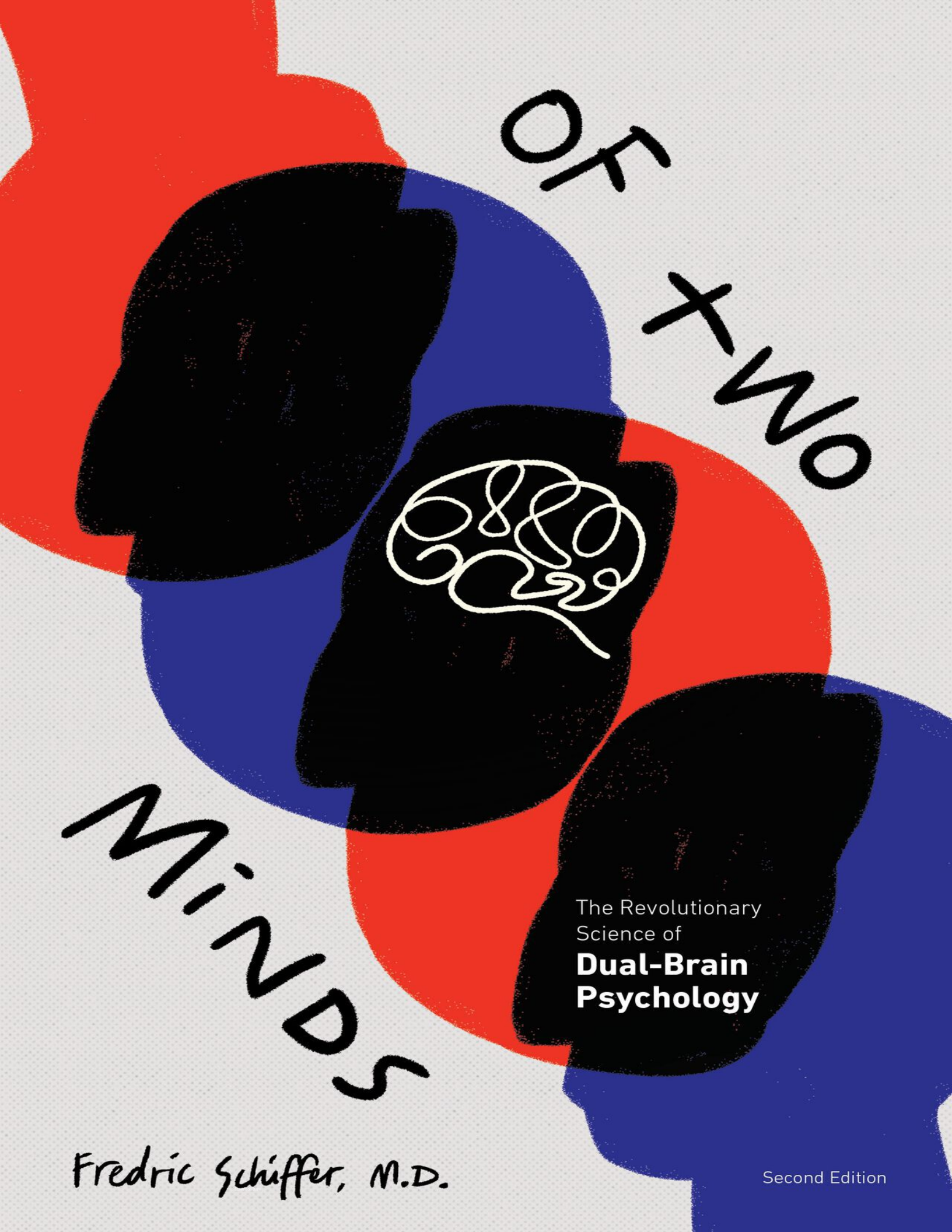
OF TWO MINDS



The Revolutionary Science of **Dual-Brain Psychology**

Fredric Schiffer, M.D.

Second Edition

OF TWO MINDS

The Revolutionary Science of Dual-Brain Psychology, 2nd Edition

Fredric Schiffer, MD

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PRAISE FOR THE 1ST EDITION

Wonderfully readable and well-informed, this is the best book ever on the social and psychiatric implications of the split-brain research.

Joseph Bogen, MD
Late split-brain colleage of Dr. Sperry

Dr. Schiffer rivals Freud in his revolutionary theories on understanding the human psyche. He convincingly portrays the working of two autonomous minds in one consciousness – offering a radical new strategy in treating a multitude of illnesses both mental and physical. I believe Dr. Schiffer's insights will be very useful for those of us wanting to optimize a harmonious healthy balance among our body, minds and emotions.

Candace B Peart, PhD
Late author of Molecules of Emotion

Of Two Minds provides the reader with a lucid exposé of the evolving understanding of the dual mind/brains that we all possess.

Bessel A van der Kolk, MD
Psychiatrist, and best-selling author

For Mary Jane with great love over half a century

ACKNOWLEDGMENTS

I would like to thank William P. Seltzer for his friendship, advice, and encouragement. I greatly appreciate over 30 years of support and mentoring by Martin H. Teicher, MD, PhD, and the collegiality of the members of his laboratory at McLean Hospital, The Developmental Biopsychiatry Research Program and Harvard Medical School.

CONTENTS

I desire to conduct the affairs of this administration that if at the end, when I come to lay down the reins of power, I have lost every other friend on earth, I shall at least have one friend left, and that friend shall be down inside me.

ABRAHAM LINCOLN

PREFACE TO THE 2ND EDITION

When the first edition came out, I had a number of peer-reviewed published studies in support of my unusual hypothesis: **that we are of two different minds, each associated with one brain hemisphere**. I also had several years of clinical experience applying the theory in my private practice. Most of the first edition is included in the second edition. It is an explanation of the theory and demonstrations of its clinical application for most psychiatric conditions. Treatments like Ketamine which treat multiple diagnoses are called multi-diagnostic treatments, and Dual-Brain Psychology is multi-diagnostic. It also presented the research that supported the work. To date there are 24 peer-reviewed publications describing experiments on Dual-Brain Psychology.

In the intervening 24 years since the first edition, I have continued to appreciate using this approach with patients in my clinical practice and have found it extremely rewarding to see even difficult problems work out well, finding symptom relief and improved quality of life and level of functioning. From my prior experience with psychotherapy, I doubt we would have achieved these results without the theory and practice of Dual-Brain Psychology.

But because private practice is private, these successes have generally not been told. Because this hypothesis has been a radically different view of human psychology, one that is inconsistent with our ordinary sense of ourselves, I was determined to continue to conduct rigorous research that could prove or disprove this theory and I believe that we now have overwhelming evidence that the majority of us, including myself, are of two minds, one more childlike and one more mature and that these two minds are related closely to the two brain hemispheres.

As is detailed in later chapters, this theory came out of observations with patients in my clinical practice. Patients seemed to have a regressed mind that could shift to a more mature mind as they improved and then reverted to an immature, more childlike mind as they regressed. When they improved again their personality seemed to change to a more mature person. I felt I was seeing two minds, two different personalities in my patients. I then reread the split-brain studies for which Prof. Roger Sperry won the Nobel Prize in 1983. They offered a very radical treatment for patients whose lives were completely disrupted by intractable epilepsy. Neurosurgeon Joseph Bogen suggested a radical operation; he suggested that the corpus callosum, the connection between the two halves of the brain, the left brain and right brain, be severed surgically. The purpose of which was to cut the communication between the two hemispheres and thereby decreased seizure activity. Sperry had years of experience doing split-brain operations in animals and together they formed the foundation for a team of scientists who would study these operated patients, these split-brain patients.

When I was in college, the split-brain studies came up in a neuropsychology course, but at the time I didn't appreciate the real significance of the studies. I think even to this day the true significance is not widely appreciated. That significance is that after the corpus callosum, the connection between the two halves of the brain was severed surgically, the patient had two independent minds. He still identified as one person with the same address and social security number, but the tests that Bogen and others embarked upon showed that each hemisphere had his own view of the world and its own intentions and wishes. One such patient, in the mind of his left brain wanted to be a draftsman, but the mind associated with his right hemisphere wanted to be a racecar driver. The idea that one half a brain could lead to an intact mind, a human mind, a mind that had political opinions, that understood English, had a sense of humor, and could follow requests was remarkable and unexpected.

I started to wonder whether the two personalities that I was observing in my patients might be related to the two hemispheres. I got this idea while on vacation in England with my family in 1990 while re-reading a book about the split-brain studies. When I returned to the United States I met with Martin Teicher, MD, PhD who had recently started a laboratory for neuroscience research at McLean Hospital. I explained to him that I thought that the right brain was related to the immature mind which I thought related

to the Freudian unconscious. Dr. Teicher agreed to our collaborating. He had an EEG machine, a brainwave detector that could give an indication of momentary brain activity. I suggested that I interview 10 people in which I asked them about neutral material such as news events or what they did last week, and then I conducted a psychiatric interview in which I explored their childhood and any traumas during their childhood. I wanted to compare the EEGs during the two interviews. Our first published paper reported our findings. In most of the subjects, the EEG activity suggested greater brain activity in the right hemisphere during the negative memories compared to the neutral ones which were more associated with left hemisphere activity. We published this suggesting that the right hemisphere was associated with old traumatic memories and that the left hemisphere was associated with the neutral memories. Years later as is described in this book I found that the negative hemisphere could be either the left or the right hemisphere. In our 10 subjects the majority had their negative side in the right hemisphere, but not all did. If we only looked at the average data, then it looked as if the right hemisphere was the negative hemisphere which is still a common belief amongst neuroscientists, but our evidence proves beyond a doubt that this is a misconception. In our study data, 3 of the 10 subjects had more left brain activity during the discussions of their childhood traumas.

As I explained in the first edition, the eyes are connected to the brain hemispheres separately. The connection is a bit complicated, but essentially if a person looks out the left half of their left eye, that can stimulate the opposite hemisphere, the right hemisphere. If they look out the right half of the right eye that can stimulate the left hemisphere. This was a very unexpected discovery that in ordinary people we could stimulate either hemisphere by simply having the person look out the lateral half of one eye versus the other. As I described in the book, I got this idea from a German neuroscientist, Werner Wittling. When I tried it with my first patient who is actually the patient described in chapter 7, Lyle, a decorated Viet Nam veteran who suffered severe PTSD. When he looked out his right lateral visual field stimulating his left brain, his face screwed up in distress and he said, “That plant behind you looks like the jungle.” He was obviously having a flashback to Viet Nam. I asked him to look out the left half of his left eye (all using his hands to block his vision), he said, “No, that’s a nice-looking plant.” He was relaxed and pleasant. His right brain, not his left brain, was his positive side. He was showing the two personalities that I had been

observing in my clinical practice, and I could elicit them by stimulating either hemisphere with lateral visual stimulation. As described in Chapter 7, I could elicit either personality at will. This gave us insight into his PTSD and enabled us to treat it quite well, greatly diminishing his symptoms and improving his quality of life.

Instead of using the patient's hands to block the vision, I made safety goggles that were taped to allow vision out of one lateral visual field or the other. What I found was that I could not predict which side of an individual would be the negative side but that for that individual the negative side was consistent. I described a study that I planned to do in the first edition. That study was to see if the side on which a person felt more negatively could predict who would respond to a stimulating treatment to the left brain. Transcranial magnetic stimulation is a treatment that is widely used for depression. At the time I planed the study, TMS as it is called, was an experimental treatment which has since been approved by the FDA for the treatment of depression. TMS is essentially a rapidly pulsating electromagnet that is always placed over the left forehead because it is widely believed that the left brain is the healthier side. As I described in the first edition, I approached Alvaro Pascual-Leone, Ph.D., who was a leading neuroscientist testing the clinical value of TMS. I made an appointment to meet with Dr. Pascual-Leone at his office at Beth Israel Hospital in Boston. I described my theory and offered him two pairs of my goggles. To my surprise he accepted them and said he would use them in a study that I suggested. I wanted him to use the goggles as a baseline for patients who were going to get a two-week course of TMS for depression. The patient would put on the goggles that looked out one side and measure his depression from 1 to 5. He or she would then look out the other side and measure his or her depression. Of 37 patients in the study, 35 had a difference in the level of their depression while looking out one side or the other. My hypothesis was that those people who felt better when they look to the right, meaning that their left brain was the more positive brain, that they would do well with stimulation of the left brain. Those who felt worse when they looked out the right side compared to the left, I predicted would do poorly. At the time of the first edition, this study was just an idea, now I have the results that have been published and replicated in a second study that got almost identical results. What we found was that using left sided TMS on a left brain that was associated with a personality with less depression, resulted in a very

successful treatment in the majority of patients. Those patients who by this simple goggle test had a negative left hemisphere were expected to do poorly, and with one exception, a left-handed woman, the 15 patients in that group all did poorly. These two TMS studies were not included, because they had not yet been done, by the first edition.

A second study that we did during this period after the first edition was an fMRI study. fMRI measures blood flow which is an index of brain activity throughout the brain and is a very widely used technique in neuroscience. In this published study, seven individuals from our lab at McLean went into the fMRI scanner with a pair of safety goggles with tape in the middle so that when they look to the left, they could only see out the left half of the left eye and the right eye was completely blocked. When they looked to the right, they could only see out the right half of the right eye and the left eye was completely blocked. We asked the subjects to look to the left for 30 seconds and then to the right for 30 seconds and then to repeat that. When we compiled and analyzed all the data, we found that simply looking to one side relatively activated the opposite brain hemisphere so that in the image when a person looked to the left his or her right brain lit up while his or her right brain was dark and when he or she looked to the right the left brain lit up and the right brain was dark. I felt that this was very compelling data that by simply looking out one lateral visual field or the other, a person could stimulate their opposite brain. In my clinical practice as described in the first edition, a person could change his or her personality by looking out one side or the other, and this seemed to me to be conclusive evidence that the different personalities were related to the different hemispheres.

I was unable to get any scientists involved with TMS to stimulate the right hemisphere in patients that the goggles suggested that that side would lead to a greater benefit. So, I began looking for a way to stimulate one hemisphere or the other as I did with my goggles. My feeling was also that the goggles did not look like scientific equipment and my work was not being widely appreciated by the Academy of scientists. So, I was looking for a noninvasive way to stimulate one hemisphere or the other. I knew near-infrared light is able to travel through the skull to reach the brain. The literature in animals suggested that it was quite beneficial to the body and brain and did not have any known side effects. I contacted the Wellman Center for Photomedicine at the Massachusetts General Hospital and connected with Michael Hamlin, Ph.D. who is the world's leading authority

on photomedicine. He was collaborating with Margret Naeser, Ph.D. in using near infrared light to the brain to treat veterans with traumatic brain injuries and he knew that scientists at a California company, PhotoThera, were engaged in a large study of near infrared light to the brain as a treatment for stroke. I wanted to see if near infrared light, like the goggles, could stimulate each hemisphere and its mind separately. First, we would need to do a pilot study to see if it showed a benefit to patients with anxiety and depression. We conducted the first study of the application of near infrared light in patients with these symptoms and the published results which we published were a bit amazing. 6 of the 10 had a remission of their depression 2-weeks after a single 4-minute near infrared treatment and 7 of 10 had a remission at that time of their anxiety. At 4 weeks their improvement waned but was still much improved from their baseline. There were no side effects or adverse reactions. We treated both sides of the head because I was concerned that if I began talking about Dual-Brain Psychology, which was not widely known, I would make it difficult to get the study approved by the Institutional Review Board, whose complete approval we needed to do the study.

I wanted next to study applying the light to the positive hemisphere only, but I couldn't get the funding that was necessary, and for a few years the method just sat there. A few other research groups replicated our work at MGH, but none was thinking of unilateral stimulation over the positive hemisphere, all used bilateral stimulation. Then at a meeting of our lab at McLean someone suggested that I try my unilateral treatment in my private practice as an off-label treatment with the patients' signed consent. I did that and results were immediately apparent and striking. Fifty-five percent of my patients had what I considered remarkable results. For example, one patient came in with a profound urge to gamble which he measured as 10 of 10. I told him I had a casino in the back room but unfortunately there was a cover charge, and I auctioned the cover charge, and he was willing to pay $1000 (in imaginary money). After a 4-minute light treatment, his craving went to zero and he wouldn't pay anything to go to my casino, in fact, he did not want to go there. In the following 2 years, until he completed his treatment, he never again had gambling cravings and never gambled. Another patient was feeling extreme anxiety and was physically tremulous especially his legs which were pumping about an inch up and down. After a 4-minute treatment his anxiety fell from 8 of 10 to 2 of 10 and his leg movements stopped.

Patients with opioid cravings saw their cravings fall dramatically with the treatments. I published these findings.

I saw nothing like this with the bilateral treatments at MGH. The improvements we saw there were on anxiety and depression scales, but the patients didn't report that they felt differently in their actual daily lives. The patients treated with unilateral treatments over the positive hemisphere immediately reported feeling very well and the positive feeling usually lasted about 3 days. After a treatment the patient often looked very different, more confident, more upbeat.

When by mistake or intentionally to aid the patient's psychotherapy, I put the light over the negative hemisphere, the reaction was negative, as negative as the patient's usual negative symptoms. I would always end a session with a treatment over the positive hemisphere and the patient always left in a positive state of mind.

I then did a double-blind, randomized, controlled trial. I picked opioid cravings as the outcome, and I recruited people with opioid cravings from CraigsList. A blinded, randomized trial means that there is an active light treatment and a sham treatment (the same device with foil over the bulb so that they can feel warmth but do not receive light photons). Neither the patient nor the experimenter who is recording the patient's cravings and other factors knows whether the patient is receiving an active or a sham treatment, only another experimenter, the treater, who places the light on the subject's forehead over the positive hemisphere knows which treatments are active and which are sham.

In this study 17 subjects completed the study. About half got the active treatment and about half the sham at the first session. At the second session, a week later, they received the opposite treatment (active or sham) from that which they received the first week. The third week was a follow-up session to see what effect the second week's treatment was. What we found and published was that a week after the active treatment there was an average **decrease** in cravings of 51% compared with 16% a week after the sham treatments. There also were large improvements in depression and in anxiety ratings after the active treatments but not the sham. I also compared treating the positive and negative hemispheres with the active and the sham treatments. There was a significant difference favoring the positive hemisphere with the active treatment but no difference after the sham treatments, as expected because they did not receive the light treatments.

In September 2019, I was awarded a Small Business Innovation Grant from the NIH and the National Institute of Drug Abuse. The grant was to a start-up called MindLight, LLC which I formed in 2019 to be eligible for the grant. This gave me a conflict of interest with McLean and Harvard, and I was not allowed to participate in the study if it were done in part at McLean. However, Dr. Teicher and his lab did not have a conflict of interest and they were able to do a third of the study as a sub-contractor on the grant.

The results were published in August 2021. We studied 39 subjects with opioid cravings from Craigslist. Twenty-four were studied at MindLight in space rented from a drug clinic and 15 were studied at McLean. Half of the subjects were given the active light treatment and half were given the sham treatment as a control. Each subject was treated with a 4-minute light treatment with our near infrared device or its sham. They were treated twice a week for 4 weeks and had 3 weekly follow-up sessions to see if any benefits lasted. At the end of the 3-week follow-up the active group had a 71% decrease in their opioid cravings! The sham group had a placebo reduction of 35%, but the difference between the active and sham groups was very highly significant statistically. The active group also had much less opioid use during the study.

Based on these results NIH and The National Institute on Drug Abuse (NIDA) awarded us a 2.5 million dollar grant to continue our Phase I study. The grant, like the Phase I, was under the NIDA HEAL program with the aim of developing a better understanding and treatment of opioid use disorder. Further, the FDA awarded us a Breakthrough Designation to facilitate our attempt to achieve FDA clarence for our treatment of opioid use disorder. We will begin the large study in February 2023.

It is my feeling that the results of studies over the past 24 years have now served to prove the hypotheses of Dual-Brain Psychology. In my practice, I can see personality changes when I put the light over one side versus the other; that proves to me that stimulating a brain hemisphere either with the visual technique or with the near infrared light can radically change how most of my patients experience themselves and the world. Putting the light over the positive hemisphere makes me seem more empathic and helpful, and the patient experiences himself as more valuable, more worthwhile. If the patient came in with drug or gambling cravings or alcohol cravings, those become diminished. Stimulating the other side, they experience me as critical, like one of their parents or some of their peers

might have been, and they felt that they were defective in some important way, and their destructive cravings reappeared. How this happens gets us into the nature of consciousness. Somehow stimulating the hemisphere alters the patients' conscious experiences.

In my psychotherapy practice, I will use the light to stimulate one hemisphere and then the other to help the hemispheres communicate with each other, to get to know each other and try to better understand their problems and see a path that allows work toward health. The aim of the psychotherapy is to treat the traumas that persist in one brain hemispheres and to engage the healthier hemisphere as a co-therapist in this vital work. I have begun symposiums for clinicians to teach the theoretical and clinical aspects of Dual-Brain Psychology: DBPinstitute.com.

So, in the chapters that follow, they are still just as relevant today as they were in 1998, but now there is overwhelming evidence that supports the theory behind Dual-Brain Psychology as well as it's profound clinical application. That evidence is presented in 24 peer-reviewed publications as well as in this book.

Fredric Schiffer, MD
Newton, MA
October 2021

Recent papers on Dual-Brain Psychology on its theory and clinical application:

Schiffer F, The Physical Nature of Subjective Experience and its Interaction with the Brain. Medical Hypotheses, 2019;125:57-69

Schiffer F. Consciousness and Good and Evil, The Science of Consciousness 2020, Book of Abstracts: C25

Schiffer F, A Novel Treatment of Opioid Cravings with an Effect Size of .73 for Unilateral Transcranial Photobiomodulation over Sham. Frontiers in Psychiatry: Addictions Section 11 (2020) 1-12.

Schiffer F, Unilateral transcranial photobiomodulation for opioid addiction in a clinical practice: A clinical overview and case series. J Psychiatr Res 133 (2021) 134-141.

Schiffer F, A Dual Mind Approach to Understanding the Conscious Self and Its Treatment. Neuroscience 2 (2021) 224-234.

Schiffer F, Khan A, Bolger E, Flynn E, Seltzer WP and Teicher MH: An Effective and Safe Novel Treatment of Opioid Use Disorder: Unilateral Transcranial Photobiomodulation. Front. Psychiatry (2021) 12:713686.

Schiffer, F, Dual-Brain Psychology: A Novel Theory and Treatment Based on Cerebral Laterality and Psychopathology. Front. Psychol. Sec. Psychopathology (2022) doi: 10.3389/fpsyg.2022.986374

PREFACE TO THE 1ST EDITION

I first saw Ryan sitting on a couch, hunched over, asleep, resembling the sagging duffle bag against which he leaned. Ryan, a freshman at Harvard, had been sent over from the university's health service for a psychiatric admission to McLean Hospital. I, as resident on call, was roused out of bed that cold night 24 years ago to attend to him. The two of us, both emerging from deep slumber, entered a consultation room, at 4 a.m., to begin a journey into his mind.

At first, Ryan was proud of his smooth adjustment to college life. But a few weeks into the semester, he started to fall behind in his work. He found he couldn't grasp concepts; was getting distracted and anxious. He started having trouble sleeping. Ryan fell even further behind and started to procrastinate. He was beginning to feel humiliated that this -- whatever this was -- was happening to him. He saw himself flunking out. Where would he go? What would become of him? What good would his hard-earned admission to Harvard be if he left in disarray, in disgrace? Could he flip hamburgers? No, he would be incompetent at that. His only talent was for being a genius, and that was failing him somehow. He knew only that he felt a sense of doom, and I saw in him a look of despondency.

How was I to understand this young man, who a month earlier was on top of the world, a freshman at Harvard, dating a woman from Radcliff, liked by his peers, on his way to becoming a scholar, but stopping first at McLean Hospital at 4 in the morning because he had been thinking seriously of killing himself? And how was I to help him?

He seemed to blame his distress mostly on his pressures at school. That is, he was being battered by his expectation that he was going to be exposed as a failure. The idea of the ensuing humiliation terrified and depressed him, making him eventually unable to function adequately. But I

observed that his expectation of failure and humiliation seemed to be based on something more than the facts and events of his current life. Surely, he had an innate capacity to succeed. It was the *idea* of failure which reduced and then impaired his abilities. Why did he have this idea? Why does he say, "Maybe I'm good at fooling people," implying that he has some core deficiency which the Harvard admissions committee failed to observe?

Ryan came under my care in 1976, during my second year of training at McLean, the flagship psychiatric hospital for the Harvard Medical School. Freud was the mainstay of my training, but what did his ideas have to do with my patient? I found Freud's writings beautiful and rich, but somehow imprecise, with a good deal of poetic license. Freud placed a great emphasis on long repressed sexual impulses or conflicts, but as I spoke with Ryan those issues didn't seem apparent, and as I sat with Ryan that November morning, the detailed inner workings of Freud's model of the mind only seemed to add to the chill in the drafty corner room and offered neither light nor warmth. I wanted something more tangible, more explicit, closely related to my actual situation, something more like physics than poetry.

It would be a few years before the psychopharmacologists dominated the hospital, and many more years before the managed care insurance companies dominated them, so I was able to meet with Ryan four times a week until he was able to leave the hospital eight weeks later. For most of the sessions we met in a consultation room on his hall, or later when he had privileges in my office, but not infrequently on pleasant days we would spend the session walking together on the tree-lined paths and roads of McLean Hospital overlooking the hills and fields for whose curative views the hospital was constructed a hundred years earlier when neither pills nor theories could rapidly rescue the afflicted.

I learned that Ryan experienced his father, a mathematics professor at a small New England college, as aloof and harshly critical. Despite Ryan's lifelong efforts, he could never feel any affection or admiration from his father, a master at finding ways to ridicule or demean even the finest accomplishment. Although Ryan had succeeded in winning acceptance to Harvard College, he had failed to get an early admission, and he had also failed to gain entrance to Brown University, facts upon which his father's attention and energy lingered. "I knew Brown had come to outrank it; Harvard's no longer what it used to be," his father commented.

Ryan experienced his mother as remote as his father, but in an entirely different way. She came across as somewhat detached, not at all like his father's aggressive, competitive self-centeredness, but rather through a meekness, an anxiety about all of the world and of her place in it. Though she doted on Ryan, she seemed disconnected, as if she always held a bit of herself in reserve.

As we walked one afternoon, Ryan said reflectively," I guess all of my life I felt I couldn't please them, that they were always disappointed with me, and I don't know why but this was very, very painful for me. It shouldn't have been . . . I know. But I can feel now that it tore me up inside. It made me feel worthless. I don't know why I cared so much."

Ryan and I had come over time to believe that somewhere within, a part of him had deduced that if he were not well loved, he needed to strive harder to get that love. This striving in large measure took the form of academic efforts that seemed the surest way to his parent's approval. Although he had attained academic success, those efforts repeatedly failed in their true aims, for he had never achieved what he most desired -- his parents' admiration. Ryan assumed responsibility for his parents' attitude, and as his college work intensified, he began to anticipate his exposure as an inadequate person unworthy of love or admiration.

One way of viewing Ryan would be to say that he developed his anxiety and depression because he expected to be humiliated, based largely on his early life experience. We would say that he had this expectation "unconsciously" since at the time of his admission he was unaware of the reasons he anticipated failure.

At first, I couldn't articulate why I felt this explanation was incomplete. I was confused about what was conscious and what was unconscious and how this all actually led to Ryan's symptoms. And then I noticed the obvious; Ryan was getting better. For whatever reason, he was improving. Whether it was our walks about the hills with our inquiries into his early life, or simply time, I didn't know for sure. But it was clear that he was improving. He had by now become a very active participant in our discussions. He could wonder aloud about why he felt destined for humiliation. An emerging part of him began to see that he needn't fail or suffer humiliation, that he had a capacity to succeed. And that part of him could now wonder about why he could hold the conviction that he must fail.

I began to see two different parts to him, a part convinced of success and a part convinced of failure.

The thought that came to my mind was that the night he was admitted to the hospital, his personality was dominated by that part of Ryan that saw himself as a failure. Ryan clung dearly to his imposter fantasy, an idea which was destroying his life. But, now there seemed to be a second part to his personality that saw himself as a success. It seemed to me possible that there were two parts to him which were battling for control of his mind. When he began the semester, the successful part of him may have been in control, but then under stress that part may have become under assault by another part of him, a part spewing forth feelings and ideas of his defectiveness, a part which eventually took control.

As his hospitalization progressed, the part of him that believed in his success was clearly becoming dominant, and with that evolution came a complete change in his entire appearance. When he was admitted, he appeared distraught, confused, disorganized. Now, as he was getting ready to be discharged, two months later, he appeared strong, a healthy person with a sense of well-being and confidence.

In Ryan I felt I witnessed an amazing transformation. He came in a psychiatric patient, and he left a Harvard student. When he came in, he had a complete set of ideas and feelings and behaviors. He knew he was doomed and consequently felt overwhelmed with a terror which rendered him unable to function in all but the simplest ways. There was no inherent contradiction in his state. Philosophically, his condition was internally consistent. He was, quite simply, a failed person.

But, at discharge, he felt his strength in his mind and body. His physical appearance is changed from early in his admission. One might conceivably not recognize two photographs of him, one in each state, as the same person. He now possessed an entirely different, positive set of ideas about his chances for success. He had been reading and studying in his free time with intense interest and concentration.

At the time I didn't understand how this transformation had been achieved. Although I wanted to assume that I was responsible for his success, that my affection and interpretations on our walks, perhaps even my bad jokes, had somehow facilitated it, I must admit that at the time I had only a vague understanding of what had happened. But however it occurred, I

was struck by not only the fact that it had occurred, but also that it seemed as if he had actually changed from one personality into another.

Then another interesting, although disturbing, thing happened. About two months after his discharge, while I was seeing him as an outpatient, Ryan's insecurities, self-doubt, and anxieties returned. His appearance was beginning to deteriorate. One might simply see this as his getting depressed again. He could have had a cyclic depression that was destined to recur like the phases of the moon. I could have seen it as a recurrent abnormality of his brain chemistry, or simply as an alteration in his mood. But that is not how I saw it. To me it appeared as if he were changing personalities. To me it appeared that we hadn't worked out and resolved his problems, as we had assumed, instead, we merely pushed his insecure personality to the rear and allowed his confident personality to emerge. And now, I believed his insecure personality was emerging again and pushing his confident personality to the rear. I began to see his success in the hospital as not due to his truly learning to appreciate his value, but rather to his suppressing that part of him which continued to believe him to be intolerably defective.

I shared my hypothesis with Ryan, and he immediately agreed. We came to see one personality as more mature, healthier. When Ryan maintained that personality, he was confident and functioned well. He knew that his parents were a bit neurotic, but this didn't disturb him. In fact, in this personality, he had compassion for them and was able to understand their own stresses and resulting parental limitations.

But, in his other personality, Ryan was emotionally immature. He became sullen, withdrawn, and easily upset. He didn't like to go out because he felt he looked troubled and insecure (which to a large degree he did). He had great difficulty concentrating when in this state, and as he began to procrastinate and fail to keep up with his massive assignments, he could again imagine his failure. This, of course, increased his anxiety, and we could easily predict a catastrophe in the making.

To us it seemed as if Ryan was of two minds. One, more adult, more present in the immediate reality. The other, immature, or primitive, saw the world as little changed from the past and still expected with certainty that his parents and, therefore, any other important people in his life, would disregard and demean him. This part of him still seemed emotionally injured, unable to get beyond the traumas it had suffered.

With this concept in mind, I began to implore Ryan to wake up his healthier half as I saw him sliding fast into a mental abyss from which I could discern absolutely no benefit or profit, only torment and destruction. Something inside him heard me, was awakened, and came to the surface. I had simply, or perhaps not so simply, urged him to arouse the mature part of him, that we had already identified and gotten to know. Almost immediately, right before me, his demeanor changed, and as if waking from a deep sleep, he said, "What the hell have I been doing?"

This victory lasted only a few days, but we were both impressed by it, and were able to repeat it in different ways many hundreds of times over the next 4 years. We learned how to talk with and negotiate with either his troubled personality or his mature "right mind." I might say, "OK, but what does the worried part of you feel about that?" or "Let me speak with the mature side." Gradually over time his healthier personality became firmly rooted in a position of leadership, and the rebellions by his other side became less intense and less frequent as that side felt better understood and appreciated as well as more disciplined. Ryan went on to graduate school after he completed his treatment, and today he lives an extraordinarily interesting and successful life.

Where is The Unconscious Mind?

Was this troubled part of Ryan, which took control of his personality, his unconscious mind? His mind, the night of the admission, seemed very conscious to me, and it seemed very complete with a full set of feelings, attitudes, and behaviors. But, still, was the troubled person Ryan became somehow related to the Freudian unconscious mind? How did all the parts of Ryan's mind fit with the superego, the ego, or the id, or the hundreds of other psychological terms which were being taught during our psychiatric residency, terms like conflict, introjects, self-objects, self-self-objects, Oedipal complexes, projections, identifications? It would take me years to untangle the psychological theory with which I was sent into battle and relate it to what I was observing. In Chapter Four and elsewhere, I will share the results of my mental wrestling and experimentation, and these I hope will clarify the theoretical tradition from which I emerged.

Ryan and I did this work before the term "Inner Child" became popular. I think our work was very different from inner child work, for Ryan had more than an inner child, he manifested an entire overt personality

which, though emotionally troubled and relatively immature, was able to take control of his mind. This personality was not merely an image of a wounded child, but a full-bodied personality which at times could be aggressive and destructive. Whatever name we may give to the Inner Child, the troubled personality, or the unconscious mind, I believe all have to do with the effects of trauma and how those effects are maintained into adulthood as a covert or an overt part of the personality. We will explore and clarify these concepts through the course of the book.

During my residency I was meeting regularly with Shervert Frazier who was the Psychiatrist-In-Chief at McLean. Frazier was my preceptor and as such he acted as my mentor and as my supervisor on some of my cases. He was a large man with a deep voice which seemed booming even when he spoke quietly. At the hospital, he was its center, its unabashed father figure. I felt a deep affection and admiration for Frazier, and when he said to me one day, "I think it's time for you to go into analysis," I felt I was being chosen for advancement rather than remedial care. In 1976, a personal analysis, whether or not one wanted to go on to become a psychoanalyst, was highly prized. It was felt that to be a good psychiatrist one had to work out one's own issues, to keep them from clouding his or her therapeutic judgement. It also was regarded as the best method for learning about psychotherapy. Of the nine residents in my class, six were already in analysis. Today, fewer psychiatric residents are willing to make that journey. Perhaps they cannot justify the time or money. Perhaps they simply do not see the need.

So, when Frazier suggested I undergo analysis, I saw it as evidence of his caring about my career and his encouraging me to undergo this initiation into the club of the true psychiatrists. I had already been leaning in that direction, and I accepted his advice with appreciation.

Then Frazier went on to say, "I think Elvin Semrad's got some time available. Give him a call. . . . He is a great man, and there are very few of them."

Elvin Semrad was a living legend in Boston. He had a reputation as the consummate analyst. He was the analyst's analyst, and he was reputed to have trained or analyzed half of the psychiatric community in Boston. And he was said also to be able to reach the most profoundly disturbed patients in a single consultation, to make mute patients speak, to make psychotic patients suddenly rational as he gently touched the inner corners of their being.

Semrad worked at the Massachusetts Mental Health Center. This was a deteriorating state mental hospital which, though drab and dirty, was a major teaching hospital in psychiatry for Harvard. Among the graduates of its program were many of the most highly regarded psychiatrists in Boston, many of whom directed programs or held prestigious teaching positions. But, still from its physical appearance, Mass Mental, as it was called, resembled any other run-down, under-funded state hospital.

I had a seat by a secretary's desk in the hallway. My appointment was for 4:50; the secretary left me alone at 5 o'clock. At 5:20 there was still no sign of Semrad. There was no one about. I knew because I had been looking all around trying to reassure myself that I was in the right place at the right time. Then suddenly a door opened and about five psychiatrists emerged from an office about 30 feet away. Then at the doorway appeared an unusual looking man. He appeared fairly short, about 5'5," and very solid and large, though somehow neither obese nor muscular. His mass was capped by thick white hair brushed back, and perhaps the total effect was of a small, stout, snow-capped mountain. He said nothing, but with a very thick hand he motioned slowly across his chest for me to come down the hall into his office.

Semrad motioned for me to sit in a straight-back wooden chair, the kind every schoolteacher uses. The chair was flush against Semrad's desk which, too, resembled a schoolteacher's. Actually, Semrad had once been a schoolteacher in Nebraska. But, now as a full professor at Harvard and a legend in his own time, he sat on his own wooden chair at his desk which was covered with piles of books and papers from which he cleared enough space for a stenographer's notebook into which he entered copious notes as I spoke. From time to time, he'd look up at me from his writing.

As I waited in the dingy hallway of a state mental hospital for a man who didn't seem to be keeping our appointment, I thought of just leaving. "What am I putting myself through?" I asked myself. And now inside his office, that question resonated louder as I surveyed the space. It was decorated with heavy green drapes from the 1940's which might have once enhanced some superintendent's office. Behind my chair the room was full of tables, each, like the desk, overflowing with stacks of books and papers. To my left and behind me was his analyst's couch, upholstered in tight pink plastic imitation leather. Most disturbing though was that the door to his office, which led to the public hallway from which I had just entered,

was cut an inch and a half too short and let the light from the hallway enter his office and, I assumed, reciprocally, allowed the confidential voices from his office to enter the corridor.

Offsetting my observations was the fact that this man had a large reputation and had been personally recommended by Frazier, so I decided to play it out further.

Semrad asked me to tell him about myself, and I began talking to him, telling him my life story. I told him who I was, or who I thought I was, and where I was from. When he'd look up from his writing, he had an expression of profound understanding and of respect. I got deeper and deeper into my story. Occasionally, Semrad would interrupt with a question to clarify what I was trying to articulate, but otherwise I continued pretty much on my own, except for his occasional looking up in silence.

At one point, I had been talking about my father and our relationship, which in many ways had been painful and strained. Then I was describing with great pride how my father had from nothing, from less than nothing, from great adversity, fought with pluck and courage throughout his life to succeed and had eventually accomplished what he had pursued. Semrad looked up and with a profound look said simply, "Your father has been very important to you."

I started to sob. And this sobbing kept rising. I felt as if I were being immersed in escalating waves of emotion from the very depths of me. Then suddenly as it intensified even further, I began to feel what I could only describe as strong electrical impulses bursting from my gut. I thought I was in danger. I looked at Semrad who seemed calm and appreciative, and I said, "I think I'm having an arrhythmia," and I began desperately trying to find my pulse which, of course, was entirely normal.

I began my analysis with Semrad the next day, and I went four days a week. There was not a session that was not profoundly moving. And my life in many ways changed dramatically. My marriage, which was excellent to begin with, achieved a great deepening. And in October, a few months after starting my analysis, I made a trip to New Hampshire with my father, and in a canoe alone on a mountain lake we silently repaired our distress, and to this day we remain the closest of friends and confidants.

The week I returned from New Hampshire, Semrad died from a heart attack. He was 67.

