filled with oxygen, you will feel more relaxed, and you will be much more likely to make better decisions.
4. Deal with conflict: Effectively dealing with conflict is one of the keys to relationship health. Whenever couples bury their differences or put off dealing with conflict, anxiety, tension, and subversive behavior result. It is important to develop both negotiation and conflict resolution skills in relationships (see the basal ganglia prescription chapter). It is also important to deal with conflict in a kind, respectful manner.

Basal Ganglia Relational Prescriptions for Partner

1. Help your partner look at the positive side of things. Help him or her predict good things rather than bad things. Join forces to kill the fortune-telling ANTs.
2. Do not get irritated with your partner's anxiety or negative predictions. Soothe him or her with gentle words or a touch.
3. Pace your breathing to help your partner's breathing. Often people unconsciously mirror their partner. When you breathe slowly and deeply, your partner is likely to pick up a more relaxed breathing pattern, automatically calming his or her anxiety.
4. Encourage your partner to face conflict in an effective way.

Prefrontal Cortex Relational Prescriptions for Self

1. Focus on what you want: Clear focus is essential to relationships. I have many of my couples develop a "two-minute focus statement". In this statement they write down, on one piece of paper, the major goals they have for their relationship in the areas of communication, time together, money, work, parenting, and sexuality. Then they post this statement where they will see and read it every day. This helps to keep their behavior on track.
2. Focus on what you like about your partner more than what you don't like: This encourages your partner's positive behavior. Think about how we train pets. Do you smack them every time they do something wrong (this will not train them to do anything but avoid you), or do you praise them every time they do something right (this encourages new behavior)? Focus on what you like, and you are more likely to get it. Many couples with prefrontal cortex problems are conflict-seeking as a way to stimulate themselves. Naturally they tend to notice the problems in their relationships, which makes them more upset and unconsciously gives them stimulation. The problem with focusing on negative behavior is that you drive the other person away. The negativity kills the relationship.
3. Positive stimulation is helpful: Look for new, exciting ways to stimulate the relationship. The prefrontal cortex seeks stimulation. It is important to have new, exciting, stimulating experiences to keep the relationship fresh and alive. Look for ways to do new things together, such as sharing a hobby, going to new places, or trying new sexual experiences.
4. Learn to say "I'm sorry": Admitting mistakes and saying you're sorry are essential to relational health. When the prefrontal cortex doesn't work hard enough, people don't have access to good internal supervision, and they may say or do things impulsively. When that happens, it is important to apologize and let your partner know you're sorry. Unfortunately, many people aren't good at saying they are sorry, and they try to justify why they did or said hurtful things. Learn to apologize and take responsibility for your mistakes.
5. Think about what you say or do before you say or do it: Thoughtfulness and forethought are essential to effective relationships. Before you say or do something in a

relationship, ask yourself if what you say or do fits with the goals you have for the relationship. Will your behavior help or hurt the relationship? Supervising your thoughts and actions is essential to relational health.

Prefrontal Cortex Relational Prescriptions for Partner

1. Do not be your partner's Ritalin: Because the prefrontal cortex seeks stimulation, many partners unconsciously seek stimulation in a negative way. Without knowing it (unconsciously), they try to upset you. They try to get you to yell. They try to make you angry. It is very important if you feel this is happening to have a calm demeanor. Do whatever you can not to yell or become emotionally intense. When you feel as if you are going to blow, take a deep breath or a break until you can get yourself under control.

2. Notice the positive. You change behavior by focusing on what you like a lot more than what you don't like. Often people with prefrontal cortex problems have low self-esteem and need encouragement and positive input from those they love.

3. Help your partner with organization. Disorganization is often a hallmark of prefrontal cortex problems. Rather than complain about the disorganization, it is generally much more effective to help your partner become more organized - if he or she will allow you to.

4. Make the appointment and drive your partner to the doctor. Often forgetfulness, procrastination, and denial accompany prefrontal cortex problems. Help may be put off for many years, even when it is obviously needed. Professional help can make a big difference in these problems, and I often see partners bring their loved ones in for evaluation and treatment. Don't wait for your partner to have the desire, will, or commitment to change; you may wait too long.

5. If medication is necessary, help your partner remember to take it. Do not do this in a condescending way, such as "Did you take your medicine? Your behavior is way off." Instead, help your partner with a gentle (nonsarcastic) reminder, or help your partner come up with a reminder system, such as weekly pill organizers or calendars.

Cingulate Relational Prescriptions for Self

1. Notice when you are struck: The first step in breaking negative cycles is for you to notice when you are in them. Being aware of repetitive negative patterns of behavior allows you to do something different. Notice these patterns when you have the same argument over and over and just do something different that you usually would. If you would usually just go on and on trying to make your point, stop and say, "I'm finished. What do you have to say?" Then be quiet long enough to really hear what your partner is saying.

2. Take a break when things get hot: When you notice things are getting into a negative "cingulate" loop, take a break. When you notice tension in your voice, your body, or your conversation, find a way to distract yourself or take a break from the situation.

3. Stop nagging: Nagging erodes a relationship and needs to stop. Nagging - complaining about something over and over - is very common in cingulate people. It often has a seriously negative impact on a relationship. When you find yourself going over the same material again and again, stop it. Beating someone over the head who is not listening to you is ineffective and irritating. Try to find new ways to deal with your frustrations.