Ten years after his death, the Harvard Medical School held a symposium on Semrad's life and work in an attempt to understand and keep alive his contribution, but even there, with so many fine minds who were taught and touched by him, his secret remained intact. A psychiatrist who trained at McLean a few years after me, who worked for an HMO promoting short-term therapy, commented at the symposium, "Who was this guy? People talk about him as if he performed miracles. This is the mentality of a cult."

As I reflect back on my work with him, I have come to believe that Semrad was able to touch a part of me with which I had not been in contact. Why had I sobbed so profoundly? I knew I loved my father. I knew I admired him. I also knew his shortcomings and his limitations. I knew my father all of my life, but I had never sobbed, never articulated or experienced such unbounded love and admiration. My sobbing came as a complete surprise to me. It was almost as if someone else were there, in my place. When I took my pulse, I came to full attention and pulled my usual self back into myself. I now realize there was another part of me, an intact part of me which did possess the intense feelings which Semrad was able, seemingly effortlessly, to get me to express. So, what are my true feelings about my father? I think it depends on which part of me I focus on.

I understood only many years later that Semrad had helped me to be aware of and to accept and interrelate two parts of me, and that integration was what enabled me to develop and enjoy a profoundly loving relationship with my father while cognizant of our limitations. My reflections on my work with Semrad lead me to the idea that I, too, have two distinct parts of me. Once a patient, upon discovering a troubled part of himself, asked me, "Dr. Schiffer, do you have an inner person inside you?" With a disdainful look on my face, I replied, "Me? . . . An inner person?" while my left hand waved to him, and we both then roared with laughter.

I was a Freudian in one important sense. I believed in the talking cure. Freud, regardless of the details of his assumptions, powerfully promoted the idea that by talking about one's innermost thoughts and feelings some sense would emerge, and some relief of symptoms would occur. Essential to this talking was a respected psychiatrist who had a genuine concern, curiosity, and high regard for the patient.

Still, though I was a believer in talk therapy, in the therapeutic relationship, and in the patient's ability to resolve his problems, I yearned for

a clearer map of the mazes I was in training to explore. I had come to McLean from a fellowship in cardiology. When I graduated medical school, I had no interest in going into psychiatry, which seemed too vague and unstructured for my taste. I went into internal medicine, but then found that after I mastered the material, it became rote and boring. I felt more like a cook who empirically followed recipes than a scientist who pondered and puzzled over concepts.

In the little spare time, I had during my internship and residency in medicine, I had become interested in the physical effects of emotional stress and began some research which eventually led to my seeking a research fellowship in cardiology. And so, in 1973, I came to Harvard to study the effects of stress on the heart. During the fellowship, in which I was gaining fascinating insights about the effects of emotion on the heart, insights I will share in Chapter Ten, I became more sure that I didn't want to practice clinical internal medicine or cardiology. I wanted to continue my research, but I saw the need for an in-depth training in psychiatry to round out my education. It was with this reasoning that I went into psychiatry.

I think this background may explain some of my frustration with the writings of psychiatrists. I was familiar with tangible qualities like the pressures and flows of the cardiovascular system, things that could be easily measured, conceptualized, and manipulated. Thus, it became natural for me as a psychiatrist in the making to try to formulate psychology in more concrete terms without losing its humanity.

By the time I had completed my residency at McLean, my fascination with the mind and my patients had won out over my passion for the heart, and I never returned to research in cardiology. But, after many years devoted to my clinical practice of psychiatry supplemented by consuming armchair theorizing about the psyche, I returned to my roots as a research scientist, and turned my sights and energies toward the ineffable, enigmatic mind. This book is the result of my searches and research.

CHAPTER ONE

INTRODUCTION

She is in despair. Her life is a shambles. She can't think straight, and the anxiety she feels seems to bury her. She has spent the last two weeks in bed, and there she cries most of the time. She doesn't know what has overtaken her. Nothing, not her business failure, not the divorce she sought, not her new relationship, nothing seems even vaguely proportional to her distress.

The first contact I have about Carol is from her brother who urges me over the phone to hospitalize her. "She's flipped out," he tells me. I ask if he could bring her over to my office, and he complies.

Carol seems to hide beneath her straggly hair, partially covering her naturally dark eyes, red around from crying. She is no longer crying, and she is cooperative and trying to be pleasant. She is in touch with reality; she sees clearly her distress, but she has no clue, no hint about what suddenly brought this great escalating turmoil into her life several weeks ago. Her life for the past 30 years certainly has been troubled at times, but never before in such distress.

I like Carol, and I think I have a very good sense of the despair she has been experiencing, and we seem easily to make a good emotional connection. It is urgent that I bring some clarity and some help to her. As we discuss her distress, I push her to try to see where she's felt this before, and she discovers to her surprise that as a child she at times had similar periods of distress.

At first, she had no idea what her past problems were about. She wasn't even fully aware until I inquired if she had had such periods, and she has no insight into them. I ask her to describe her family life in her childhood, and it becomes clear to us as she speaks that she often felt emotionally abandoned and betrayed by her parents, and there seems to be a connection between her early distress and that perception of estrangement.

I wanted to see if her present despair might somehow parallel that of her childhood, and indeed, she began to understand that about a month earlier when her divorce became final and her business failed outright, she started to feel abandoned, unsupported emotionally. Further, as she did as a child, she blamed herself, felt she must somehow be bad, be defective to warrant the perceived abandonment. And so, her despair was related to the anxiety of feeling abandoned and metaphorically left to suffer a painful psychological death, in addition to the pain of believing she was so repugnant as a person to deserve such bad treatment and its terrible consequences.

She was fighting constantly with her new boyfriend, a man whom she loved dearly and who returned her love. She was continually accusing him of not loving her, and her behavior towards him was becoming unbearable for him. She was effectively pushing him away, effectively further proving her abandonment. Carol was able to see and appreciate all this.

At this point, I said, "But I think there's another part of you that knows that Mike loves you."

"Yes, I know that."

I then explained to her my hypothesis. I didn't feel I could wait a few years for her to come to it in her own time. I wanted to bring some clarity and structure, right then, into the session. I explained to her that I believed she had a part of her personality which is immature, troubled, and panicking, and that I believe it has been taking control of her life. I explain that I believe that she may also have another part of her personality, one more mature and grounded, but which, at the moment, is being pushed aside. She told me that she can actually feel such a struggle within; she has periods when she feels calm and in control, but then those times become disrupted by her overwhelming feelings of anxiety.

"I am going to talk with your troubled-sided personality," I tell her. "I can see that this part of you is extremely frightened and upset. I know you [her troubled side] don't yet understand why you are so distressed, but I and your more mature side will help you to understand yourself. But, right now, I want you to stop attacking Carol. I want you to let your mature side lead; otherwise, your life will continue crashing off course." My tone was caring, firm, forceful.

To Carol's surprise, her symptoms suddenly abated. She felt calm and in control. I did not expect this remission to last more than a few minutes, but its occurrence set out the blueprint for what was to follow in our work together. We interpreted her calmness as her troubled mind's listening and deciding to cooperate. It was in essence, I believed, her troubled mind's non-verbal response to what I had said.

I explained to Carol that I believe we have two minds, much as Steve Martin and Lily Tomlin are comically portrayed as living and struggling together within the head of one person in the movie The Two of Us. I explained that I believe she has a mature part of her which knows she is essentially safe and well regarded despite the business failure which is more of an insult to her pride than her pocketbook and in spite of the divorce she struggled so hard to achieve. In this calm frame of mind, she acknowledged this. And I went on to explain that I believe she has another mind which knows that she is utterly alone and on the verge of a long-awaited destruction. She acknowledged that she had been living in that mind for the past month. I then went on to suggest that in life these two parts of our mind can struggle or cooperate, and that apparently in the past month, the immature part of her had assumed a dominant role in her personality. In time we will study why this switch occurred at this turn in her life, but for now I just wanted to offer her a kind of diagram for what has been happening to her and from that map, a direction back to mental stability.

I next asked her to try on a pair of plastic safety glasses taped over the front so that she could see only out of the extreme right side of her right eye. She looked at me as if to ask if I might not need some help more than she. I smile and nod in acknowledgement of her unspoken question, but then simply asked her what she was experiencing. In a moment she said with some surprise that the glasses make her feel calmer, that she feels safer. I gave her a second pair almost identical to the first, and I asked her to try them on. The second pair limits her vision to the left side of her left eye. She told me almost immediately that she felt trapped and distressed. Her symptoms were recurring. I asked her to switch again to the first pair, and again within seconds she was calmed by that pair.

With this strange exercise which I will explain in great detail as we proceed, I tried to help Carol see that the idea of an immature personality taking over the control of her life was more than a metaphor, more than a vague hypothesis; it was a demonstrable, concrete phenomenon. When I

suggested that we talk to the immature part of her, from then on, Carol knew from her experience that we were not waxing poetic.

I went on to begin to teach Carol how to strengthen her mature mind and how to notice her troubled side, how to listen to it, how to talk with it, how to get it to cooperate, how to get it to feel better. By the end of her 50-minute session, her despair is gone. We have begun a therapeutic relationship, and she has left with a new understanding and with new techniques for taking advantage of that insight. She would not need a hospital. I knew that her troubled side would reassert itself and that this respite would be brief. But we accomplished something dramatic, and we would be able to return to what we did again and again.

Over the next month, the course was turbulent as Carol's immature side in fits and starts showed its strength and determination. But steadily we made progress, and by six weeks, she began for the first time in several months to feel almost completely like her old self again. By that time Carol could readily feel what she called "my troubled side," and she had become quite skilled at listening to her, at disciplining her, and at helping her with her fears. Eventually, she easily related to this newly discovered troubled part of her, and she found that her relationship with this aspect of her own self was much like her relationships with other people. She responded to it, and it responded in turn. Over this time, we have helped her troubled side feel safer and more a part of her life in a cooperative, constructive way. She improved significantly over the next three months and then dramatically over then following three, by which time she had achieved an emotional stability and balance because the mature part of her personality had firmly established its leadership.

Of Two Minds

From my early days as a psychiatric resident at McLean Hospital, I noticed that my patients very often seemed to have a kind of double personality. On the one hand, part of them was very mature and stable, but on the other hand, another side of them seemed to be more irrational, overly emotional, impulsive. This impression became more complex but clearer as I worked over the next 20 years with my patients in my private practice. I could see how these different aspects of my patients interacted, with one part often struggling with or sabotaging the other. The troubled part seemed usually to still be stuck in a traumatic past, and I had begun to see the object

of treatment as helping this distressed part learn that it was more valuable and safer than it had believed based on some past experiences. The relationship and the complex interaction between our two minds is the focus of this book: How to recognize them, communicate with them, and, most importantly, improve their relationship. We will also explore the physical basis for our two minds.

Split-brain Studies

My clinical impressions led me to reread and reassess the literature on the famous split-brain studies of the 1960's because I had the feeling that that research too had encountered two minds in one person. The operations were performed only on patients desperately suffering from epilepsy not relieved by conventional treatments. As I will describe in more detail in the next chapter, the operation, called a commissurotomy, consisted of cutting the corpus callosum, the large nerve bundle connecting the left and right cerebral hemispheres.

I was, of course, very much aware of the popular belief that there are left and right-sided personality types with the "left-sided" person being very logical and unemotional, and the "right-sided" person perceived as creative or spontaneous. But I knew also that these ideas were generally held in disregard by neuroscientists.

As I reviewed for myself the entire split-brain literature, I realized that the most striking and most dependable finding from the classic split-brain studies was generally under appreciated by scientists as well as lay people. This most important idea, which I will discuss in detail in the next chapter, is that in split-brain patients there exist two intact, reasonably intelligent, autonomous minds. That is, after these patients had their corpus callosum cut, they each manifest two separate minds. They became, in effect, two people inhabiting one body.

In the next chapter, I will present extensive evidence and clarification of this incredible statement, but briefly here some dramatic examples to quickly illustrate my point.

- One patient had to wrestle with his left arm (controlled by his separated right brain) to keep it from striking his wife against his (left-sided) will.

- Another split-brain patient consciously wanted to smoke, but each time he lit up, his left hand (controlled by his right brain) would grab the cigarette and, to his dismay, put it out.
- A third split-brain patient was awakened by a hand slapping her across her face. Her alarm clock was going off, and she realized she had overslept and was going to be late for an appointment. The hand which had aroused her was her own left hand! While her left brain was asleep, her right brain awoke and appreciated her predicament.

Each of these are examples of the "post-commissurotomy syndrome" which many split-brain patients manifest for a short time following the surgery. In this syndrome the left hand connected to the right brain acts autonomously and purposefully, but often in opposition to the intentions and actions of the left brain.

My Notions Versus the Popular Notions about the Split-brain Studies

The difference between my idea about there being two minds in each of us, did not relate necessarily to the popular notion of there being left (logical) and right (creative) sided personalities, because my notion had more to do with maturity versus immaturity. I did at first expect the immature personality to reside in the right brain, for there is not a long leap from the popular idea of a creative, emotional right brain and my idea of an overly emotional neurotic side Similarly, the popular concept of a logical, orderly left brain didn't seem too far from my idea of a mature side. But, in my more developed notion, the mature mind might be poetic and artistic, and the troubled side might tend to be extremely orderly and logical as are some patients suffering paranoia who can take one false idea, perhaps about the CIA, and then go off into a maze of analytical arguments.

The popular notion was not suggesting two actual, distinct minds, but merely that some people were more logical and less emotional, like typical computer wizards, and that others were more creative and spontaneous like typical artists. The popular notion does imply that these personality types might bear a relation to the left and right brains with one hemisphere tending to have a more important role in shaping the individual's integrated personality. This popular notion is called "hemisphericity" by neuroscientists, and its scientific validity is not established. Nor is it disproved. But scientists generally believe that the popular notions about

hemisphereicity have far overreached the scientific evidence for them. And so, while it is obvious that some people are more logical and less emotional and others, the opposite, this categorization has not been well enough studied to determine clearly whether it actually relates to the hemispheres of the brain.

Although the split-brain findings didn't suggest that one hemisphere was either more mature or more emotional than the other, there were two main, dependable findings to come from the split-brain studies that demanded further investigation. The first, described above, was the amazing discovery that two autonomous minds resided in each split-brain patient. The second was that only the left side could speak; the right brain is mute. (The location of speech in the left hemisphere was already known prior to the initial split-brain studies, but that fact became more graphic in the split-brain patients.) It appeared that while the left side was superior at most language tasks, the right side excelled at spacial tasks, but whether one side was more intelligent, logical, or mature was difficult to assess. The detailed psychological nature of right mind was not studied. This was because the right "mute" brain, being, was very difficult to study psychologically. (Recently, I went to California to the group that did the original split-brain research, and I collaborated with them to study specifically the psychological nature of the left and right brains in split-brain patients. We will come to this exciting chapter in neuroscience a bit further along in our story.

Two Personalities?

I wondered how the two personalities I observed in my patients related to the two minds revealed by the split-brain operations. Was what I was observing as a clinical psychological phenomenon supported by the compelling data from these neurosurgical patients? Was what began for me as a clinical metaphor, an actual reality? Were there really two minds in my patients? Did these two minds relate to the two cerebral hemispheres in a manner consistent with the observations to come from the split-brain studies? How did these two minds reconcile with classic Freudian theory of the conscious and unconscious minds and to the superego, ego, and id? Did all people have two minds? Was there a relationship between traumatic experiences and the troubled mind's world view? If these two minds existed, might not both in some people be mature or both immature?

With these and many more questions in mind, I embarked on a deeper review of the literature and on a series of neuroscientific and psychological studies, often in collaboration with some of the finest neuroscientists of our age. In this book, I will present our results as well as their implications for psychological theory and treatment.

Testing a hypothesis is not limited to collecting and interpreting laboratory data but extends also to how well it can successfully explain a wide range of clinical observations, and to how much its therapeutic methods accomplish. In conducting our research, we attempted to interrelate as much as possible the consulting room and the scientific laboratory.

In and Out of the Lab

In 1990, I approached Dr. Martin Teicher, a highly regarded neuroscientist who had always maintained an interest in novel ideas. We were at McLean Hospital and Harvard Medical School. I told him of my hypotheses and suggested a protocol which could begin to scientifically test my ideas. Dr. Teicher gave his assent and offered me the use of his EEG laboratory. I invited patients with a history of trauma to come to the laboratory where I asked them to recall a neutral memory, such as something routine that they did the week before, and a traumatic memory, which I helped elicit in a brief psychiatric interview. What Dr. Teicher and I found was that in most of the patients, their left brains were more active during the neutral memory, but their right brains were more active during their traumatic memories. The data suggested that traumatic memories might be more often lodged in the right hemisphere. I speculated that each hemisphere had a recollection of the trauma, but the mind in the right hemisphere was more sensitive to it.

An Unexpected Discovery

In November 1995, I made a completely unexpected discovery which was to advance my ideas and my clinical skills, but which was also to drastically alter my hypothesis that it was always the right brain which was more troubled by past traumas. Dr. Werner Wittling and his associate neuroscientists from Eichstatt, Germany developed a technique to show films to one half of the brain at a time in a group of healthy, intact subjects. The German experiment seemed to confirm what a group of scientists working in the United States had already learned. Films shown to the right brain often

elicited a stronger emotional and physical response than when shown to the left brain. It is commonly known that if something is shown to the extreme left or to the extreme right of a person, the image tends to go first to the opposite side of the brain. The German group used an expensive and complicated method for isolating one side of the brain that was too costly and complex for my tastes and budget. But it inspired me to begin using my hands to block out parts of my vision, to see if I felt a little differently when looking out of one side. I imagined I felt some difference but concluded my brief experience unconvinced.

That afternoon I asked my first patient, Larry a research assistant at MIT, to hold one hand over his right eye and the other over all but outside half of the left eye. I was completely surprised when he became a bit agitated and said, "Oh, my God!"

"What's that?" I had no idea what he meant.

"I have all of my anxiety back."

Some months earlier, Larry entered treatment for profound anxiety stemming from childhood mistreatment, and by this time his symptoms had been substantially relieved.

"Try the other side [right side of the right eye]," I retorted.

"That's better!" he immediately responded to the relief of both of us.

I asked him to go back and forth, and he repeatedly felt his symptoms when he looked to the left side of his left eye, and he had the complete relief of his symptoms when he looked out of the right half of his right eye. We were both amazed.

I asked all my patients that day to do the same thing, and the first five all had similar dramatic responses. One patient, a Viet Nam veteran, whom I had diagnosed with a severe post-traumatic stress disorder, looked out of one side, and developed an expression of intense apprehension as he looked at a large plant in my office. "It looks like the jungle," he said with some alarm. I asked him to look out the other side, and he said, "No, it's a nice-looking plant."

Over the past two years I have studied this phenomenon extensively, both in the laboratory with volunteers and in my office with patients. To simplify the technique, I taped the front of plastic safety goggles so that they blocked vision in all but the extreme side of the left or right eye. When I began, I expected that all the troubled views would be associated

with the right brain, because that hemisphere had been found more active during episodes of negative emotion. I couldn't understand why Werner Wittling's' group in Germany had found in a later study that a second group of subjects, a group of patients suffering from psychosomatic complaints had more distress in their left brains. However, several of my own therapy patients experienced increased anxiety while looking to the right side, which we believed stimulated their left brains. My unexpected finding in my patients were consistent with Wittling's unexpected findings in his psychosomatic patients. The goggles' effects and later effectiveness in psychotherapy not only supported my long-held hypothesis that we are essentially of two minds, but also confirmed Dr. Wittling's reports that emotional distress can be associated with the left hemisphere as easily as with the right.

The New Dual-brain Science

Dual-brain science is a burgeoning new field engaged in exploring scientifically and psychologically the role of cerebral laterality in high level mental functioning. Until just a few years ago it was unfashionable to turn to brain studies for an understanding of emotions. Most of the scientific interest in the split-brain studies focused on cognition. My approach to neuroscience has been grounded in psychology. I have sought to resolve any antagonism that often exists between a biological approach that sees complex psychological syndromes as simply brain or chemical malfunctions, devoid of personal meaning, and a psychological approach that has not been able to relate to the vast amount of information now being generated by technological advances in neuroscience. Indeed, for much of the past decade, I and other scientists have attempted to ally the discrete fields of neuroscience, psychopharmacology, and clinical psychology, to initiate a new understanding of behavior and to lead to more effective ways of improving psychological balance. I will present compelling evidence from the scientific literature and from my own studies that I believe prove a relationship between the two cerebral hemispheres and the two distinct personalities which form the basis of my hypothesis. I will show that dual-brain science has the power to explain the whole range of symptoms that we humans suffer from anxiety to psychosis.

Dual-brain Therapy

The lessons from dual-brain science provide me with the theoretical framework to learn how to access and work with the troubled hemisphere, to correct its archaic, destructive ideas and emotions. Dual-brain Therapy incorporates aspects of the traditional psychotherapy that I have practiced for over 20 years as well as strategies from cognitive therapy. Like traditional psychotherapy, it emphasizes empathy and a psychodynamic understanding. And like cognitive therapy, it attempts to help patients correct misperceptions and negative ideas they have about themselves. But in both cases, my new techniques diverge from and surpass these popular therapies because it is better informed by recent advances in brain science and grounded in the idea that we can have two distinct parts to our personality which allows the therapy to become more active and more concrete. The advance of Dual-brain Therapy over traditional therapies derives from its demonstration of the troubled side as an interior, complex person. This realization greatly clarifies and simplifies the therapeutic tasks.

One major goal of Dual-brain Therapy is the care, nurturance, and education of the mind of the more troubled hemisphere. The troubled side is often like a traumatized person who hasn't been able to move beyond the trauma, even when removed from it, because he continues to expect traumatization. The traumas can range from the obvious and apparent to the most subtle and inapparent. Initially, this mind may have withdrawn from the world around it, making it even more difficult for it to learn that the world may have changed for the better since the traumas. This is especially true for childhood traumas that are often externally removed with the passage of time and the physical and mental maturity which comes with development. Yet insidiously, trauma can remain covertly present because the mind on the troubled side fails to notice or to trust the improvement. Dual-brain Therapy, then, entails a reaching out to the mind of the troubled hemisphere and attempting through patience, persistence, and a loving, mature, informed attitude to teach it that it no longer has to fear abuse and no longer has to attempt to protect itself with the archaic defenses which have become the source of only new pain and problems.

Some Definitions

Throughout the book we will explore the relation between psychology and neuroscience. The language and vocabulary of neuroscience, although complex, can be defined with some precision. To really understand

the physics of magnetic resonance imaging (MRI) requires a sophisticated grasp of theoretical physics, higher mathematics, and computer science, but we all understand that if the doctor orders us to have an MRI, we will have a series of pictures similar to X-rays taken of our insides. So, if we define an MRI as a procedure for taking detailed images of internal parts of our bodies, we have no difficulty understanding precisely what we mean by an MRI because we are defining something concrete.

When we cross over to the psychology side, things become more difficult to define precisely. Think about the word "mind," for example. We know that we have one, but few experts have been able to define it very precisely. According to Webster's Dictionary, it is "the element or complex of elements in an individual that feels, perceives, thinks, wills and especially reasons." This definition seems quite good until you wonder what is the element or complex of elements that does the feeling, perceiving, and thinking, and then the precision evaporates. Still, even if we can't be absolutely explicit, I will state the definition of mind that I use in this book: that part of a person which experiences, thinks, and decides.

But, then what about the self. How is this different from the mind? I think the two terms refer to the same thing essentially, except perhaps that the term, self, might imply more of a life history and perhaps more of a human quality. And what of the term, personality? Webster's defines this as "the totality of an individual's behavioral and emotional character traits, attitudes, or habits." Walter Mischel's textbook, entitled, Introduction to Personality, states on the first page: "Most thoughtful people have asked the question, 'What is personality?' but few agree on an answer. The term 'personality' has many definitions, but no single meaning is accepted universally."

These three terms might tend to differ in their temporal implications. If we speak of Joe's “mind” we might be thinking of his mind in a moment of time. We might say his mind was alert or confused. If we speak of his "self," we refer to a lifelong quality, closely related to his personal identity. When we refer to Joe’s personality, we are identifying his psychological characteristics which may change in time. We wouldn't be surprised if over time Joe manifests changes in his personality, but we wouldn't expect Joe's self to change. It isn’t my intention to stick rigidly to these imprecise meanings. For my purposes, the terms mind, self, and

personality mean more or less the same thing: a part of an individual which has a unique set of memories, motivations, and behaviors.

Compared to our next task, attempting to define mind, self, and personality may seem easy. What does it meant to assert that a person has two minds, two personalities, or especially two selves? Surely, Joe hasn't been cloned or twinned. He's one person with one mind and one self. (We wouldn't be too troubled if he had changes in his personality, especially over time.) So, what do I mean when I keep speaking of two minds in one person? I mean by this: a part of an individual which has a unique set of memories, motivations, and behaviors alongside another part of him which has a different unique (though possibly similar) set of memories, motivations, and behaviors.

This may seem unreasonable and unforgivable on my part. The philosopher Daniel Dennett tells us, we get one self "to a customer." And Nobel Laureate and eminent neuroscientist Sir John Eccles and psychologist Daniel Robinson write:

> Each soul [self] is a Divine creation, which is "attached" to the growing fetus at some time between conception and birth. It is the certainty of the inner core of unique individuality that necessitates the "Divine creation." We submit that no other explanation is tenable; . . .

But philosopher Jennifer Radden in her book, Divided Minds and Successive Selves: Ethical Issues in Disorders of Identity and Personality argues that a person can clearly have two selves especially in exceptional conditions such as recurrent psychosis or multiple personality disorders which she asserts have implications for ordinary people. Radden clarifies what would be required for a person to have two selves in one body. She suggests that each self would have to have a separate, distinguishable pattern of motivation and behavior. They may also have different physical and emotional styles, temperaments, and moral dispositions. Radden suggests that at times "each [self] exhibits well-rounded and roundly contrary personalities," and that at other times the differences can be more subtle. For instance, Radden quotes a beautiful description by William James of men who are constantly struggling with destructive impulses as an example of more subtle divisions in the self:

> Their spirit wears with their flesh, they wish for incompatibles, wayward impulses interrupt their most deliberate plans, and their lives are one long drama of repentance and of effort to repair misdemeanors and mistakes (James 1890, 145).

Following Radden's definitions, I will argue that ordinary people generally have two selves in one body, but I will need a few chapters to present my evidence. i

Chapters to Follow

In the following chapter, "A New Look at Split-brain Studies," I will show how split-brain and other neuroscientific research compelling demonstrate that two separate minds can exist in one person. In the Chapter Three, "Looking Right (And Looking Left)," I describe in detail, my discovery and research into the effects of the glasses, limiting vision to one side or the other. These findings, give graphic evidence from my patients that ordinary people may frequently manifest two distinct personalities each related to either the left or right hemispheres.

The next chapter, "Dual-brain Psychology," discusses how understanding the many different possible relationships between the two minds, revealed by the research described in the earlier chapters, leads us to a much clearer understanding of human psychology. For instance, the two minds can cooperate with each other in a deep, synergistic relationship fostering creativity and maturity or they can sabotage each other leading to a plethora of psychological and psychosomatic problems. Psychological problems often result from injuries to the left or right mind and from the internal struggles and imbalances which such injuries initiate. Many psychological insults of both childhood and adulthood can injure one hemisphere more than the other. Such damage will often enhance and/or corrupt the power of the troubled side and can often leave the more mature side underdeveloped. This can lead to a destructive struggle between the two minds and to psychological problems.

When I finish the presentation of the general framework for my hypothesis, I pass on to six chapters in which I apply the ideas and techniques of the first four chapters to specific areas of human distress. Chapter Five, "Apprehension: Anxiety Disorders," discusses the origins, mechanisms, and treatment of problems with anxiety. Chapter Six,

"Despondency: Depressive Disorders," deals similarly with depression, Chapter Seven, "Extremes: Posttraumatic Stress Disorder," with posttraumatic stress disorder, Eight, "Collapse: Psychotic Disorders," with psychosis, Nine, "Coca Compulsions: Cocaine Abuse" with cocaine abuse, and Ten, "Attack on the Heart" with stress-induced cardiac problems. Each chapter will discuss past theoretical explanations and show how they are improved with the dual-brain approach. And each chapter will continue to use stories of patients who illustrate how they struggled to understand and deal with their problems.

In Chapter Eleven, “Using Dual-brain Therapy to Discover and Reconcile Your Dual-minds,” I describe how you might practically improve the relationship between your two minds, how to discover and assist a troubled side to further mature or heal. I explain how a healthy left and right mind with a respectful, cooperative relationship between them can lead one to a life of greater meaning, creativity, productivity, and fulfillment. Only when the relationships within a person are in harmony, is he or she best able to sustain a healthy relationship with another person. One major goal of Dual-brain Therapy is the care, nurturance, and education of the mind of the more troubled hemisphere.

Throughout the book I have presented cases to illustrate my ideas and my work. I have altered identifying information about each patient so that their anonymity will be maintained, but the essential facts of each case are accurate. All the transcripts presented are unaltered except for some minor editing for clarity.

CHAPTER TWO

A NEW LOOK AT SPLIT-BRAIN STUDIES

I was in Los Angeles chatting with an ordinary looking man. He is forty-six years old and employed as a printer. He seemed cheerful, content, and perfectly reasonable. If we had been introduced and spoken at a party, I would have noticed nothing remarkable about him. Like most people, he is right-handed. But there is something exceptional about this man–- in 1964, at age fourteen, he underwent a neurosurgical procedure called a commissurotomy in an attempt to treat the epileptic seizures that had tormented him since the age of four.

The operation was performed by Dr. Joseph Bogen, then a young, enthusiastic neurosurgeon, and his mentor and partner Dr. Philip Vogel. They felt the new surgical technique they had recently pioneered might successfully treat the fourteen-year-old boy's seizures. To achieve that success, the doctors cut the large nerve bundle, the corpus callosum, which had connected his left and right cerebral hemispheres. The forty-six-year-old printer I had traveled from Boston to Los Angeles to meet was the split-brain patient "AA," long famous in the annals of neuroscience. ii

In the Summer of 1996, Dr. Bogen and his colleague, experimental psychologist Dr. Eran Zaidel, invited me to join them in a study in Dr. Zaidel's eminent neuroscience laboratory at the University of California at Los Angeles. I had proposed that we test "AA" and another split-brain patient known as "LB," to learn more about the psychological nature of the two hemispheres in split-brain patients. Drs. Bogan and Zaidel, two of the world's authorities on Neuropsychology, have likely performed and published more studies about split-brain patients than anyone else in the

world. They both have a deep understanding of the human mind from the special window they helped open.

Joseph Bogen and Eran Zaidel were colleagues of the late neuroscientist, Roger Sperry, who in 1981 was awarded the Nobel Prize for the pioneering split-brain studies of the 1960s. In the previous chapter I told you that the most compelling and important finding to come out of these experiments was the knowledge that split-brain patients such as AA have two separated, autonomous, intelligent minds. I realize that this is a strong claim to make about the nature of the human mind. Indeed, some scientists and philosophers call it disturbing and preposterous. For example, philosopher Daniel Dennett ridicules the idea that split-brain patients could have two autonomous minds by comparing that possibility to the chance that "there could be talking bunny rabbits . . .. There could be, I suppose, but there aren't . . .." But I will present my evidence that split-brain patients, indeed, do have two autonomous minds, each with their own motivations, behaviors, memories, and temperaments. Perhaps even Dr. Dennett will then be persuaded. iii

To begin, I will describe the essential findings from the split-brain studies. If we sit AA, or any other split-brain patient, in front of a screen and flash pictures to either the left or the right side of the screen (to his left or right visual field), the image will be seen only by either the left or right brain depending upon to which side the image is shown. As I will explain a bit later, we know that this involves the neural connections between the eyes and the brain. When AA is shown any object to his right side, he can identify what he sees: a pair of eyeglasses, a pen, a tie clip. An image shown to AA's left side can only be seen by his right brain (due to the neural connections between the eye and the brain). Shown an object to right brain, AA tells us that he can't see it. But, if we ask him to reach with his left hand (connected to his right brain) behind a screen and select from several objects in a box, AA will easily and repeatedly pick out the object that was shown to his right brain, even though he keeps saying that he couldn't see it.

The idea that emerged from these studies is that AA has two separate minds, one in his left brain and one in his right brain. Only the left brain can speak. When AA was shown an image to his right brain, his left brain could not see the image, and he tells us so. The right brain understands most speech, follows instructions, recognizes, and selects objects, but it is unable to reply verbally to the researcher’s questions. AA's mute right brain

can express itself with the left hand which it controls, and which consistently picks out by touch the correct items.

To get a feel for our procedure, imagine for a moment that you are a split-brain patient being tested in Dr. Zaidel's laboratory. First, Dr. Zaidel tells you where to sit and how to look at the screen. He instructs you to focus on a dot in the middle of a panel of two screens. Images flashed on the right side of the screen will be seen only by your left brain, and images flashed on the left side will be seen only by your right brain.

Dr. Zaidel then flashes a picture to your left brain, and you see immediately that it is a picture of a banana, and as he requested, you tell him so. Then he flashes an image to your right brain. You can't see it. He asks you what you saw, and you say, "I didn't see anything." Then he asks you use your left hand to reach behind a small curtain into a box with several items, to pick out the object shown to your right brain. Although you don't know quite what he's talking about, you place your hand through the curtain. Seemingly acting on its own, your left hand pulls out a tie clip. You really can't understand what is happening. You know you didn't see a picture of a tie clip; you didn't try to pick one out of the box, yet Dr. Zaidel says, "That's correct, the tie clip."

The split-brain studies have provided us with wonderful insights into the mind. We now know that a split-brain person sees and appreciates whatever is shown exclusively to the right brain. The right brain does not have a speech center and so cannot speak, but *it can understand* Dr. Zaidel's instructions and easily carries them out.

The second obvious finding is that the left brain has a speech center that enables it to speak, understand, and follow Dr. Zaidel's instructions. Each side operates independently. It didn't matter to the left brain that the right hemisphere was excluded from our conversation with AA. He is a complete person in his left brain and doesn't require a right hemisphere to know who he is, what he sees, feels, wants, or plans to do. In fact, there are people who do not have a right hemisphere at all, for example, people who had cancer in their right hemisphere and had it removed surgically. For the most part these people, although often paralyzed on the left side, seem to be able to function and carry on with their lives without a loss of their personal identities.

Just what does it mean to say that AA talks "out of" his isolated left brain only? Technically, brains don't speak, even in intact people. The

brain is a hunk of neurons, chemicals, and electromagnetic fields essential to the support and production of a person's mind. When we say, “that’s my brain speaking,” I think we are wrong. The mind and brain are so intimately connected that some scientists believe they are identical. I don't share this opinion, and so. I prefer to say that AA was speaking with the mind of his left brain. But, because it becomes cumbersome to repeat phrases such as "the mind of the right brain," I will sometimes refer to that mind as simply the right or left brain or hemisphere.

You might wonder what AA's right brain was up to while I was carrying on a conversation with his left-sided mind. That, in fact, was what I had traveled to California to learn more about. I suspected that AA's right-sided mind was listening quietly to our conversation, minding its own business. My intention was to learn to communicate with the mute right-sided mind, to gain a clearer sense of what it was thinking and feeling.

In our experiment we planned to verbally ask AA questions and have him respond simultaneously with both hands by touching two sets of pegs behind a curtain, one set for each hand. Both sets included five pegs lined up in a row. The first peg represented the answer "none," the second, "mild," the third, "moderate," the fourth, "quite-a-bit," and the last, "extreme." We had him practice, and each hand responded to each practice question. Both hands waited for the question and then simultaneously moved over the pegs and then stopped clearly at the selected pegs. iv With an assistant to help, we carefully recorded his hand responses.

Before we began the test, I led AA through a brief review of his childhood stresses. He revealed although it doesn't bother him at all now, when he was a child, he was very upset by a group of bullies who picked on him over a period of years. I decided to add this piece of information into the study. We posed several questions focusing on his past and current feelings and recollections of the “bully” period in his life.

I asked him 49 separate questions, including how much his seizures bothered him, how much his girlfriend annoyed him. How much would he like to be a movie star, how much did he loved his mother, how much did he believe in God, in abortion, in the soul? I queried about how much he enjoyed shopping, movies, eating, sex, romance, work, and taxes, how much he wanted to be admired, rich, angry. I also asked him 14 questions having to do with the bullies. I asked him how scared he was of the bullies, how frustrated by them, how hopeless they made him feel. I asked how angry he

was now with the bullies, how cruel he now felt they were, how painful were their taunts. I asked how much he still hated the bullies, how much the bullies bothered him today.

His right hand, answering for his left-sided mind, the side with which I had been speaking, answered none or mild to most of the questions which had to do with the bullies. As he had told me verbally, his left-sided mind was not upset by the bullies. But, his left hand, answering for his right-sided mind gave a very different picture. His left-handed answers to most of the bully questions were "quite-a-bit" or "extreme." On almost half of the bully questions his left hand pointed to a peg 3 or 4 points higher than the one his right hand indicated.

AA's left-handed answers revealed that, his right brain was very upset by what had happened and still felt quite disturbed by what had occurred about 30 years earlier. His left brain reported both verbally and with his right-hand responses that he was not upset by the bullying. "Of course, I'm not upset by them; that happened so many years ago."

On the other questions unrelated to the bullies, the two sides answers were much more compatible. Both sides disliked paying taxes, enjoyed sex and romance, both "extremely" believed in God. Both hands pointed to the first peg, indicating "none," when asked about how much he believed in abortion. Both sides "extremely" loved his mother, wanted to be rich, a movie star, and enjoyed eating. Neither side wished to be poor, angry, or do puzzles! Both sides indicated that the boyhood seizures bothered him "extremely," and neither found his girlfriend annoying. On 74% of these "non-bully" questions, the two sides agreed exactly; when they disagreed, it was almost always by only one point.

Our statistical tests indicated that AA's left and right-hand answers to the bully questions were significantly different, while his left and right answers on the other questions were not distinct. The left-right differences on the bully questions were also significantly different from the left-right differences in response to the other questions. These statistical tests plus the overall pattern of answers confirmed that we had indeed gotten his right brain to talk with us through his left hand.

AA, like Ryan and Carol, has two distinct parts to him, one that is adversely affected by a past trauma and still suffers its pain; and another part that seems removed emotionally from the injury. In AA we can locate his two parts; the first is in his right hemisphere and the second is in his left.

The second split-brain patient was LB. He was 44 years old, and a bit of a prankster. As I tried talking with him, he started flicking some switches on our equipment, and the lab assistant who knew him well, said, "Cut that out! You're incorrigible." He then settled down and told me that he didn't want to get into any heavy conversation. He said he was a little leery of psychiatrists. LB, who is right-handed, had his split-brain operation for epilepsy when he was 13.

LB also seemed quite ordinary. I would never have been able to pick him out of a room full of people and say, "Oh, him, that person over there, he must be the split-brain patient," even if I knew that one of ten people in a room were a split-brain patient.