4. Use good problem-solving techniques: When you are stuck in an impasse, write out the problem, options, and solutions to the problem. Writing down the issues that bother the relationship can often be very helpful. Use the following problem-solving model: Write out the issue (such as spending too much money), write out the options and solutions to the problem (spending less, budgeting, cutting up credit cards), and then choose among the options. Writing problems down often helps to get them out of your head and out of repetitive relational arguments.

5. Exercise together: Exercise enhances serotonin production in the brain and often helps a person (maybe even a couple) to become more flexible and less cingulate.

6. Have a carbohydrate snack. Carbohydrates (whole-grain bread, crackers, yogurt, etc) often improve mood and help cingulate people be more flexible. Low blood sugar often correlates with anger and irritability.

Cingulate Relational Prescriptions for Partner

1. Notice when your partner is stuck: The first step to breaking negative cycles is for couples to notice when they are in them. Being aware of repetitive negative patterns in your partner allows you to be helpful in the situation rather than inflame it. For example, if you notice your partner is not listening to you but holding firmly on to his or her own position, take a breath and really try to listen to your partner. Do something different to break the negative cycle.

2. Take a break when things get hot: When you notice your partner is getting into a negative "cingulate" loop, change the pace. If you see your partner going over and over the same territory, or when his or her anger is escalating, find a way to distract your partner or take a break from the situation. As I've said, one of the most helpful things I tell people to do is learn how to go to the bathroom when things get hot.

3. Deal effectively with nagging. Nagging may be caused by an overactive cingulate, or it may arise because you're not listening to your partner. When someone has repetitive complaints about you, let him or her know you hear what they are saying. Ask your partner what steps you can take to make the situation better. Also, make it clear that you have heard about the issue and would appreciate not hearing about it again. In a kind way, ask what you can do to make that happen.

4. Exercise together: Exercise enhances serotonin production in the brain and often helps people (couples included) become more flexible and less cingulate.

Temporal Lobe Relational Prescriptions for Self

1. Use memory helpers to keep the relationship fresh: Reminders can make all the difference between your partner knowing you care and feeling he or she is not important. Given the busy pace of our lives, we often forget to notice the people who are most special to us. Use notes, signs, computer reminder systems, ticklers, and so on to keep your attention focused on making the person you love feel loved. Flowers (limbic smells), cards, CDs, and loving notes help your partner remember you love and care for him or her. Temporal lobe partners need constant reminders to keep you lovingly in their memory banks.

2. Listen to beautiful music together: Music is healing and often has a positive impact on relationships. As we have seen, music can enhance moods and sharpen learning and memory. Use beautiful music to enhance your connection to your partner.

3. Move in rhythms together: Moving together helps maintain connection. Dancing, walking hand in hand, and loving are movements that promote bonding in a relationship. They promote connectedness and provide rhythms that help to solidify memories of togetherness.

4. Remember the best times. Develop a positive sense of the history of the relationship. Reread loving cards and letters on a regular basis to maintain an overall happy sense of the relationship.

5. Deal effectively with anger. When you know that you have a temporal lobe problem and anger is a serious issue for you, practice effective anger management strategies. Deep breathing, correcting negative thoughts, and clear communication are some anger management strategies that work. In addition, be sure to stay away from alcohol and drugs. They can unleash a vulnerable temporal lobe, uncorking anger and causing serious problems.

6. Know you have a tendency to be extremely sensitive to the behavior of others. Mild paranoia often accompanies a temporal lobe problem. When you feel others are being negative toward you, check it out. Do not automatically believe your negative thoughts or feelings. Check them out.

7. Protein snacks may be helpful. Often, stabilizing blood sugar with a protein snack (cheese, nuts, meat, hard-boiled eggs) helps to settle down the situation caused by temporal lobe irregularities.

Temporal Lobe Relational Prescriptions for Partner

1. Do not take this problem personally. Often people with temporal lobe problems struggle in relationships because of their negativity, anger, and mild paranoia. Help your partner see situations clearly, but do not take the negativity personally.

2. Take anger seriously. Sometimes temporal lobe rage can get out of control. Do not escalate the situation when you see your partner is escalating, especially if substance abuse is involved. Talk in a soft voice. Take a break. Actively listen. Offering food may also help. Do not use addictive substances around the temporal lobe partner. The more you use, the more likely your partner will use. Then things can really get out of control.

3. Keep protein snacks around.

4. Make sure you help get your partner to the doctor if the temporal lobe problems interfere with functioning. Such problems are often very treatable.

Use these prescriptions to enhance the love in your life. Love makes life worth living.

17

HELP!

When and How to Seek Professional Care

This chapter will attempt to answer four questions that I am frequently asked:

When is it time to see a professional about these problems?

What should I do when a loved one is in denial about needing help?

How can I find a competent professional?

When do you order a SPECT study?

When to Seek Help

This is relatively easy to determine. I recommend that people seek professional help when their attitudes, behaviors, feelings, or thoughts interfere with their ability to be successful in the world, whether in their relationships, in their work, or within themselves, and when self-help techniques have not helped them fully understand or alleviate the problem. Let's look at all three situations.

As seen in the last chapter, underlying neurobiological problems can truly sabotage relationships. *If you or someone you know suffers these problems and they interfere with the quality of relationships, get help.* Often it is necessary to address psychobiological problems first, before working on the psychology of the partners. I often use a computer analogy: you need to first fix computer hardware before it can effectively run sophisticated software. Let's take another look at how each brain system can interfere with relationships.

- *Depression can cause a person to feel distant, uninterested in sex, irritable, unfocused, tired, and negative. Unless the partners understand this disorder, they often have severe relational problems.*

- *Anxiety causes sufferers to feel tense, uptight, physically ill, and dependent, and to avoid conflict. Partners often misinterpret the anxiety or physical symptoms as complaining or whining and do not take seriously the level of suffering.*

- *Obsessive or overfocus tendencies, as we have seen, cause rigid thinking styles, oppositional or argumentative behavior, holding on to grudges, and chronic stress in relationship. Seeking help is essential to establishing a new ability to relate effectively.*

- *Prefrontal cortex problems, such as ADD, often sabotage relationships because of the impulsive, restless, and distractible behavior involved. Without help there is a high degree of relational and family turmoil.*

- *Temporal lobe problems may be associated with frequent attacks of rage, angry outbursts, mood swings, hearing things wrong, and low frustration tolerance. I have seen these problems ruin otherwise good relationships.*

These underlying brain problems often need treatment in order for relationship to heal.

The workplace is also affected by underlying and often unrecognized brain system problems. *If you or someone you know suffers these problems and they interfere with work, it is often essential to get professional help.* Addressing these problems can literally change the whole atmosphere at work.

- *Depression can cause people at work to be negative, unfocused, tired, and unmotivated, and to take things too personally or the wrong way. Such employees may negatively affect others' morale and unknowingly skew everyone's perceptions at work so they see positive things in a bad light. Depressed people have more sick days than people without depression.*

- *People with anxiety are often tense, physically sick, and conflict-avoidant. Their level of anxiety often causes them to be dependent and require too much supervision. Their anxiety tends to be contagious, and those around them may also begin predicting negative outcomes to situations. They can negatively affect a work group and tend to be fearful rather than hopeful.*

- *Obsessive or overfocus tendencies cause rigid thinking styles, and employers or employees tend to be more irritable, oppositional, or argumentative. They often hold grudges and can be unforgiving, causing long-term workplace problems.*

- *Prefrontal cortex problems, such as ADD, cause many problems at work, including chronic lateness, inefficiency, missing deadlines, impulsive decision making, and conflict-seeking behavior.*

- *Temporal lobe problems often affect work. I am willing to bet that most workplace violence is associated with temporal lobe disorders. More commonly, temporal lobe problems are manifested at work by mood swings or unpredictable behavior, low frustration tolerance, misperceptions, auditory processing problems, and memory problems. The anger, misperceptions, and mild paranoia can wreak havoc in a work group.*

Ben

Let me give an example of how brain system problems can affect the workplace. Ben was on the verge of being fired. He was frequently late to work, disorganized, forgetful, late on deadlines, and off task. His boss let his behavior slide because she felt that Ben had a good heart and wanted to do well. His boss's boss, however, wanted Ben fired. He thought

Ben was bad for unit discipline and morale. Ben's boss was my patient. I was treating her for ADD. She saw many of her own characteristics in Ben. One day she asked Ben to come into her office. She told him her own story, about her problems in school and with timeliness, organization, distractibility, and procrastination. She told him she had ADD and that her treatment had made a big difference for her. She said that her boss wanted her to fire him, but she had convinced him to give Ben another chance. She suggested that Ben seek professional help if he could relate to her story. Ben started to cry. His history was a carbon copy of hers. He had done poorly in school and had trouble with concentration, organization, completing assignments, and underachievement. He did not expect his boss to care enough about him to try to help. Other employers would just fire him, as the boss's boss wanted to do. Ben came to see me. He had a classic case of ADD. With medication and structured therapy, his behavior improved dramatically. His boss and those higher up in the company saw a wonderful turnaround in Ben. The company saved money but not having to hire and retrain someone to take Ben's place, and Ben was deeply grateful that he was given another chance, along with the information he needed to heal. The odds are that he will always be a loyal employee of this company.

All of this brain systems can have a significantly negative effect on internal life, self-esteem, emotional health, and physical health.

- *Depression (limbic system) clouds a sense of accomplishment (even with incredible accomplishment) and causes intense sadness and internal pain. Depression is not the absence of feeling, but rather the presence of painful feelings. Depression is one of the most common precursors to drug abuse and suicide. Depression often compromises immune system function, leaving people more prone to illness.*

- *The tension and panic associated with anxiety (often a result of basal ganglia problems) can feel like torture. I have known many patients with panic attacks who become suicidal in hope of escaping their fear. Anxiety is often associated with physical tension and an increase in illness. Many anxious people self-medicate by drinking alcohol, taking drugs, overeating, engaging in inappropriate sex, and other potentially addictive behaviors.*

- *Overfocus (cingulate) issues cause repetitive thoughts and worries that are often self-mediated with drugs or alcohol. Internal torture by constant worry is common. When someone says one negative thing, they may hear it in their minds five hundred times. They cannot get away from negative thoughts.*

- *People with prefrontal cortex issues, such as ADD, often feel a tremendous sense of underachievement, repetitive failure, and low self-esteem. People with prefrontal cortex issues may use internal problems for self-stimulation and be chronically upset. The stress associated with these problems is often accompanied by increased illness.*