But of course, not all split-brain patients are alike, and LB had his own personality, which was quite different from AA's quiet demeanor. He appeared lively, more of an extrovert, and he seemed very bright and quick witted. I had to remind myself that in LB's case, the personality we were able to communicate with was entirely "left sided." What his silent right brain is thinking and feeling we would attempt to learn from our study.

At this point we might wonder what this says about the emotionless Dr. Spock of left/right brain lore? Isn't the left brain logical, sequential, and analytic? Yet neither AA nor LB resemble Dr. Spock or even an MIT graduate student in engineering. In fact, the left brained personalities of both AA and LB were well rounded and balanced. AA (the left brain of AA, that is) does not seem particularly poetic or creative, but no less so than many people I know. LB's left side in fact seemed very creative in as much as he was witty and a jokester, but he also seemed logical and fully capable of reason.

It was perfectly clear to those of us in the room that AA and LB's isolated left brains bore little relation to popular notions about left-sided, logical, analytic personalities. This suggested to me that many of our popular ideas about the left and right hemispheres demanded reconsideration.

Our experimental protocol for LB was a bit more complicated than the one we had designed for AA. Remember, images that are shown to the left of the patient are seen by the right brain, and images shown to the right go to the left brain. Dr. Zaidel suggested we ask the beginning of a question such as, how much do you feel? and then finish the question with a different word flashed to the left and right sides of LB. In this way I would say aloud, "How much do you feel ____?" And immediately two words would be

briefly flashed to the left and to the right side. In one instance, the word "confident" was flashed to the left and the word "anxious," to the right. Simultaneously, we asked LB's left brain, "How much do you feel anxious?" and his right brain, "How much do you feel confident?" Again, as for AA, LB was taught to respond by touching the same sets of pegs in front of each hand.

In this more complex design, we were able to ask both sides all the same questions but in different orders, at different times. In this way we could ask one side if he liked paying taxes and the other if he liked being loved. Since his answers to questions like these two (with expected responses) came out in the anticipated way (he didn't like taxes but wanted to be loved) this procedure was another confirmation that the left-handed answers were coming from his right brain.

I hadn't questioned LB about the existence of specific childhood memories, so I couldn't devise a series of questions about a traumatic experience as I did with AA. Nevertheless, we found that LB saw himself more positively in his right brain and more negatively in his left brain. For instance, when asked how much he felt he was admired or attractive, his right brain (via his left hand) consistently reported a higher score than his left brain (right hand). And when he was asked about negative traits such as disrespected or dishonest, his left brain consistently scored higher. In other words, his left brain reported lower scores on positive attributes and higher scores on negative attributes. These results were significant when analyzed statistically, so we felt confident that we were seeing a reliable result.

These results were unexpected. Generally, it is the left brain, in right-handed people, which is believed by scientists to process positive emotions, whereas the right brain is often considered a key center for processing negative emotions. Here, with LB we were seeing the opposite trend, and we didn't know how to explain our findings. Then I came across an article by two prominent neuroscientists, David Bear and Paul Fedio. They had found in patients with epilepsy in their temporal lobes, an important area of the brain dealing with emotion, that in those patients whose left brains were more active because of the epilepsy, they tended to put themselves down. Those patients with a more active right hemisphere tended to exaggerate their good qualities. Bear and Fedio labeled the group with more activity on the left side, "tarnishers" and the other group "polishers." Our results were entirely consistent with these findings.

Considered together, these discoveries teach us lessons about the danger of making generalizations about the character of one hemisphere or the other. At the end of this chapter, I will show how the popular notions about the left and right brains became established in the national psyche. For now, we can be clear that in our study LB's left brain and his right brain had different opinions and each viewed "himself" differently. Again, the most important and reliable discovery about the split-brain patients is that they have two autonomous minds. At the end of the chapter, I will show why these split-brain studies are relevant to all people, particularly the vast majority of us who have not had brain surgery.

An Earlier Split-brain Study

The autonomy and interactions of the hemispheres in split-brain patients were demonstrated clearly in a study performed on LB and another split-brain patient and published in 1979 by Roger Sperry, Eran Zaidel, and his wife Dahlia Zaidel, a renowned neuroscientist. They used special contact lens designed by Eran which could allow photographs to only be seen by the right brains of these patients. The experimenters talked with the patient while his or her right brain viewed photographs of themselves, family members, entertainers, and world leaders. The patient's left, verbal self could hear the experimenters, but could not see the photographs. The experimenters asked the patients, while their right brains were looking at a particular photograph, to rate it by giving a left-handed signal, thumbs up or thumbs down. That is, the patient's right mind looked at the photographs and then expressed its judgment with a hand signal while the patient's left, speaking mind sat trying to guess what was going on. Try to imagine this scene as you read this excerpt from a tape recording of a conversation between one of the experimenters and the first patient (LB). Here LB's right brain was shown four photographs simultaneously. His right brain could scan the photographs as you or I could if they were placed on the table in front of us. (All of the following transcripts are excerpted from the published scientific article describing the experiment.) vi

The experimenter says, "Point to any of these that you recognize."

After 14 seconds, LB's hand points to a photograph that pictures the only person who is recognizable, a well-known figure who is standing with four other people. The other photographs are of people unknown to him.

Experimenter: "Do you recognize that one? Is that the only one?"

LB again inspects the photos but does not point to any others.

Experimenter: "Well, on this: is this one a 'thumbs-up or a 'thumbs-down' item for you?"

LB signals thumbs-down with his left hand (connected to his right brain).

Experimenter: "Who is it?"

Now LB's left, verbal mind answers (his right-sided mind can't speak), "GI came to mind. I mean . . ."

The experimenter notes that LB's left hand (connected to his right brain) is trying to trace letters on the back of his right hand. That is, his right brain is trying to tell his left brain the name of the person in the picture. The experimenter says, "You're writing with your left hand; let's keep the cues out."

LB's speaking left-sided mind says, "Sorry about that."

Then the experimenter asks, "Is it someone you know personally, . . . or from entertainment, or . . . historical, or . . .?"

LB's left brain (which did not see the picture) interrupted and said, "Historical."

Experimenter: "Recent or . . .?"

LB: "Past."

Experimenter: "This country or another country?"

LB: "Uh-hu--okay."

Experimenter: "You're not sure?"

LB: "Another country, I think."

Notice what has happened. LB's left-sided mind was speaking. He did not see the picture, but he apparently had a feeling, or an intuition "sent" to him from his right-sided mind because his guesses thus far were correct. These feelings were probably sent through the lower brain levels which were not cut by the operation.

The experimenter then asks, "Prime Minister, king, president, . . . any of them?"

LB has a ponderous look on his face and says, "Gee."

Experimenter: "Great Britain? . . . Germany . . .?

LB then interrupts and asserts, "Germany," and then after a pause, "Hitler."

There can be no doubt that LB's verbal self never saw the photos. Yet, prodded by Sperry and the Zaidel he guessed the correct identity of the

person in the picture. How did LB do so well on this test? The implications were fascinating and incontrovertible --LB, and others like him, had a highly developed mind in his right brain. It was apparent that this right-sided mind saw the photographs, recognized Hitler within 14 seconds of scanning the four pictures. This right-sided mind not only recognized a well-known face, but it also had an opinion about the person. With the thumb signal, this right-sided mind definitively signaled that he disapproved of Hitler. And LB's right-sided mind had other political opinions as well: Churchill (thumb up), Castro (thumb down), and pre-Watergate Nixon (thumb *horizontal*).

It was remarkable how this right-sided mind communicated with his left-sided mind. The right-sided mind apparently was able to send feelings or intuitions to the left-sided, verbal mind. We can see how the left-sided, verbal mind was struggling to retrieve information about the photographs. You may liken this process to what we do when we are trying to remember something on a test or in psychotherapy but can't quite grasp a memory or idea and have to search somewhere inside ourselves for clues, clues which may then coalesce, as they did for this patient, into a definitive answer.

Toward the end of the testing session, LB's right-sided mind was shown another four photographs, three of strangers and one of himself. When asked if he recognized anyone in the pictures, he immediately pointed out the correct choice. When asked to rate the person in the photo, he grinned and turned his thumb down. With prompting, his left side guessed the correct identity of the person in the picture. Not only was LB's right brain capable of self-recognition and obviously self-awareness, but it was also capable of humor, and good humor at that.

The other split-brain patient studied with this special lens showed very similar abilities. This patient, a woman, was being tested with a long series of fairly uninteresting pictures. Then she was shown four photographs and was told, "Here are four people; again, point out the one you like best."

Her right brain scanned the photos for about seven seconds and then she exclaimed with a burst of mirth and surprise, "Oh no! . . . Where'd you g . . .. What *are* they?" She then laughed and said, "Oh God!" After a 3 second pause, she asked, "Dr. Sperry . . . You sure there's people there?"

It was clear that her right-sided mind recognized that these pictures were different from those which she had been viewing, and that they aroused a strong emotional reaction in the right mind. It is also apparent that her left

mind had no idea what the pictures were about. The patient's right-sided mind and her experimenters knew that the four photographs were each different pictures of the patient herself. In that trial, even with prompting, her left-sided mind couldn't guess what or who was in the pictures. But, on a subsequent trial of similar pictures of herself, she said, "What do you think, Dr. Sperry; what's the matter with me? . . . I mean, am I thinking or what? I . . . keep pointing to that one, and I don't know why. Whose face is it? Probably me and that's why I like it; nobody else does. Yeah (more definitely) that's a picture of me."

The experimenter said, "Yeah?"

Patient: "Yup."

Experimenter: "Which one is you?"

Patient: "That one (pointing to the one she had picked) . . . and that one, . . . and that one . . . and that one.

Experimenter: "All four?"

The patient responded loudly and firmly, "Yup!"

From these experiments it was apparent that the patients' right-sided minds were conscious, alert, intelligent, emotional, personable, and self-aware. However, the patients' conscious left minds remained unaware of the conscious experiences of their right minds. Both of these split-brain patients clearly manifested two independent, intact minds. One spoke while the other could not, but otherwise there was no obvious or extreme difference between them. Both patients, on both sides, seemed capable of rational judgments (expressing political opinions) and of humor. And both sides recognized their own photographs.

How the Two Hemispheres Relate to Each Other

These studies on LB and the female patient tell us not only that the left and right brains have intact, separate minds, but they also tell us some things about how the two hemispheres interact. In one instance, the experimenter had to tell LB to stop writing with his left hand onto his right. The passage, or sharing, of information about the photographs from one side to the other demonstrates an attempt at communication.

A female split-brain patient was in Dr. Sperry's laboratory having the vocabulary of her right brain tested with words flashed the left side of her vision by a tachistoscope in a way that allowed only her right brain to view

them. Suddenly she began laughing. When asked why she was laughing, she said, "Doctor, you have a funny machine."

Her statement demonstrated that her left, speaking mind had not the slightest idea why she was laughing. Her giggle was precipitated by the very distinguished Professor Roger Sperry, who had placed a provocative picture of a nude women in among the words which were being flashed to his patient's right-sided mind.

Her left-sided, speaking mind, in fact, did not have any idea why it was laughing; it could only feel that something was "funny." It is interesting that she did not say, "Gee, I have no idea why I am laughing." Instead, she tried to fabricate a reason to gloss over the situation.

Her right-sided mind registered the photograph, appreciated its significance, and responded by evoking feelings of mirth. The impulse to laugh was sent to the left side, but the reason for the impulse was not. Although her left, speaking mind was greatly affected by her right-sided mind, she was unaware of being influenced by a "hidden self." Of course, she had no appreciation of that influence nor any insight into its cause.

In a similar study, Dr. Zaidel showed a patient's right brain a picture of a funeral procession. The patient's left-sided mind reported feeling very sad and uncomfortable but did not have any idea why. Apparently, his right-sided mind appreciated the meaning of the photograph and sent the appropriate feelings of sadness to the left side, but it sent those feelings without words or meaning. vii

I have wondered about the origin of anxiety or other feelings that seem to surface out of the blue and are impossible to explain. Perhaps common shifts in our emotional state are not simply due to unexplained "chemical imbalances" or other psychologically meaningless factors, but rather are due to unexplained feelings coming from our less dominant hemisphere. We will return to this idea in the next chapter.

In another study Zaidel showed a picture to a patient's right brain and then asked her left side what was in the picture. The patient, who was a housewife, said she could not see the picture and that she did not know what was in it. Dr. Zaidel then encouraged her to guess. After a few moments, she said, "Dumbbell."viii

Dr. Zaidel had no idea what she meant, and so he asked her what the term meant to her. She said that "dumbbell" was a derogatory name her

husband called her when he felt the house was unclean, implying that she was slothful. She did not understand how that might relate to the picture.

Zaidel had shown her right brain a picture taken from a psychological test. It was an emotionally evocative picture of a woman sitting on a bed, appearing grief-stricken or depressed. Apparently, her right brain associated the woman in the picture with her husband's demeaning term and then sent feelings or intuitions to her left side which allowed her to guess "dumbbell" without ever having seen the picture.

The Post-commissurotomy Syndrome

We can also learn about the nature of the mind of the disconnected right brain by considering several fascinating observations which have been made in a number of other split-brain patients. The first is a phenomenon called the post-commissurotomy syndrome which has been observed in many split-brain patients for a brief period shortly after the operation, possibly before the two hemispheres have learned how to get along with each other. A few of these examples were briefly presented in the introduction, but here I want to take a closer look at these compelling observations. In this syndrome, the patient is shocked to find that his left hand (controlled by the right brain) is acting autonomously, in an obviously intentional manner. For example, one split-brain patient, a woman, wanted to wear a certain dress and reached for it in the closet with her right hand, but her left hand (connected to her right brain) kept putting it back and tried to reach for another (perhaps more stylish) dress. Another man tried to pull his pants up with his right hand while his left tried to pull them down. Another man's left hand tried to forcibly grab his wife while his right hand (directed by his conscious mind) tried to rescue her. Another patient struck his wife on a few occasions. Afterwards, he apologized profusely, explaining that it was his autonomous left hand, not *himself* which was the perpetrator. Another patient's left hand tried to strangle himself and had to be restrained. ix

Not all right mind behaviors in split-brain patients are destructive. One patient who wanted to smoke cigarettes found that each time he lit up, his left hand would grab the cigarette and put it out. His autonomous left hand prevented him from smoking, something his physician was probably unsuccessful at accomplishing.

The highly regarded neuropsychologist Rhawn Joseph reports a patient whose left-hand grabbed food from the refrigerator which the patient

consciously did not want to eat. On another occasion, even though he was enjoying a television show, his left hand changed the channel to another show. Once when he was out walking, his left leg refused to move except in the direction of home, even though he consciously wanted to go for a longer walk. At times in the laboratory, he would become quite angry with his left hand and would express hatred for it. He even struck his left hand, and both hands were observed in an actual physical struggle. xi

Perhaps the most amazing story is of a female split-brain patient who was abruptly awakened from a sound sleep by slaps across her face. She awoke to find it was her left hand, acting autonomously and intentionally (it would seem), which was slapping her. The patient had overslept, and the right mind must have awakened, realized the time, and tried to rouse her. Later in the book, I will discuss this case when we look at common mechanisms for treating insomnia in normal people. xii

These cases are fascinating, not merely as curiosities, but more importantly as illuminators of the nature of the right-sided mind. They demonstrate purposeful, complex behaviors initiated by the right-sided mind. Even though this post-commissurotomy syndrome does not persist in every patient, these behaviors have been observed in many of the split-brain patients.

Split-brain Patients with Exceptional Right-sided Expressive Abilities

It is easy to appreciate that a mute right brain must be quite difficult to study. There are, however, three split-brain patients who are quite exceptional in regard to their ability to express themselves. One of these patients, could draw pictures in response to questions asked of his right brain. For example, when an image of a horse was flashed to his right hemisphere, he was verbally asked by the experimenter to draw "what goes on it." His left mind said he didn't know because it didn't see the image, but with his left hand (connected to his right brain) he drew a crude picture of a saddle. In this instance, the patient not only demonstrated that he understood that the image was of a horse, but also demonstrated that he could generate the correct image of an object not shown, an object apparently chosen through a higher level of abstraction than that required merely to match pictures and objects. xiii

The other two patients, studied by the pioneering split-brain researcher, Michael Gazzaniga had expressive language on their right side.

Their right brains (as well as their left brains) could speak. You could talk with the patient's left-sided, verbal mind, and you could also have a limited conversation with his right-sided mind, although these exchanges are generally limited to one sentence answers. That is, you could have two separate conversations, one with each mind. These findings do not mean that every right brain can speak. These were exceptional patients and represent the only two with this capacity in a series of about 44 split-brain patients. xiv

Let's look closely at one of these split-brain patients, a patient named Paul. Initially, his right mind couldn't speak, but it could communicate by spelling words with scrabble chips. The experimenters could ask questions such as, "What is your favorite ____?" Then they would flash a word such as "hobby," so it could be seen by only one hemisphere. When the experimenters asked his right mind what it wanted to be when he grew up, it spelled out "auto race," which the experimenters interpreted to mean that he wanted to become a race car driver. When they asked his left, conscious side what he wanted to become, he replied, "a draftsman." It is interesting that Paul's left side appeared to be more conservative, more reasonable, perhaps, more mature than his right side which seemed possibly more impulsive, unrealistic, and immature.

When his right side was asked, "Who (are you)?" he wrote, "Paul." This shows that his right mind has a sense of himself as a person, a personal identity. His response is consistent with the reactions of Zaidel's two contact lens patients when they were shown pictures of themselves.

In another experiment, Paul was asked how much he liked certain people or things. He was asked, "How much do you like ____?" and the following items were individually presented first to one hemisphere and then later to the other. The list contained: Dad, dope, Fonz, God, home, Liz (his girlfriend), Mom, Nixon, Paul, police, school, and TV. After each item was flashed to his right brain, he pointed, as instructed, to one of five cards, each with one of the following ratings: dislike very much, dislike, undecided, like, and like very much. In this way his right mind could be asked, for example, "How much do you like (Liz)," and he could point to the "like very much" card. Over a series of different days, both hemispheres were asked to rate the people or things on the list. Paul appeared to feel better on days when both hemispheres were in general agreement. He appeared out of sorts on days of general disagreement. xv

The Significance of the Split-brain Studies

The split-brain studies can make us feel ill at ease because they challenge our sense of our selves. We obviously do not experience ourselves as being of two minds. But what makes the split-brain studies so important is exactly that they challenge our intuitive ideas about human nature, even our own personal nature. If we can objectively consider the split-brain studies we are forced to admit (even, perhaps, against our will), that they definitely demonstrate that these patients do, in fact, have two working, independent minds. Roger Sperry concluded this:

> In sum, cerebral commissurotomy [the split-brain operation] appears to divide not only the brain but also the mind. Two separate realms of subjective awareness are apparent: one in each disconnected hemisphere, and each in itself seems to be remarkably whole, unified, and capable of supporting behavior comparable in many respects to that of the combined intact system. . ..
>
> The two disconnected hemispheres of man not only function as if each is independently conscious, but also as if each possesses distinctive qualitative properties not equally shared with the other. xvi

And Joseph Bogen wrote:

> Roger Sperry was awarded the Nobel Prize in 1981 for his work with human split-brain subjects, but the implications of this work have yet to be fully appreciated. The principle of hemispheric specialization [left, language; right, spatial abilities], illuminated by him, has been widely recognized, which has stimulated an immense amount of research. But the principle of cerebral duality [that each hemisphere has its own mind], . . . has so far had insufficient recognition . . .. We all look forward to the day when the implications of the split-brain research emerge in a form that can help guide human society toward an improved understanding of its own internally conflicted creativity. xvii

Patients Who Have Had Their Left-brains Surgically Removed

Another set of observations that substantiate the intelligence and intactness of the mind of the right brain are those of patients who had an even more radical operation than the split-brain surgery. There are several cases of the adult patients who had their left cerebral hemispheres (the left halves of their brains) removed because of brain cancer. These findings report that almost all patients, post-surgery had reasonable emotions and behaviors. While they have extensive deficits, such as language problems and paralysis, they remain generally functional mentally. For example, a published study of a 12-year-old girl reported, "Additional observations from the present study indicate that personality characteristics such as humor, boredom, love, and frustration are readily exhibited by the right hemisphere in a pattern reported by the parents to be substantially the same as before surgery." This and similar reports of patients who had their left hemispheres removed demonstrate that a right brain, alone, has the capacity to support reasonably intelligent human life. xviii

In 1843, the English physician Arthur Wigan published a book entitled *The Duality of the Mind*. Wigan's interest in the subject began years earlier when he attended the autopsy of a friend who had died unexpectedly. To everyone's amazement, his friend had only one brain hemisphere. The entire other side of his skull was empty. Yet, Wigan's friend apparently thrived with only one hemisphere. For the next twenty years Wigan pondered the significance of this observation and ultimately concluded that if his friend had an intact normal mind with one hemisphere, then perhaps, people with both a left and a right brain have two minds. xix

The Connections between the Eyes and the Cerebral Hemispheres

To understand the split-brain studies, it is not necessary to understand the physical connections between the eyes and the left and right brains. The premise is quite simple: Images shown to one side of a split-brain person will be registered only in the hemisphere on the opposite side. But, because this and much other research depends on this assumption, I feel it would be helpful to discuss this connection.

Think of the eye as a camera; it has a lens in front that operates much like the lens of a camera. In a camera it is the job of the lens to focus an image of an object in front of the camera onto the sheet of film at the back of the camera. If the camera is not focused properly the image on the film will be out of focus or blurry. If an object is to the right of the camera, the

lens will place the image on the left side of the sheet of film. Similarly, the lens in the eye focuses an image, but in the case of the eye, on a sheet of light sensitive cells, called the retina, at the back of the eye. An image of an object to the right of a person, will be focused on the left side of the retina which acts much like film, or even more accurately like the light sensitive computer chips at the back of a video camera. The image on the retina is then sent to the brain via the optic nerve, much the way an image in the back of a video camera is sent via wires to the tape recorder for storage or via another wire to a television monitor for viewing.

Now we come to the tricky part in the human being. The retina is essentially divided functionally into two separate sheets at the back of each eye. As shown in figure 1.,INSERT FIGURE 1 in each eye, one sheet covers the left side and one the right side. If we look only at the right eye for a moment, we see, at the back of the right eye, a retina which is divided between the left and right sides. Images which fall on the right half of the retina of the right eye are transported via the optic nerve to the right brain for processing. Images falling on the left half of the retina of the right eye are transported via the optic nerve to the left brain. This is true for all human beings. One could speculate on why our species evolved in this way, but I will simply deal with the anatomy as we find it. And what we find is important. Each half of each eye sends its visual information to a different cerebral hemisphere. See figure 1.

Since the optic nerve from the right eye goes to both brains, there must be a point at which it divides such that one part goes straight back to the brain on the right side and one part veers off to the left to connect with the left brain. This indeed occurs, and the point where the optic nerve crosses the midline is called the optic chiasm. At that point the optic nerve from the left eye sends a branch over to the right hemisphere. In split-brain operations in humans the optic chiasm is not touched. In animal experiments the optic chiasm is often cut, and by doing so the experimenters prevent the images from being sent to the opposite hemisphere. In the case of the right eye, in an animal with its optic chiasm and corpus callosum cut, the optic nerve would go only to the right brain. In that animal his left eye would be connected only to his left brain. We will return to these animal studies a bit later.

If we close our right eye and keep our left eye open, an image a chess piece in the center of our vision will go to both hemispheres because there is an area of overlap between the two sides of our retina at the back of

the right eye. If we turn so that the chess piece is now to our left (the left side of our body), then the image of the chess piece will go through the lens and be focused on the right side of the retina (of the left eye) only. This is the side of the retina which sends its image to the opposite hemisphere. In this case, our right brain would process the image. After the image is processed it can be sent (sort of like E-mail) through the corpus callosum to the other hemisphere so that eventually both hemispheres will be able to appreciate the chess piece. In split-brain patients since the corpus callosum is severed, the image cannot be sent to the other side of the brain, and it is upon this anatomical fact that all of the split-brain studies are ultimately based.

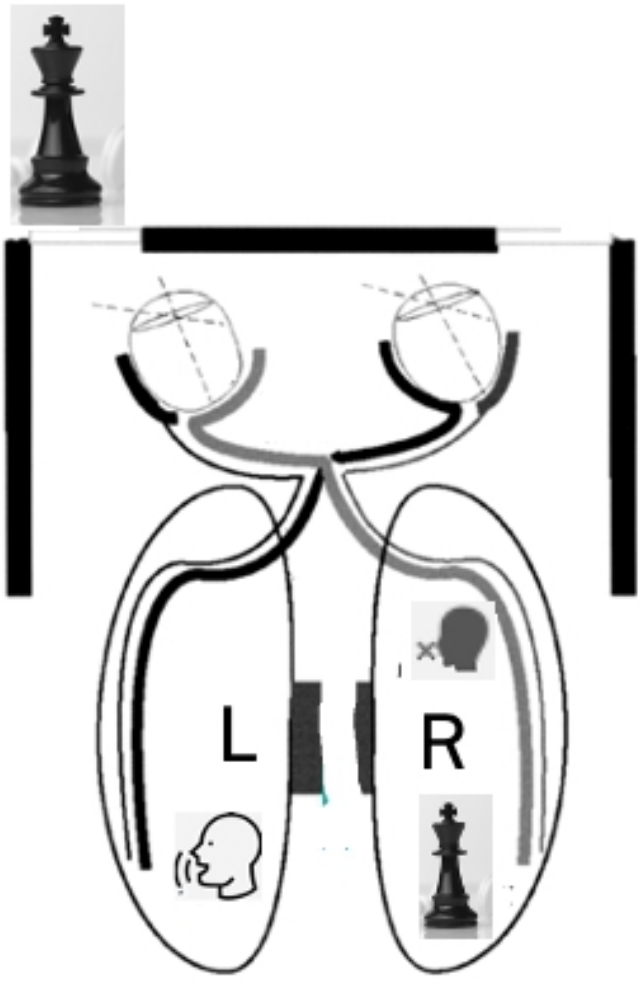

Figure 1.
The chess piece shown to the left lateral visual field strikes the medial retina of the left eye and goes to the right brain. If the connection between the brain hemisphere is intact, the image can be seen later by the left brain. In split brain patients, this connection is cut as in this figure and in this case only the right (non-speaking brain hemisphere) can see the chess piece.

The left eye as shown in figure 1. is designed similarly to the right eye. If an image is focused on the right side of retina of the left eye it will be sent via the optic nerve to the right brain.

So, if we are focused on a chess piece to the left side of our body, its image would go first to the right brain. Because there are delays and limitations in transferring information even in people with an intact corpus callosum, that is even in ordinary people, an experimenter can send information preferentially to one side of the brain or the other even in people

who have not had a split-brain operation. In fact, as we will discuss in a moment, experimenters have shown movies to either the left or the right brain in ordinary people. There also have been many hundreds of studies in which images are flashed to one side or other of the eyes in ordinary people, and these images go preferentially to one hemisphere or the other depending on which side of the person's vision the image is shown.

In many experiments whether in split-brain patients or ordinary people, it is often necessary to present images very briefly when we want them to be seen by one side or the other. The reason for this is that if the eyes move, even slightly, the image will be seen on the other half of the retina and will go to both hemispheres. Therefore, many experiments use images which are flashed for only a small fraction of a second. The special contact lens which Eran Zaidel designed was the first procedure to enable split-brain patients to look at an image for as long as they wanted without a concern that the image would be seen by the other hemisphere. In intact people, contact lenses painted over on one side, as well as other methods, have enabled researchers to send persistent images preferentially to one hemisphere or the other in ordinary people. We will have more to say about these studies in a moment.

Do the Findings from Neurosurgical Patients Apply to Ordinary People?

As Joe Bogen pointed out above, the duality of mind discovered in the split-brain patients is often dismissed by scientists, psychologists, and philosophers as irrelevant to ordinary people. These naysayers contend that because the surgery is so radical, and these patients suffered epilepsy and so should be considered brain damaged in some unspecified way and not related to healthy people. I think this position is taken merely because the split-brain findings are so unexpected and so often disturbing. The surgery, radical in its concept, creates a specific, limited surgical lesion with no apparent damage to the hemispheres themselves. I believe that the commissurotomy revealed preexisting minds. It is highly unlikely and unproven that the surgery could create an extra mind.

Further, people with epilepsy usually do not have obvious brain damage. The fact that the patient has seizures means that he has some functional abnormality at the time of the seizures, but most seizure patients have normal MRIs, and their EEG's are often normal between seizures. In fact, the task of determining whether a patient is epileptic is often difficult.

Even in particular cases when the disorder has been definitively diagnosed, it is very difficult to find its cause or source. Certainly, some people who get seizures, such as those who have had a significant head injury, may have an obviously damaged area of their brain, but most people with epilepsy appear to have normal functioning brains when they are not having seizures. Split-brain patients taken together do not form a homogeneous group; there are very many variations among the types and causes of their epilepsy. Although it is true that a number of split-brain patients suffered a variety of types of brain damage both before and after surgery, this is not true of all split-brain patients, and it specifically is not true of AA and LB. All split-brain patients have manifested a duality of mind, the presence of a left and a right-sided mind.

Split-brain Studies in Animals

There is a large body of split-brain studies in animals (without epilepsy, of course), and these studies also show the same duality of mind. For instance, prior to his work on human split-brain patients, Sperry had been experimenting with cats and monkeys in which he would cut the corpus callosum. He also cut the optical chiasm, the point where the nerve tracts from the eyes cross to the opposite side. By this operation he constructed an animal with not only a split-brain, but also an eye connected to only one hemisphere. Following surgery Sperry covered one eye and taught the animal a trick or two. For instance, he could teach the animal that to get a food pellet, it had to push a button with a circle on it rather than the button next to it with a cross on it. What he found was dramatic. He could teach the animal's left brain, and only its left brain would learn the task; its right brain would remain untaught. He could then teach the right side to do the opposite, that is to push the cross button to get food. Then, depending upon which eye was uncovered, the animal would push either the circle or the cross. xx

Sperry discovered that the split-brained animal acted as if it had two minds, each of which was unaware of what the other had learned. Each mind was capable of perceiving, learning, remembering, and initiating action. This work in animals dovetailed with the discoveries of two minds in human split-brain patients and proved that the phenomena cannot be attributed to epilepsy or some unspecified, undiscovered brain damage.

Testing Ordinary People

Split-brain studies in themselves imply but do not prove that ordinary people have two minds. Fortunately, there is an abundance of scientific data that demonstrates the relevance of the split-brain findings for ordinary people with intact brains. In studies of split-brain patients that attempted to discover the cognitive advantages of the left or right brains, researchers noticed that the left brains were better at language tasks and that the right brains were superior at certain spatial tasks. For example, if you place an unusually shaped object in the left or the right hand of a split-brain patient and ask him to match that object with a set of pictures, her left hand (right brain) is consistently better at the task, readily able to point to the picture of the object. When the object is placed in the right hand (left brain), the patient has difficulty pointing to the correct picture. In split-brain patients, it seems that the left hemisphere generally uses different strategies than the right side. The left brain can more easily pick out an object placed in the right hand if the object lends itself to a verbal description, say a cube or a sphere. It has extreme difficulty with amorphous shapes. The left hand (right brain) though is quite adept at identifying amorphous objects.

Now comes the more interesting point. Scientists have found that ordinary people have the same differences in cognitive abilities between sides as the split-brain patients. For example, if an ordinary person is seated in front of a screen and asked to look forward and an object is flashed very briefly to his right side (his left brain) he will respond faster and more accurately if the task involves language. If you flash a spatial task to the screen, asking the subject, for instance, to tell if a dot is within a circle, he will perform better when the images are flashed to his left side (right brain). Ordinary people also are shown to be better at noticing details if they are flashed to the left brain, and better at seeing the overall picture if the image is flashed to the right brain.

These studies and others involving hearing through the left and right ears have been repeated many hundreds of times in ordinary people and the findings are consistently similar to the findings in split-brain patients. This means that the cognitive properties of the left and right hemispheres of split-brain patients are similar to those in ordinary people. When all the evidence is sifted and weighed, we are reminded that our “ordinary” minds are more similar to split-brain minds than some neuroscientists would like us to believe.

But What About Mr. Spock? Beliefs that Confuse Us

We need to step back and consider some things that confuse many people. The idea that the left brain is logical and sequential or analytical and that the right brain is more synthetic, more visuospatial comes from the kind of studies I have just described in split-brain and ordinary subjects. For example, the subject is asked to tell whether a face flashed to one side is the same as one being shown in the middle. If the face is flashed to the left side (right brain) the person (split-brain or ordinary subject) will more quickly and more accurately tell if the flashed face is or is not the same as the one being shown directly in front of the person. When the face is flashed to the right side of vision (left brain) the subject is slower and less accurate. But, when the experiment was changed so that the subject was required to tell whether the flashed face had a similar specific feature, such as the nose, then the left brain did better. The inference from these experiments is that the right brain is better at analyzing the whole picture, the whole face if you will, but that the left brain is better at detecting and analyzing smaller details. I need to point out also that in this research, in general, the right brain does not have an overwhelming superiority on its tasks and the left brain does not have an overwhelming superiority on its tasks. The left brain is better at word tasks than the right brain, but only by a ratio of 1.5:1.0. The right brain is better at recognizing faces 1.2 times better than the left side. xxi

Thus, the idea that the left brain is cognitively different from the right is well substantiated, but the idea that those differences are dramatic is not, except for speech, which is only on the left side in almost all people. The right side does have language functions and seems to add embellishment to speech, but in isolation the right brain as demonstrated cannot speak. In the intact person, however, the mind of the right brain should be able to use the corpus callosum and control the speech center in the left brain for its own use. So, the right mind in intact individuals is probably very articulate. This may seem strange, but if the right brain wants to move the right hand whose control center is located only in the left hemisphere, it could easily accomplish the movement. For instance, someone who had an injury to his left frontal lobe, but whose motor (movement) cortex was intact, would not be paralyzed and his right brain would control most voluntary movement on both sides.

We shouldn't be too surprised that LB's left brain does not seem overly logical and analytical because this attribute of the left brain refers to

rather subtle comparisons with the right brain. Still there is some merit to the idea that each hemisphere has a degree of advantage at some cognitive tasks. For instance, it is very interesting to note that when LB returned after his operation to his high school where he was a very good student, he had to drop geometry because he couldn't grasp the spatial concepts with his isolated left brain.

Thus, we are talking about two different things. In one instance we are talking about LB's personality on his left side and in the second we are talking about certain cognitive skill that his left brain has, has to a limited degree, or doesn't have. The mind in LB's right brain also has a personality. It tells us with his left-hand responses to my questions that he feels admirable, honest, and confident on that side. That side tells us with his left-hand responses that he "extremely" likes reading, puzzles, math, shopping, movies, and sex, but does not like work or paying taxes. Now if we gave both sides of him cognitive tests they would score differently, but more importantly they both have their own mind or personality. In an analogous way, we can find cognitive differences between males and females with women scoring higher on most language tasks. Still, what is most important to recognize is that males have minds and females have minds. That they may tend to have some cognitive differences is generally of more minor importance.

More Evidence of Two Minds in Ordinary People

Another piece of evidence that the split-brain findings relate to normal people comes from a variation of a procedure long used by neurosurgeons prior to brain surgery. In order to locate definitively the patient's centers for expressive language and memory (so they are not removed unintentionally), the surgeon uses a procedure referred to as the Wada test, after the physician who developed it. xxii It consists of injecting sodium amytal, a short acting anesthetic agent, into either the left or right carotid artery, these arteries support the parts of the cerebral hemispheres most related to higher mental functions. The brain on the side of the injection becomes anesthetized, while the other half remains awake. Actually, for the first three minutes or so after the injection, both sides of the brain become dysfunctional. The side opposite the injection rapidly recovers, while the side of the injection remains anesthetized for another 10 minutes or so. When the right side is injected, the patient, after the initial brief dysfunction,

regains his usual consciousness and can converse fairly normally. The left side of his body remains paralyzed for the 15 minutes or so during which the anesthesia lasts.

When the left side is injected, after the brief period of dysfunction on both sides, the patient's right brain is awake, even if somewhat groggy, while his left-sided, verbal mind remains anesthetized. Usually, the right brain cannot speak.

When the test is conducted in its usual way, it is an interesting phenomenon, but it doesn't tell us much about the nature of the right brain. However, an interesting study by Drs. Risse and Gazzaniga begins to reveal more about this hidden side. They used the Wada procedure to anesthetize the left brain, and, while the left brain was unconscious, they placed objects in the subject's left hand (right brain). When the subjects (left brains) woke up, none of them consciously had any idea about whether anything had been placed in their hands. Yet, when they were shown an array of pictures of several different objects, they easily pointed to the correct one. This study implies that the right brain functioned independently of the left brain, that it was able to appreciate, remember, and retrieve the object--all without any participation of the left brain. In this study the patients were not split-brain patients, but had whole, surgically intact brains. xxiii

There is another Wada study which lends support to the idea that in ordinary life, both hemispheres can possess a mind of their own. Dr. Geoffrey Ahern and his associates reported fascinating results in separate Wada tests performed as part of an assessment for epilepsy in two young men. The patients were unusual in that each had demonstrated two distinct personalities, and in each case, Ahern demonstrated definitively that one personality was coming from the left hemisphere and the other from the right. xxiv

For example, in one patient his usual personality was emotionally withdraw and sullen, but for an hour or so after a seizure he would have a marked personality change--for the better! After the seizures he became very affable and sociable. His family had reported that the changes in personality were profound -- that he was like a different person.

When the doctors injected the patient's left carotid artery with sodium amytal and anesthetized his left brain, he smiled and laughed and appeared to the doctors to be much more emotionally spontaneous than he

was in his usual state. During the test he was asked if this was what he felt like when he was in his positive personality, and he responded affirmatively.

During a Wada test, the anesthesia gradually wears off after 5 to 15 minutes. As the left brain was coming out of its sleep to wakefulness, the patient said, "I think we just got done with the niceness." He then indicated that the drug was wearing off quickly and made a chopping motion with his left hand (controlled by his right brain). He then *abruptly* had a personality change back to his unemotional, unsociable self. His left brain had apparently woken up and taken control.

The doctors then engaged in the following conversation with the patient:

> Doctor: "Did you, I mean the emotional part, like coming out here by yourself today?"
> Patient: (The patient turns his head and eyes to the right, indicating that his left brain is talking.) "No, not really!"
> Doctor: "So, you wouldn't want to come out again, by yourself, without the 'talky' [left] hemisphere?"
> Patient: "What's that?"
> Doctor: "The emotional part of you, I'm talking to that part of you right now. Would you want to come out by yourself again, or do you like being back in there suppressed and quiet?"
> Patient: (With very flat affect suggesting that his left side is speaking) "I'm just naturally a suppressed and quiet person."
> Doctor: "You're not going to let him talk, are you?"
> Patient: "Who's that?"
> Doctor: "Your other side."
> Patient: "It all depends on what the other side says." (The patient then smiled, but only on the left side of his face, controlled by his right brain.)

The second case described by Ahern was also a young man suffering from seizures who had also been observed to have dramatic personality changes. This patient's usual personality was well-adjusted, but after a seizure his personality became extremely aggressive and disruptive. His seizure activity came from his left hemisphere, and after his seizures his left brain would be severely inhibited by exhaustion, and his right brain

would become dominant. This suggested that his disturbed personality might be associated with his right brain.

During the Wada test, when his right brain was put to sleep with sodium amytal, he remained his usual pleasant, well-adjusted self, but when his left brain was made inactive, he again became his belligerent personality. In fact, he was becoming so verbally and physically abusive that the doctors had to inject him with an antipsychotic medication.

The results of these experiments reveal that these two intact people who had never undergone a split-brain operation, obviously were of two separate minds, one left and one right. In the first patient, the disturbed personality was associated with the left hemisphere. In that patient an MRI showed some non-specific scarring, suggesting that his left brain may have been damaged. The doctors speculated that his psychiatric problems might have been related to that possible damage, since his disturbed personality was located on the left side. In the second patient, the disturbed personality was associated with the right hemisphere.

Ahern's study is remarkable because it is a clear demonstration of two distinct personalities, one in each hemisphere, present in two patients not given split-brain surgery.

Much More Evidence for Two Minds in Ordinary People

Thus far we have overwhelming evidence of existence of two autonomous minds in split-brain patients, and we have learned some things about how the two relate. And we are beginning to accumulate evidence that ordinary people can have two autonomous minds, each associated with one hemisphere. In the next chapter we will discuss new evidence that such minds may exist in all of us.

CHAPTER THREE

LOOKING RIGHT (AND LOOKING LEFT)

Toward the end of a therapy session, I asked Tom, a patient with self-esteem and marital problems, to try something new. I handed him two pairs of strange looking safety goggles, each unartfully covered with a lot of white plastic tape.

"What do you want me to do with these?"

"Just try them on."

"Which one?"

"Which ever."

"You mean I get my choice?"

"Absolutely. Pick the prettier ones."

With some hesitancy Tom complied. I asked his consent to tape our session so that I could listen closely to his responses to my unusual therapy aid. This and all dialogues with the goggles to follow are transcripts from tape recordings. In a few places I have changed the name of a city or other information which might possibly reveal the patient's identity, but otherwise the transcripts are verbatim.

"So, you're looking out the left side. Tell me what you are feeling about yourself."

"I'm looking out the left side. And I'm . . . I'd say I like myself quite a bit, and I'd describe myself as bright and energetic. And I'm ready to succeed."

"Try the other pair." (He switches to the other pair, allowing him to see to his right side. There is a 10 second pause before he speaks.)

"This is the pair with the right side exposed. I'm feeling much more timid looking out this side. I'm feeling anxious, maybe a little scared, and if I had to describe myself, I would describe myself differently. I would say the way I'm feeling right now, I'm feeling timid and a little inhibited."

"On that scale [which we had discussed previously] how do you like yourself?"

"On your scale: none, mild, moderate, quite a bit . . . moderate."

"And how confident do you feel, now with these glasses on?"

"Less safe than I'd like to feel."

"And how does the future portend?"

"It will have its share of scares, and we'll have to see. Not optimistic, not pessimistic."

"What's your business forecast?" [Tom is an entrepreneur who owns and operates a start-up company]

"We'll hang in there."

"How are you going to do? What are you going to look like in December?"

"Like we look now. Hanging in there O.K."

"Would you try the other glasses [allowing vision to his left side]? (Pause) How do you feel?"

"Better. I like these glasses better."

"How's your business going to look like in December?"

"Hum, well, I know what I just said, but I'm feeling better. I'm thinking there could be a lot of opportunities and there could be some large success. So, I think we're going to look better than I just said we were going to look. I think we're going to look much better."

"How much better?"

"I think we're going to be a totally different company in December from what we look like now."

"Does that seem like a big difference from where you just saw . . ."

"Yeah, it does; it seems like a huge difference. It questions my a . . ."

"Try these other glasses." (He switches to the other pair, allowing him to see to his right.)

"These are my forecasting glasses."

"How's the business going to look in December?"

"I'm . . . I don't like to admit that glasses could make any difference, but I don't think . . . I don't feel as confident about what I just said wearing these glasses. (We both laugh.) Interesting."

"What do you think of that? What do you make of that? Do you remember what you just said with the other glasses?"

"Oh, sure, everything. Optimistic mood with the other glasses; they create an optimistic mood for me. For these, they create a more somber, conservative . . . don't feel . . . don't take the risks, don't think things may succeed because they may not."

Mary Beth is a 37-year-old divorced woman. For many years she had suffered a form of agoraphobia in which she would feel great anxiety when she went to unfamiliar places. In this session, she discussed a strong conflict between her fear of leaving the Boston area and a compelling need, for personal reasons, to travel to San Francisco. During this session I asked her to wear the special goggles for the first time. As the excerpt begins, she is wearing the goggles with the left visual field occluded, and these have increased her symptoms.

"Now, how would you feel if you were now in San Francisco?"

"Like this? Not too happy."

"What would you feel?"

"Not great."

"Imagine that you were in San Francisco. How would you feel?"

"I would feel lost. I would feel unable to take care of myself, you know, to do what I needed to do."

"I want you to try the other glasses [allowing her to see to the left side of her]." (15 second pause.)

"These are much better. (Laughs.)

"So now you're looking out the left side."

"Yeah."

"And what are you feeling."

"Relieved. It's better than the right side."

"How is it different?"

"It's manageable. I can manage this." (Laughs.)

"And suppose you were in San Francisco. How would you feel?"

"I would feel like I could cope, but I would feel sad that I couldn't be free that I couldn't be using my whole range of vision."

"It sounds like you'd feel a little differently being in San Francisco. How would you feel differently?"

"Different than I feel now here or different than I would feel were I wearing the other pair?"

"Different from how you felt, imagining yourself in San Francisco with the other pair."

"I feel much less incapacitated, much less handicapped."

"Could you handle it?"

"Yeah."

"With some duress?"

"Yes."

"Manageable duress or are you not sure?"

"If I'm doing it relative to how I felt with the other pair on, yes."

"As you feel right now."

"Yeah. Yes, because if I don't start thinking about the bigger picture which is even without glasses I don't know if I can handle it. . . . This feels certainly better than the other pair."

"O.K. and does it feel better than no glasses?"

"That's interesting. Yeah, it might feel a little safer."

"But the way it feels right now, do you feel you have a reasonable chance?"

"A shot at it."

"You got a shot at it?"

"Yeah."

"And how good a shot?"

"Pretty good shot."

Sitting with patients who have rather dramatic changes in their outlook on their life and the world, within seconds of putting on taped safety glasses, is a remarkable experience which may not be fully conveyed by the transcripts. Seeing the patient's entire demeanor change, seeing him laugh in bafflement at what is happening, and then witnessing dramatic clinical improvements that occur over a relatively short period of time, is a compelling experience which I want to share with you. Prozac, in the 30% of patients in whom it works well, can achieve a comparable transformation, but only gradually. What I was observing in the same percentage of my patients was a vivid, definitive alteration in their mental state.

For a long time, I had difficulty believing that my patients' reports were authentic. Perhaps I was covertly instructing them in some way beyond my conscious intent, or perhaps that I was observing a placebo or

hypnotic effect. Assuming what I was observing was reliable, I knew that it would be profoundly important, and so I spent the next two years carefully studying this phenomenon. I want to tell you how I came upon this unexpected discovery, how I have rigorously studied it, and its significance both for understanding our human mind and for furthering our ability to better deal with a wide variety of emotional or psychological problems.

How It Began

For many years I had been studying the role our left and right brains might play in determining our personalities and in aggravating our psychological problems. I had already published laboratory work on the possible role of the hemispheres in patients who had suffered psychological problems related to childhood traumas. And I had already developed many of my ideas about how the left and right brains affect our psychological status. xxv

One morning in 1995, I was rereading and thinking about a group of scientific papers by Werner Wittling and his associates, the German scientists I mentioned in Chapter Two, who reported that they could show movies to either the left or right brain by showing it to either side of the person. I was most taken with their idea that an experimenter could show a movie predominately to one side of the brain of an ordinary person. I, like most neuroscientists, had had the impression that in healthy people with an intact corpus callosum, if you showed something to one hemisphere, it would simply be transferred to the other side via that large connection between the hemispheres. In fact, the whole point of the split-brain studies seemed to be that by cutting the corpus callosum, the experimenters could only then restrict visual information to one hemisphere. But now Wittling's group had reported convincing evidence that they could indeed show a movie primarily to one hemisphere in intact people. If his reports were well founded, his techniques could open an entirely new window into the mind. We might be able to conduct experiments resembling the split-brain or the Wada studies by simply limiting vision to one side, but without any of their discomfort, side-effects, or complexity. This was just a thought and honestly, I didn't have much confidence in it initially. But it was an idea that had captured my imagination.

Wittling found that when he showed the movie to a person’s left side (the left visual field), she tended to secrete significantly more cortisol, a

stress hormone, than when the movie was shown to her right visual field. Since the left visual field is connected to the right hemisphere and the right visual field to the left hemisphere, Wittling's data indicated that when the right brain saw the movie (which was of patients getting electroconvulsive therapy) the person had a stronger physiologic response than when his left brain saw it. In another study Whittling and his associates showed a three-minute romantic movie scene and found significant increases in blood pressure when the movies were shown to the right but not the left brains. In a later study they found that both positive and negative films evoked stronger emotional responses when shown to the right hemisphere. Their findings contained some interesting surprises about which side was more aroused. We will return to these later in the book, but my point here is simply that they were able to show a movie to one side or the other of a person and subsequently get different physiological and emotional responses depending on the side to which the movie was shown. These fascinating studies demonstrated conclusively that images could be seen and processed independently by the hemispheres of intact, ordinary subjects. xxvi

In the 1970's, the late British psychiatrist, Stuart Dimond, led a group of researchers that used less elegant techniques, but also found that they could show a movie to either the left or right brain in ordinary people. They placed a specially designed contact lens over one eye that allowed the image to fall on only the left or right half of the retina, depending upon where the lens was placed on the eye. The other eye was simply closed. In general, they found that positive movies were responded to more by the left hemisphere and that negative movies, by the right. (We will return later to the discrepancies between the emotional responses found by Wittling and by Dimond.) Their work has generally not been widely appreciated or cited in the scientific literature. Certainly, in light of Wittling's findings, it now deserves more attention. xxvii

How was this possible with an intact corpus callosum? Wittling thought that part of the explanation is that the transfer of information through the corpus callosum is slow compared to the transfer of information within a hemisphere. He suggested that the images would remain predominately on one side. Marcel Kinsbourne may hold a key to the puzzle. Kinsbourne, a prominent brain scientist at Tufts University, discovered that when one hemisphere is stimulated in an intact person, there may be some tendency to

suppress the other side. This suppression could explain how the movie could be viewed predominately by one side. xxviii

Marcel Kinsbourne and his associates next remarkable study showed that when asked to perform a verbal memory task (considered a left-brain task), their subjects turned in superior performances when gazing to the right side. Although all of their subjects completed the task looking in either direction, most of them did it faster when looking to the right visual field. Kinsbourne concluded that looking to the right stimulated the left brain, while that looking to the left stimulated the right brain. Thus, Kinsbourne asserted that a person could tend to activate his left or right brain merely by looking to one side or the other. Even today his astonishing observation is not widely known or appreciated among scientists. The importance of Kinsbourne's point was not that the left side was linguistic and the right spatial, but that one could manipulate which side of the brain would become relatively more active. When Kinsbourne first made this interpretation in 1973, it was a bold and remarkable assertion. Over the years his hypothesis has been borne out repeatedly. xxix

For instance, at the University of Colorado, Roger Drake and his associates in a series of experiments found that they could convince subjects of an argument if they stood to his left side (activating his right brain) than if they stood to the right side. Six separate research groups independently found that subjects could do a spatial task more quickly if they gazed to the left (right brain) and a verbal task faster if they gazed to the right side. These findings, like Kinsbourne's, showed that one could affect which cerebral hemisphere was dominant by simply looking to one side or the other. I should point out that the differences in performance while consistent and statistically significant were not very large. This implies that looking can influence, if not dramatically affect cerebral dominance. A subject could still perform a verbal task while looking to the left side, but his performance would be consistently, but slightly slower than when he looked to the right side. Italian psychophysiologist Patrizio Tressoldi found that subjects didn't have to look far to the left or the right side to attain a lateralized difference in performance. Tressoldi concluded that the image didn't have to go exclusively to one hemisphere to shift the lateral dominance. Apparently, what was important was that most of the stimuli went to one hemisphere. xxx

In 1992, University of New Mexico researcher Edward Fouty and his associates used a contact lens that was occluded on one side, to test subjects' ability to recognize faces and the orientation of lines in space. Both tasks are known to be better performed by the right hemisphere in split-brain patients and in intact subjects to whom images are flashed to one side or the other. In order to learn if lateralizing contact lenses could affect the balance between the left and right brains, Fouty tested subjects to see if right hemisphere tasks would be performed better when they wore the lenses to the left side of both eyes. They were not disappointed: The subjects performed significantly better when the lens sent the images to the side of the retina connected to the right brain. xxxi

And more recently, psychiatrist Steve Levick led a distinguished group of scientists from the University of Pennsylvania who performed a series of experiments on twenty-three right-handed men who wore a pair of contact lenses which were painted over except for a small area on one side of the lenses. One pair allowed vision only to the left side, the other, only to the right. Levick's group confirmed Tressoldi and Fouty's results. When wearing the lenses so they could see to the right (stimulating the left brain), the subjects did better on a word analogy test. When the subjects attempted a line orientation task (a task known to be performed better by the right brain), they did better when they could see to the left side.

Thus, it did seem that all of these research teams were doing a kind of gentle split-brain study, without the surgery. It seemed that looking out the right-sided lenses might help to access the left brain more than the right, and vice versa. I was intrigued by the possibility that the different-sided lenses might "provoke" different emotional experiences. Levick's group did report that the subjects were asked about emotional changes between looking to one side or the other. The only positive finding was that subjects seemed to feel more fatigue when looking to the left side. But these experimenters didn't distinguish among individuals: They simply reported the average scores on the left and right sides. If some subjects had more anxiety looking to the left and others had more looking to the right, these differences in the group as a whole would cancel each other out, and differences in individuals could have gotten lost in the overall data. Interestingly, they gave one pair of contact lenses to six very disturbed patients who were hospitalized, and one felt so much better with the contact lenses that he didn't want to give them back. xxxii

Still, the unexpected element in all these studies was the finding that one could tend to activate one hemisphere or the other merely by looking to one side. Psychologist Bernard Schiff in Canada reported that by having subjects squeeze a ball in one hand or the other, they were able to increase the relative activity of the opposite hemisphere. xxxiii

These studies on lateral vision and on hand exercise affecting hemispheric dominance give support to the work of Wittling and Dimond, by suggesting that by merely restricting vision to one side, one might be able to communicate preferentially with one hemisphere or the other in ordinary people.

If this were so, unless my two brains were very similar, it would mean that I should have a different experience looking out one side versus the other. This idea seemed absurd because I has spent much of my life looking from one side to the other (especially crossing streets), and I never noticed any difference. Still, I was eager to give it a try even if my expectations were low. And the fact that so many groups reported consistent (though usually small) differences made me persevere.

Wittling's work inspired me to create my own, modest experiment. I tried covering my eyes with my hands so that one eye was covered completely and the other was covered so that I could only see out of the side of it. I tried to judge if I felt any differently when looking to one side versus the other. Although I didn't notice much of a difference, I had a sense the I might have been a bit mentally clearer looking to my right than to my left. But as a scientist I was not impressed with my observations. I was aware also that in the German studies the subjects were shown upsetting films, and I was only looking around my living room which though a bit untidy was not emotionally distressing.

A few hours later I asked my first patient of the day to try using his hands to restrict his vision. His response was clear and dramatic. He almost immediately began to feel a very intense anxiety. His whole demeanor changed to an expression moderate distress. I then asked him to switch his hands and quickly he smiled and told me that he felt comforted. I immediately felt I understood what I had observed. I believed I had communicated separately with his left and right brains, and I found that they each viewed the world quite differently.

Six of the twelve patients I saw that day and the next felt their symptoms intensify on one side and lessen on the other. We could go back

and forth, and the differences persisted. We could try to get the view of the world held by one side to consider the view of the other side. By the end of the week, I had constructed two pairs of safety goggles taped to allow vision out of the left or the right side. The goggles seemed to get a response generally equal to or greater than the hand blocking, and the patients seemed to prefer them. I was finding that about half of my patients were having a response to the goggles, and about half of those had a fairly dramatic response.

I began using the glasses frequently in therapy sessions because they appeared to be very helpful in treating a significant number of patients. In a patient who had been persistently depressed, I might be able for the first time to get him to see with the glasses, with his own eyes, that he was safer and more valued than he had been able to appreciate before. Having two contrary views seemed to be literally mind boggling. It demonstrated dramatically that the patient's negative view of himself in the world was only a perception, not an unalterable fact, for how else could the negative view be changed so easily? Enabling the patient to see this with his own eyes was much more effective than my simply telling him that he was safe and valuable. Often, I give a patient a pair of goggles, looking out the comforting side, to take home. They can be very helpful to patients struggling to ward off anxiety or depression.

Evan

I used the glasses in my work with Evan whom I had been treating for severe anxiety. He was chronically experiencing overwhelming stress, especially at work. He dealt with his anxiety by being hyperalert and supremely efficient. He was terrified that he would be caught in error, and that terror motivated him to be nearly perfect in his complex work as a financial officer of a large company. He loved his wife and children, but he was too stressed to be with them; there were always impending emergencies in his mind that took precedence over them and that distanced him emotionally from the people he loved. The sad irony, of course, is he secretly longed for the love and closeness that they longed to give him.

When Evan was a child, his father was a violent alcoholic, a huge man of remarkable physical strength misguided by an enormous unfathomable rage.

Evan explained, "The routine was reenacted almost nightly. I waited for my father's homecoming from the bar. As soon as I heard the car, I pretended to be asleep, my heart pounding. Had I adequately cleaned up the living room? Were my papers or books left around? Were the sofa cushions puffed up? Were my boots put away? My jacket? Did Mom have Dad's supper ready? Was it good enough or would he toss it against the wall, or worse, against her? When would their argument start? How soon? Should I try to intervene, risking his terrifying roar, risk being thrown into a wall, into whatever table or mirror or lamp was in the line of fire? Or would he come looking for me because he had tripped over a baseball glove or spotted an untidy corner? Would I live through the next assault?"

Evan and I have been working together for a few weeks. The taped glasses had become an integral part of therapy. This time I asked his permission to tape record our conversation.

"So, you're looking out the right side [left brain]," I asked.

(pause of 30 seconds) "Uh huh."

"How does that feel?"

"I feel the same, kind of nervous."

"And how would you rate your anxiety: none, mild, moderate, quite-a-bit, or extreme?"

"I'd say moderate. The point that I have a stomachache almost. Nervous."

"Do you feel sad?"

"Yeah, I feel kind of grayish."

"How would you rate that?"

"I'd say moderate."

"Ah huh, try the other glasses." (30 second pause) "Now you're looking out of the left side [right brain]."

(30 second pause) "Yeah."

"How do you feel?"

"I feel very relaxed. I feel like I'm calming down. That's how I feel, calming down. Things don't look really bright, but they don't look as gray as they were."

"How anxious do you feel: none, mild, moderate, quite-a-bit, or extreme?"

"I'd say mild right now. Maybe in a few minutes it will almost . . . it feels like it's just calming down kind of effect."

"And how sad do you feel?"

"I don't really feel sad. I don't feel happy; I don't feel sad."

"Would you say: none, mild, moderate, quite-a-bit, or extreme?"

"I don't feel sad. I'd say none. I'd say I feel non-emotional at this point."

"And what's your anxiety level now: none, mild, moderate, quite-a-bit, or extreme?"

"I'd say right now it's none. I don't feel anxious at all."

"Now I want you to try the other glasses again [to the left brain]. (45 second pause) And how are you feeling."

"A little nervous, but not as nervous as I was before."

"How would you rate it?"

"I would say mild, mild right now."

"And sadness: none, mild, moderate, quite-a-bit, or extreme?"

"I'd say mild, mild sadness."

"Now which side feels more like you were feeling earlier today?"

"This side."

"Is there a difference between this side and the other side?"

"Yeah, a big difference. This is . . . well, I feel like opposite ends of emotions. I'm sad on this side and I feel content on the other side. And I feel very anxious over here, and I feel almost relaxed over there. So, I feel a big difference."

"Now we were talking earlier about whether this anxiety relates to the past or not. Do you have any sense of that."?

"Yeah, it must."

"Tell me."

"Well, because I'm feeling exactly the way I've felt all day long. I don't know specifically why, I've been feeling this way the past 24 hours, but, yeah, I definitely see that it has something to do with my early life."

"How much anxiety are you feeling now."

"Not as much as I did earlier, but I am still a little anxious."

"Mild, moderate?"

"I'd say mild."

"Try the other glasses [right brain]." (40 second pause) "How are you feeling?"

"I feel like I'm just starting to feel calm. That's how I would explain it. More relaxed. I see things more maturely, I think, out of this side than

the other side."

"From this perspective, do you have any insight into your distress today?"

"Not something underlying, but I can see that things about which I was getting upset weren't that important. You know what I'm saying? I kind of blew things out of proportion."

"What do you think made you blow things out of proportion?"

"It was my other side of me. I was seeing things the way I felt as a child. Not maturely. I wasn't, you know, saying this happened, and it was this guy's fault, and it's not my fault."

"You say you saw it as a child? How did you see it?

"As a personal attack on me. I saw it as if I was a hundred percent the cause of everything, and that it was really all my fault that things were happening at home the way they were. How I should have been looking at it is that now this is not my fault, this is their problem. Instead, I brought it on myself. I thought the reason why my mother was upset was because of me, I wasn't doing what I was supposed to do."

"And how do you feel now?"

"On this side, I can see things a little bit more maturely. These things weren't my fault, they were my parents' fault. And that they were just reacting towards me. I take things very personally. It really had nothing to do with me."

"Are you saying that on the other side [left brain] you take things very personally?"

"Yeah, I take things . . . when things happen, I take them as if it's my fault."

"Are you doing this now?"

"No, on this side [right brain] I put things where they belong."

Evan made a rather rapid recovery, and by six months his symptoms where markedly diminished. As part of our therapy, I invited him to write a brief letter describing his experiences with the glasses:

> I periodically suffer from extreme anxiety attacks, which stem from an alcoholic father's treatment of me from as far back as I can remember until the age of 15. My father's behavior towards me was physically and mentally abusive but more traumatic was the abuse I witnessed endured by my mother and other siblings. I was

constantly told that I was the cause of all the problems...whether they existed or not. These episodes occurred three to five nights per week.

This abuse caused me to believe that this routine would always be this way, and that I was a bad person, who could never do anything right. The reason I am explaining my situation in this manner is because a part of me today still feels this way. With Dr. Schiffer's help I realized that this is the root of the problems which cause my anxiety attacks.

Dr. Schiffer has explained to me that there are two sides of our brains that see things differently and that there is a tool that I can use in order to calm my anxiety attack, so I can naturally work myself to a point of becoming calm. The tool we originally used were two pairs of goggles, and currently I use my hands. Basically, what happens is that I cover my right eye with the goggle or hand and look out [the side] of my left eye which enables me to become calm, and my mind sees everything in a realistic light. I feel secure, relaxed, and comfortable. When I cover my left eye and look out [the side] of my right eye I have an extreme feeling of impending doom. I become very scared, and my entire insides feel extremely nervous and nauseous.

<u>An example of this episode:</u>

One of the managers in the office told me point blank that I was being extremely negative while conversing with him on issues that involved his department. Within seconds I became extremely anxious, and all I could think was that maybe this manager is right. I began to feel suffocated and felt as if the walls were going to cave in. All I could think of was to get out of the office quickly to make sure that no one sees me in this paralyzed state. I then thought of my sessions with Dr. Schiffer and the tool he gave me. So, I sat at my desk and put my hand over my right eye, and I looked out [the side] of my left eye and concentrated on the picture in my office and within seconds I became calm enough to maturely rationalize what had happened. I went directly to my supervisor, and I explained the issues completely, and asked him if he thought I was being negative,

and his reply was no. He explained that it was my job to convey to that manager all the suggestions that I made in the manner in which I made them. My supervisor agreed that it is that manager's job to act upon the information I had given him whether it was negative or not.

This tool has given me the ability to overcome my extreme anxiety in order to maturely rationalize the situation that I am in, so that I can function as a normal individual.

Evan continued to progress and by nine months from the time we started our work, he became essentially free from anxiety. For the past two years, he has continuously maintained his progress.

Further Explorations

Although I was quite pleased by the progress I saw many of my patients making, after a couple of weeks, I saw the need to test my finding in a series of controlled studies. If my findings had to do with the glasses enhancing one side of the brain or the other, I needed to have compelling evidence to substantiate that and to demonstrate that I wasn't simply placing complex ideas in my patients' heads through suggestion. I began a formal study on 70 consecutive psychotherapy patients. A short time later, I began a laboratory study at McLean using EEG's and bilateral ear temperature measurements in 15 college students who had been recruited for participation in another study in which I was a co-investigator. I also studied Evan and two other responsive patients in the EEG laboratory.

What 70 Psychotherapy Patients Had to Tell Me

In the study of the seventy 70 patients, I randomly offered each a pair of the taped safety glasses and after 45 seconds I would request an anxiety rating on a simple 1-5 scale: asking him to rate his level of anxiety on the following scale: none (0), mild (1), moderate (2), quite-a-bit (3), or extreme (4). Immediately following the rating, I offered the second pair which allowed vision out of the other visual field. I included in the study only the patients' first encounter with the glasses. Thirty-nine males and 31 females participated. Fifty-nine were right-handed; 11 were left-handed. Their average age was 43 years.

For the last 40 subjects, I added two sets of control glasses. These were similar safety glasses which were taped entirely over one side (as

were the others), but on the other side only the bottom 1/3 of the lens was taped. This meant that the subject could see out of one eye entirely. Vision out of one eye, called monocular vision, sends images to both hemispheres. It does in fact send the images more to the opposite hemisphere, but not nearly as strongly as the experimental glasses. The reason for this is that the retina at the back of each eye is divided into two sheets, one to the left of the eye and one to the right. The sheet of retina is larger on the side of the eye near the nose than that on the lateral side of the eye. What we would expect to find is that the control glasses should stimulate each the hemispheres differently. That is, that like the experimental glasses the control glasses would stimulate the opposite hemisphere more strongly, but those differences should be less pronounced than those of the lateralized safety glasses. If I found that the experimental glasses got much stronger responses than the control sets, then that would show that the responses were not due merely to a placebo effect or to suggestion. I found that indeed there were much larger responses to the experimental glasses than the control glasses, and those differences where highly significant by statistical tests. Later when I describe our EEG studies, I will show that the experimental glasses induced the expected shifts in hemispheric activity, while the control glasses did not.

Of the 70 patients, 60% reported a one - point or greater difference on the five- point scale between the two pairs of goggles and 23% reported a two- point or greater difference. A person with a one- point difference might feel mild anxiety on one side and moderate anxiety on the other. These patients who reported a one-point difference said they could feel a distinct difference between sides. Twenty-six patients had a 1-point difference, seven had a 2-point difference, five had a 3-point difference, and four patients had a 4-point difference. A four-point difference represents an extraordinary change from being anxiety-free to feeling extremely anxious. Overall, the more baseline anxiety a patient had, the more he would tend to respond to the glasses. There did not seem to be any relation between a patient's response and his gender, handedness, age, or whether he was on medication. xxxiv

Troubled Left Hemispheres

I was surprised to find that many patients, like Evan, had more anxiety when looking to the right visual field (left brain). I had expected all

of the negative reactions to occur in the right brain, but this was clearly not the case. My expectations were founded on the persuasive psychological literature indicating that the right hemisphere is better at detecting and expressing emotion, especially negative emotion. But I had in my hands data that contradicted those assumptions. What did this mean? Were my data flawed? Unacceptable? Or was it possible that we have been making unwarranted assumptions about the right hemisphere? xxxv

Earlier I mentioned that Dimond and Whittling found that healthy subjects had larger responses to negative films in their right hemispheres. However, in two repeated studies Wittling found no emotional differences between the hemispheres even though these studies reported higher cortisol [stress hormone] levels when the negative movie was shown to subjects' *right* brains. In a subsequent article, Wittling's group shared the results of a study of people with a high level of psychosomatic complaints. In this population they found that the cortisol secretion was higher when the movie was shown to the subjects' *left* brains. xxxvi

Richard Davidson, an experimental psychologist at University of Wisconsin, is one of the strongest proponents of the theory that the right brain handles negative emotion. I have followed his work for years and appreciate his contributions. Davidson has shown a correlation between fear responses to films and the activity of the frontal aspect of the right brain. To measure the brain's activity, Davidson recorded EEG's (brain waves) over 20 different regions of the scalp. His studies indicated that when he recorded baseline EEGs of nursing students while they were resting, he found he could predict the students' responses to films designed to provoke negative emotion. Those students whose right hemispheres were more active in the frontal aspect during the baseline EEG recordings tended to verbally report more negative emotional responses when the movies were shown. Further, the EEG measurements over the right frontal areas made during the films correlated with the subjects' verbal reports of negative emotion. These and other studies suggest that the right hemisphere is involved in the processing of negative emotion. xxxvii

Another method for measuring brain activity is the PET scan. This technique involves injecting a radioactive tracer into the vein of the subject just as he performs a task. The tracer travels to areas in the brain that are active at the time of the injection and is then detected by scanner. The result is a read out and a picture of the relative activity of the entire brain during

the activity. Recently, a group which included Dr. Davidson, reported a study of 12 right-handed women with a mean age of 23 years who were given PET scans while they watched three films. One film evoked happiness, one sadness, and one disgust. The result of the study was that there were no significant differences between the left and right brains in any areas during the three different emotional conditions. This discrepancy with the earlier studies remains unexplained. Further, other PET studies of a similar design have failed to demonstrate a relationship between the right brain and negative emotion**. xxxviii**

Still the preponderance of the scientific literature does point towards the right hemisphere as being more involved with emotion, especially negative emotion, but the differences between the left and right side that are found in most studies are generally fairly small. One way to understand what might be going on is to look more closely at my study of 70 patients. If I excluded patients who were left-handed as well as patients suffering a diagnosis of posttraumatic stress disorder (PTSD), then we would find that there is more anxiety in the right brain, and the difference between the left and right sided anxieties would then be statistically significant. If we only had this limited data, we would have concluded that anxiety was associated with the right brain. Notice though, even among this limited sample of 52 right-handed patients who were not suffering PTSD, eleven still had more anxiety in their left brain (17 had more in their right hemispheres, and 24 had no difference). My point is that even when the data show a statistically significant difference favoring anxiety in the right hemisphere, there are still a substantial number (21%) who have more symptoms unexpectedly in the left hemisphere.

By analogy, it is true that men are taller than women, but a man who measures 5'5" tall, knows there are millions of women who are taller than him. Obviously when we say men are taller than women, we mean on average. In talking about the left and right brain, I am concerned that many statements about the properties of the hemispheres are based on averages, but are applied to all individuals, and, therefore, do not give a complete picture.

My unexpected finding that many of the subjects had more anxiety in their left hemispheres should be taken seriously. I pointed out that the group at Penn reported only average data, and it would be interesting to know if

some of their subjects did have measurable differences in emotion between sides.

Why Some Patients Had More Troubled Left Hemispheres

How do we explain why some people had more distress in their left brains rather than their right? What factors might predict why someone would be more troubled in his left hemisphere? Among my data gender, handedness, medications, and age seemed to have had no predictive role. Only a patient's diagnosis seemed to predict the side on which a patient experienced more or less anxiety. A high percentage of patients with posttraumatic stress disorder (PTSD) felt more distress in their left brains. Of 18 patients with this diagnosis, 10 had considerably more symptoms looking to the right [left brain]; 4 had more symptoms looking to the left [right brain], and 4 had equivalent responses on both sides. Thus, among the PTSD patients 78% responded to the glasses, and of these, 71% had their symptoms when their left brain was stimulated. In contrast, among 21 patients with a formal diagnosis of major depression, 71% responded, and of those 73% had their symptoms while looking to the left [right brain]. So, one factor which seemed to determine whether the patient was more likely to be anxious when he looked to the right [left brain] was a positive diagnosis of PTSD.

Why should patients with PTSD tend to have more symptoms in their left brains? In fact, this result contradicts a study that I performed at McLean with Drs. Martin Teicher and Andrew Papanicolaou in which we studied patients with a history of abuse who were not symptomatic. We had the patients remember a neutral memory such as something ordinary which they did the week before. And then we measured their relative left and right brain activity with a technique developed by Dr. Papanicolaou called "probe auditory evoked potentials" which use sophisticated analyses of brain waves. After we took the recordings for the neutral memories, I interviewed the subjects for about 15 minutes in which we discussed, as in a therapy session, the emotional experiences they had suffered. We found that during the neutral memories the left brains were more active in 9 of 10. During the unpleasant memory the right hemisphere was more active in 7 of 10, and we interpreted this to suggest that possibly the traumatic memories were stored preferentially in the right hemisphere. Later, a group at the

Mass General Hospital led by Scott Rausch found similar results in PTSD patients using PET scans. And in general, the prevailing view has been that if there is more activity in one hemisphere in PTSD patients, then probably the more troubled side would be the right brain. xxxix

Never-the-less, there are other imaging studies on PTSD which have contrary findings and there is significant new data which point to the left hemisphere being the more troubled side in PTSD. For instance, my colleagues at McLean, led by behavioral neurologist Yutaka Ito, reviewed the medical records of 77 children approximately 13 years old who were admitted to McLean Hospital with a history of abuse. What they found was rather dramatic evidence of nonspecific abnormalities of their left brains by brain wave and other clinical studies. The problems were not the result of physical injuries. And in another study from this group, a sophisticated EEG analysis (coherence analysis) was used on 15 children, eight to twelve years old, with a history of trauma compared to a similar healthy group. The EEG analysis indicated that the abused children, but not the unabused had findings which strongly suggested a delayed or abnormal development of their left hemispheres. xl

Other studies indicate that under stress normal subjects and PTSD patients show an opposite hemispheric laterality to that in unstressed ordinary subjects. For example, PTSD patients under stress do better on language tasks (usually left-brain tasks) when the information is sent to the right brain, and they do better on a facial recognition task (usually a right hemispheric task) with their left brains. xli

In short, we do not yet know enough about PTSD and the brain to reach the truth in regard to whether it is more closely related to the right brain functions, as neuroscientists Scott Rausch and Bessel van der Kolk suggest, or whether it is more related to the left brain, as Martin Teicher and Rachel Yehuda suggest. Based on my data I now side more with Drs. Teicher and Yehuda, but in fact the truth is apt to be much more complicated. Traumatic memories are likely closely related to a lower brain center called the amygdala, which is present in both hemispheres. The amygdala in each hemisphere is inhibited by a high-level cortical center, the orbital frontal lobe, in that same hemisphere. This means that activity of the hemisphere is related to the interactions of these two components. If the amygdala is trying to express itself but is being inhibited by the cortex, we could have a different situation from that of the cortex being inhibited and

allowing the amygdala to have more of an influence. Further there are a number of other areas which come into the action, and ultimately it all gets very complicated. And then there is the fact that we are dealing not only with the brain but also with the mind. This means that what the brain does on a given day will depend in part on how the mind feels and thinks; an upset hemisphere is very different from a relaxed hemisphere. xlii

Speculations about The Left Hemisphere and PTSD

I feel that to ponder about why patients with PTSD tended to respond to the glasses more to the right visual field (left brain) is permissible so long as we keep in mind that we are speculating. Iaccino cites evidence that when the left hemisphere is stressed it tends to terminate the emotional reactions faster than does the right hemisphere. Perhaps, people who are exposed to extreme traumas use their left brains to try to deal with the stress in order to best control the degree of distress, and by so doing, the left hemisphere might get more involved with the experience than the right hemisphere. Joe Bogen suggested to me that the left hemisphere may get more involved in traumatic situations because of the linguistic abilities of the left brain. He reasoned that if one can name something or verbally try to understand it, one has a better chance of coping with it. xliii

My colleague, Martin Teicher offers a possible explanation for his findings of left hemispheric impairments in abused children. He speculates that stress may activate brain neurotransmitter systems that are known to be represented differently in the different hemispheres and that these neurotransmitters might affect brain development differently on each side. He believes it is plausible that verbal abuse may inhibit the development of the left hemisphere because of its tendency to be evoked by language tasks. His argument is similar to, but subtly different from Bogen's suggestion. Finally, Teicher points to evidence suggesting that the left hemisphere is on a faster developmental track between the ages of 3 months and six years, and that its advanced development may lead to more vulnerability of the left side in abusive situations. Others, particularly David Galin and Rhawn Joseph, have suggested that it is the right hemisphere which develops first, and used their assertion to explain why emotions are often more associated with the right hemisphere. xliv

The Important Lesson

We have too little information to do more than speculate about why the left brain may be more involved in the traumatic experiences of abused patients. But what the data from the glasses do strongly indicate is that in many patients there is clear evidence that looking to one side evokes a very different experience from looking out the other side. Patients who have strong reactions to the glasses apparently have two distinct parts of their mind, one which sees the world as threatening and one that sees it as much less so. As with a legal case, some pieces of evidence are more compelling than others. The responses of patients using the glasses in many cases were not subtle, but rather were as graphic and compelling as they were unexpected.

Why Some Patients Do Not Respond to The Lateralizing Glasses

These strong data also raise interesting new questions. Why did 40% of the patients have no response to the lateralized glasses? I suggest that in these patients either of two conditions are likely to exist. First, their two hemispheres may be very similar in their outlooks. The experimental glasses would find little difference in such people. In this case both sides could be calm and healthy, or they could both be equally troubled and disturbed. I have tested three patients with stable chronic mental illnesses, and none have had any response to the glasses. I wonder if both hemispheres in these patients are troubled.

A second, intriguing possibility may be that one side might dominate the other side so much that even when the glasses attempt to stimulate the opposite hemisphere, that stimulation is not adequate to overcome the dominance of the other side. A number of times in the course of therapy I have seen patients who initially did not respond, but eventually, perhaps weeks or months later, did as the subordinate hemisphere became more liberated through the therapy. On the other hand, I have seen patients respond to the glasses, but over the course of their therapy as the troubled side recovered, the glasses no longer elicited a response, probably because both sides then felt well. The majority of patients are consistent in their responses from week to week. I believe that the glasses influence which hemisphere will be more active, but I do not believe they control the brain. The glasses do not have the power of a Wada test and are influenced by the patient's overall situation.