- *Temporal lobe problems can wreak internal havoc. The internal violent mood swings and thoughts often torment the soul. Unpredictable behavior, low frustration tolerance, misperceptions, and memory problems are often associated with an internal sense of damage. Anger often alienates others, and loneliness is common.*

Gaining Access to Your Own Good Brain

The internal problems associated with these brain system difficulties can ruin lives, relationships, and careers. It is essential to seek help when necessary. It is also critical for people not to be too proud to get help. Pride often devastates relationships, careers, and even life itself. Too many people feel they are somehow "less than others" if they seek help. I often tell my patients that, in my experience, *it is the successful people who seek help when they need it*. Successful business people hire the best possible outside consultants when they are faced with a problem that they cannot solve or when they need extra help. Unsuccessful people tend to deny they have problems, bury their heads, and blame others for their problems. If your attitude, behavior, thoughts, or feelings sabotage your chances for success in relationships, work, or within yourself, get help. Don't feel ashamed; feel as though you're being good to yourself.

In thinking about getting help, it is important to put these brain system problems in perspective. I tell my patients to get rid of the concept of "normal versus not normal." "What is normal anyway?" I ask. I tell my patients who worry that they are not normal that "normal" is the setting on a dryer. Or that Normal is a city in Illinois. Actually, I spoke in Normal, Illinois, at a major university several years ago. I got to meet Normal people, shop at the normal grocery store, see the Normal police department and fire department. I even met Normal women. They were a very nice group, but really not much different from folks in California. The Normal people seemed to have all of the problems I mention in this book. I also tell my patients about a study published in 1944, sponsored by the National Institutes of Health, in which researchers reported that 49 percent of the US population suffer from a psychiatric illness at some point in their lives. Anxiety, substance abuse, and depression were the three most common illnesses. At first, I thought this statistic was too high. Then I made a list of twenty people I knew (not from my practice). Eleven were taking medication or in therapy. Half of us at some point in our lives will have problems. It's just as normal to have problems as not to have problems. Again, it is the more successful people who will get help first. The same NIH study reported that 29 percent of the population will have two separate and distinct psychiatric diagnoses and 17 percent of us will have three. In my experience, very few people are completely without these problems. In fact, in doing research, one of the most difficult challenges is finding a "normal control group".

Most of us have traits of one or more brain system misfires. Sometimes the problems associated with each section are subclinical (they don't get in your way much), and sometimes they are severe enough that they significantly interfere with your life. When they do, it is time to get help. I see many of the problems I treat as medical with significant psychological and social consequences. This classification is, I believe, accurate, and a lot less stigmatizing for patients.

One of the most persuasive statements I give patients about seeking help is that I am often able to help them have *more access* to their own good brain. When their brain does not work efficiently, they can't be efficient. When their brain works right, they can work right. I will often show them a number of brain SPECT studies to show them the difference on and off medication or targeted psychotherapy, as a way to help them understand the concept. As you can imagine after looking at the images in this book, when you see an underactive brain versus one that is healthy, you want the one that is healthy.

What to Do When a Loved One Is in Denial about Needing Help

Unfortunately, the stigma associated with "psychiatric illness" prevents many people from getting help. People do not want to be seen as crazy, stupid, or defective, and they often don't seek help until they (or their loved one) can no longer tolerate the pain (at work, in their relationship, or within themselves).

Jerry and Jenny

When Jerry and Jenny started to have marital problems early in their marriage, Jenny wanted to get help. Jerry refused. He said that he didn't want to air his problems in front of a stranger. It wasn't until Jenny threatened to leave him that he finally agreed to go for counseling. Initially, Jerry listed many reasons why he wouldn't go for help: He didn't see that the problems were that bad; it was too much money; he thought all counselors were "messed up"; and he didn't want to be perceived as crazy by anyone who might find out about the counseling.

Unfortunately, Jerry's attitude is common among men. Many men, when faced with obvious problems in their marriages, their children, or even themselves, refuse to see the issue. Their lack of awareness and strong tendency toward denial prevent them from seeking help until more damage has been done than necessary. In Jerry's case, he had to be threatened with divorce before he would go. Another factor in Jerry's case was that he had ADD. As a child he had been forced to see a counselor for behavioral problems at school. He hated feeling different from the other kids and resented his mom for making him talk to the doctor.

Some people may say it is unfair for me to "pick on" men. And indeed, some men see problems long before some women. Overall, however, in my experience mothers see problems in children before fathers and are more willing to seek help, and many more wives call for marital counseling than husbands. What is it in our society that causes men to overlook obvious problems, to deny problems until it is too late to deal with them effectively or until more damage is done than necessary? Some of the answers may be found in how boys are raised, the societal expectations we place on men, and the overwhelming pace of many men's daily lives.

Boys most often engage in active play (sports, war games, video games, etc) that involves little dialogue or communication. The games often involve dominance and submissiveness, winning and losing, and little interpersonal communication. Force, strength, or skill are used to handle problems. Girls, on the other hand, often engage in more interpersonal or communicative types of play, such as dolls and storytelling. When my wife was a little girl, she used to line up her dolls to teach them. Fathers often take their sons out to throw the ball around or shoot hoops, rather than to go for a walk and talk.