The Glasses in Clinical Practice

The patients who significantly benefited from the goggles did not have miraculous cures by simply putting on a pair of goggles. Rather, we used the goggles to show that they could manifest two very different views of the world, one very anxious and troubled and similar to the patient's view from his or her childhood and the other a more confident, more realistic view. By our work with these divergent views of the world, we could more effectively teach the troubled side that the world might be a be safer place than it had believed. But this teaching usually was still a struggle. In some cases, the patients recovered rather dramatically, but in most there was still required a determined effort as in unaided psychotherapy, but the work with the goggles did make that struggle easier by more clearly defining it and by more concretely demonstrating a more positive view of the world. If I told the patient that he was safe and lovable, he would have trouble believing me, but when he could experience this for himself through his use of the goggles, then this was more compelling and convincing. Sometimes I would ask the patient to keep switching back and forth between the different goggles, and this often helped to integrate the views. Often, I would ask the patient to let his or her troubled side look out the more positive side, and the patients seemed to clearly understand what I was asking even though I wasn't entirely sure myself. Often, I would simply let the patient enjoy the positive view much like the pleasure of sunbathing. Patients might borrow a pair of goggles for work between sessions, and a number of patients constructed their own goggles, while others simply used their hands to block their vision when they were under stress or experiencing unusual anxiety. The lateralized glasses may be covered by patents. xlv

Physiological Studies

The next step seemed to be to try to obtain physiological evidence that the taped glasses were indeed affecting the relationship between the two hemispheres.

The group at Penn did a final part to their experiment in which they measured the subjects' brain waves (EEG's) while they wore the different lateralized contact lenses. From brain wave recordings a scientist can measure fairly reliably which areas of the brain are active. Steve Levick and his colleagues at Penn found, as expected, that with the left looking lenses, the right brain was more active, and the opposite was observed with

the right looking lenses. In my literature review, I found 4 other groups who similarly found brain waves to change in the expected direction with changes in the side of vision. I also found one paper which found the same conclusion using a PET scan. xlvi

I decided to test my goggles with EEG's using a procedure similar to the group from Penn. At McLean, my colleagues and I were just beginning a brain wave study of college students while they recalled unpleasant or traumatic memories. Since I was participating in the study and since I already had my goggles approved by McLean for study, it was easy to simply add my goggles to the first study. When each subject finished the memory study, we let him rest, and then when each was ready, we took a baseline EEG recording and then took EEG's while he wore each of the goggles. In addition to the left and right sided goggles we used the two pairs of comparison or control goggles, described earlier, which allowed vision out of one entire eye. After each goggle was worn while the EEG was recorded, my colleague, research psychologist, Dr. Carl Anderson, asked a series of questions about how they felt using my 5-point scale. We studied 15 college students: 11 females and 4 males.

I also asked three of my patients who had robust responses to the glasses to come to the lab and have their EEGs recorded with the four different glasses. They had very large emotional responses in the laboratory as they had in the office. Each of these three patients had EEG shifts, in the expected directions, indicating that the left visual field glasses increased the right hemispheric activity, and the right sided glasses, that of the left hemisphere.

When we analyzed the EEG data for the college students, we found that the subjects' brain activity had very robustly shifted in the expected direction. That is when the patients used the left-sided goggle, their EEGs consistently indicated a shift to increased right brain activity, and the opposite occurred with the right-sided goggles. The differences were very highly significant by statistical tests. The subjects' brain waves were not affected by the placebo goggles. xlvii

We found also that the college students had significantly greater differences in anxiety with the experimental glasses than with the control glasses. Nine of the 15 had more anxiety out of one side than the other, and of these 5 had more than a one-point difference. The side of more anxiety varied between subjects. What is most interesting is that these subjects

were unknown to me, were not complaining of emotional symptoms, were not in therapy, were in the sterile environment of the laboratory, and yet they still showed significant shifts in anxiety with the lateralized glasses, and not with the control glasses.

An Unexpected Finding

We also reported another unexpected finding. I had been looking for a convenient method for measuring hemispheric dominance and had been experimenting with ear temperatures. Pediatrician and researcher, Thomas Boyce, from the University of California, San Francisco, reported that he found ear temperature differences between the left and right sides in children. He found that children with behavioral problems had larger differences than other children. Boyce found in the troubled children their left-sided ear temperatures were higher than those of the right. xlviii

I wondered if the increased blood flow which would be expected with a shift in brain activity might be reflected in temperature changes determined by a very sensitive ear thermometer. I tried measuring my temperature in each ear under different conditions to see if I could detect any changes with different activities. I found some encouraging preliminary results, and so my colleagues and I decided to measure the temperature in each ear while each subject wore each pair of goggles. Based on a hypothesis offered by Frank Pompei, an expert in scientific temperature measurements, we predicted that as more blood was used by the cerebral cortex on one side, because both hemispheres are supplied equally from the carotid arteries, on the side of more activity, blood would be shunted away from the areas around the ears to the active cortex. In other words, we expected the ear temperature to drop as the hemisphere became more active. We found exactly what we predicted. When subjects wore the glasses looking to the left, stimulating the right hemisphere, there was a relative drop in the right ear canal temperature. The opposite, as predicted, occurred with the right sided glasses, and the changes we observed were significant by statistical tests. The control glasses did not affect the ear temperatures. We also found that there was a very high correlation between the shifts in ear temperature and the shifts in the EEG's. All of the shifts in EEG and ear canal temperature were in the predicted directions.

A Functional Magnetic Resonance Imaging Study

And one last experimental finding. Each of the college students prior to our EEG and temperature studies underwent a functional MRI which is the new cutting-edge method of measuring brain activity. Like a PET scan, it gives images of the brain's activity, but it is faster and without radiation. What we discovered was that those college students, who had more activity in their right temporal lobes when they had the fMRIs under baseline conditions, tended to have stronger EEG responses to the experimental glasses. xlix

Implications

Thus, the experiments with the glasses offer compelling evidence for the idea that the two hemispheres can each have a separate mind and lend very strong support for the psychological ideas I began to develop when I worked with Ryan. In the next chapter we will systematically develop the psychological concepts which follow from the idea that we can possess two minds.

CHAPTER FOUR

DUAL-BRAIN PSYCHOLOGY

Harold, a rumpled, brilliant fifty-five-year-old newspaper reporter, came to see me because he wanted very badly to marry Jane. It's just that he couldn't. They had been together for two years, and she was quite frustrated by his excuses. "I want to move forward, but my legs somehow won't abide," he explained.

Harold is a non-Jewish Jew. It's not that he doesn't bristle at the rare anti-Semitic remark, but he dislikes the idea of Jewishness, an idea that has always annoyed him. He grew up poor in Newark. His father, Harold said, "was a bit of a *schlemiel*", a man who failed in a record number of attempts to earn the living that his wife silently required. Harold's mother was a distant person who, rather than recede into her own unhappiness, stood silently in the center of all of their lives. She was a homemaker in a home that couldn't afford one, a woman who had longed for something more than she had captured in her three-room, fourth-floor walkup, with a man she grew quickly to despise as much as he grew to love her.

Harold remembered joyful errands with his father, helping him make a delivery, accompanying him on a day-long business trip to New York or beyond. His father was a loving man -- a kibitzer, a hugger -- and Harold could feel his palpable love. Although Harold could cry about missing his father, about how much he enjoyed the hugs, even the embarrassing, sloppy kisses in front of the school, still his father's love was tainted. What use was the love of a failure, a man who couldn't achieve more than contempt from the woman he loved?

Although Harold's mother kept her own counsel, through some inarticulate gestures or indirect comments, he learned that she expected he

would find fame one day. Possibly a George Gershwin, someone to make a mother proud, proud to be his mother. "Some mothers have children that make a mother *kvell* inside with joy," she would say. But, early on she realized that her ordinary son, who didn't have Cary Grant looks or Albert Einstein brains, wasn't going to do much more for her than her dimwitted husband. Eventually she decided that Harold was more related to his father than to her. How did she get stuck in such a hopeless and painful circumstance?

Most of all, Harold remembers his mother's back. It was her back that she used to punish him, to reject him, simply by turning from him and giving him the broad back of her when he longed for her face, her smile, her love.

As Harold talked, I appreciated the complexity of his personality. He knows that he is highly regarded professionally by his peers. His articles are widely read and appreciated. But, he confessed, to me, "I just know I'm an imposter; people think I'm smart, cultured, and important, but in fact I'm just great at fooling people. They don't see the simpleton, ne'er-do-well inside." With this image of himself, Harold experienced a profound soul-wracking self-hatred. Lately, the despair had lessened, in part by Jane's love which seemed as simple and straightforward as his was complex and convoluted. Jane had little idea how tangled in its own debris his mind had become. She expected others to be as clear, uncluttered, and uncomplicated as herself, and yet she had an inkling of what she was pining to embark on, but she didn't appreciate the whole of it.

When Harold would hesitate with Jane, I'd ask what he was feeling inside, what that feeling reminded him of. I did the same when he felt self-hatred. And from his associations and our probing, themes began to emerge. Harold's self-hatred and fear of marriage had the same source: his fear of his mother's painful rejections. As a child he felt somehow unlovable, defective, for why else would his mother -- this woman who is the center of his family's universe -- turn her back on him, showing him utter contempt when she must have known how much he hurt, how much like his father, he needed her love. The only explanation for him as a child, the only thing that could make any sense to him at the time was that he was repulsive -- utterly repulsive. It is exactly this feeling that overtakes him when he experienced his self-loathing, and at times has driven him to despair and to the brink of suicide. This was

the pain he wanted Jane to relieve, but it is also the pain he feared she would repeat, especially if he let go and allowed himself to love her desperately.

Within a few months of our work, Harold was able to marry Jane, and he began to love and appreciate himself. I want to show how we accomplished this with what I call Dual-brain Therapy. I don't feel that the path we took was the only one which could have succeeded, and I will examine how I would have treated him with other approaches, so that we can compare methods and theories. I will also show how the Dual-brain Model is consistent with many interesting dissociative phenomena such as hypnosis, split or multiple personalities, and certain psychophysiological reactions. In the chapters which follow, we will apply this model towards the understanding and treatment a number of common psychological impediments and problems.

The Dual-brain Model

Two Minds

The dual-brain model hypothesizes that we have two minds, one associated with each hemisphere. In Harold, there was a part of him which could agree with me that he was a legitimate, worthwhile person and that Jane was a sane, safe, reliable, loving person. At other moments, when he expressed feelings of self-contempt, I asked, "What's all that anger about?" And this would get him to consider his feelings, and as we'd work on it, he became able to see that despite his feelings, he had value and was valued as a person. And when he felt anxiety about Jane, an anxiety that was difficult to articulate, I asked, "Do you feel somehow she'll turn her back on you?" Through our work, Harold grew steadily confident that Jane wasn't a back turner.

Still, the part of him which knew himself to be an embarrassment, who knew that Jane would somehow hurt him, persisted. After we could readily get in touch with these feelings, I told him that I believe we have two minds, one associated with each hemisphere. One mind was the part of him which could see his value and Jane's constancy and love. The other mind knew that he was a nincompoop like his father, a faker who would never be able to sustain Jane's love, because after her discovery of his true defectiveness, she would no longer have the strength or desire to bear him.

The Nature of the Two Minds

The second key to the dual-brain model is that often the two minds are different: In one constellation, one mind is more mature, reasonable, and living in the present reality. The second mind, immature in its cognitive and emotional aspects, is stuck back in an old trauma. It sees the world as it was at the time of the trauma, and like a child, it is dogmatic and overly emotional. It knows, no matter what one tells it to the contrary, that the painful situations which it experienced will repeat themselves. For example, the immature part of Harold knows he is worthless and knows that Jane will reject him.

Harold and I learned to call one aspect, "his mature self," and the other, "his immature self," and Harold accepted and appreciated this clarification. He saw more clearly what was happening to him, within him. Harold was able to feel both parts and learned to listen to and talk with the immature part. Harold, surprised to see how easily this worked and how clear it was to him, asked me over and over, "Does this mean I'm schizophrenic?" I believe that Harold was embarrassed to carry around this distinct immature personality. Repeatedly, I explained that the dichotomy of mind which he had discovered within himself is entirely normal, that it is in fact the way we human being are made. Indeed, Harold wasn't crazy in any sense; he had simply become aware of his true nature. (Technically, schizophrenia does not mean two minds, even though when the term was first used almost a hundred years ago, the "schizo" part of the word did have to do with a poorly defined "splitting" of the mind, referring to a poorly defined disharmony of mental functions. Today "splitting of the mind" is not today considered, in any way, a part of that severe mental illness.)

Harold was surprised to see how powerful the immature part of him was, how it got him to procrastinate and play computer games instead of meeting his deadlines. It made him turn away from Jane, even made him question his attraction when his other part knew that he was deeply attracted to her physically as well as mentally. Harold marveled at all this. "I can't believe this. If someone heard our conversation about this immature person and this mature person, they would think we were both nuts." Nonetheless, Harold eagerly addressed his troubled mind, "Let's get our work done, and then I'll let you play on the computer." And surprisingly, he feels the other part of him settle down and become calm.

Harold was typical of many of the depressed or anxious patients I see, in that his two personalities were getting to know each other, learning

how to communicate in a healthy way. Harold appreciated how hurt that part of him had been, he feels its pain, its longing for his mother's love, and the utter distress that her persistent rejections caused him. With my encouragement, Harold comforted that immature person inside and eventually learned to love him deeply in much the way he longed for his mother's love. Harold described the burgeoning relationship between his two sides as one that will eventually heal his distress, and by so doing enable him to enter fully his relationship with Jane. He will not be able to commit to Jane until he has the safety of a solid relationship with himself. Once Harold had established this healthy relationship within, he was able not only to fully commit to Jane, but also, he could forgive and love his mother, because she was no longer blocking his growth and mental integration.

The Important Message in Dual-brain Therapy

Harold responded well to the lateralized glasses. Looking to the left (right brain) called up his immature view of the world and looking to the right (left brain) consistently evoked the mature view. Although the lateralized glasses are therapeutically beneficial when they work with a particular patient, they aren't indispensable. In almost all the patients I have worked with, whether or not the glasses achieved a response, the dual-brain hypothesis of two distinct minds is helpful. When they work, the glasses are an important adjunct to the tasks of Dual-brain Therapy, the discovery of these different parts and the establishment of a healthy relationship between them. But with or without the glasses, the essence of Dual-brain Therapy lies in teaching the troubled side that it is safer and more valuable than it had learned through some archaic experiences.

Different Constellations of the Dual-brain Model

In Harold I observed the most common constellation of the two minds in the dual-brain model, the presence of a mature mind and the presence of an immature mind. But in other people I have found what I believe to be two troubled minds, that is an unquiet mind in both the left and right brains. I tend to see this more in patients who have suffered chronic mental illnesses such as chronic schizophrenia or rapid cycling manic depressive illness. It is possible, in a particular instance, that there is a mature mind buried deep inside, and that, I am unable to find it because it is so dominated by a troubled side. But I suspect that in some people both sides have become very troubled.

In other people I've observed two sides which are both healthy and somewhat similar. Such a person is apt to be in touch with a part that may be less mature, but is not dramatically different from the other more focused side. For instance, one side might be very focused, very tuned to world. Another part might be more of a worrier. If such a person has trouble sleeping it is always this part of him that remains wide awake and distressed. But in general, the two parts are allies, working together in life. One part may be my more sensitive and intuitive, but, in a healthy state this part won't keep him from flying, make him depressed, or prevent him from yearning for his lover.

At other times, I have worked with patients who clearly had one side dominate the other such that it was only over time that the other part (which I suspected existed inside) could come to the surface and express itself. I have seen this, for instance, where a person has for years repressed a verified traumatic memory. Simultaneous with the recovery of the memory, an immature part of the person's personality usually becomes more apparent. Perhaps, both the memory and the immature personality were repressed.

Other times I have seen a patient whose life has been dominated by a troubled personality which suppressed its healthier but weaker partner. For instance, I often see this constellation in patients who abuse drugs or alcohol. We often must dig down and find the more mature part, and then nurture it, and eventually enable it to take on the position of leadership. This constellation is different from Harold's in which a mature mind predominated but was interfered with by an immature side.

Understanding the many different possible relationships between the two minds leads to a much clearer understanding of human psychology. The two minds can cooperate with each other in a deep, synergistic relationship fostering creativity and maturity, or they can sabotage each other -- leading to a plethora of psychological and psychosomatic problems. I am suggesting that the role and activities of the subordinate hemisphere are dynamic and changeable. Sometimes that hemisphere influences a person in the background and sometimes it comes out and takes over the personality, as when we suddenly lose our temper and then later say, "I don't know what just came over me." When a patient recovers quickly from an acute depression or psychosis it may be because his more mature side has regained control. When after years of intensive psychotherapy, a patient of mine has achieved a true resolution of the illness, I consider her improvement and stability largely

due to the further maturation and healthy development of the more troubled hemisphere that our interpersonal treatment facilitated. Personally, I remain very optimistic about the treatment of psychological problems because I see that the major requirement for success is simply to help an injured troubled side recover through the process of therapy (often assisted by medications). In my view, drugs alone, do not repair an injured side.

Similarity between Dual-brain Psychology and the Split-brain Studies

The properties of two minds in my patients (including the relationship between them) appear remarkably similar to the properties of the two minds found in split-brain and Wada studies. We observe that the two minds constantly interact. As Harold's situation demonstrated, his conscious mind was covertly, though strongly, influenced by his inner mind. This interaction was generally inapparent to Harold. This mirrors the relationship between the left and right sides of the female split-brain patient, who was shown a picture of a nude to her right brain, whom I described in Chapter Two. Asked why she was laughing, she replied, "Doctor, you have a funny machine." Her left-sided, speaking mind, in fact, did not have any idea why it was laughing; it could only feel that something was "funny." It is interesting that she did not say, "Gee, I have no idea why I am laughing." Instead, she tried to fabricate a reason and gloss over the situation.

Another patient of mine who had grown up in a very intense, dysfunctional family, had a highly developed though very disturbed inner immature mind. At times she felt as if this inner mind were trying to kill her. As a child she was continuously threatened and rejected in very sadistic ways by her severely disturbed mother. When my patient was about eight, her mother, crazed and enraged, threaten to throw boiling water at her. This patient, a woman in her 30's, came to therapy because of a profound depression. Her mother, still very intense and troubled, continued to hurl the most outrageous, inappropriate insults at her daughter. Intellectually, Margie, my patient understood that her mother was extremely disturbed, and she could often laugh about her mother's aberrant behavior.

But when Margie was very depressed, she could feel an inner troubled self-attacking her just the way her mother would have. I once listened with great anxiety as she described how she felt that some part of her had tried to grab the steering wheel and drive her car off the road. She physically struggled with herself and survived. Over the course of her

therapy, this and similar struggles repeated themselves. Through Dual-brain therapy, Marie realized that her immature self at times would copy and behave like her hostile mother.

This patient reminds me of the split-brain patient I described earlier whose left hand tried to grab his wife but was restrained by his right hand. She also reminded me of a split-brain patient who went out for a walk and found his left leg trying to pull him in another direction. His doctor, who knew the patient's neighborhood, realized that the patient's right brain (controlling his left leg) apparently wanted desperately to walk in the direction of his ex-wife's apartment. She had spurned him because she could no longer tolerate all his medical problems. li

One split-brain study has shown that the two hemispheres can compete for dominance on experimental tasks. In a very complex experimental design, the experimenters found that if they encouraged either hemisphere, they could get it to control the person's behavior, even when the other side was better at the particular task at hand. In a similar way, Dr. Ahern's dialogue with his patient during the Wada study described in the second chapter showed that the patient's left mind was actively and thoughtfully suppressing his right mind. lii

My point here is that not only have we discovered two intact minds in split-brain research and in psychology, but also, we have found that in both cases, the two minds seem to interact in similar ways. Psychologically the relationship between the two minds can be one of dominance/submission, sabotage/alliance, or harmony/disharmony.

Beginning with the psychiatrist David Galin in 1974, a number of authors, including myself, have turned to the split-brain studies to advance the notion that the right hemisphere is the site of the Freudian unconscious. In 1988, Galin reconsidered the accumulated evidence and appreciated that the reality was far more complex than he had first realized. I too have altered my own views over the years. Although I no longer closely associate the right hemisphere with the unconscious, I continue to believe that the basic idea emanating from the split-brain studies -- that of mental duality -- does offer a profound foundation for any psychological thinking. liii

Dual-brain Model as A Possible Explanation for Distinct Mood or Personality Changes

Premenstrual Syndrome

Often the two minds, when of similar strength and power, vie with each other for dominance. Try to imagine a tug of war between the minds, one side leads but then is thrown by the other side, who will then come to dominate the person' overall mind. Dual-brain psychology accommodates both subtle and significant personality or mood shifts. Awakening from sleep full of anxiety may not simply be a result of brain chemicals randomly scrambled but may signal a change in our hemispheric dominance. On the other hand, brain chemicals may act, in part, through evoked changes in hemispheric dominance. I suspect that premenstrual syndrome (PMS) may be such a situation. Perhaps the change in hormones alters the hemispheric dominance. A group of prominent scientists from Edinburgh have reviewed findings demonstrating that estrogen levels, which are altered during the menstrual cycle, affect brain neurotransmitter systems that are known to be asymmetrically distributed between the left and right brains. liv

Manic Depressive Illness

Manic depressive illness (MPD), which has recurrent dramatic shifts in personality from healthy to depressed to manic, has been hypothesized by a number of authors to be related to lateralized problems in the brain. I speculate that these switches in mental state might relate to struggles between the two minds. I will address manic depressive illness more closely in the Chapter Eight on psychosis.

Dissociative Disorders

There are a number of interesting examples of a mental duality which come under the heading of dissociation, a term defined as a state in which a person manifests clear evidence of two or more fairly distinct mental aspects or personalities. The first of these which I will discuss is multiple personality disorder (MPD), which entails often dramatic shifts in personality, is often associated with evidence for changes in brain laterality. There is substantial, but not conclusive, evidence, mostly from EEG studies, and neuropsychological testing which suggests that the different mental states found in multiple personalities relate to shifts in hemispheric dominance. Neuropsychologist Polly Henninger has suggested that in multiple personality disordered patients the more mature, dominant personality is related to the

left hemisphere and that the alters, of which there may be several, are associated with the right hemisphere. Some have argued that since multiple personality disorder very often involves more than two personalities, that it cannot then be associated with the cerebral hemispheres of which there are only two. But, in many cases there are only two major personalities, and in other cases the lesser personalities, as suggested by Henninger, may be sub-divisions of the alter personality. [i]

Many cases of dissociative phenomena are of historical importance, and still are useful for demonstrating the presence of two intact minds in one person. In 1889, Freud's contemporary, Pierre Janet, presented this fascinating case history:

> This young person was brought from the country to the hospital of Le Harve at the age of 19 because she was considered insane, and the hope of seeing her cured had almost been given up. The facts were that she had periods of convulsive attacks with delirium which lasted for days. . . . At the time preceding her menstruations, Marie's character changed; she became gloomy and violent, which was not in her habits, and suffered pains, nervous spasms, and shivering in her entire body . . . . At times, she would utter cries of terror, ceaselessly speaking of blood and fire, fleeing in order to escape the flames; at other times she would play as a child, speaking to her mother, climb on the stove or on the furniture, and create havoc in the ward. The delirium and the violent bodily contortions alternated with short periods of rest for 48 hours. The attack ended with vomiting blood several times, after which everything came back approximately to normal. After one or two days of rest, Marie would quiet herself and remembered nothing of the episode.

After she had been hospitalized for eight months, Janet decided to hypnotize her.

> It then occurred to me to put her into a deep somnambulic condition, a state where (as when have seen) it is possible to bring back seemingly forgotten memories, and thus I was able to find out the exact memory of an incident which had hitherto been only very incompletely known.

> At the age of 13, she had had her first menstruation, but, as a result of a childish idea or of something she had heard and misunderstood, she imagined that there was some shame in it, and she tried a means of stopping the flow as soon as possible. About 20 hours after the beginning, she went out secretly and plunged herself into a big bucket of cold water. The success was complete; the menstruation was suddenly stopped, and in spite of a violent shivering, she was able to come back home. She was sick for a rather long time and had several days of delirium. However, everything settled down, and the menstruation did not appear again until five years later. When it reappeared it brought back the disturbances I observed. Now, if one compares the sudden stopping, the shivering, the pains she describes today in waking state, with what she describes in a somnambulic condition--which, incidentally, was confirmed from other sources--one comes to this conclusion: Every month, the scene of the cold bath repeats itself, brings forth the same stopping of the menstruation and a delirium which is, it is true, much more severe that previously, until a supplementary hemorrhage takes place through the stomach. But, in her normal state of consciousness, she knows nothing about all this, not even that the shivering is brought forth by the hallucination of cold. It is therefore probable that this scene takes place below consciousness, and from it the other disturbances erupt. . . . lvi

First, Janet realized that the patient had "fixed subconscious ideas" or an intact, inner mind that operated on archaic, unrealistic premises. Second, when she was in her so-called delirium, Marie apparently would lose contact with her usual conscious mind and her whole being would become under the *conscious control* of her inner mind.

Hypnosis

It is a well-known phenomenon in psychology that certain highly hypnotizable people can be given a suggestion to not consciously remember and yet carry out a command. This phenomenon strongly supports the notion of the subject's having two minds, one which hears, remembers, and carries out the hypnotic suggestion, and one which performs the command without knowing the real reason for its own actions. A number of EEG studies

performed on hypnotic subjects suggest that different levels of activation of the hemispheres are involved in hypnotic phenomena. lvii

Stanford University psychologist Ernest Hilgard in the early 1970's performed a now famous experiment. He hypnotized a number of highly hypnotizable subjects and had them put their hands in ice water. He gave the hypnotic suggestion that they would not experience the procedure as painful. He also suggested that they could perform what is called automatic writing in which a person's hand writes in legible English while he or she is consciously fully engaged in another task and is consciously unaware of what is being written. As the subject's hand remained in the ice water, Hilgard at intervals asked if he or she were experiencing pain. The subjects consciously reported minor discomfort, but their automatic writing expressed that they were feeling intense pain. "Hidden observer" is the term Hilgard has given to this phenomenon. His subjects had an unconscious awareness of the pain that they were able to express through automatic writing. lviii

Psychophysiological Reactions

Psychologist Matthew Erdelyi offers an interesting example of another situation which demonstrates the existence of an inner autonomous mind. By way of a completely spontaneous experiment, Dr. Erdelyi saw how physiologic responses reveal complex and sophisticated thinking which is consciously inapparent to the person:

> Elizabeth, at this time a first-year graduate student, was strikingly pretty. She had wavy blond hair, her eyes were deep blue, her skin was utterly free of blemishes. On a previous occasion, however, she had complained of a tendency to break out into a peculiar rash when intensely angry: First her neck and eventually her whole face would develop pink blotches that soon darkened into spots of red and scarlet.
>
> The event of interest transpired during one of our weekly research conferences. She had been making rather poor progress, and I had invited a more advanced graduate student (who happened to be male) to our meeting, in the vague hope that he might be induced to join our project. This graduate student, who had just returned from a year's leave of absence, had never before seen Elizabeth. As soon as he entered the room it was clear that he was very taken with her. Unfortunately, he did not know how to handle

the situation and attempted to make an impression on Elizabeth by adoption a superior, overbearing manner. He criticized Elizabeth's proposed experiment in altogether abrasive terms. . . . He interrupted most of her efforts to explain or defend her work, taking every opportunity to show off his expertise.

Some twenty minutes into the meeting, during which he ignored several attempts on my part to defuse the atmosphere, I suddenly noticed Elizabeth's neck, and then her face, turning into a mottled mass of pink, red, and scarlet splotches. I decided to put an immediate end to the research conference, suggesting to the graduate student that he summarize his major points in writing for future discussion. He had clearly noticed Elizabeth's dermal reaction, looked uncomfortable, and took his cue to leave eagerly.

But for Elizabeth's rash, it would have been impossible to deduce any untoward emotion; in every respect, in her overall demeanor, her expression, and her speech, she exuded a cheerful calm. I tried to smooth matters over and urged her not to be unduly angry at the graduate student. Elizabeth looked at me in surprise: "But I wasn't angry!"

I was unsure whether to drop the matter at this point or to pursue it further. Finally, curiosity compelled me to retort: "But Elizabeth, you have your famous rash all over your face and neck; you look like a pink leopard!"

"You are putting me on," she said. With a hint of annoyance, she reached into her pocketbook, took out her compact, and looked at herself. She started shaking her head and giggled in embarrassment. A normal blush lit up the pale rest of her face. "That's amazing," she said, "I was completely unaware of it.

There are many other examples from psychosomatic medicine which demonstrate a relationship between an inner mind and involuntary physiological functions. We will discuss these more fully in Chapter Ten on heart disease.

The Role of Trauma in the Dual-brain Model

Psychological problems often result from the emotional injuries to one hemisphere and from the internal struggles and imbalances which such injuries initiate. Many psychological insults of both childhood and adulthood

can injure one hemisphere more than the other. Such damage will often enhance or corrupt the power of the troubled side while leaving the more mature side underdeveloped. This can lead to a destructive struggle between the two minds and to psychological problems.

We speculated in the last chapter about why one hemisphere might become more injured by trauma or abuse. Although scientists disagree about the rate at which the two hemispheres develop from birth to adulthood, it is likely that the two hemispheres do develop on different timetables. It is also likely that the two hemispheres manifest different cognitive and emotional capacities at various stages of development. We can speculate the developmental achievements of the hemispheres at the time of the trauma will influence how each hemisphere will be affected by the trauma. How and to what extent the hemispheres process and respond to the traumas seems dependent on the nature or type of traumatic experience. As we will discuss in the next chapters, there appear to be exceptions when both hemispheres are adversely affected by the trauma. But the most common experience is for one hemisphere to be more mature emotionally and cognitively than the other. Is it possible, as suggested by my colleague at McLean, Martin Teicher, that if one side becomes injured, that the other becomes "parentified" -- much like children of alcoholic parents who must assume the role of the parent? Or could the hemisphere that deals actively with the trauma become injured to the point that its' development is delayed or interfered with? In time, the other hemisphere may be able to proceed with its own development and achieve adult cognitive and emotional maturity. In this case, a traumatized child who was unprotected and alone during his childhood years, may discover at some point, perhaps in early adulthood that a new mature mind has materialized. Some of my most rewarding moments in therapy come from teaching a person that not only has she survived and been removed from the old traumatizing circumstances, but also, she has a strong new ally within herself that has developed, even if not yet consciously recognized. This new ally is her more recently acquired mature mind.

In my clinical practice, I work closely with the inner minds of people who are troubled by their unresolved and often unacknowledged trauma. When a child is traumatized, the hemispheres may tend to disconnect emotionally to some degree. The troubled side then can remain isolated and stuck in the trauma. The abuse might stop the natural maturation and development of one hemisphere and cause it to remain immature to some

degree. That hemisphere can continue to resemble an unhappy person, one who constantly lives in the past, who comes to believe only in the worst (perhaps, so as not to risk disappointment by expecting better). As this traumatized immature mind stews for years, cut off from current realities which have often improved, its' intrapsychic power and influence can grow.

Martin Teicher has suggested that early stress can affect the functioning of the corpus callosum, the large bundle connecting the two hemispheres, leading to decreased hemispheric integration and a pattern of anomalous dominance. Teicher and his associates hypothesized that early abuse might adversely affect the development of the corpus callosum, and they embarked on a study to examine the size and structure of the corpus callosum in 51 consecutive pediatric psychiatric admissions to McLean. Each of these children had had an MRI as part of their hospital work-up, and Teicher had each of these MRI's reviewed by an expert (unaware of the study's intentions) to determine the size and physical structure of the corpus callosum in each of these patients. From the medical records colleagues unaware of the MRI results were able to determine the presence and extend of physical, sexual, psychological abuse, or neglect, and they found that in males either neglect or physical abuse was associated with a 25% reduction in sections of the corpus callosum. Females who suffered neglect had large increases in the size of the corpus callosum. Teicher suggests that these increases may also represent an abnormality, perhaps due to tangled fibers. We can only speculate about the meaning of the gender differences and why all forms of abuse were not associated with abnormalities of the corpus callosum. This study is a first important step in exploring the possible effects of abuse on the corpus callosum, and it lends additional support for the idea that a traumatized hemisphere may in some circumstances become relatively isolated from the effects of the negative experience on the development of the corpus callosum. lx

Most of the traumas to which my patients were exposed occurred in childhood, a time when we are most vulnerable and therefore most easily traumatized. Children rarely have the power to avoid trauma and are poorly equipped to tolerate it when it does strike.

Let me offer an analogy. Suppose I am watching television with my daughter when she was six years old and suddenly the program depicts graphic violence. I am used to seeing such violence on television and am an adult with a few good coping skills, by my young daughter is unable to deal

with what she has seen. I will sleep well that night, but she will have nightmares that may linger for months. We both would have viewed the same scene, but it would have had very different meanings to us. To me it would probably be ordinary, to her it might be catastrophic.

But trauma does occur in adults, of course, and severe trauma in adults can have devastating psychological consequences. I have treated a number of Viet Nam veterans and have come to appreciate the effects that the war had on their inner minds.

How Trauma Affects the Brain

Perhaps, the first step in trying to identify how trauma affects the brain is to clarify what we mean by trauma. Some psychologists describe two kinds of trauma: life-threatening such as extreme physical abuse, violence, or disasters; and critical incidents, which cover such common events as the death of a grandparent, school-related anxiety, a playground incident. The most common trauma that I see in my practice is from the psychological effects of being a child in a dysfunctional family. I prefer to keep our definition of trauma related to our ordinary life experience, and I think we generally mean by trauma, any event which hurts or harms us. This could be an off-hand comment which we possibly took the wrong way (or possibly the right way). It could be a shove, a punch, a stabbing, a shooting. It could be a look, a statement, a series of looks and statements. Whatever hurts us. If we cope well with the trauma, we may grow from it and may not be harmed by it. But those traumas which are more than we can deal with (and what we can deal with will depend on our age, health, allies, etc.) will harm us. Some traumas like rape, incest, bludgeoning, are always severe and harmful, although the degree of harm will depend on the relation between our coping abilities and the severity of the traumas. We should not forget that we are often injured (and therefore traumatized) by neglect, rejection, or humiliation assaults which are often difficult to detect especially when we are children. The effects of profound trauma (war or incest) are qualitatively and quantitatively different from those less dramatic such as neglect and rejection, but I believe that they all share enough common characteristics to discuss them together here.

When we are traumatized, our brain registers the pain. In response to the pain, we develop two types of responses: cognitive and emotional. Cognitively, we decide to try to avoid hot stoves or pointed people-

whatever has hurt us. Emotionally we may be showered with a variety of affects from anger to sadness to despair. With cognition we have a sense of being active. With emotions they seem to happen to us, and as Goleman points out, they may erupt with great speed.

One of the most common emotions to follow trauma and pain is fear or anxiety. Generally, we refer to this emotion as fear when we believe we understand its source and as anxiety when we don't. Fortunately, fear (or anxiety) is one of the best studied emotions from the neurophysiological perspective. In his book, *The Emotional Brain*, Joseph LeDoux of New York University gives an excellent review of this well-developed field in which he has led much of the research. LeDoux has shown that fear responses involve largely three brain structures: the orbital frontal cortex, the hippocampus, and the amygdala. When trauma occurs essentially two types of memories are laid down, one in the amygdala and one in the hippocampus. The memories in the amygdala are called implicit memories because they are beyond our consciousness. When after a trauma we return to the scene, we are apt to feel nausea or other physical feelings of emotional distress, and we will feel these even though we know we are now safe. This would be an example of an implicit memory of the trauma, and such memories are stored in the amygdala. Interestingly, the amygdala not only retains a covert memory of the trauma but is connected to the autonomic nervous system and is capable of evoking the adrenaline mediated "flight or fight" response. A part of that response is the release of adrenaline which comes back to the amygdala and acts to enhance the traumatic memory. The amygdala also stimulates the release of the stress hormone cortisol. LeDoux believes that memories once set down in the amygdala may be indelible. We will return to this assertion that traumatic memories may be indelible.

The hippocampus is a structure physically close to the amygdala. It helps to form long term memories and is associated with conscious or explicit memories. Both the orbital frontal cortex and the hippocampus tend to try to calm the amygdala. The hippocampus tries to reduce the release of cortisol. When the amygdala cannot be calmed but rather overpowers the other centers then a person is apt to enter a state of panic. In this state cortisol release continues, and over time it can cause damage and even physical shrinkage to the hippocampus.

The orbital frontal cortex is more related to cognition and to the interaction of emotion and cognition and will attempt to inhibit the excited

amygdala. LeDoux points out that cognition allows us to turn from reaction (emotion) to action (decision). When the cortex learns that safety has been achieved, it tries to *extinguish* what the amygdala has learned through suppression of the lower center. lxi

The Dual-brain Model and the Biology of Fear

Both cerebral hemispheres, left and right, have a cortex, an amygdala, and a hippocampus. The dual-bran model accommodates the biology of fear by appreciating that each hemisphere can physically respond separately to a perceived danger. Each hemisphere has a cortex closely connected and related to its lower centers. On each side, for instance, the cortex and the amygdala can struggle for control. lxii

Neurosurgeon, Pierre Gloor, of the Montreal Neurological Institute, has placed electrodes in patients who are undergoing brain surgery for temporal lobe epilepsy, and he has been able to electrically stimulate the amygdala on both the left and right sides in 35 patients. In aproximately half of the patients, stimulating an area of the amygdala elicited experiential phenomena such as an old memory or an emotion. Interestingly, stimulating the same patient on both sides almost always elicited different results. In one dramatic case, a 20-year-old man had his right amygdala stimulated and a memory of a traumatic event on a cliff by the seaside and associated fear were elicited. When his left amygdala was stimulated, he experienced hallucinated odors and felt "exasperated," but did not experience a memory or fear. Another patient had an experience when his left amygdala was stimulated but not his right. Although we cannot be certain how to interpret data from brain stimulation, it is interesting that almost always stimulation of the amygdala is associated with a negative emotion, especially fear, and that in the same person the two sides appear to respond differently with the side of the greater fear varying among patients. lxiii

LeDoux pointed out that the hippocampus can be damaged by high chronic levels of the stress hormone cortisol. Usually the damage, which results in shrinkage of the hippocampus (detected by MRI's), is asymmetrical, and in different studies, on different groups of patients, the side of the shrinkage has varied. For example, one study showed an 8% shrinkage on the right side in 26 Viet Nam veterans. But another study of Viet Nam veterans found a bilateral reduction in hippocampal size with slightly more on the left side. And 17 patients with posttraumatic stress disorder

from sexual abuse had a 12% shrinkage on the left side. Thus, studies in patients with PTSD have shown shrinkage of the hippocampus as LeDoux pointed out, but interestingly the shrinkage was on different sides in different patients. lxiv

Think back to my interview with the split-brain patient AA. On one side he was still upset by the bullies, but the other side treated the childhood experiences as a mild annoyance that he barely registered. Could this suggest that his amygdala-cortical interactions are different on his two sides? We do not have enough information to determine if the differences are in the two amygdala, cortices, or hippocampi, or even in combinations and interactions of these structures. In both hemispheres each mind is an emergent property of all the brain structures on that side, and important among those brain structures surely are the cortex, the amygdala, the hippocampus.

If we reconsider my patient, the Viet Nam vet who thought my plant was the jungle--on one side, it seems that we have a few struggles going on. One is perhaps between the orbital frontal cortex (and the hippocampus) trying to calm the amygdala on each side, and the other struggle is between the entire left mind and the entire right mind. In dual-brain therapy, I emphasize the struggles and relationships between the left and right minds, realizing that both emerge from the workings of many underlying brain structures.

The Location of the Unconscious Mind

Not only is the *nature* of the different minds important in the Dual-brain Model, but also their *relationship* is critical to the expression of the person's total personality. For instance, in Harold's case, his immature mind functioned as an "unconscious mind," inducing neurotic behaviors and anxieties and sabotaging his more mature mind. Harold was completely unaware of his immature mind, and yet it had a great impact on his life. It was this mind's suffering from his mother's mistreatment which made him depressed, self-loathing, and unable to commit to relationships. This mind was simply doing what it believed it had to do to survive in the kind of world where contempt and rejection were the rule.

When we say that Harold was upset by his mother's behavior, we should be more specific and say that Harold's inner mind felt very rejected, but his more adult mind for the most part did *not*. His conscious mind came

to see me not because he was upset by his mother's past behavior, but rather he came because he could not achieve intimacy and had periods of depression. He was unable to achieve intimacy because his inner mind had the power to interfere covertly with his feelings and behavior. That is, his conscious mind was affected by inhibitions and painful feelings sent to it by his inner mind.

I call the ideas and feelings in Harold's immature mind "neurotic," meaning that they were based not on a present reality, but rather on a past experience which was no longer present except in the constructs of his inner mind. If a person is anxious and doesn't want to get married, but has a cogent, realistic reason (perhaps the partner has repeatedly acted abusively), I would not call the behavior or emotion neurotic, and if he chose to end the relationship, I would not see that as an imperative reason to embark upon psychotherapy.

When an immature mind dominates a person's whole personality, I would *not* refer to it as an unconscious mind. For example, if Harold's immature mind took over, and he became chronically irritable, anxious, sullen, and cantankerous as a result, it would be difficult to call his immature mind *unconscious* because it is in full control of his conscious personality. We can say that he isn't conscious of being motivated by past traumas with his mother. In this sense his immature mind is motivated by factors beyond his awareness and hence are unconscious. But in this latter case we should not call his "dominant" immature mind "the unconscious mind," but rather we should call it his immature mind affected by unconscious factors. That is, to call anything which is not held in conscious awareness "the unconscious mind" would be a serious mistake. For example, when my doctor strikes my knee with his reflex hammer, my lower leg gives a kick. This is a reflex. I am not consciously causing the reflex, but to refer to it as occurring in my unconscious mind would be meaningless. The reflex arc is not a mind, it has no thoughts or feelings. As one works his way up the nervous system, one finds more and more complex reflexes, but one has to get to the cerebral hemispheres before we can find an area of the brain which could support a mind. There are lower brain centers such as the thalamus, hypothalamus, or the amygdala, which perform complex functions, but they do not by themselves constitute a mind, an integrated center with intentions, feelings, and actions. Harold's immature mind could be dominated by his right-sided amygdala, which may retain vivid archaic traumatic memories of his mother's

rejections, but I would not consider the products of his right amygdala as a mind, and therefore I would not call it "the unconscious mind," even though it probably plays an important covert role in producing the immaturity of his right sided mind. For me the unconscious mind should be an intact mind, that acts covertly, but acts in and integrated manner with well-developed thoughts and feelings.

What is the difference between an intact mind and a lower brain center such as the hippocampus or amygdala? In the first instance, Harold has a mature mind which is being troubled by his covert immature mind. His immature mind is a complete mind. It has cognition (thoughts) and feelings (emotion), and like an immature person has a tendency to over generalize and to obsessively hold onto ideas. A lower brain center like the hippocampus or amygdala can contain memories and perform mental functions which affect mentation, but they are not minds in and of themselves.

Do children have unconscious minds? Consider young children who tend to be more emotional than mature adults; their emotions more easily overpower their thoughts. A five-year-old child, heartbroken over his mother's attitude will have difficulty making the connection between his mother and his pain, and yet his pain is real, and it affects his life dramatically. The roots of his pain are not understood and in that sense are not conscious, but I don't hypothesize an intact even smaller child inside him, and so I would not refer to his inarticulate pain as coming from his "unconscious mind," but I would see it as coming from elements in his mind and brain which are beyond his awareness. The mental properties of the two hemispheres in children are unstudied, but I suspect both are similar (less differentiated) and both childlike.

Freud's Unconscious -- and Mine

The Psychoanalytic View

Psychoanalyst Ruth Munroe has written on Freud's concept of the unconscious:

> Freud does *not* conceive of an "unconscious mind" as a separate, unchangeable entity somehow inhabiting our mortal flesh. . . . It is mentioned here as a common misinterpretation of psychoanalytic doctrine, understandable because in all psychoanalytic literature conscious and unconscious processes are

> informally contrasted and goal-directedness is ascribed to each with some separateness--in fact, often with complete antagonism. The popular dichotomy, however, is far too simple. . . .
>
> We have noted that for all schools the unconscious is a process--or better, processes--conceived within a dynamic (motivational) theory of human behavior. It is *never* thought of as an isolated entity which can be studied independently of the total personality, according to its own peculiar laws. lxv

Freud, in his later years, saw the unconscious as essentially consisting largely of the id, a seething caldron of primitive drives and emotions. He also discussed an unconscious aspect of the ego which acted as a censor, keeping some painful ideas from becoming conscious. But Freud was never clear about the boundaries between the conscious and unconscious aspects of the ego, nor about their specific properties or relationships. And certainly, Freud never described the unconscious aspect of the ego or any other aspect of the unconscious mind as an intact, inner being. lxvi

Freud saw repression as necessary to the construction and maintenance of the unconscious. He felt that people often had sexual or other unacceptable impulses which needed to be repressed from conscious awareness. But who or what instructs the unconscious to repress or censor some ideas? Does the censor decide what material must be repressed? If the unconscious can make decisions and can oppose the conscious mind, why can't it be studied in isolation? How could the analysts describe the unconscious, tell us it was primitive or child-like, had wishes, memories, fantasies, and yet say it did not exist in actuality, but only existed as processes? lxvii

A psychoanalyst may have diagnosed Harold as suffering neurotic symptoms such as his fear of intimacy and his self-loathing. These symptoms would be conceptualized as coming from unconscious conflicts. The analyst would try to establish an empathic relationship and would encourage Harold to free associate, that is, to say whatever comes into his mind. From his free associations, connections are made called associations, and from these the analyst may make interpretations. The relationship between the analyst and the patient is also examined in light of how Harold will tend to view it as similar to his relationships with his parents. The relationship with the

analyst thus contains transference, and by examining the transference relationship, more is learned about the unconscious mind.

Ultimately, the analyst would come to see Harold's unconscious as a primitive id or drive state which intensely wants to be gratified by a loving mother and becomes desperately hurt and angry by her failures in this regard. These emotions are overwhelming in Harold's present unconscious and lead to depression and regression of his ego, or conscious executive mind. Since his mother was hostile, a part of her was internalized in his unconscious, and it is her introject (the internalized image of his mother) that becomes a part of Harold's superego and violently criticizes him, producing his self-loathing. In psychoanalytic terms, Harold's hesitancy about marriage would be interpreted as his unconscious fear of and rage at his mother, his conflicted need for her love and his fear of her rejection. A further interpretation would also describe his fear of his mother's accepting him and moving him into competition with his already partially spurned father. All of this is unknown to Harold because an unconscious part, has repressed it in order to protect him from this knowledge too distressing to face. Unconsciously, Harold fears defeating his father and winning his mother's love, but he also unconsciously longs for this. This is a classic unconscious conflict.

As the primitive contents of the unconscious slowly become revealed and are worked on an integrated, Harold's symptoms would be expected to decrease as his insight increases, and he should emerge a more integrated, mature, healthier individual.

The Dual-brain Concept of the Unconscious

My work with Harold, although in many ways similar to a psychoanalytic approach, in other ways takes a much different conceptual path and therapeutic course. In either approach, Harold should be treated with profound empathy and the quality of the therapeutic relationship is critical to both forms of treatment. That is, in both Harold should feel well-regarded, respected, liked, even loved in the therapeutic sense -- deeply and genuinely cared about and appreciated, in the healthy brotherly or sisterly sense. This solid relationship should anchor the treatment and lay the foundation for the trust that is essential for any substantive treatment.

The differences begin with the concepts around the nature of the unconscious mind. In the dual brain model the unconscious is an intact mind

(albeit immature) with its own thoughts, feelings, and actions (either urged or taken), a mind we physically associate with one of the cerebral hemispheres. In the psychoanalytic model, the unconscious is a vague process, as Ruth Munroe described it, rather than an entity or actual mind.

I believe that my idea that Harold has an immature mind, which is evoked by a lateralized pair of glasses, can encompass, and clarify the psychoanalytic concept of the unconscious mind. I see free associations as feeling or ideas coming from the immature side. The analysts' "interpretations" are actually the decipherment of the thoughts of Harold's immature mind. The "transference" is the relationship between Harold's immature mind and the therapist, and I agree that understanding and interpreting and working on transference issues can be extremely valuable for understanding and communicating with Harold's immature side. I don't believe Harold has an "id," per se; rather I believe that his immature side is simply immature, childlike, and therefore primitive. I believe that the immature part of him does copy some of his mother's negative, abusive behavior and does attack him, but to call this an "introject" or a part of a "superego," seems to me to miss the point. We all tend to copy powerful figures, especially when we are children. Harold's immature side is merely copying his mother because she is so powerful and important to him. And like a child, Harold tends to blame himself. Children do this all the time. I don't think we need to invoke the idea of a punitive superego as the punisher. I think Harold's immature mind can punish himself very well all by itself. And I don't believe that the term repression properly captures the struggle between Harold's mature mind and his immature mind. His mature mind is trying to suppress his immature side, but he does so with varying success.

And when it comes to treatment, I have found that when I explain the dual-brain concepts, explain that there is an intact inner mind which is disturbing the person, this explanation clarifies what has been happening, and it goes on to set up a straightforward, concrete therapeutic task. The aim of Dual-brain Therapy is to mend the archaic, destructive ideas and emotions of the mind on the troubled side, to teach it that it is safer and more valuable than it learned during some traumatic experiences, and to help it appropriately grieve and come to terms with its actual losses and disappointments so that it can appreciate its abundant gains. I teach patients how to recognize and listen for the mind in their troubled hemisphere, and then how to speak to it--out loud! I show patients also how to strengthen

their more mature minds, and most importantly how to improve the relationship between the two sides.

The troubled side is not an ill-defined confluence of id, superego, and introject, rather it is an intact mind which can't get over the trauma, even when removed from it, because it continues to expect re-traumatization. Initially, this mind may have withdrawn from the world around it, making it even more difficult for it to learn that the world may have changed for the better since the traumas. This is especially true for childhood traumas which are often externally removed with the passage of time and the physical and mental maturity which comes with development, but which can remain covertly present because the mind on the troubled side fails to notice or to trust the improvement.

Dual Brain Therapy, then, often entails a reaching out to the mind of the troubled hemisphere and attempting through patience, persistence, and a loving, mature, informed attitude to teach it that it no longer has to fear abuse and no longer has to attempt to protect itself with the archaic defenses which have become the source of its new pain and problems. The advance of Dual Brain Therapy over traditional therapies derives from its demonstration of the troubled side as an interior, complex person. When it operates covertly, it becomes an unconscious mind, not a vague construct, but rather an intact though often troubled mind.

In the chapters which follows I will apply the ideas of dual brain therapy to several major, common emotional disorders. To the extent that these ideas explain and assist in the treatment of these problems, the theory is supported. In the cases which I describe I will often include transcripts of interviews I had with different patients while they wore the different lateralized glasses. These transcripts are not typical of therapy sessions per se, but rather are intended to demonstrate that the unusual findings with the glasses occurred in many patients and in many different disorders.

Chapter Five

APPREHENSION: ANXIETY DISORDERS

Joe comes to my office sweating, though I am chilly, wringing his hands and pacing. He has a new job and feels a lot of emotional pressure there. Joe has trouble thinking clearly, and trouble performing his work. He avoids meeting people because he feels it is apparent to others that something's wrong with him. (And he's right, his emotional discomfort is apparent, though perhaps not quite as apparent as he feels.) He has become so apprehensive about being called to task for poor performance, about being humiliated, about being fired that he has trouble noticing that something made him anxious in the first place, before it began to feed voraciously on itself. "I've been feeling this way for two months, and as far as I can tell it is only getting worse" he told me on his first visit to my office.

Everyone knows what it's like to be scared. Some of us have been very scared, perhaps after an automobile accident, perhaps during an examination for which we were ill prepared, perhaps on a date when we seemed to care more than the other person. We all know the sickening feeling in the gut, physical clumsiness, mental cloudiness, and general sense of distress which we call anxiety. Some people like Woody Allen's persona seem to experience this frequently, and some like those with a John Wayne persona feel it only when they fall off their white horse, but there can be little doubt that this emotion is pervasive throughout the human species. For those of us, like Joe, who experience this feeling with an intensity and duration which becomes distressing, this ordinary feeling can become a problem of catastrophic proportions.

Is it a chemical imbalance that first made Joe this way? A genetic defect, perhaps passed on by a long dead, derelict ancestor? Is Joe simply suffering castration anxiety, id anxiety, separation anxiety, or superego anxiety, anyone of which is posited as the outcome of repressed, unconscious, sexual or aggressive drives? Has he been covertly conditioned to be fearful, much like Pavlov's dogs learned to salivate whenever a bell rang, even when it rang without the food with which it used to be paired?

How can I help Joe? His primary care doctor has already tried him on Prozac, Zoloft, Effexor, Klonapin, Xanax, and Ativan. There's behavioral therapy to teach him to relax but relaxing only makes him more agitated. A cognitive therapist could teach him to recognize his negative, defeating thoughts, but these seem to be the only thoughts he has. As for psychoanalysis, Joe’s managed care company expelled all the analysts from its panel. And there's psychotherapy, but the nature and quality of this

enterprise varies so tremendously from therapist to therapist that it's hard to define what it is or what to expect from it.

How Dual-brain Therapy Can Help

In our first session, I learned from Joe that his father had been a tough man in public, but at home his father was chronically disrespected by his wife whose approval he desperately sought. Joe's mother favored Joe among her three children, and Joe's father developed a harsh, condescending, even belligerent attitude towards him. Joe responded in part by copying his father and became a bully at school. Towards his father, Joe expressed defiant through mischievous behavior at home. His father responded to Joe's acting out with very severe physical punishments. Though Joe tacitly assumed that the ridicule and physical punishment were warranted, he could not articulate why. Joe had never connected his father's attitude and treatment as possibly related to his current symptoms. When I suggested such a connection, Joe laughed and said, "You sound like a typical shrink wanting to put the blame conveniently on my parents." He felt no connection between his past and his symptoms. Yet, halfway through his first session, Joe commented, "I think the way I feel at work is a lot like the way I felt as a child when my mother sent me to my room to wait for my father to come home to punish me." He explained that he had not realized how painful still was his father's continuing disapproval, couched now in an appearance of helpfulness. His father would still ridicule his hair as too long or too short or too messed or too combed. The humiliations he felt were devastating, echoing what he anticipated at work. His longing for his father's approval was similar to his longing for acceptance at work. Joe began to sob though he said, "I don't understand why I'm crying." When he pulled himself together, he expressed bewilderment at his crying, and skepticism about the connections he had just made between his father and his anxiety.

"How are you feeling right now?" I asked.

"I'm doing a lot better than I was earlier today, but I'm still anxious and the emotions are just beneath the surface. I'm afraid they could come out at any time. That's basically how I feel. My emotional state is high right now."

"And how do you feel you'll do with the job right now?"

"I can do well with this job. There's no doubt about it. Obviously, I have normal anxieties about walking into a place with new people and stuff

like that. I've always felt inferior in some ways and superior in other ways. It's nervousness, natural anxiety."

"Joe, I want you to try on these special glasses--they're going to be the rage in Paris."

"You want me to try these on?"

"Yes, just pick either pair."

"What are these?"

"Just try one of them on."

Joe puts on a pair of goggles taped so that he can only see out of the left side (right hemisphere). Almost immediately he takes a deep sigh.

"How do you feel now?"

"I'm definitely very nervous, and when you look out this side there's an optimism, a certain life affirming, you've got a chance, you know, you can go in there and do the job."

"How do you feel you'll do?"

"Well, I think I can do well on the job, I'll go to work and work hard at it. I'm gonna do my best. I can do the job."

"Try the other goggles [left hemisphere]."

There is a 30 second pause, then he sighs, and says, "Ah, man. This is a, ah . . . I wouldn't want to go to work wearing these."

"What do you feel?"

"Well, I feel a, I feel more . . ., the longer you wear them, the more you get subdued. I'd like to say I think I could still do the job, but ya know, because I just said that before, but it, you don't have as optimistic an attitude from this spectrum."

"What do you feel?"

"I just feel sadness on this side. I mean, this kind of brings up the feelings of how I felt earlier today."

"Tell me."

"Just, just, pain and fear and insecurity . . . and a lack of confidence, and I mean then sadness. Turned to sadness."

"What's the sadness about?"

"It's about . . . just about (he's crying and having difficulty speaking) ah, it's never doing, never doing what I could do, never achieving any goals, running away from things, never . . ."

"Not being good enough?"

"Well, knowing you're good enough, but being lazy, self-centered."

"Is that how you feel, or how you feel you're being accused?"

"Ah, that's tough to say."

"How sad do you feel?"

"I felt very sad there for a while, the crying actually helped a little bit I think, it's kind of a release. But, out of this side there's a . . ."

"How much sadness are you feeling at the moment?"

"I'm sad."

"How would you measure it: none, mild, moderate, quite a bit, or extreme?"

"Moderate."

"Moderate now?"

"Right, quite-a-bit before. I mean, in talking to people you just . . . . Obviously, this all stems from my parents (crying) really, I mean, when I think of them then that's when it comes up."

"You feel it right now?"

"Yeah, now I do."

"You feel it quite-a-bit?"

"Ah," he sighs deeply in pain. "Yeah."

"Switch to the other pair of goggles." There is a 30 second pause, then I ask, "What do you feel?"

"Hey, I feel better a little bit, right away. Now let me just try to think of my parents. (10 second pause.) It blocks out certain wavelengths of pain which is interesting."

"What are you feeling now?"

"Oh, I feel better now like this, definitely, I mean I just tried to shift gears into thoughts about my father and stuff like that and it's, if I were wearing the glasses on the other side I probably would be weeping right now."

"And what do you feel right now?"

"Just a bundle of nerves, but I mean, I feel better with these on, I just feel I could be in more control like this. I could deal right now. Before it kind of obliterates your ability to function. I mean I could be sad and deal with it now."

"Can you think about your parents now?"

"Yeah, I can actually. I can think of them in a more reasonable way, and I can constructively criticize them. I don't know if that makes any sense or not."

"How do you understand the sadness on the other side?"

"That's a mystery to me. That's it."

"What is that part of you saying?"

"It just comes up to the depths and it's so hard to explain to other people, you or my mother when she called today, and she was very kind today. She wanted to take me out to lunch. She was very worried about me. When I called when she called . . . tremendous concern. I just didn't know how to explain to her."

"Do you feel that anxiety now?"

"I just felt it big time, there."

"Just now?"

"Yeah, but in a way, I could talk about it more than the lugubrious other side, but I still felt the emotion, yeah, of course, I did. It's an emotional thing. I mean, I just think a fuckin, I don't know, I don't where it comes from, I mean I just don't know what the fuck happened to me to where I'm just so prone, I mean kids get beaten all the fuckin time, ya know. Why am I so prone to depression, why does it hurt me so much? I'm not the only kid in the world beaten, called a bum, whatever. Maybe I just wanted to be the one. Maybe I wanted to be the President of the United States; maybe I should of been the guy on Broadway now, somethin' like that . . . never fuckin' did. Not a fuckin' thing. I've just been living a fucking lie my whole fucking life. I think I'm a fucking phoney. Well, (laughs) at least I can laugh a little on this side."

"You feel like you're a phony or something?"

"Yeah." He sobs. "Yeah, I think there's a tremendous part of me that just thinks I'm never going to be truly be at home with other people in a warm kind of loving environment where I'm not a little bit uncomfortable, unless I'm drinking with them or something. There's a part of me that maybe will always feel things a little different, maybe sometimes a little better, maybe a lot of times a little worse, I don't know. I know that I'm gonna be able to come to grips with this thing. I think the stress of the new job and the old job and my father, maybe it's bringing something to the surface that was here a couple times before. I just know I want to be able to come to grips with it and just be able to walk out of my house and jump in my car and just do what I want to do and not be driven by thoughts of what other people want me to do or what, you know, not be my own person, not be driven by other

people, like a constant search for love and acceptance which basically I've done in a lot of ways . . . as bizarre as that may sound."

"Hum, I think that's true; I think that's what happened. Is there a part of you which can see your value?"

"Yeah, there is. I know that; I have a lot of friends and they're wonderful, and we have wonderful times together. Yet sometimes I'm still uncomfortable with them, you know."

"How are you feeling now? Is there a difference with the glasses?"

"Yeah, I feel a little more laid back and relaxed. Once again, that huge swell of emotion calmed me down. I remember in the past when I was depressed in the past I would sit there and bring on the tears because there would be some kind of solace to the pain after . . . there certainly is now."

"How do you feel about yourself right now? Do you feel a legitimate person, or do you feel illegitimate? How do you regard yourself?"

"I feel like there's a thousand volts of electricity running through my body. But I mean . . . I am a legitimate person, there's no doubt about it."

"Do you feel that on the other side?"

"It's tougher on the other side, naw it's definitely tougher on the other side. There's no doubt about it."

"What do you feel on the other side?"

"The other side is this just lugubrious, it's down in a hollow somewhere; the longer you have them on, you are kind of being sucked down inside there. Over here you can still have the emotion, but, you know, I'm a little more pumped up on this side."

"Do you feel more approval of yourself on this side?"

"Yeah, I do, I feel more approval, but I'm still extremely anxious. I don't feel I could get up and go wild right now, but I definitely do feel . . ."

"And how about going to work after the weekend?"

"Yeah, but I'll be very nervous there, I know that."

"You feel nervous now?"

"Yeah, I feel edgy."

"How will you do at the job?"

"Well, I'm gonna go in there and give it my best."

"What do you predict?"

"I predict success, I mean I know I can go in there and do it. I know this is something I can do."

"Ok, can you let the other side [his troubled left brain] look out this window?"

"Well, that side is kinda looking out this window, that's why I'm not as upbeat right now. That side is definitely pushing over to this side right now. There's no doubt about it. Which is causing doubts. I don't know if that's something that makes sense to you or not."

"It does."

"Because this guy's definitely coming out here. I can definitely feel it."

"Can you let him look out and see . . . can you hold your confidence while he looks out?"

"That's very hard. But I'm trying right now."

"Why don't you try the other glasses."

He puts on the pair of glasses which stimulate his left hemisphere and thirty seconds later, I ask, "How do you feel about the job, about going back to the job?"

He sighs, "Um, similar to the other side, about nervousness, anxiousness, um, I mean I don't want to walk into the job with this kind of heightened anxiety when I walk into meet my boss."

"Is the anxiety the same on this side as on the other side?"

"No, it's fuckin' movin' on up! As we speak . . . it's movin' on up!"

"What's it about?"

"I don't know, it's comin' up right through here," pointing to his gut.

"Is it about feeling humiliated?"

"No, you know what it's about? It's about the nervousness of meeting someone who's my boss and about meeting people."

"And why does meeting people, meeting your boss make you nervous?"

"I really don't know, it just does."

"Is there a threat there?"

"Yes."

"What's the threat, what's the harm?"

"The threat of not being liked."

"Yeah, right."

"And being . . . and failing."

"And being humiliated?"

"I don't feel the threat of humiliation, I feel the threat of . . . I have to go there in a couple of days, and I don't want to be like this, this is what's freaking me out right now because now I gonna go in there . . . I don't want ta fucking feel like this."

"What's the thing that you're afraid of?"

"Just the simple fact that a . . . that I'm unworthy."

"Yeah, you're unworthy, right, and they're gonna see that."

He laughs, "Yeah."

"And they're gonna blow smoke in your face, right?

"Yeah."

"Are we hitting it? Is that what it is?"

"Yeah, I mean, it's doubt. Basically, it's doubt."

"They're gonna criticize you . . . your tie's crooked, and you've got the wrong pants on . . . and you're no good. . . . Are we hitting it?"

"Well, yeah, tie's crooked and no good, that's basically it, you know, that's something my father said to me, I know what you mean."

"But is it the same sort of thing that you expected?"

"It's more deep rooted; it's more like they could see through me . . . into my phoniness."

"Right but remember on the other side . . . let's check the other side."

He changes to the left-sided goggles (which stimulate the right brain) again.

"What are they gonna see?" I ask.

"This guy's awful strong over here. No, now that you say that I got more of a chance out of this side than I do out of the other side. A much better chance. I wish I could just isolate this side."

"What are they gonna see when they look at you?"

"Well, they're gonna see a guy, a good guy, well spoken, who's extremely nervous."

"Are they gonna see right through you?"

"No . . . I understand what you're saying. No, they're not gonna see right through me, cause there's nothing . . ."

"Nothing to see through?"

"Right," he laughs.

"You're a substantial person."

"Right."

"You're nervous, right?"

"I'm nervous to a fault."

"But you're nervous because you feel they may see through you."

"But they're not gonna see through me because if I sit down to talk like this, I feel, I mean, I feel I could carry a conversation with anybody. If they ask me a question, I can respond to it."

"On the other side you don't feel that way?"

"No, on the other side that was different."

"So, what do we make of that?"

"This side goes through the world and functions and goes down and works out at the gym and gets along with people and stuff like that in a substantial way, but there's also a huge side that is there that is keeping me from anything that I would consider . . . playing basketball is what little kids do, I can do that, this other side can cripple any efforts to try to improve yourself."

"What we're saying is that one side is very nervous and expects to be ridiculed."

"Yes, no doubt about it. One side is so sad it's unbelievable, it almost killed me today."

"The other side?"

"The other side. This side can be sad too; it's sad for the other side; that's what's going on right now."

Joe was much improved after our first session and his symptoms were largely alleviated by his third. Our work was not finished even though he had become essentially asymptomatic; we still had work to do on the underlying problem to keep it from recurring. When his managed-care company wouldn't support his care after ten sessions because of the reduction in his symptoms, he had to cut back to monthly sessions and his symptoms erupted again. With renewed authorization from his insurance company, we resumed our work and again quickly got on top of his symptoms and continue at this time to work towards resolving his underlying problem. Essentially, we continue to teach the immature side of him that he is now safe and valuable, and this side of him is slowly but continuously assimilating our message.

Causes for Anxiety Disorders

In my twenty years in practice, I have seen many people with anxiety disorders, and each has resembled Joe in most important aspects. Each attributed their anxiety to their "nature," in other words, to a personal weakness, be its cause moral, chemical, or genetic.

It is possible that Joe and my other patients suffer chemical imbalances or genetic deficiencies, but the capacity to become anxious is universal. Recall, the frightened, haggard, and depressed appearance of the American Air Force pilots captured and put on Iraqi television during the Gulf War. These well trained, highly selected brave men were reduced to obviously terrified, defeated souls, as would any person subjected to torture. Anxiety is a response to a significant threat of danger; it is part of our biological nature. Joe and my other patients who have suffered persistent anxiety are exercising this same universal capacity. The difference between Joe and the pilots is that the threat is obvious in regard to the pilots but not to Joe. (At times psychologists refer to this emotion as fear when the source is known and as anxiety when it is not. But the pilots suffered anxiety even though they had an obvious reason for their emotional state. The term anxiety implies a greater level of impairment than fear.)

Initially Joe's anxiety appeared spontaneously generated, much as bacteria in broth were thought before the microscope, to spring spontaneously from nothing. But Joe had a reason for his anxiety. In part of his mind (in his left brain) he believed he would always be humiliated, just as he was throughout his life by his father. This is the danger he anticipates. A struggle within him began as the more adult part of him (in his right brain) which does not experience such humiliation, became more prominent.

Dual-brain therapy, aided by goggles, helped Joe to learn that his anxiety is a natural response to danger perceived in one hemisphere of the brain. We learned that the perspective on life that the troubled hemisphere harbors often mirrors the perspective it had as a traumatized child.

Our EEG studies confirmed that the goggles stimulate the hemisphere opposite to the side out of which we can see. It is also apparent that with each pair of goggles, Joe's personality, and view of himself in the world are altered. Accordingly, as in most of the severely traumatized patients in my study, the mind in his left brain sees himself as vulnerable and insubstantial as a person. The mind of his right brain is more adult, more reasonable. Thus, the origins of Joe's anxiety were obscured because he

tried to understand it with his right brain while the problem existed in his left, and there was poor communication between the two.

Joe and many of my other patients were anxious because a part of them associated with one hemisphere was frightened because they saw the world as they had seen it as a child, as much more dangerous than their capacity to protect themselves. In Chapter Eight Collapse: Psychotic Disorders, we will learn about patients who have distorted views of the world in both hemispheres. This condition can make patients more difficult to help with dual-brain therapy.

We can see that in many important ways Freud was wrong when he suggested that neurotic anxiety was usually a signal to the conscious mind that the id manifested sexual or aggressive urges that were in conflict with the superego's moral standards. Although Joe was indeed caught in a triangle between his parents as a child, he didn't appear to be significantly troubled by repressed desires for his mother or rage against his father. He is now troubled in one hemisphere by the effects of real events--his father's ridicule and beatings. In Joe's case, this hemisphere cannot be called an unconscious mind because, as we discussed in the last chapter, it is very often dominant and indeed very conscious even though he cannot at first understand the reason for his anxiety. His left-sided immature mind, motivated by hidden fears, responds to the world almost reflexively with anxiety. Joe simply puts on the wrong pair of goggles, and his distress soars.

A Chemical Imbalance?

Joe wondered why he was prone to anxiety. Here, he asks a very important question. Is his anxiety the result of a chemical imbalance? It is natural Joe would raise this issue because we seem to hear all the time about chemical imbalances in the brain. Indeed, the brain has chemicals, and we know that when we are frightened our brain chemistry is going to look differently from when we feel relaxed and secure, but other than this reasonable hypothesis, we know frightfully little about brain chemistry. We know that there are chemicals we can inject into the body which can induce feelings of anxiety, especially in people prone to panicking, and we know of alterations in stress hormone levels in patients with posttraumatic stress disorder.

We know that in animals who are threatened there is heightened activity of certain brain systems. We have also gained some insights from

brain imaging studies of patients diagnosed with anxiety disorders. But in general, the results of these imaging studies are so far inconsistent from one study to the next, and it is difficult to synthesize a consistent picture. Another problem is that if we see heightened activity on an imaging study, we do not know the nature of that brain activity. The brain area which is more active could be an area which is busy inhibiting other areas, or it could be the area causing the anxiety. And we don't know if the areas which show heightened activity are causing the anxiety or whether they are simply responding to the anxiety which may be induced elsewhere.

I have a great regard for neuroscience, and there has been a very exciting acceleration in the acquisition of knowledge about how the brain functions, but the brain is so complex that we are still at the edge of the frontier in many regards. If I ask you how fast a car is going and tell you the time but not the distance it traveled, then no matter how smart you are or how much you know about the specifications of the car, you will never be able to solve the problem. It's impossible. And unfortunately, with the brain there are many factors which remain unknown and many questions which remain unanswered. Neuroscience has to be commended for its efforts and for its honesty in reporting its uncertainty in many areas.

But we do know that with a pair of glasses we can calm Joe's anxiety, and so whichever of his chemicals are imbalanced, they seem too easily right themselves at least temporally. Because in most of my patients, their anxiety symptoms resolve with psychotherapy, the chemical states associated with anxiety can often be altered psychologically. This fact would not be possible if the chemical changes were generally inalterable. Of course, anxiety can be markedly reduced with medications, but this does not prove that a chemical disorder is the primary cause, but rather medications help many medical and psychological problems. More likely, anxiety is caused by an interaction of brain states (including chemical states) and psychological factors. It appears that Joe has different brain states in his different cerebral hemispheres.

Genetic Factors?

And aren't genetic important here? Infants are born with different temperaments. Don't identical twins reared apart share some psychological traits? Yes, they do. Our genetic makeup is undeniably important. Let's take tennis. Surely there are genetic traits which enhance one's ability to play

tennis. But we do not generally think that there is a gene for tennis. We inherit thousands of characteristics which might affect our ability to play tennis. Further, some of our genes will only be activated (or inactivated as the case may be) if we are put in an environment at the right time in development which stimulates those particular genes. What we begin to see is that the relationship between our genetic makeup and our ability to play tennis is very complex. If we play poorly, we can't simply blame our tennis instructor, but nor can we simply blame our genes. I believe each of us can play tennis. Our range of abilities will vary, but unless we suffer some very debilitating condition, we each can put on a pair of sneakers and stand at the baseline with a racquet in our hands. Thus, like anxiety, I see the ability to play tennis as a universal characteristic. For most people, if we begin lessons early and practice compulsively, we should become a competent player after some number of years. Some people will grasp it quickly and excel at each step of their development, and others will find it more difficult, and some will remain lousy players no matter how hard they try. Do genetics play a role? Certainly. Does the environment? Certainly.

Let's suppose that there is a tennis school for small children, and suppose that unknown to the parents, the instructor is very evil. Suppose he is extremely threatening and humiliating towards the children but that he tells the children that he will harm their parents unless they give glowing reports about the tennis school and attend class regularly. We can predict that out of 100 students, most if not all will become poor tennis players (as well as trauma victims). We can acknowledge that each child has genes which affect tennis performance, but we wouldn't think of the problems of these children as genetic disorders.

Of course, there are some genetic defects which are profound. Down's syndrome is a genetic problem which causes mental retardation regardless of the environment in which the child lives. Could some people inherit strong tendencies to be anxious? Certainly. Do we have any scientific evidence for this? Not so far. To date the best studies on anxiety and heredity have been done on patients diagnosed with a panic disorder. Here the scientific evidence is inconclusive. [ii]

Behavioral Approaches to Anxiety

At the beginning of the chapter, I mentioned Pavlov's dogs. This was a reference to a common explanation for anxiety states among the group

of psychologists called behaviorists. The behaviorists theorized that behaviors, especially, but also emotional states, are determined largely by our learning experiences. They called their discovery "learning theory." For instance, J. B. Watson, who enthusiastically brought Pavlov's ideas to America in the 1920's, discovered that when Albert, an 11-month-old "experimental subject," was given a white rat to play with, he enjoyed the animal and showed no fear. But, when Watson made loud unpleasant noises whenever the rat appeared, Albert not surprisingly became afraid of his former pet. He also became afraid of anything which remotely resembled the rat such as cotton wool or sealskin. Watson discovered this- that we learn from our experience and that we apply what we learn to other objects, in a process learning theorists call "generalization." Some behaviorists have suggested that experiences such as Albert's could possibly underlie anxiety disorders in adults, but that hypothesis remains underdeveloped.

Watson was followed by Edward L. Thorndike who was to lead American psychology in the first half of this century. Thorndike discovered from experiments on cats that we learn from "trial and error," and B. F. Skinner, building on Thorndike's work, proposed that we learn from rewards and punishments (positive and negative reinforcements). Skinner believed that all behavior was simply the result of the combined effects of a person's cumulative rewards and punishments throughout life. Skinner and many behaviorists objected to discussions of emotions or the unconscious mind because they felt such concepts were less reliable scientifically than observable behaviors. Today cognitive psychologists who are the successors to the behaviorists do appreciate some of the importance of emotion and do admit that many mental processes go on which are beyond consciousness, and for these they have applied the term, "the cognitive unconscious." The cognitive unconscious does not relate to hidden psychological issues as in the psychoanalytic unconscious mind, but rather describes how mental processes, cognitive and/or emotional can occur outside of awareness. Cognitive psychologists are particularly interested in covert learning and implicit memory (memory not easily available to language) when they discuss the cognitive unconscious.

You might wonder how anyone could argue with such a compilation of obvious observations as those obsessively detailed by the behaviorists. But I find an important defect in thinking behind learning theory. It failed to appreciate that each of us has two minds, each of which

learns differently from the same experiences. All of the principals about learning are obviously true. Certainly, we learn from trial and error and from rewards and punishments, but what we learn and how strongly we learn depends on which mind we are talking about and the condition, developmentally and physiologically, of the brain areas supporting that mind. Joe's mature side can grasp in a few minutes that he is a capable, admirable person, but it is his immature side, the mind of his left hemisphere, which will keep him in therapy for a while yet. What the behaviorists have failed to appreciate is that the person is the product of the interactions of both minds. Because the struggles which go on within a person are not easily observable, they were missed by the behaviorists.

Am I Anxious?

Most people have or will suffer some form of anxiety. Many of my patients have had episodes of panic, some feel self-conscious in public (the essential symptom of acrophobia); some have obsessions or compulsions, almost all have been traumatized by some form of stress, acute or chronic. Symptoms are dynamic and fluid; they are responses to a person's circumstances, either internally or externally, and they cannot be easily captured in an enduring diagnostic label.

Nonetheless, mental health professionals use the specific criteria of the Diagnostic and Statistical Manual of Mental Disorders, now in its fourth edition. It is called by everyone the DSM-IV. This latest edition lists over a dozen major disorders relating to anxiety. One of the unfortunate outcomes of the hegemony of DSM is that patients are meant to have one specific disorder that can be corrected with a specific treatment. But in practice this goal is often elusive, and the same medications and treatments are used, as they should be, to treat a wide range of problems.

I believe that anxiety and depression (which I explore in the next chapter) are natural biological states that one enters when threatened (anxiety) or defeated (depression). Some people are more severely threatened or more chronically defeated than others, but fundamentally such states are fluid and dynamic and depend on which hemisphere is dominant. Dual-brain therapy applies knowledge about hemispherically based intra-psychic differences to clinical practice. Often, I will prescribe medications to assist my patients, but I do so as a partner with them in an ongoing uncontrolled experiment of sorts, in which we both watch carefully for

possible medication effects and side effects. For patients experiencing distressing anxiety, I may offer a benzodiazepine such as clonazepam, or an antidepressant such as imipramine or Prozac if the first session or two has not brought enough psychic relief. In my experience, it is relatively easy to move my patients off psychotherapeutic drugs when anxiety is well treated psychologically. This is especially true when a patient is able to help his emotionally healthier side convince his troubled side that together they are safe.

In the next chapter entitled, Despondency: Depressive Disorders, we will discuss depression, but this will not be an entirely new subject, rather it will be a continuation of this one with a look at how depression is generally viewed by the profession and how that view might be altered by a perspective which considers the left and right hemispheres.