Many men retain the childhood notions of competition and that one must be better than others to be any good at all. To admit to a problem is to be less than other men. As a result, many men wait to seek help until their problem is obvious to the whole world. Other men feel totally responsible for all that happens in their families; to admit to a problem is to admit that they have in some way failed.

Clearly, the pace of life prevents some men from being able to take the time to look clearly at the important people in their lives and their relationships with them. When I spend time with fathers and husbands and help them slow down enough to see what is really important to them, more often than not they begin to see the problems and work toward more helpful solutions. The issue is not one of being uncaring or uninterested; it is not seeing what is there.

Many teenagers also resist getting help even when faced with obvious problems. They worry about labels and don't want yet another adult judging their behavior.

Here are several suggestions to help people who are unaware or willing to get the help they need:

1. Try the straightforward approach first (but with a new brain twist). Clearly tell the person what behaviors concern you. Tell him or her that the problems may be due to underlying brain patterns that can be tuned up. Explain that help may be available - help not to cure a defect but rather help to optimize how the brain functions. Tell the loved one that you know he or she is trying to do his or her best, but unproductive behavior, thoughts, or feelings may be getting in the way of success (at work, in relationships, or within themselves). Emphasize access, not defect.

2. Give the loved one information. Books, videos, and articles on the subjects you are concerned about can be of tremendous help. Many people come to see me because they read a book of mine, saw a video I produced, or read an article I wrote. Good information can be very persuasive, especially if it is presented in a positive, life-enhancing way.

3. When a person remains resistant to help, even after you have been straightforward and given him or her good information - plant seeds. Plant ideas about getting help and then water them regularly. Drop an idea, article, or other information about the topic from time to time. However, if you talk too much about getting help, people become resentful and won't get help, just to spite you. Be careful not to go overboard.

4. Protect your relationship with the other person. People are more receptive to people they trust than to people who nag and belittle them. I do not let anyone tell me something bad about myself unless I trust him or her. Work on gaining the person's trust over the long run. It will make him or her more receptive to your suggestions. Do not make getting help the only thing that you talk about. Make sure you are interested in the person's whole life, not just potential medical appointments.

5. Give new hope. Many people with these problems have tried to get help and it either didn't work or made them worse. Educate them on new brain technology that helps professionals be more focused and more effective in treatment efforts.

6. There comes a time when you have to say enough is enough. If, over time, the other person refuses to get help, and his or her behavior has a negative impact on your life, you may have to separate yourself. Staying in a toxic relationship is harmful to your health, and it often enables the other person to remain sick. Actually, I have seen that the threat or act of leaving can motivate people to change, whether it is about drinking, drug use, or treating

underlying ADD or manic-depressive disorder. Threatening to leave is not the first approach I would take, but after time it may be the best approach.

7. Realize that you cannot force people into treatment unless they are dangerous to themselves, dangerous to others, or unable to care for themselves. You can do only what you can do. Fortunately, today there is a lot more we can do than even ten years ago.

Finding a Competent Professional

At this point, I must get thirty to forty calls, faxes, or e-mails a week from people all over the world who are looking for competent professionals in their area who think in ways similar to myself and utilize the principles outlined in this book. Because these principles are still on the edge of what is new in brain science, such professionals may be hard to find. Still, finding the right professional for evaluation and treatment is critical to the healing process. The wrong professional can make things worse. There are a number of steps you can take to find the best person to assist you:

1. Get the best person you can find. Saving money up front may cost you a lot in the long run. The right help not only is cost-effective but saves unnecessary pain and suffering. Don't rely on a therapist solely because he or she is on your managed care plan. That person may or may not be a good fit for you. Search for the best. If he or she is on your insurance plan - great. Just don't let that be the primary criterion.

2. Use a specialist. Brain science is expanding at a rapid pace. Specialists keep up with the latest developments in their fields, while generalists (family physicians) have to try to keep up with everything. If I had a heart arrhythmia, I would see a cardiologist rather than a general internist. I want to be treated by someone who has seen hundreds or even thousands of cases like mine.

3. Get information about referrals from people who are highly knowledgeable about your problem. Sometimes well-meaning generalists give very bad information. I have known many physicians and teachers who make light of brain system problems, such as ADD, learning disabilities, or depression, and discourage people from getting help. One family physician told one of my recent patients: "Oh, ADD is a fad. You don't need help. Just try harder." In searching for help, contact people who are likely to give you good information, such as specialists in the field, people at major research centers, people in support groups about your specific problem. Check out Internet medical support groups. Support groups often have members who have visited the professionals in the area, and they can give you important information about the doctor, such as his or her bedside manner, competence, responsiveness, and organization.

4. Once you get the names of competent professionals, check their credentials. They should have board certification; to become board certified, physicians have to pass certain written and verbal tests. They have had to discipline themselves to gain specialized skill and knowledge. Don't give excessive weight to the medical school or graduate school the professional attended to the exclusion of other factors. I have worked with some doctors who went to Yale and Harvard who did not have a clue about how to treat patients appropriately,

while other doctors from less prestigious schools were outstanding, forward-thinking, and caring.

5. Set up interview with the professional to see whether or not you want to work with him or her. Generally you have to pay for his or her time, but it is worth spending time getting to know the people you will rely on for help. If you sense the fit isn't good, keep looking.

6. Many professionals write articles or books or speak at meetings or local groups. If possible, read their writings or hear them speak to get a feel for the kind of people they are and their ability to help you.