CHAPTER SIX

DESPONDENCY: DEPRESSIVE DISORDERS

Celia, an attractive woman in her early 40's, was a literature professor at a local college. In spite of her obvious intelligence and considerable accomplishments she had always felt deep within that she was hollow. Celia diminished her accomplishments and held out little hope of doing anything interesting with the rest of her life, for she "knew" herself to be neither attractive, intelligent, nor worthwhile. She avoided or rejected professionally successful men, and she intimidated those who weren't. After the last break up, several months before beginning her treatment, she found herself feeling long periods of despondency. She felt very alone and pined for a relationship but was afraid of getting injured if she sought one. She also felt stymied in her career by a department chairman with whom she could not relate amicably.

Celia seemed so depressed that I prescribed Prozac in the first session. She came to feel that the medication was helpful to her as we continued our work over the next few months. She felt her mother was extremely critical of her especially during her adolescence. Her relationship with her father had always been very strained. Celia described a father as a person who couldn't express love, but only unwarranted and unnecessary precautions and admonitions about sexual promiscuity. Her parents always appeared to her to be in an unhappy, painful relationship with each other. Celia discovered that she could escape the family's pain through her academic work.

Though her mood improved, and Celia seemed clinically less depressed, I felt that her therapy was moving slowly. Celia struggled to avoid looking deeply into her psychological nature because she was so

utterly convinced that she was inalterably, intolerably defective. Confronting this ugly essence, she felt, could be devastating.

It was at this point, two months into our work, that I suggested she try on the lateralized glasses.

"So, you're looking out the left side [right brain]. How do you feel?"

"Well, I feel anxious, nervous."

"How would you rate your anxiety on a scale of: none, mild, moderate, quite a bit, or extreme?"

"Moderate."

"And how do you feel about yourself as a person?"

"I feel as if I have a lot of things I need to work on."

"You mentioned earlier, you were feeling 'defective.' Could you use that same scale to measure your sense of defectiveness?"

"I don't know, more than moderate."

"On that scale."

"Quite a bit, I guess."

"You have a sense of quite a bit of defectiveness as a person? And can you elaborate on that a little bit? What do you feel is defective about you?"

"I don't think I do as much with myself as I should. I don't think I'm as good as most people as a person in terms of being a good person, in terms of going out of my way to help other people. I think I could be more ambitious, and I could do more with myself. I'm not as creative as I'd like to be."

"Do you feel, if you're in a room full of people, that you're as good as the other people?"

"No."

"You feel that you're not as good?"

"No, I will, in fact, find the person that I'm convinced is what I consider to be better than myself and that will be the person I compare myself to."

"And, if you are on a subway, how do you usually feel?"

"On a subway, I'll tend to look at the different people, and I'll do the same thing even in a subway."

"How do you rate yourself on the subway? As good as other people or less than other people?"

"No, less than, I would say, because I would feel self-conscious."

"I want you to try the other glasses. (She switches glasses, and then there is a pause of 20 seconds.) Now you're looking out the right side [left brain]."

"Right. I feel more comfortable for some reason. I'm not sure. Not quite as anxious, maybe mildly anxious, and I feel a little calmer. Hum, not so critical. I mean I know I've just been critical; I know what I've just said."

"Just looking at what you're feeling now."

"But my feelings are more complacent, more at ease."

"And suppose you were on a subway, and you were looking around, how would you feel you were compared with other people?"

"Well, I think I'd see myself more as someone who's just an observer rather than someone who's being observed. And I go back and forth with that."

"How do you mean?"

"Sometimes, I feel very self-conscious and other times . . . "

"I mean right now."

"Right now, I would feel more like the observer."

"Would you feel less than other people on the subway?"

"No."

"Would you feel superior to people on the subway?"

"No. Equal."

"You'd feel equal?"

"Right."

"And, if I ask you to on that scale to measure your sense of defectiveness would you say none, mild, moderate, quite a bit, or extreme?"

"Ah, mild."

"Now, ah, do you remember how you felt when you had the other glasses on?"

"Yeah."

"Do you notice a difference?"

"Yeah, I notice I guess I feel a little more secure with these on."

"And what about, is there any difference in terms of how you feel about yourself, your self-worth?"

"Well, I think I feel that I'm OK."

"With these glasses?"

"Hum."

"And with the other glasses?"

"I tend to think of being a little more not OK, I guess, you know."

"Right. And do you notice that difference?"

"Hum."

"What do you think of that difference?"

"Well, it's a little strange because, I mean, obviously I can remember what I just said so, I mean, I'm going back and forth with these feelings, ah, I guess it's maybe the way I tend to view myself."

"I'm only asking do you notice any difference between the two ways in which you view yourself with the glasses?"

"Yeah."

"OK. Would you say it's a big difference or a small difference?"

"Well, I think it's a noticeable difference. I think it reflects the conflict I always have in myself."

"Right. So, this a conflict you've always observed, but now it's kind of made more concrete?"

"Hum, yeah."

"And that you can see one piece of yourself with one pair of glasses and another piece of yourself with the other pair of glasses? Is that what you're saying?"

"Yes."

"How does that feel to see these two views and separate them?"

"Well, I'm not sure. Hum, I mean, it makes sense to me, but I'm not sure why it's so, why it would be different. I mean, not different, but why this situation would be so clear cut with the two glasses. This struggle is a familiar one to me."

"Right. Right, it's a familiar struggle. Which view do you feel is more real?"

"Well, that's hard to answer. I would say the anxious one."

"And you feel that even with the glasses that you have on right now?"

"Yeah."

"So, you sort of trust the other side more?"

"Hum."

"But, with these glasses on you can see this other view of yourself."

"I mean, I can see the two."

"Has that changed at all, if you were on the subway, how would you view yourself right now?"

"I would be calm, and just . . ."

"Would you be as good as other people?"

"Yes."

"O.K. So, that's stable, a pretty stable view of yourself."

"Uh huh."

"So, I want to say that this negative view of yourself could be questioned. Not by a factual debate, but that it's just interesting that out of another side you just see yourself differently. And nothing else besides switching the glasses has changed. It's just that your view is different. Isn't that interesting."

"Well, I think the thing that is annoying for me about all of this is that one side dominates the other."

"Right."

"And it's not just a balance, I mean, it's a struggle, and one seems to get the better of the other."

"More the insecure part seems to dominate?"

"Right."

Celia's sense that she is worth less than other people is a common symptom of depression. She also suffered a sense of hopelessness, loneliness, alienation, meaninglessness, and despair. She was inhibited and withdrawn in both her work and her social life. All of these factors were interwoven into her general condition that psychiatrists call depression.

What becomes clear through the magnification of the goggles is that it is only Celia's right hemisphere which views herself as inadequate; her left side views herself, the same person, as adequate, and (from my further observations) is not depressed. In Celia's case, as in the majority of my depressed patients, the right brain harbors the disparaging view.

The Role of Trauma in Depression

In the next chapter we will discuss the syndrome of posttraumatic stress disorder in which traumatic experiences seem to implant themselves deep within the person and evoke symptoms such as flashbacks or nightmares which clearly represent a residue of the traumatic experience. But, as discussed in Chapter Four, all the patients we have discussed are really

trauma victims. The differences are in the timing in the person's development as well as the duration and severity of the trauma which influence the person's response to the experiences and shape the symptoms he is likely to develop.

All of the injurious experiences we have described so far have occurred in the patients' childhoods. Childhood is the time people are the most vulnerable, the least capable of protecting themselves. The younger the more vulnerable, all other things being equal. In order to traumatize a healthy adult, we may need an extreme condition such as war or torture, but Rene Spitz, studying infants neglected in an overcrowded nursery found profound psychological injuries, even death, resulted from the lack of loving care. [iii]

The fact is that small children are defenseless on their own. They are small. Their brains are not fully developed. They own nothing. They have few legal rights, and those that they have they don't know they have. Children are completely dependent on the adults who are expected to care for them. When those adults do not appreciate the child's needs either through lack of education or psychological disturbance, the child will suffer. Siblings and peers can also do great damage to children. Bullying and ridicule are serious forms of torture to small children. Adults often do not appreciate the damage which children can do to one another. Even worse, the child/victim usually doesn't appreciate that he or she is being assaulted, but rather assumes that it is he or she who is defective and deserving of mistreatment. One major psychological consequence of trauma is depression.

Depression As A Natural Biological Process

Depression, like anxiety, is the natural biological consequence of experience. Anxiety comes when we feel threatened. Depression results when we feel defeated. Anxiety and depression are emotions. Psychologist Daniel Goleman defines emotion as "a feeling and its distinctive thoughts, psychological and biological states, and range of propensities to act." Emotions are part of our biological make up. They are evoked by our brains in response to certain stimuli. When an emotion such as despair becomes persistent it interferes with our functioning and leads to the pathological state, we call clinical depression. Any condition which leaves us feeling utterly defeated will eventually lead us into the state of despair and

hopelessness that we call depression. When deeply into this condition, nothing works right. Our bodies betrays us, we become clumsy, jittery, unattractive, often incompetent. Working or socializing in a depressed state can become impossible, and not understanding his condition, the depressed person will often become severely embarrassed by himself and try to hide and withdraw, often curl up in bed with the covers over his head. And he can get very angry with himself and feel the same contempt for himself which he feels others have for him. [iv]

Why would mother nature provide us with a biological mental mechanism for self-destruction? From nature's perspective, the victim's destruction is good for the species. Let's say that a beautiful female moose is in the valley and two strong, handsome male moose want to approach her and mate. First the males must confront each other. They go off to the mountain top and fight. The winner gets the rewards and produces offspring, right? Wrong. What will happen is that the moose will both fight to the death and by the time the fight is over, both will be severely injured and exhausted, even the winner. Along will come a skinny moose, perhaps, looking a little bit like Woody Allen, and since he's the only male left, he gets to mount the female and beget weak, skinny, nearsighted offspring. Well, in order to guard against such a natural catastrophe, nature through evolution, came up with the solution--anxiety and depression.

The two strong moose go off to fight, but as soon as it becomes clear that one is superior, nature makes something happen. The one who's doing well becomes more emboldened, his adrenalin gets pumping, and everything functions well. He's having what we could call a "success syndrome." The other moose who senses that he is going to be defeated, begins to go into a “depression”. His energy ebbs, he becomes uncoordinated, and confused. He has all the symptoms of a depressed person. He is, in fact, depressed. In this condition, he has no choice but to submit. The two moose no longer must fight to the death, but rather as soon as one moose gets the upper hand, nature assists him, and he can win without serious injury. It is he who gets to mount the beauty. The defeated moose, like his human counterpart gets depressed, and wonders off to feel despondent. His human equivalent may not only feel despair but will become prone to a heart attack or any of a long list of lethal diseases associated with depression, including suicide.

We don't have to go to the Northern woods of Maine to prove my theory. Just watch the Super Bowl on TV. When one team gains a substantial advantage, it gets fired up and plays better while the other team begins to fall apart. What you are watching on national television is the early stage of the formation of depression. Notice too, that this happens even in the most successful, best trained, world class athletes. It's biology, it's the same behavior we would observe in the jungle.

Psychoanalytic and Dual-brain Explanations for Depression

Psychoanalysts have long recognized a relationship between painful childhood experiences and depression. They saw traumas such as loss of a loved parent or the loss of a parent's affection as especially important. The renowned psychoanalyst Karen Horney saw a connection between the loneliness and insecurity of depression and parental rejection. Freud's colleague, Sandor Rado linked depression with the child's sense of helplessness. More recently, British psychoanalyst John Bowlby emphasized the importance of problems with the emotional bond between the mother and infant for the development of depression in later life. In Chicago, psychoanalyst Heinz Kohut founded the "school of self-psychology" on the principal that a lack of emotional nurturance early in life was the basis for most psychological problems. Analysts, Elizabeth Zetzel and Charles Brenner also wrote about the relationship between early psychological traumas and later life depressions. [v]

My addition to all of this wonderful research on depression is that the traumas of the past get retained in the mind of one hemisphere. All of these analysts I mentioned saw childhood psychological insults as predisposing to depression, but none had a clear explanation for how this happened. Each asserted that a link existed, but the nature of the link was always a bit murky. This is because they mistakenly viewed the person as having one mind, but this is generally wrong. Heinz Kohut, for example, would say that the patient was depressed because his early needs for admiration and approval were not met, leaving him unfulfilled as an adult, frustratingly searching for the missing approval. My correction would be that Kohut's hypothesis is correct for the mind in one hemisphere, but it is wrong for that of the other hemisphere.

In Celia, the mind in her right hemisphere suffered exactly what Kohut described. When Celia looked out the extreme left side of the glasses,

she experienced herself as less than other people. This was the image she developed in her right mind in response to the rejecting attitudes of her parents. This archaic view persisted in the mind of her right brain. On that side, she felt inadequate because, as Kohut hypothesized in his theory, her parents were poor at providing her with the emotional nurturance she needed. In her left hemisphere, however, she had developed a more realistic sense of her value. Her problem can be more clearly understood as an injury to the mind in her right hemisphere which then tends to dominate her left-sided mind.

Sometimes when the defeat is persistent and overwhelming, both hemispheres will feel defeated and manifest depression, but this is only the case for extreme circumstances. In that case, the analysts would be correct to speak of the whole person becoming depressed over a massive loss or trauma. But, in most people with intermittent depressions or depressions of varying degrees, I feel that here the depression results from the negative side's gaining the upper hand in its constant struggle for power and control over the other side.

There are a few other interesting hypotheses from psychoanalysis about the genesis of depression. Freud and Carl Abraham suggested that depression stemmed from anger turned inward against the self in a very complicated scheme. The child's mind first felt his mother slipping away in their relationship and so he tried to internalize an image of the mother inside his own head. He then became so angry with the inner idea of the mother because she had abandoned him that he attacked her image. Because the image was actually located inside himself, he wound up unwittingly attacking himself and not his mother at whom he was really angry. Freud also came to feel that an image of a critical parent could be lodged in the patient's mind in the superego, and from that position could torment the patient with a lifelong barrage of criticisms. [vi]

I would reinterpret both of Freud's hypotheses differently using my schema. I would say that the child did get angry about the lack of fulfillment he was experiencing. Children can protest quite well, especially, after a certain age. But if the parents become unresponsive to the child's protests, then the child will become anxious (threatened) and then depressed (defeated), and the protests will eventually stop. This is why many, but certainly not all, depressed children have difficulty expressing anger outwardly. In adults who are depressed, in their troubled hemisphere is an

immature mind which feels anxious and defeated. When this troubled mind has a strong influence on the adult's personality, the adult may have trouble expressing anger because his troubled mind finds that such an expression would be too dangerous.

The troubled hemisphere in Celia's mind often attacked her by making her feel insignificant and inadequate, turning the anger inward towards herself. This was Celia's troubled side treating her exactly as her father had treated her. Sometimes she would have the feeling that she was sexually promiscuous, something her father accused her of, but nothing which could ever be attributed to her real behavior.

My view is that the complex notion of Freud and Abraham is unnecessary. Depressed patients have troubled, defeated minds and as a result have difficulty expressing anger outward because they do not feel empowered; they express it against themselves because that is what the troubled mind has been taught to do.

The Dual brain View of Depression

The reasons the troubled minds of depressed people attack themselves are the same reasons immature people become belligerent. First, we have a biological tendency to get angry with those who are failing. We don't like losers. Again, look at the Super Bowl; the fans get angry and disgusted at their team when they play poorly. The fans of the losing team may even feel a bit of depression after a loss. We (the human species) are enamored of winners and repulsed by losers. The troubled mind of the depressed person is no different, and when he sees himself losing, can become quite critical of himself, and beat up on his other side. This is why depression is apt to worsen after we suffer an actual humiliation.

But there is an additional, more interesting, complex reason why the troubled hemisphere might pick on its partner. Sometimes when a person feels overpowered by someone else, there is a human tendency to try to befriend that person. Patty Hurst fell in love with the man who was torturing her; many people in occupied countries joined the Nazis probably to be a part of the powerful group. It is plausible that the mind of an abused, mistreated, troubled hemisphere would try to "join" the powerful person. We often identify with powerful figures, and so could a troubled hemisphere.

Since the tormenter sees him as lowly or evil, he must assume this same view to maintain the identification. To join the tormenter, the troubled

mind must begin to attack himself. The troubled hemisphere is too concerned with joining the tormentor in order to survive to be concerned with the fact that he must attack himself. If this abuse begins in childhood, as the child grows, his troubled mind will continue to attack himself.

The mind in Celia's right hemisphere acted much like her father in its condemnation of herself. Because it is on the inside, the troubled mind can attack with a ferocity rare in the external world. This is why many of my depressed patients say to me, “If you've never been depressed, you have no idea how terrible it is."

A Person in the Troubled Mind

The picture of the mind of one hemisphere acting autonomously and attacking the other side is astounding to witness, and I see this often in my practice. One of the poignant examples of this is that often I have *spoken* to the troubled mind, *and I have had it answer me!* When this is experienced directly, it is quite remarkable.

An example of my talking directly with a patient's troubled mind occurred in a recent session with Don, a 47-year-old electrician who was severely mistreated as a child and who for most of his adult life has suffered severe depressions. The right-sided glasses (left brain) readily evoke his more troubled side which, for convenience, we call Earl (which is his middle name), and the left-side pair bring out his mature side, which we call Don. He has been in treatment with me for two years and has made excellent progress over this time, but at times like the present session his depression breaks through despite our work and the medications I prescribe. The following transcript began at about the middle of our session when he was describing his current feelings. He was wearing the right-side glasses (left brain) which evoke his troubled side.

"What do you feel?" I asked.

"Anxious, nervous, depressed"

"What's the depression like?"

"I'm sitting here and contemplating the anxiety I have. I can't quite get out of it. I'm stuck. Don't know exactly how to turn it around."

"Does Earl feel angry?"

"He's always angry."

"Tell me about his anger."

"Anger is just anger. It can come out at anyone at any time."

"Does he get angry at Don?"

"Yeah, he's not doing his job."

"How's that?"

"I still like Don, but I feel bad for him."

"How do you feel bad for him?"

"Because he's weaker than a woman to me, because Earl, he's a strong son-of-a-bitch."

"Does Earl get angry with Don?"

"Yes."

"Do you feel angry with him now?"

"Yeah. A little."

"How so?"

"Cause Earl is pissed. He don't like too many people. He don't even like himself."

"Who's he most angry with?"

"Well, Earl is just fuckin' pissed off, cause he just can't figure out what's right and what's wrong."

"So, he's not particularly upset with Don?"

"Earl, he's jealous of Don. He doesn't like it when things are fuckin' good. He likes to be a little on edge, no matter what. Earl's not really mad at Don. But he likes to take a bite out a Don every once and a while, for sure. Just to keep him on track; this is the way it is. Earl, he keeps on turning wild. Don don't want it that way. Their piss off at each other."

"Does your anger relate to your depression?"

"Yes."

"How?"

"Well, when I get depressed, I get angry because I'm fucking depressed."

"And who's gettin' angry, Don or Earl?"

"Well, Earl's gettin' angry."

"And what's he do when he gets angry?"

" He tries to make Don angry; he tries to get Don in the same fuckin' boat."

"What's he do to Don?"

"He aggravates him, he throws him off kilter. He makes him mad; he wants Don to join his side. And when I'm depressed, I'm angry because I know he's fuckin' workin' on me."

"And what's he doing' when he's workin' on you?"

"He's not accepting reality; he's seeing things that aren't really there? He's frightened."

"When you get depressed is he biting you?"

"Oh, yes, definitely."

"How's he bite you?"

"Just like a thing I feel: pain, guilt."

"Is that Earl biting you?"

"Yes."

"And is he doing that now?"

"Yes."

"Now I want to talk to Earl. Can I talk with him?"

"Yes."

I at this moment change the tone of my voice, speaking firmly, with authority. "Earl, I want you to listen to me. I want you to stop biting yourself, I want you to stop biting Don. I want you to cut it out. I want you to relax and let it go. I want you to stop this biting. I want you to stop this depression, stop this picking on yourself. I want you to stop this abuse. You've had enough of that. . . . What do you feel?"

"I feel like I am a six-year-old who just got a spanking for acting up."

"How about your depression?"

"I'm eased off a little bit now."

"Tell me."

"I listen to you, Doctor. Earl listened to you. It's funny. It's not funny. See I take what you say seriously. Earl, he'll listen, but he doesn't seem to retain the thought or the advice, the knowledge, the right thing too long. He listened to what you said. He listened and he responded."

"Is he still responding? Or has he stopped listening?"

"No, he's responding."

"Is he not biting you now?"

"No."

"He's not?"

"No".

"And how do you feel?"

"I feel more comfortable."

"And how about nervous and depressed"?

"More comfortable, Doctor."

"Less depressed?"

"Oh, yes. Earl's there. He was attacking me. It was like you pulled him off me."

"He listened to me?"

"Yes, he did."

"What do you think about that?"

"Well, I wish the fuck he'd listen to me more. I think he takes me for granted. See I have more faith in you than you realize. I think Earl does too, in fact, I know he does 'cause he might not want to come here, he might not want to get well. Well, this motherfucker is gonna get better whether he likes it or not. Your talking was like a good flick on the back of the ear in second grade, and it got his attention. He's not roughhousing with me now."

"He'll listen to me?"

"Yes, he will."

Again, I assumed my firm tone. "Now I want Earl and I want Don to listen as well. I want you to listen to me and I mean it. But I want you to listen also to Don. Don is more important in this. And all three of us are going to work together. I want you to listen to Don the way you listen to me. I want you to follow me, and I want you to do what Don asks you to do. I want you to cooperate with him. Very important. I want you to do that. I want you to cooperate with me and that means to cooperate with Don."

"Now he's agreeing with you. Son-of-a-bitch. Sorta strange. It's the first time that I've gotten a down grade on his performance level on me, listening to you. He's calmed down tremendously. I was at an 8 [on a 10-point scale we have used] and was getting next to a fuckin' 9."

"What feeling was an 8 or a 9?"

"Anger, depression, both."

"And can we get Earl to treat you nicely?" I again assume my firm tone. " Earl, I want you to treat Don nicely, not just not bite him. Be his friend. Make him feel well. Earl, I want you to make Don feel well, welcomed, loved, valued. He's working hard for you; I want you to comfort him. Can you do that Earl?"

"Yeah, Earl can do that. Earl can do that. It's just a matter of him doin' it."

"What do you feel now?"

"Feel a little anticipation because that would be great to have a partner that's not bitin' me."

"Ah. A partner that's not bitin' you. That sounds good to me. Huh?"

"Yeah, it does."

"And how about a partner who's loving? How's that sound?"

"That would be icing on the cake."

"How would that feel?"

"I don't know?"

Again, in my firm tone. "Earl, do you hear me? I want you to love Don. Earl, do you hear me, love Don. Let it come. I know you've got that love. Give it to him. Share it."

Don cries. Tears flow down his cheeks. "I think Earl's feeling sorry for me now. Well, he's beaten me up so fuckin' much. Seems I wonder if he's even capable of loving."

"Can you feel his love now?"

"I can feel his caring . . . his concern. It's definitely weird. He's come over. I feel rested. I feel like I've won. I feel stronger with him, of course, more than I do without him even though he's a fuckin' asshole at times. I want Earl to learn to love. I haven't had these feelings. I don't know what a real capacity to of giving love, sharing love, receiving it is like."

"Are you beginning to? Are you beginning to discover what it's like to be loved? Can you feel Earl's love?"

"Yeah, because I think Earl can learn to love me. I'm gonna be loveable."

"And can Don love Earl?"

"Oh, sure, even though he's treated me like a fucking goddamn bastard. Earl, of course, is the dominant factor of everything. Earl is all that shit. Just mountains of shit. I take all that mountain of shit and applying to love; that's phenomenal. What it amounts to is all them fuckin' things, they were hate, they were painful. And I'm making that into a parcel of love to join Don."

"See the abuse wasn't Earl. It's that Earl was abused, and Earl can love; we just simply need to teach him. Earl suffered himself, and he also gave out a lot of abuse, but he can love. And we feel that now."

"Yes."

"And that's what's gonna make you better."

"Hum. . . . That's when it hurts me at times, thinking that I wasn't capable of loving."

"He's gotta learn how. He's learned about abuse; now he's going to learn about love."

"That's right. I just got a lot out of that. Earl did. Thank you, Doctor."

The Troubled Mind as A Perpetrator as Well as a Victim

Don was abused as a child. His troubled mind, Earl, is a victim of that trauma, but he has also become a perpetrator. We see that when we see Earl "biting" Don. Which is Earl? He is both. When I talk to Earl, I try to address both aspects. I try to let Earl know that I appreciate his suffering, his own anxiety and depression, but I also let him know that I want him to stop attacking Don. Parents need to do this all the time when their children need discipline for negative behaviors which stem from insecurities and hurt feelings. The parent needs to say, "No, you can't kick me, but why do you want to?" or “No, you can't use drugs, but why do you want to?"

I also believe that the mind in the troubled side can have changes in mood. It is not always attacking us, and this is why depressions seem to "cycle," come and go.

The Troubled Mind Can Recover

One of my patients who was very responsive to the goggles had a right hemisphere which was very troubled and depressed. The patient had been severely ridiculed as a child by other children. When his depression was at its worst, his right sided mind was very strong and very certain that it was about to be ridiculed. It dominated his left-sided mind which did not share this frightening view of the world. When the patient wore the right visual field goggles (stimulating his left brain) he felt much better, but as soon as he took off the goggles he returned to his depressed, frightened state.

The patient made a fairly rapid improvement over the next few weeks in his therapy. Interestingly, the goggles continued to work, but now his right side was not so frightened, and even without the goggles he was beginning to feel well, though not as well as when he wore the goggles that stimulated his left brain. His left hemisphere was having a greater influence on his overall state and on the mood of his right side.

As he progressed, he was no longer clinically depressed, and was in fact beginning to do groundbreaking work in his field. Nonetheless, when

he wore the goggles activating his right side, he was untrusting, and that side wanted to stop his therapy. What became clear was that the right side wanted to stop the therapy because it was afraid of being ridiculed first by me, possibly, but also by others if it ever became know that he was seeing a psychiatrist. To his troubled right hemisphere, anything which might provoke ridicule in the school yard needed to be urgently avoided, and seeing a psychiatrist was something his troubled side saw as potentially dangerous in that regard.

His left side, however, was not at all afraid that I might ridicule him and wanted to continue his therapy because he saw that his right side still had work to do--it had to learn that it was truly safe from ridicule. When the patient came into his session (without any glasses), he wanted to stop his treatment because his depression had been resolved, and he was functioning extremely well. He didn't have the time for therapy, and he could not justify the cost. But, after seeing that his right side was still troubled, though no longer so powerful or so troubled to cause a clinical depression, the patient decided to continue his therapy with the aim of further helping his right side. A few months later when his right hemisphere was feeling secure and trusting, we both decided that he was ready to terminate his treatment, for we had accomplished our goal--we successfully taught his right side that he was now truly safe.

There appear to be two ways a person can resolve his depression. The first and most successful is when both sides become healthier, and the troubled side is no longer troubled. The other case is when the healthier side becomes able to dominate the person's mental life, and the troubled side though still maintaining its archaic ideas, sits more in the background. Later I will describe some patients who had appeared to have fully recovered who return at my request to try on the glasses. Some of these patients, including two recovered cocaine addicts who also suffered depression and had had no drug use or symptoms for years, immediately had their old symptom return with the glasses on one side and disappear on the other. In these patients, their recovery was apparently due to the assertion of their healthier side.

Cognitive Therapy

The other major psychological explanation for depression comes from the learning theorists who are the leading psychological thinkers at most universities. Aaron Beck of the University of Pennsylvania has led their

charge in the clinical aspects of this area. Beck discovered that persons with depression have negative thoughts. He categorized three types of negative thoughts which he called a "cognitive triad": thoughts of helpless, interpretations of events in an unfavorable light, and thoughts that the future is hopeless. Beck developed cognitive therapy which attempts to help people discover, clarify, and then work to change their negative, depressive thoughts. I would venture that the excellent results that cognitive therapy can achieved stem from the therapist's correcting the negative thoughts in *the troubled hemisphere*. [vii]

The Biology of Depression

A large number of neurochemicals and hormones are being studied to determine a relation between them and depression. Candidates being investigated are norepinephrine, acetylcholine, serotonin, cortisol, and thyroxine. Since the selective serotonin reuptake inhibitors (SSRI's) have become useful medications for depression a great deal of research is under way to understand how serotonin may relate to depression. One hypothesis is that a low level of serotonin does not by itself cause depression, but that low levels permit either mania or depression depending on the norepinephrine level which tends to be higher in mania. Some researchers believe that serotonin is an inhibitory chemical that reduces arousal and decreases norepinephrine secretion. Another hypothesis is that an imbalance between acetylcholine and norepinephrine such that the acetylcholine exceeds the norepinephrine might contribute to depression. What is clear is that the neurochemical systems in the brain are quite interrelated and a change in one chemical leads to complex alterations in its related systems. [viii]

There is much speculation about whether chemical changes precede or follow the psychological changes wrought by depression, but easy, clear answers are not available, and quite possibly the complex interactions between mind and brain are inseparable. The fact that many patients can recover quickly and permanently suggests that many of the neurochemical changes associated with depression are not inalterable.

Research into the genetics of depression have not yet yielded clear results. There has been no research on the inheritability of ordinary, everyday depressions. Research has been conducted on patients with Major Depression, which is a very profound depression often requiring

hospitalization. For Major Depression the evidence does not suggest much in the way of inheritability. For instance, when identical twins (with identical genes) were compared to fraternal (non-identical) twins (with different genes as in any pair of siblings) regarding depression, there was little difference between the two types of twins. One study involving over 1000 twins showed that if one identical twin was depressed then 48% of the time so was the other. If one fraternal twin was depressed, then so was the other 42% of the time. I don't think there's a big difference between 48% and 42%. If major depression were inherited, you would expect a large difference between the two types of twins.

Geneticists often use this type of twin study in which the similarities between identical twins are compared with those between fraternal twins. These studies have certain problems inherent in them. For instance, identical twins probably have more similar environments than fraternal twins; they get dressed identically and are constantly mistaken for one another, and so one might find differences between the groups on the basis of environmental as well as genetic factors. I have always regarded these studies with caution, and the finding in one such study, that identical twins both with heart disease differed substantially in their smoking habits, demonstrating that cigarettes do not pose a risk for heart disease, gives me further confidence in my caution. [ix]

Better twin studies are obtained by examining identical twins who were adopted and reared apart, but there are, as yet no such studies. There are 2 studies of adopted children who were not twins. The first study looked at how many biological parents of 56 depressed, adopted children living separately were also depressed. They found that 5 of the biological parents suffered depression, in contrast to 3 of the adoptive parents. This study suggests that depression is not inherited. [x]

The second adoptive study looked at 8 depressed biological parents and found that 38% of their adopted away children suffered depression. Of 43 biological parents who were not depressed only 9% of their adopted away children suffered depression. Though 38% is much larger than 9%, because there were only 8 depressed parents, the results could be due to chance alone since they did not pass the mustard of statistical analysis. These authors did report that known environmental factors were very important in inducing the depressions in these children. I think this

study leaves open the possibility that inheritable factors are important in depression, but it certainly proves nothing of the sort. [xi]

Another serious test of hereditability would be to see if we could find the actual genes which cause depression. This has not happened. The next best thing would be to see if known inheritable traits such as eye color or blood type could be consistently associated with depression. Such known inherited traits are referred to as "genetic markers," meaning that if an association between a known trait such as eye color and depression can be established then eye color would become a genetic marker for depression. Over the last few decades, a plethora of studies have attempted to find such genetic markers for depression. On many occasions such genetic markers have been found, but, in each case so far, the findings were not confirmed by repeated study, and to date no accepted genetic markers for depression have been discovered.

There is considerable evidence reported by the biological psychiatrists for the hereditability for manic psychoses which often alternate with depression in the so called manic depressive illness or bipolar disorder, but I think this is a long way from the typical clinical depression. But, even for bipolar disorder, the data could use continued examination, especially since clinically, according to biological psychiatrists, about a fourth of patients with a diagnosis of major depression are reclassified as manic depressive.

I remember in 1987 being very impressed when Dan Rather announced on the CBS Evening News that a group of scientists essentially located the gene for manic depressive illness by finding that it was linked to a specific known gene on a specific chromosome. I found this incredible since it contradicted all I had observed about psychiatric illnesses, even manic-depressive illness. [xii]

Over time nine different attempts by different groups of scientists were made to replicate these amazing findings, but none could. The group which originally announced the findings, two years later retracted them. [xiii]

Some neuroscientists have suggested a relationship between a "physically defective" right hemisphere and depression. These scientists base their hypotheses on studies involving neuropsychological testing, EEG analysis, imaging studies, and clinical histories of patients with brain injuries to one hemisphere. Most of these workers have not yet conceptualized the right hemisphere as psychologically troubled. I would not generally classify

the emotionally immature nature of one hemisphere as a brain disease, although certainly this psychological nature could relate, in part, to the hemisphere's physical structure. [xiv]

Neurotransmitters (brain chemicals) are not free floating in the brain but are secreted locally in small amounts by discrete systems of neurons which have specific paths and locations in the brain. It is interesting that a number of the neurotransmitter systems which are considered possibly related to depression are physically located more in one hemisphere than the other. In most people, the norepinephrine and the serotonin systems appear to be located more in the right hemisphere than in the left. Further a number of recent studies have indicated that many medications appear to have more effects on one hemisphere than the other. [xv]

This leads to the possibility that popular SSRI's such as Prozac have their effects by enhancing one hemisphere over the other. Although widely believed to be essentially a cure for depression, in the only large, controlled study comparing Prozac to placebo the differences were not impressive. Prozac lowered the level of depression 40% compared to a lowering of 29% for the placebo. Psychopharmacologist William Appleton points out that while 70% of patients taking Prozac achieve some benefit, only 28% manifest an excellent response. Is Prozac apt to work by helping to shift the hemispheric dominance to the healthier side? [xvi]

The New Magnetic Stimulation

Recently, a new treatment for depression was announced by the National Institute for Mental Health and by a group from Spain let by neuroscientist Alvaro Pascual-Leone who has recently come to Harvard. They both reported treating depression using a pulsating electromagnet held over one side of the head. The electromagnet has a powerful localized effect on the underlying brain. Depending on the rate at which the magnet is set to pulsate, it can either enhance or inhibit the area of the brain being treated.

Recently, I met with Dr. Pascual-Leone at his new laboratory in Boston. He has found that by placing the electromagnet over the left side of the patient's head, in other words over his left hemisphere, and setting the pulse rate so that it enhances the left-brain activity, he is able to significantly reduce the depressive symptoms in 60% of his patients. I speculated that what might have happened was that the healthy hemisphere of each improved patient was physically enhanced by the electromagnetic stimulation, allowing

the more mature side to become more dominant. Possibly the patients who did not respond, would benefit from stimulation on the other side. It is interesting that of my patients with major depression, 60% responded to the glasses in a manner that indicated that their left hemisphere was the healthier side. I suggested to Dr. Pascual-Leone that perhaps the lateralized glasses might predict which hemisphere is more mature and more likely to benefit the patient from its stimulation. I sent Dr. Pascual-Leone a set of the two lateralized glasses, and he and his associates are using them on his patients as part of their pre-treatment work-up. So far many of his patients have had lateralized emotional response to the glasses, and we are planning a study to see if the side and intensity of the responses to the glasses correlate or not with the clinical responses to the electromagnetic stimulation. I have also wondered if combining this treatment with psychotherapy, similar to the way I combine the goggles with therapy might prove helpful. [xvii]

Why Therapy Succeeds or Fails

Depression is often very difficult to treat, and I welcome advances that can be made from the neurosciences. Drugs like Prozac are extremely helpful to those who get a very positive response. When therapy fails, I feel it is because we have failed to win the confidence of the troubled side. Often the troubled side is so dogmatic and so determined because it is so frightened, that it defeats me (even aided by Prozac), and with me, the patient. Fortunately, the troubled side usually learns with trepidation to accept the help it pines for. Our goal in dual-brain therapy is to help the patient's healthier side to teach, comfort, and discipline his more troubled side, and eventually to convince it of the reality that it no longer has to be defeated.

CHAPTER SEVEN

EXTREMES: POST TRAUMATIC STRESS DISORDER

Lyle, A Veteran of Viet Nam

Lyle waits with his head down. He hears the shouts to "move on the fuck out." The fire fight erupts. Bullets ripping in from cross directions from an impenetrable jungle on both sides of the rice paddy. The lieutenant goes down. Dead. Lyle fires aimlessly at the jungle and tries to run forward, but his feet slip and he's back in the water. He hears bullets all around. He knows it's the one he doesn't hear that will kill him.

Lyle is in Viet Nam. He has been on this mission for several days. He is exhausted. He is spent. But he is alive. Half the men in his platoon are dead or so badly wounded they wish they were. The leaches don't bother him as much as they used to. He wonders if he'll get out of this one, something he's wondered a hundred times before.

Lyle survived. He wants to attribute his survival to his grit and courage, for which he's been decorated, but he knows his real debt is to dumb luck, to blind statistics and probabilities. He survived only because he survived, only because some bullet or some mortar round didn't happen to land exactly in the small space his body occupied.

When he returns to Fort Benning, Georgia, he learns that his fiancée is four months pregnant. He was always a mild-mannered man of Southern gentility. Now he finds himself intoxicated, screaming at the woman whom he feels betrayed him, the woman he doesn't have the strength to leave. He's becoming chronically angry. He never sleeps much. He can't function at work. And he's always feeling scared, always jumpy. He can't trust anyone. He's alone and terrified. At night in the dark and in his dreams he's back in the rice paddies and the fire fights. He wakes up drenched in sweat. He needs a drink or he's gonna kill some motherfucker.

Lyle's drinking becomes more intense and more frequent. When he's not picking bar-room fights, he's driving his pick-up truck around the town as if he's in a stock car derby. Eventually he's arrested. And by the third arrest, the army suspects he may need a psychiatrist. He's hospitalized uncaringly.

Our First Meeting

I meet Lyle 27 years later, after he's had Thorazine and Stelazine and Prozac and Valproate and three more hospitalizations, all for conditions with which he's labeled but only vaguely fits, from character disorders, reactive psychosis, to manic depressive illness. And somewhere back there, he's not exactly sure where or when, he's been given a series of 12 electro-shock treatments. When I meet Lyle in 1995, he is referred to me because his last psychiatrist became too frightened of Lyle's anger, too frightened that Lyle's rage would erupt in his direction, too frightened to treat him any longer. He said this in his letter. And he was right, Lyle was dangerously angry with him. But Lyle is not only angry with his psychiatrist, his angry embraces much of the world. And he is about as terrified and as depressed as he is enraged.

Lyle and I know almost immediately that we will work well together. I understand that he is injured profoundly, that he is initially injured by his experiences in Viet Nam. I will teach him that his rage, his terror, his despair are the distant sequelae which have evolved eventually from his war experiences and from the error upon error that followed in attempts to address his misunderstood symptoms.