7. Look for a person who is open-minded, up to date, and willing to try new things.

8. Look for a person who treats you with respect, who listens to your questions, and who responds to your needs. Look for a relationship that is collaborative and trusting.

I know it is hard to find a professional who meets all of these criteria and who also has the right training in brain physiology, but it is possible. Be persistent. The right caregiver is essential to healing.

How Can I Tell If I Need a SPECT Study?

I order SPECT studies only for very specific reasons. Because of our very large database, I actually order fewer studies now than I did several years ago. Our extensive SPECT work has given me the clinical experience to diagnose more readily brain patterns that are responsive to certain treatments. I have included many of these patterns in this book. Here are several common questions and answers about SPECT.

Will the SPECT study give me an accurate diagnosis? No. A SPECT study by itself will not give a diagnosis. SPECT studies help the clinician understand more about the specific function of your brain. Each person's brain is unique, which may lead to unique responses to medicine or therapy. Diagnoses about specific conditions are made through a combination of clinical history, personal interview, information from families, diagnostic checklists, SPECT studies, and other neuropsychological tests. No study alone is a "doctor in a box" that can give accurate diagnoses on individual patients.

Why are SPECT studies ordered? Some of the common reasons include:

1. *Evaluating seizure activity.*
2. *Evaluating cerebral vascular disease.*
3. *Evaluating dementia and distinguishing between dementia and pseudodementia.*
4. *Evaluating the effects of mild, moderate, and severe head trauma.*
5. *Suspicion of underlying organic brain condition, such as seizure activity contributing to behavioral disturbance, prenatal trauma, or exposure to toxins.*
6. *Evaluating atypical or unresponsive aggressive behavior.*
7. *Determining the extent of brain impairment caused by drug or alcohol abuse.*

In this book I have listed other examples of SPECT's use, such as in difficult marital situations. I must emphasize that this is a very sophisticated use of SPECT and not likely to be found in clinics outside our own.

Do I need to be off medication before the study? This question must be answered individually between you and your doctor. In general, it is better to be off medications until they are out of your system before a scan, but this is not always practical or advisable. If the study is done while on medication, let the technician know so that when the physician reads the study, he or she will include that information in interpreting the scan. In general, we recommend that patients try to be off stimulants at least four days before the first scan and remain off them until after the second scan if one is ordered. Medications such as Prozac (which lasts in the body four to six weeks) are generally not stopped because of practicality. Check with your doctor for specific recommendations.

What should I do the day of the scan? On the day of the scan decrease or eliminate your caffeine intake, and try to not take cold medication or aspirin (if you do, please write it down on the intake form). Eat as you normally would.

Are there any side effects or risks to the study? The study does not involve a dye, and people do not have allergic reactions to the study. The possibility exists, although in a very small percentage of patients, of a mild rash, facial redness and edema (swelling), fever, and a transient increase in blood pressure. The amount of radiation exposure from one brain SPECT study is approximately the same as from one abdominal X ray.

How is the SPECT procedure done? The patient is placed in a quiet room, and an intravenous (IV) line is started. The patient remains quiet for approximately ten minutes with eyes open to allow his or her mental state to equilibrate to the environment. The imaging agent is then injected through the IV. After another short period of time, the patient lies on a table and the SPECT camera rotates around his or her head (the patient does not go into a tube). The time on the table is approximately fifteen minutes. If a concentration study is ordered, the patient returns on another day to repeat the process; a concentration test is performed during the injection of the isotope.

Are there alternatives to having a SPECT study? In our opinion, SPECT is the most clinically useful study of brain function. There are other studies, such as electroencephalograms (EEGs), positron emission tomography (PET) studies, and functional MRIs (fMRIs). PET studies and fMRIs are considerably more costly, and they are performed mostly in research settings. EEGs, in our opinion, do not provide enough information about the deep structures of the brain to be as helpful as SPECT studies.

Does insurance cover the cost of SPECT studies? Reimbursement by insurance companies varies according to your plan. It is a good idea to check with the insurance company ahead of time to see if it is a covered benefit.

Is the use of brain SPECT imaging accepted in the medical community? Brain SPECT studies are widely recognized as an effective tool for evaluating brain function in seizures, strokes, dementia, and head trauma. There are literally hundreds of research articles on these

topics. In our clinic, based on our experience over eight years, we have developed this technology further to evaluate aggression and nonresponsive psychiatric conditions. Unfortunately, many physicians do not fully understand the application of SPECT imaging and may tell you that the technology is experimental, but over one hundred physicians in the USA have referred to us for scans.

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Who Is Andrew Really?

Questions About the Essence of Our Humanity

In the introduction, I told the story of Andrew, my nephew who became violent because of a brain cyst occupying the space in his left temporal lobe. When the cyst was removed, he returned to his kind, caring, inquisitive self. In subsequent chapter I have also discussed:

- *Michelle, a woman who attacked her husband with a knife several days before her period and who, when treated with Depakote, became her normal, nonviolent self.*

- *Samuel, a negative, oppositional ten-year-old who was failing in school and isolated from friends and who, on 10 milligrams of Prozac daily, became successful at school, at home, and with friends.*

- *Rusty, a man who was arrested four times for assault and failed five drug treatment programs for methamphetamine abuse and who, since his underlying temporal lobe disorder was diagnosed and properly treated, has been able to remain personally more effective as well as gainfully employed.*

- *Sally, a woman admitted to the hospital as suicidal, depressed, and anxious and who, when properly diagnosed with adult ADD and effectively treated, felt less depressed and more focused, and was able to be the mother and wife she had always wanted to be.*

- *Willie, a college student who experienced "minor" head injuries in two car accidents and whose whole personality subsequently changed. He became aggressive and depressed, and nearly killed his roommate. With the proper treatment he was able to return to his funny, happy, effective self.*

- *Rob, "the anger broker of the Valley" who had severe family problems and suicidal ideas and actions. On the antiobsessive antidepressant Anafranil, he became pleasant, effective, and someone his family wanted to be around.*

- *Linda, a woman who had been raped on two occasions and who suffered from anxiety, depression, worrying, and drug abuse. With Saint-John's-wort and EMDR psychotherapy, her brain normalized and she was able to be much more effective in her life.*

- John, a retired contractor, who had been physically and emotionally abusive to his wife during most of their marriage, and emotionally abusive to his children. At the age of seventy-nine, after a psychotic episode following open-heart surgery, it was discovered that he had had a serious head injury at the age of twenty that had damaged his left frontal-temporal region. The head injury may have changed his behavior and affected three generations of his family.

These stories and many others in the book and in my practice have caused me to question the very essence of who we are. Who are we really? Are we really who we are when our brain works right? Or are we really who we are when our brain misfires?

I believe, after seeing five thousand SPECT studies (along with the patients and stories that go with them), that we are really who we are when our brain works right. When our brain works right, we are more thoughtful, more goal-oriented, and more interested in other people. We are kinder, our moods are more stable, and we are more tolerant. Anxiety doesn't rule us, although we have enough anxiety to get out of bed in the morning and go to work. Even though we may have negative thoughts from time to time, they do not rule our internal life. Even though we may have graphic, violent thoughts, they are not common and we do not act them out. When our brain works right, our spouse may make a mistake, but we do not hold on to that mistake for twenty or thirty years. We feel sexual, but we are not ruled by our sexual desires. Our children may still drive us crazy, but we act toward them in a positive, helpful way the vast majority of the time. When our brain works right, we are more able to be who we really want to be.

Other questions that this work has stimulated me to ask are:

- What choices do we really have about our behavior? Probably not as many as we think.

- Does our relationship with God depend on brain function? Probably it is easier to see a kind, loving, involved God when our brain works right. And it is probably easier to imagine a harsh, punitive God when we have an overactive cingulate and limbic system coloring the world in a negative way. (This will probably get a few people mad at me - I am not trying to be conflict-seeking.)

- Do we make bad choices as a result of bad training, in defiance of God's will, as a result of poverty, because of a moral or character defect? Perhaps, but again, we are more likely to make bad choices when our prefrontal cortex is underactive as a result of brain trauma or having ADD. Of course this doesn't mean we cannot make bad choices as a result of bad training, defiance of God, poverty, and the like, but doing so will be more likely when our internal supervisor is less active than necessary.

- Do we make better choices when our brains work right? Of course we do is the obvious answer from this book.

- Is our personality a collection of neurons, neurotransmitters, and hormones? Yes and no. Our personality is intimately connected to brain function, but as we have seen, brain

function is also intimately connected to our thought and environment. They work in a circle and cannot be separated.

- What does Mike Tyson's brain look like? Did he bite Evander Holyfield's ear in the heavyweight championship fight in 1997 because he wanted to embarrass himself and seem like an animal? Or did his brain misfire after a head butt and did his cingulate and temporal lobes consequently go haywire with little prefrontal cortex supervision? I bet on the latter.

- What does Saddam Hussein's brain scan look like? What about Adolf Hitler's brain scan?

- Should we scan our political leaders? My guess is that we would gain great insight into the political process. Odds are President Ronald Reagan's brain would have demonstrated blood flow patterns indicating Alzheimer's disease in the early part of his presidency. His forgetfulness became obvious during his second term. If we had known about his impending Alzheimer's disease, what then?

- Should I scan my son's and daughters' romantic interests? I think so. My kids are not thrilled about the idea.

The questions could go on and on. The main point is that the brain matters in all we do. The brain is one of the first things we should think about when we try to understand abnormal behavior. Self-help programs need to consider the brain. To prevent relapse from substance abuse, to cut down on violence in our society, and to curtail the alarming rates of divorce and family discord, we need to think about the brain.

Of course, the brain doesn't function in a vacuum - we always need to think about the psychological and social underpinnings of behavior as well - but all behavior starts in the actual physical functioning of the brain. Your brain matters.

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Brain Dos and Brain Don'ts

A Summary of Ways to Optimize Brain Function and Break Bad Brain Habits

Based on my research and that of many other neuroscientists, here is a list of brain dos and don'ts to optimize your own brain function and begin to break bad brain habits that hold you back from getting what you want in life.

Brain Dos:

1. *Wear a helmet in high-risk situations.*
2. *Drink lots of water (six to eight 8-ounce glasses daily) to stay well hydrated.*
3. *Eat healthfully, adjusting the proportion of protein and carbohydrate to your brain needs.*
4. *Take ginkgo biloba as necessary under your doctor's supervision.*
5. *Think positive, healthy thoughts.*
6. *Love, feed, and exercise your internal anteater to rid yourself of ANTs (automatic negative thoughts).*
7. *Every day, take time to focus on the things you are grateful for in your life.*
8. *Watch the Disney movie Pollyanna.*
9. *Spend time with positive, uplifting people.*
10. *Spend time with people you want to be like (you are more likely to become like them).*
11. *Work on your "people skills" to become more connected and to enhance limbic bonds.*
12. *Talk to others in loving, helpful ways.*
13. *Surround yourself with great smells.*
14. *Build a library of wonderful experiences.*
15. *Make a difference in the life of someone else.*
16. *Exercise.*
17. *Regularly connect with your loved ones.*
18. *Learn diaphragmatic breathing.*
19. *Learn and use self-hypnosis and meditation on a daily basis.*
20. *Remember the "18/40/60 Rule".*
21. *Effectively confront and deal with situations involving conflict.*
22. *Develop clear goals for your life (relationships, work, money, and self) and reaffirm them every day.*
23. *Focus on what you like a lot more than what you don't like.*
24. *Collect penguins, or at least send them to me.*
25. *Have meaning, purpose, excitement, and stimulation in your life.*
26. *Establish eye contact with and smile frequently at others.*
27. *Consider brainwave biofeedback or audiovisual stimulation to optimize brain function.*
28. *Notice when you're stuck, distract yourself, and come back to the problem later.*
29. *Think through answers before automatically saying no.*
30. *Write out options and solutions when you feel stuck.*
31. *Seek the counsel of others when you feel stuck (often just talking about feeling stuck will open new options).*
32. *Memorize and recite the Serenity Prayer daily and whenever bothered by repetitive thoughts (God, grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference).*
33. *Take a break and come back later when you're unsuccessfully tried to convince someone who is stuck.*
34. *Use paradoxical requests in dealing with cingulate people.*
35. *Make naturally oppositional children mind you the first time (through a firm, kind, authoritative stance).*

36. *Learn something new every day.*
37. *Enhance your memory skills.*
38. *Sing and hum whenever you can.*
39. *Make beautiful music a part of your life.*
40. *Make beautiful smells a part of your life.*
41. *Touch others often (appropriately).*
42. *Make love with your partner.*
43. *Move in rhythms.*
44. *Use a skilled psychotherapist when needed.*
45. *Use an EMDR (eye movement desensitization and reprocessing) therapist to deal with trauma.*
46. *Take head injuries seriously, even minor ones.*
47. *Take medications when needed, under your doctor's supervision.*
48. *Take herbal remedies when needed, under your doctor's supervision.*
49. *Consider underlying brain problems in substance abusers.*
50. *Do full brain evaluations for people who do terrible things.*

Brain Don'ts

1. *Isolate a developing baby.*
2. *Use alcohol, tobacco, drugs, or much caffeine when pregnant.*
3. *Ignore erratic behavior.*
4. *Lie around the house and never exercise.*
5. *Ignore concussions.*
6. *Smoke.*
7. *Drink much caffeine.*
8. *Drink much alcohol.*
9. *Do drugs (NO heroin, inhalants, mushrooms, PCP, marijuana, cocaine, methamphetamines (unless in prescribed doses for ADD)).*
10. *Eat without forethought about what foods are best for your brain.*
11. *Drive without wearing a seat belt.*
12. *Ride a motorcycle, bicycle, skateboard, in-line skates, snowboard, and so forth without a helmet.*
13. *Hit a soccer ball with your head.*
14. *Bang your head when you're frustrated (protect the head of children who are head bangers).*
15. *Bungee jump.*
16. *Hand out with people who do drugs, fight, or are involved in other dangerous activities.*
17. *Allow your breathing to get out of control.*
18. *Think in black-or-white terms.*
19. *Think in words like always, never, every time, everyone.*
20. *Focus on the negative things in your life.*
21. *Predict the worst.*
22. *Think only with your feelings.*
23. *Try to read other people's minds.*
24. *Blame other people for your problems.*
25. *Label yourself or others with negative terms.*

26. *Beat up yourself or others with guilt (very ineffective).*
27. *Personalize situations that have little to do with you.*
28. *Feed your ANTs.*
29. *Use sex as a weapon with your partner.*
30. *Talk to others in a hateful way.*
31. *Push people away.*
32. *Be around toxic smells.*
33. *Be around toxic people.*
34. *Focus too much on what other people think of you (odds are they aren't thinking about you at all).*
35. *Allow your life to just happen without you directing and planning it.*
36. *Take the "stimulant bait" from other people.*
37. *Be another person's stimulant.*
38. *Allow thoughts to go over and over in your head.*
39. *Automatically say no to others; think first if what they want fits with your goals.*
40. *Automatically say yes to others; think first if what they want fits with your goals.*
41. *Argue with someone who is stuck.*
42. *Isolate yourself when you feel worried, depressed, or panicky.*
43. *Allow naturally oppositional children to be oppositional.*
44. *Listen to toxic music.*
45. *Blame substance abusers as morally defective.*
46. *Refuse to take medications when needed.*
47. *Self-medicate; when you have problems, get help from professionals.*
48. *Deny you have problems.*
49. *Refuse to listen to the people you love who are trying to tell you to get help.*
50. *Withhold love, touch, and companionship from those you love as a way to express anger.*