PTSD Can Sometimes Be Difficult to Diagnose

Although Lyle suffered the classical syndrome of Posttraumatic Stress Disorder (PTSD), his condition had been misunderstood from its beginning, just as the syndrome itself as it relates to Viet Nam was not widely recognized until the mid 1980's. For 27 years he had been regarded essentially as a genetically deficient, character disordered, mentally ill patient, unresponsive to the modern, good treatment bestowed upon him. Somehow Lyle had slipped through the cracks when the mental health profession made the connection between the effects of war trauma and the thousands of broken Vietnam vets being treated at Veteran's Hospitals nationwide, and his war experiences were not considered central to his problems by him or by his caregivers. One of the reasons for this is that

patients with PTSD suffer profound anxiety, depression, and impulsive behaviors, any of which can capture the attention and concern of health providers and overshadow the distant roots of the problem. [xviii]

Psychiatrists have been leery about letting in the Trojan horse of PTSD, lest it contaminate all of the psychiatric diagnoses (which are seen by many as biological disorders unrelated to the environment), and they have worked hard to delineate it clearly from all other psychiatric syndromes. To have a diagnosis of PTSD, a patient must have experienced or witnessed an actual life-threatening event. The emphasis here is on the word "actual." This means that if the person were threatened as an inarticulate child by a dysfunctional family with humiliation and neglect then he would not qualify for PTSD since his trauma would not be "actual" as this word is intended by the anonymous authors of the DSM-IV. To have a diagnosis of PTSD one must have experienced a trauma obvious to all, such as war or rape. Unfortunately, as in Lyle's case for 27 years, even war may be overlooked as a trauma, and, of course, it is easy to overlook less obvious traumas such as chronic rejection. So, to begin to define a diagnostic category by what is apparent to an outside observer of questionable skill is to my mind starting out on slippery ground.

The three additional clinical features one must have to earn this diagnosis are that one mentally reexperiences the traumatic event in one of a number of ways such as flashbacks or nightmares, that one avoids some memories, thoughts or feelings associated with the trauma, and that one has persistent symptoms of arousal such as insomnia, difficulty concentrating, or easy startling.

Lyle easily fit all of these criteria, but his most prominent symptoms were his profound depression, his irritability, and his intense anxiety. Further, the great majority of patients with PTSD have in addition other psychiatric diagnoses such as alcoholism, antisocial personality, depression, and anxiety disorders. So, this surgically clean, politically charged diagnostic category of PTSD, for me becomes messy and indistinct. I do not assert that obvious, "actual," overwhelming traumas may not affect a person differently from the less obvious, more insidious life traumas. Indeed, dissimilar traumas could be expected to affect people differently and to affect distinct groups of people (trained adults versus small children) differently, but we cannot be precise about this because there are too many unknown variables. For instance, we do not know precisely what the trauma

meant to the person, precisely how well or how poorly he dealt with it, or precisely how many supports he had or didn't have. Lacking such precision, we can only speak in the broadest generalities. Like many others, I do not feel that PTSD is a completely distinct syndrome. Bessel van der Kolk, a prominent psychiatrist at Boston University and his associates describe "complex PTSD" which includes symptoms of emotional distress after the acute PTSD resolves when clinicians may not appreciate that the symptoms are the result of an earlier trauma. In fact, there have been elements of trauma (defined more broadly) underlying all the psychiatric symptoms that I have ever witnessed and treated. [xix]

Today, Lyle is vastly improved. Except for occasions when he gets stirred up, he is calm and comfortable. His heart no longer races all the time, but now beats calmly and slowly. He smiles now for the first time in decades. Although he continues to take several medications, he requires much less medication than when we started two years ago. I now prescribe sertraline, a SSRI antidepressant, clonazepam, a benzodiazepine for anxiety, and valproic acid, which was given to him as a "mood stabilizer" prior to my seeing him for a previous diagnosis of manic-depressive illness. Although I have never diagnosed him with this condition, since he feels this medication (which affects same type of brain receptors as the benzodiazepines) helps to calm him, we continue to use it. And he no longer relies on heavy doses of alcohol to supplement his prescribed psychotropic drugs.

The Pivotal Theoretical Importance of PTSD

PTSD is of pivotal theoretical and clinical interest because it bridges the gap between biological psychiatry and its sibling, dynamic psychiatry. Some psychiatrists had asserted that disorders such as major depression and severe anxiety were generally the result of primary biological brain abnormalities which they sought to discover. Dynamic psychiatrists asserted that such psychological problems were primarily the result of life experiences which were too painful and too difficult to deal with.

Certain extreme and severe life experiences allow us to reflect upon this debate. In World War II, with the ascent of psychoanalysis, it became widely recognized that there were vast numbers of psychological casualties from combat experience. Studies of Nazi concentration camp survivors indicate that 100% of survivors who were there for a length of

time suffered substantial psychological symptoms of anxiety and depression. In a study of Viet Nam veterans, psychologist Ghislaine Boulanger reported that about 36% of heavy combat veterans suffered symptoms of PTSD. And in a more recent and more comprehensive study led by psychologist Brian Engdahl of the Veterans Affairs Medical Center in Minneapolis, the research group found that among 262 veterans who had been prisoners of war during World War II or the Korean War, 53% had suffered PTSD. Among those held by the Japanese who inflicted the most severe traumas, the lifetime rate of PTSD was 84% of whom 59% continue to suffer the full syndrome. The authors concluded, "These findings indicate that PTSD is a persistent, normative, and primary consequence of exposure to severe trauma." By the term normative, the authors mean that any ordinary person exposed to severe trauma can be expected to develop PTSD. [xx]

Psychiatrist William True and his associates assert that veterans who become ill are likely to be genetically more vulnerable to trauma, and psychiatrist R. K. Davies even asserted that victims of trauma may actually seek assaults because of neurologic, possibly genetic, abnormalities. [xxi]

Bessel van der Kolk reviewed the literature and described the physical effects of severe emotional trauma. His descriptions of the lasting physical effects of traumatic mental events were clear and striking and began to narrow the gap between the biological and dynamic approaches to the mind. Clearly, no longer could the mind and the body be considered separate, impenetrable worlds. From now on the mind could affect the brain in substantial ways, and of course the brain could in turn affect the mind. In other words, van der Kolk's work suggested that psychiatric syndromes were biologically induced by brain and hormonal abnormalities that were the consequences of traumatic life experiences. The solution in Bessel van der Kolk's view is biological because the defect is biological, but henceforth the biological defect has a new origin, the ethereal mind. [xxii]

There is no doubt any longer that psychological trauma can affect the body. A traumatic experience alters brain neurotransmitters, the immune system, and our hormones as well. And there can be no doubt that there are psychological consequences to these physical changes. A new set of neurotransmitters will clearly affect one's view of the world. We see this whenever we take psychoactive chemicals whether prescribed or illicit. Lyle's persistent changes in body and brain resulted from his war experiences and were compounded by the disruption of his life by the resulting

symptoms. But these persistent biological effects can be treated psychologically, as Lyle's improvement through his psychotherapy demonstrates. In fact, Lyle and I made some original observations with the goggles which shed important light on the physical and the psychological nature of PTSD. [xxiii]

Using the Lateralized Glasses with Lyle

Lyle had been in treatment with me for about a year when I first thought of asking patients to limit their vision to one side. When he looked out of his left visual field (right brain), he said he didn't feel much different. But his distress was palpable when he switched sides. I asked what he was feeling, and he said, "That plant looks like the jungle." He was looking at a large potted plant behind me. I asked him quickly to switch to the other side again, and he then reported, "No, that's a nice-looking plant."

In some subsequent sessions, I tape recorded his responses to the taped goggles. Let's look at the transcripts of one of these trials.

"(Without any glasses) How much anxiety are you feeling right now?"
"Moderate."
"Pick one of the glasses. . . . OK, you're looking out the right side [left brain]."
"Yes. . . . Just a little turbulence."
"How much anxiety are you feeling?"
"A little more."
"How would you rate it . . . none, mild, moderate, quite-a-bit, or extreme?"
"Quite-a-bit. More so than what it was."
"And how depressed do you feel, none, mild, moderate, quite-a-bit, or extreme?"
"I'm depressed quite-a-bit."
"Quite-a-bit. Do you have any physical feelings?"
"My heart rate seems to be at a higher rate."
"Does it seem very high. Is your heart racing or just a little bit fast?"
"Just fast. Worrisome."
"And how much stress do you feel, none, mild, moderate, quite-a-bit, or extreme?"
"Feel quite-a-bit, Doctor."

“OK. And would you try the other glasses for me? (30 second pause.) So now you’re looking out the left side [right brain].”
“I see, I feel more like reality is there.”
“How much anxiety do you feel now?”
“Moderate.”
“And how much depression do you feel, none, mild, moderate, quite-a-bit, or extreme?”
“It’s moderate, it’s not extreme. I’m more at ease.”
“And how about your heart?”
“I felt myself calm down.”
“And how much stress are you under, none, mild, moderate, quite-a-bit, or extreme?”
“Moderate.”
“Moderate stress? And how much difference is there between one side or the other?”
“On a scale of say one to ten, ten being extreme, one being nothing, from a nine to a four, easy.”
“So, you feel like a four on this side [right brain], and a nine on the other side [left brain]?”
“And is that true for anxiety as well? How would you rate the anxiety?”
“Yeah, my entire . . . whole spectrum of things.”
“How would you rate how you feel with these glasses on versus how you felt when you came in when you were sitting there without the glasses, and I asked you how you felt?”
“Better.”
“And on that scale between one and ten, how would you rate the difference between now and before you put on any glasses.”
“Well, before putting any glasses on I was about seven.”
“And now?”
“Three or four, Doctor.”
“So, you feel less depressed on this side [right brain]?”
“Oh, most definitely.”
“Now, can you let the other side look out this window [glasses allowing vision to the left visual field which generally stimulates the right brain]? Can you let that other part of you see how calm the world looks out of this window, out this side?” I am asking him if somehow (and I don't know

how) he can let his troubled side look out and see the way the world looks to his healthier side.
"I understand what you're askin'. (1 minute pause.) Well, he's balking. He don't really want to look. Let me concentrate here. They're so separate. (1 minute pause.) OK. I've got him over here."
"And can you let him see how calm and safe things are?"
"He's lookin'."
"And is he impressed?"
"I think he is."
"Can he see that the war's over?"
"Yes he can."
"How's he feel about that?"
"He feels good."
"Can he enjoy that?"
"He can. He can. . . He can see that side."
"Maybe he's not in danger anymore. Maybe he doesn't have to suffer anymore. Maybe he's safe now. Maybe it feels good to be safe."
"Oh, it does. He has to feel that way. He has to."
"And he can see it for himself?"
"Clearly now."
"Uh huh. He doesn't have to trust me; he can look and see it for himself; that the war's over."
"Yes, he can."
"He's done his duty; he can come home now."
"I think he can retire from the war, Doctor. And it's crazy; he feels, he's tired, you know that. He's one tired veteran. He needs to rest. He can see that. He's calm now."
"Put your arms around him and bring him home. He's safe. He's done his duty. Now it's time for R & R; time to come home. Time to come home . . . to safety . . . to peace . . . to rest."
"He wants that. I know he does."
"And you'll protect him?"
"With all my strength and being I will. I need him; he needs me."
"How's it feel now?"
"He's still lookin' in that window; I don't think he's looked through it long enough to see that clear colored breeze, no bombs, no machine gun fire. It's very quiet. I got to . . . He needs a lot of love and attention; he needs to

be cared for. I don't think I've done my best. I feel stronger emotionally right now. Feel like I, I feel like I'm walkin' along beside him. He's battered and he's bruised. He's hungry for it. He's hungry for . . . he's hungry for love."
"And he's gonna get it too."
"And peace."
"Let him have it. Let him have it."
(Patient sobs.) "Nobody knows what the hell he's been through, Doctor. I gotta love him even though he's been a bad guy; but he's not really, just the way things happened to him. But he wants it; he wants it. He wants help. He's ready."
"You gonna bring him home?"
"I am. . . I am.
"How do you feel?"
"I feel good."
"Good. First time I heard that in a long time."
"I don't recall ever saying it [before]."

What we find in Lyle is interesting. We find that he does indeed still suffer from the experiences in Viet Nam which he endured about 30 years ago. In his life before our work, he continually suffered the symptoms of PTSD, the angry outbursts, the intrusive flashbacks and nightmares, the avoidance of intimacy, the pessimism, the depression, the despair. But what we come to observe with the goggles is also important. We see that on one side, looking to the right, he is much more symptomatic than when looking to the left. From our interview we see that he too has two minds, one very troubled, still mentally living in Viet Nam, and another mind much more calm and realistic, living much more in his present reality.

Lyle's improvement did not come in one session by simply putting on a pair of glasses. It was a hard up and down struggle which only in the last two months has begun to show solid, reliable improvement which he can maintain between sessions. Essentially, it took us two years, meeting weekly, often but not always using the goggles, to finally get his mature side to have the will and the courage to stand up to his then more energetic, more troubled side. We had to convince his troubled side that it too would profit by letting the mature side lead. We promised his troubled side that his mature side would nurture and protect him. His mature side and I imagined

that we were rescuing his troubled side -- wounded soldier from the battlefield. We wanted to let the troubled part know that the war was over and that we were here to bring him home.

Essentially what we learn is that when a human mind is overwhelmed it stops functioning well. It suffers the effects of the traumatic experience, and it suffers in predictable ways. It will develop all of the symptoms of PTSD. These symptoms, disturbing thoughts and memories, emotional withdrawal, hyperactivity, anxiety, and depression are simply the human mind's biological response to a sense of overwhelming danger and defeat. The important word here is "overwhelmed." The DSM-IV says that to have PTSD the patient must have experienced an actual life-threatening event. We have not used the word "actual" in our clinical descriptions because what is experienced as catastrophic by one person may not be by another. What is important in regard to trauma is that it causes injury when the mind is overwhelmed, stretched beyond its ability to cope. In an adult it may take a war to overwhelm a mind, but in a small child it may merely take sustained rejection or ridicule.

Lyle's mature mind could better deal with the trauma, is able to bring "psychic" resources to bear against the trauma and its memories. Lyle's recovery was aided by the goggles in two important ways. By isolating the troubled side, we became aware of the full extent of the psychological injury. His healthier side becomes stronger and thus able for the first time to teach his troubled side that both are now safe. I described a third benefit in Chapter Three: the goggles provide the wearer a few moments to bask in the healthier aura of the more mature mind.

Abuse in Childhood

Kathleen was a 40-year-old married black woman who had been an executive at a leading Boston advertising firm until she was summarily fired without obvious reason two months earlier. That was nine months ago when her primary care physician referred her to me because she seemed to be feeling periods of moderate depression. He put her on Prozac which she felt didn't help her and caused her stomach distress.

In our first session I learned that she came from a very intense dysfunctional family in which her mother would alternately scream at her and lavish love on her. Her father seemed a distant man who was prone to pathetic depressions. I attributed her depression to the pain of her job loss

amplified by unresolved issues going back to her dysfunctional family. I pointed out that there might be another part of her which was more troubled by her past than she realized. I suggested she stop the Prozac and I gave her a prescription for Zoloft another SSRI antidepressant.

Ten day later in her next session she reported feeling much better but neither of us understood why. She said, "I hope it isn't because of our discussing that inner part of me who had felt injured by my parents." She on her own had begun to call that part of her Kathy because it seemed to relate to her childhood. She referred to her mature personality, the former advertising executive, as Kathleen. As with other patients I have described who have given names to the different aspects of their personalities, this was not a form of multiple personality disorder in which different parts of a person become autonomous and can have amnesia for other parts. With Kathleen, Kathy, was merely a conveyance to aid our discussions.

In the second session Kathleen told me that she had decided not to fill her prescription for Zoloft. She expressed concern that I was not paying enough attention to her present life problems, but at the end of the session when I described our task in her therapy as that of our teaching Kathleen how to be a good parent to Kathy, she suddenly broke into profound sobbing. Neither she nor I knew what my comment had touched.

Kathleen called and asked for an urgent appointment, and I saw her two days after the second session. She had been feeling very upset since our last session. Essentially, she had been in a deep grief about her relationships with her mother and her father. We discussed the nature of grief and the process of handling it. She felt much better by the end of the session, but she felt a need to come in more often and I began seeing her three times a week.

She was continuing to do well through her next three sessions, but in the following visit she reported that over the weekend she had had a memory of her mother holding her and slapping her so hard she thought her head would come off, and she could still hear the sound of the slaps. She thought she would be killed. She had known before that her mother hit her at times, but the vividness of the memory was new as was the realization of the ferocity of the assault. During the session she began to have further memories. Each new memory revealed more shocking sadistic behavior involving both her parents. She recalled her father beating her with a stick.

Her memories were detailed and consistent and were confirmed by a sibling who was also abused separately. The two had never discussed

their abuse before. Over the following sessions she struggled to deal with these emerging memories. She began to have vivid nightmares about the abuse and sleep began to require medication. Frequently, I would get calls from her in great distress. At times she became Kathy and would be feeling overwhelmed with terror and with actual physical pains in the different parts of her body which had been beaten. I struggled to arouse Kathleen, so that she and I could comfort Kathy. We were generally successful at this both over the phone and in the sessions, but not infrequently her terror and despair would overwhelm her and for the next few months the therapy took on the form of urgent rescues alternating with periods of composure in which Kathleen was in control. Overall, we were winning the struggle and Kathy was being comforted and reassured and calmed, but as new, more extensive, more cruel memories arose the battles kept repeating themselves.

Our strategy was simple. Kathleen and I needed to let Kathy know that this was the present and she was no longer in grave danger, and we needed to help both Kathy and Kathleen try to make some sense out of what had happened. How could her parents have acted so? How could other perpetrators behave so sadistically? How could she have not known this before her therapy with me? Why did it not come up in an earlier treatment she was in her 20's? How did she survive and become such a successful wife, mother, and career woman?

The realization of her abuse brought up archaic inner feelings of defectiveness. Was she somehow responsible for her abuse? Did she in some way unwittingly provoke it? In Kathy she felt great shame as well as terror. All of these and many other questions were pondered in our work together. Kathleen was very intelligent and mature and was able to be compassionate towards herself in the form of Kathy. The problem for us was that very often Kathy would take over and the patient would spend the day in bed crying or planning a suicide. I pointed out that suicide would simply be Kathy's acting out ultimately her parents' sadistic impulses, and we would be able to gain control of the situation.

Several aspects of our treatment were helpful to Kathleen's recovery. First, she had established a very trusting relationship with me. She believed I could help her and that I had her interests foremost, and she was able to use me as a valuable ally. She also had the help of a wonderful husband whose love, understanding, and support were without limit throughout months of nightmares and pains and terrors into which he threw

himself without reserve and comforted her at all hours of need, whether in the middle of the night or the middle of his business day. Kathleen was also helped by her personal strength, courage, and intelligence.

In our strategy to get Kathleen to aid and lead Kathy we also found using a lateral visual technique to be helpful. Kathleen found the taped goggles frightening and oppressive, and so we couldn't use them. But I had developed a special pair of sunglasses which had effects generally less intense but otherwise similar to the taped goggles. A friend of mine, Robert Meyers, a professor of physics at Brandeis University at dinner after hearing my description of my findings with the taped glasses, suggested that I might try using sunglasses which were tinted darkly on one side but gradually became clear on the other. I took his suggestion and had an optometrist make a pair of sunglasses with round lenses so I could rotate the partially tinted lenses so that one pair of glasses could serve as either left or right sided glasses. I did not expect the sunglasses to work, but for many patients they have been very effective. Usually, the sunglasses do not evoke as strong an emotional reaction as the tapped goggles on a given side, but they have the important advantage that they can be worn in public places and allow the patient free range of movement. I now have 12 patients who use the sunglasses in their daily lives, and Kathleen became one of these patients.

For Kathleen the sunglasses were often helpful when she was trying to calm Kathy. Unlike most PTSD patients, Kathleen was comforted by looking to the right side (left brain). And as with other patients, the glasses by themselves without the context of psychotherapy would have likely not of been of great value, and even within therapy there were times when Kathy's distress was too great to be calmed by the glasses. Nevertheless, often the sunglasses were a significant help.

Gradually, over the past nine months, Kathleen and Kathy have worked well together, and generally Kathy feels safe and appreciated. Our work continues as Kathy gets stuck in a memory or in a nightmare and her terror and pain flair, but undoubtedly, we are moving toward longer and more stable periods in which Kathleen leads, and Kathy feels loved and safe.

The Essential Mechanisms of PTSD

Kathleen and Lyle are quite similar. Both primarily suffered symptoms of anxiety and depression, and in both their symptoms were in response to overwhelming experiences. Both had their personalities overrun

by an energized immature part of themselves that tenaciously held on to the traumatic experiences. Both recovered by discovering and wisely using a mature part of themselves.

PTSD results when we are injured by that which confronts us and surpasses our capacity to cope -- in spite of or because of all of our genes, all of our biochemicals, all of our life's experiences, and all of our efforts. Certainly, dissimilar traumas will affect us differently and will affect us variously depending on our different resources, and at the bottom of all that we suffer are the injuries we have not yet been able to recover from, not yet been able to grow from.

CHAPTER EIGHT

COLLAPSE: PSYCHOTIC DISORDERS

Mark is terrified. Four men, large men have him cornered in a small room. Do they not realize whom they offend? "I AM JESUS! I AM JESUS!" he yells, but still they press on, grabbing at him, poking, pushing. Do they not realize, for Christ's sake? What humiliation upon the cross. Righteous betrayal. Damn them. Dirty bastards. They have overcome him. Face down upon the bed. A man on each arm and each leg. They know not what they do. The bastards. Upon the cross he never bore such ugly indignation. Squalid humanity, fucking bastards. They have his pants down! What now, sodomy? Oh, Holy Mother. The wrath of heaven shall smite them. He feels the pinch and the pain of the hypodermic needle pierce his buttocks and can feel lances piercing his body. The Lord shall smite them, and when he rises he will crush them with boulders in each hand; he shall strike them with thunderclaps. Yeah, they will regret this heinous act, this offense against the heavens.

For a few weeks before being taken to the hospital by the campus police, Mark had been losing his contact with reality. Slowly and then rapidly slipping into a psychosis; he had been losing his mind, his rational mind. It began with some difficulty concentrating and studying, then feeling anxious most of the time. Most frightening was not knowing why or what was happening to him. Soon he wasn't able to attend class because of his mental discomfort, his sense that he did not belong, did not fit in, his sense that he could not make it. The constant sense of impending doom, the constant worry, the increasing inability to concentrate. More anxiety. Now a constant sense of impending humiliation. Ridicule. "YOU CAN'T MAKE IT!" chants throughout his mind. He is becoming terrified. "ASSHOLE,

ASSHOLE" distantly rings in his ears. After two weeks, he can no longer leave his apartment; he is too disorganized, too confused, too terrified. He is immersed in an overwhelming pain that envelopes him without boundary. He is drowning. He feels he has no way out, but then a thought emerges, a simple thought, a thought that he may be superior, that perhaps he must have been mistaken, that all this suffering is exceptional, unique, misunderstood. Perhaps it is not he who is failing; it must be the world, which is upside down, not him. There is a ray of hope, a relief from the storm. The world is crazy; he is safe. And so gradually, he began to realize that he was Jesus. The parallels were all there; the misunderstanding, the misplaced ridicule, the false accusations, the lack of acknowledgment, the ultimate superiority and triumph, sustaining the success, love, and adulation he needed to assuage his anguish.

I meet Mark a week after he was admitted to the hospital. He is referred to me for psychotherapy after he has settled down and is back to realizing that he is a broken man, that he has experienced a mental collapse, that it is he who was crazy and not the world. He is embarrassed that he thought he was Jesus and avoids talking about those thoughts, those thoughts with which he tried to rescue his life.

We sit together. He feels mired in pain and confusion. I try to let him know that he is not the first to become mentally undone. I try to explain that sometimes when we feel overwhelmed with life, the fuses in our mind can blow.

He does not know what might have overwhelmed him. He was under some stress, especially by one professor whom he felt disregarded him, but he wasn't feeling so much overwhelmed as undermined, as simply sinking into a mud hole, a pool of quicksand, in which the more he moved and tried to help himself, the quicker he descended.

Growing up, Mark was constantly ridiculed and bullied by his peers. On the school bus from elementary school through high school he endured chants of "Asshole, asshole." Panic filled him especially whenever he had to go to the cafeteria or to gym class. He was chronically terrified, and the terror on his face was a signal to others to attack him with impunity, with taunts, insults, pushes, and punches. There was no escape and there certainly was no understanding or help.

When he arrived at college, he was surprised to see that he was respected and included. For the first time in so many years he was treated

without abuse, and for the first three years he thrived in that environment. But in his last semester, he began to sink, he began to mentally reexperience feelings of terror and helplessness, which, only now in his therapy could he see resembled the chronic feelings of his earlier life.

Perhaps the uncertain prospects after graduation or the stress with the professor could have triggered his dormant memories to explode and overwhelm his mind. I presented this as a hypothesis, trying to offer some possible insight into what at first seemed simply chaotic, simply incomprehensible.

Mark and I seemed to make a good emotional connection, and he seemed eager to work with me. Since he was no longer having delusions that he was Christ, the staff felt he was safe to discharge a week after we began working together. Although he remained free from delusions, Mark was quite depressed and self-conscious, suffering feelings of embarrassment and anxiety. He felt too distressed to return to his classes, and too disorganized and uncomfortable to concentrate on his schoolwork.

Upon admission, a medication psychiatrist initially diagnosed him with manic depressive illness and explained that this disorder was a genetic illness that through a chemical imbalance in his brain would periodically cause him to have periods of psychosis. Fortunately, modern psychiatry offered medications that could help lessen the chance or the frequency of the recurrences of Mark's inherited, devastating problem. Mark felt beaten and devastated and couldn't see how he could ever climb out of the deep hole that he or his biology seemed to have dug for himself. He had been traumatized not only by his childhood tormentors, but also by his slip from reality, his official diagnosis, and by becoming a bona fide mental patient in a psychiatric hospital.

I shared with Mark that I did not share the view of the hospital psychiatrist, that I felt he had had a psychotic episode largely because he somehow couldn't bear life as he saw it in a part of his mind. Given enough distress, any person could possibly become separated from reality. I agreed that he should be treated with the medications which the hospital had begun, valproate (a mood stabilizer like lithium) and resperdol (a new antipsychotic drug). After a few months together we decided to taper him off the resperdol.

At five months after his discharge, Mark showed a marked improvement; he was studying effectively and doing nicely academically. He

was shy and ill at ease in social settings, but this area had always been difficult for him, and I didn't expect a rapid improvement there. Overall, I was very pleased with Mark's progress. In his therapy we continued to focus on helping him appreciate the pain and trauma he had experienced both in childhood and as an adult, and then to teach a part of him we called the "little boy inside" that he was now safe and valuable.

Although we had a very good relationship, he would at times admit that he had a fear that I might try to humiliate him. He expressed that my interest in seeing him was to profit at his expense by taking his money under the false pretense of offering a service. A part of Mark knew that I had no interest in humiliating or exploiting him. We were able to see his fears of ridicule and abuse as coming from the "little boy inside" him, and by working on these ideas we were able to try to correct some of his archaic fears. Psychotherapists call this aspect of treatment transference work. Freud discovered the concept of transference in which the patient would project his inner archaic ideas onto the therapist, offering an excellent opportunity to clarify the present reality. But transference work is a rather slow process that requires frequent repetition to gradually achieve inner learning.

Then at about a year and a half after his hospitalization, following an intense stress, he very suddenly again slipped into a disordered state of mind. It seemed to me as if the troubled little boy inside him had become distressed and energized and was taking control of his mind. He could no longer concentrate or even attend classes. To look at him one could easily see that he was not well. I worked with him to try to get the adult part of him to take control, and for short periods of time he would appear normal, but the healthy state would not persist for more than a few minutes. I markedly increased his medications.

I had at this time been working with the goggles with my other patients. I didn't want to try them with Mark in his condition because I felt they might confuse him or make him more fearful. Finally, out of my feeling of urgency I decided to use them with Mark despite my uncertainty about their safety. We had to take the risk.

Mark donned the goggles that activated his right hemisphere: "I don't trust you, Doctor!" I quickly urged him to try the other pair allowing him to look out of the right side [left brain]. He did this and almost immediately he said with a very friendly smile, "Of course, I trust you." I

was astonished. Looking out the right-sided goggles [left brain], Mark was absolutely normal. There was no hint of a mental illness. He was relaxed and sociable and he commented on how relaxed he felt. He realized that he was in a healthy mental state and seemed impressed and delighted by this sudden change in his condition.

I then asked him to try the other goggles again. Just as quickly as before, he again became paranoid, tense, and angry. He said that he didn't trust me and that he felt his roommates were abusing him like the bullies of his childhood. Again, I quickly asked him to switch back to the other side, and he immediately relaxed and said that he found me obviously trustworthy and that although he felt his roommates were not too likable, they were not bullying or abusing him.

Without removing the health promoting goggles, we explored our observations of the "two" Marks. The goggles aided Mark to tangibly locate and arouse the two distinct personalities of his mind that we had long felt existed: one healthy and the other irrational, terrified, suspicious. For the past month, Mark's troubled mind had been besting the healthy mind for control. Our task was to help the mature part learn to lead, protect, and comfort his frightened side. I realized this was essentially because Mark's troubled side did not have the maturity or mental capacities to run his life in a safe, intelligent manner. We needed to let his troubled side see how safe the world appeared through his right-sided view [left brain] and see how well his life could go if his healthy side led.

Mark and I were both delighted with this session's revelations and results. I gave him the health inducing goggles to take home and suggested that he wear them as much as possible. On his own Mark performed an experiment at home in which he wrote two descriptions of the session, one without the glasses on while he typed on his computer and one with them on.

Without Glasses

> I would say that the experience with Dr. Schiffer Friday night was fairly impressive, but who really cares? I feel like I need help right now just to get through anything in life. I'd like to get my hair cut, do not feel in control enough of my thoughts to do so. I just want to be able to control my thoughts.

With Glasses

> It's much harder to type with funny glasses on. Must persevere! I think the glasses experiment was phenomenal and shows the power of the little boy inside (more like a petulant child at the moment). Our goal must be to make him sit down in his chair and let the adult part lead.

What I witnessed over the next several sessions was a remarkable struggle between these two aspects of his mind. He was not out of danger. When he was not wearing the goggles his immature side still tended to dominate, though I could gradually see that we could more easily evoke his mature side. In each session we would use the goggles and his response to them remained robust and remarkable. We used them as a tool in our struggle to get his mature mind to lead and to teach his troubled side that it was safe and should no longer struggle for control. Over the next ten days we were slowly winning, and he was able for the first time in six weeks to return to class.

Over the next month, he continued to make slow progress, first to about 50% of his usual capacity to study, then to about 65%, and by two months after we first used the goggles, he reported that he was now functioning at 100% of his capacity. Over this period, we continued to wittiness the same struggle. It seemed that the troubled part of his mind did not want to relinquish its power even though it was clear that he would be better off with his healthier side leading. It was as if his troubled side was saying, "Yeah, but what do you want me to do, go on unemployment? Hell, no, I enjoy leading." But over time with all our efforts, we succeeded in establishing the leadership of his mature side as we worked to discipline and to comfort his troubled side.

Today it is two years since we first tried the goggles, and Mark has not only maintained his health, but he is actually functioning at a much higher level than ever before in his life. He is enrolled at a prestigious graduate school where he is engaged in groundbreaking scientific work in his field.

Other Patients with Psychosis

In my practice over the past few years, I have not treated any other patients with acute psychoses. I have three patients with chronic severe mental illnesses and none of them have had any response to the glasses. I

have wondered if in these chronic patients, whether both hemispheres have become troubled. Alternatively, in chronically ill patients the troubled side might become extremely powerful, dominant and able to effectively control the entire brain, like an occupying army.

My View of Psychosis

I propose that a psychosis occurs when the mind of a less mature hemisphere becomes distressed and energized and in a hyperarousal state comes to dominate the person's personality. Mark lost his mind; his mature mind that is; he lost it to the powerful, disturbed, panicking immature personality of his right hemisphere. This troubled mind is "crazy" only when we are expecting the mind of a mature adult, but it in fact has a "method to its madness," reasons for its distressed state and behavior. His troubled mind is upset because he was ridiculed and abused severely in the past, and for some reason this old pain has suddenly aroused and energized his troubled mind. Why did his troubled mind become active when it did? My answer is that his right-sided mind is a mind like all other minds, and that means it is capable of responding and deciding. Apparently, life or the world as this part of Mark saw it was becoming intolerably threatening, and this part of him apparently became energized. The human mind, whether adult or child, left or right, is to an important degree unpredictable. It has its own capacity to make decisions, to respond to the world.

Mark's right sided mind did more than panic. It left reality and created its own view of the world, a view in which he was no longer being ridiculed for being inferior, but rather one in which he was being attacked for being superior, for being Jesus Christ. Why did Mark's right sided mind do this? I suggest that it did this because it was seeking relief. Someone else might have thought of using alcohol or heroin. Perhaps someone else might have thought up a more creative and effective solution.

There is another important factor which led to Mark's psychosis. His more mature, left-sided mind collapsed under the pressure from his other side. If his left-sided mind had been able to hold its ground more effectively, then the psychosis would not have materialized. But the relationship between two minds, even two minds in the same head, is difficult to predict, especially when they are no longer cooperating, but are engaged in a struggle for dominance. Did Mark's left-sided mind have to lose that struggle? I don't think so.

So, I see a psychotic disorder as not qualitatively different from an anxiety disorder or a depressive disorder or a posttraumatic stress disorder. In fact, in all cases, I see psychological problems as stemming from traumas which lead to a sense of anxiety and then defeat. Why trauma leads to anxiety, defeat and then a whole host of impairments goes back to our biological nature, our built-in defeat system.

A trauma model for psychosis is not new. Almost all psychological theories of psychosis have in a variety of ways seen the psychotic reaction as a response to some kind of trauma. For Freud the trauma had to do largely with unbearable anxiety form conflicts between id impulses and ego and superego restraints; for the eminent psychiatrist, Harry Stack Sullivan, who devoted his career to working with psychotic patients, and for a number of others prominent theorists, psychosis had much to do with painful early relationships. [xxiv]

Genetic Studies of Psychosis

Genetics studies of psychosis do indicate that genetic factors are relevant, but they also clearly indicate that just as relevant are psychosocial factors. For example, in a large Finnish study of adoptees, when children whose mothers were diagnosed as schizophrenic, were given up for adoption and reared in healthy homes, none developed a mental illness. When such children were reared in unhealthy environments a number did develop psychoses. Adopted children whose biological mothers were apparently healthy did not develop serious mental illnesses in either a good or a poor environment. [xxv]

Biological Theories of Psychosis

There are a number of theories about how chemical or neurological defects could cause major mental illnesses, but the evidence does not yet lead to a clear hypothesis. In patients with schizophrenia there are often structural brain changes. Whether these changes cause or follow the psychological changes is not yet scientifically established. A number of neurotransmitter systems such as norepinephrine, dopamine, glutamate, and serotonin had been found to be abnormal, but some debate exists about whether these chemical changes follow the structural brain alterations. The questions remain, what are the primary causes of the mental disorder and

what are the *interactions* between the psychological impairments and the brain abnormalities. [xxvi]

Theories of Hemispheric Abnormalities in Schizophrenia

Within the last 30 years scientists have explored the possibility that psychotic illnesses may involve one hemisphere more than the other. Flor-Henry found that a left hemispheric focus for temporal lobe epilepsy was associated with schizophrenia and a right sided focus with manic depressive illness. Flor-Henry speculated that this association suggested that schizophrenia was associated with a dysfunction of the left hemisphere and that manic depressive illness was related to a comparable dysfunction in the right hemisphere. But the nature of such dysfunctions was unclear and whether findings from epilepsy can be extended to explain psychosis has not been supported over time. [xxvii]

But still a view that schizophrenia is somehow associate with an abnormality of the left hemisphere has persisted. In England, researcher, John Gruzelier and his associates have used galvanic skin responses which essentially measure the amount of electric current present in the skin of the hands. Under stress, in part, because of increased sweating, electrical conductance generally increases. Gruzelier found that under stress patients with schizophrenia have greater conductance in their right hands which are neurologically connected to the left brains. In contrast, patients with depression had greater conductance in their left hands suggesting an increased right brain activity. [xxviii]

In further studies John Gruzelier found that schizophrenic patients who manifested active symptoms such as delusions and excitement had a left hemispheric dominance, but that schizophrenic patients who were withdrawn showed a right hemispheric dominance. [xxix]

Stuart Dimond, the psychiatrist who developed a contact lens for showing movies to one hemisphere or the other, along with his associate Graham Beaumont, did postmortem examinations of brains of a number of people who had been diagnosed as schizophrenic and they found that the corpus callosums from these patients tended to be enlarged. They hypothesized that this enlargement was an attempt by the brain to compensate for poor communication between the hemispheres. In a follow up study, they simultaneously very briefly flashed stimuli to both the left and right visual fields (going each to the opposite hemisphere) and asked subjects to try to

determine if the stimuli were the same or different. Compared to a control group the schizophrenic patients did poorly on this task, but they did just as well as controls when both stimuli were sent to the same hemisphere. From these studies Dimond and Beaumont concluded that the schizophrenic patients had difficulty communicating between their hemispheres. [xxx]

A more recent study from London's Institute of Psychiatry, however, contradicts Dimond and Beaumont. They studied 42 patients with schizophrenia and 43 normal control subjects with MRIs to determine the size of each corpus callosum, and they found that in the schizophrenic group this structure was slightly smaller. They tested for how well the hemispheres communicated using a neuropsychological test called the Stroop Test, and they could detect no differences between the two groups of subjects. [xxxi]

Recent MRI studies from three different groups of scientists suggest an association between the left hemisphere brain structural abnormalities in the temporal lobes in schizophrenic patients with auditory hallucinations. But the majority of imaging studies do not show physical differences between the two hemispheres in patients suffering schizophrenia. [xxxii]

A large number of functional imaging studies have been performed on patients with schizophrenia. These studies use PET scans and other techniques which measure which areas of the brain is active at a given time. Unfortunately, overall, these studies have given very inconsistent results. Karen Berman from the National Institute of Mental Health Neuroscience Center and her associates wrote:

> The notion that schizophrenia may involve disordered lateralization of brain activity has been explored for many years using a variety of methods. However, even among those studies that support the notion there is little agreement as to which hemisphere is implicated or whether the putative aberration may involve both hemispheres. Similarly, if there is an abnormality, it is unclear whether it consists of increased or decreased activity on the affected side or an increase in one side and a decrease on the other side. The existing functional brain imaging data concerning the question are relatively sparse and do little to resolve it. [xxxiii]

Treatment of Psychosis

I believe that the potential can be great for psychological treatments to help people who have fallen into a psychosis. For many people, a mental collapse into a world of delusions racks a devastation they cannot recover from. Ever. And I think it is urgently important, especially early on before the condition multiplies upon itself, to offer the patient an intense effort with a high-quality psychological therapy as well as with drug therapy. From my almost 25 years' experience, I believe that the type of treatment a patient receives at the time of his first illness will determine the course of his illness more than any other factor, and I believe it is vital to make every effort to affect a good recovery. It is easier to fall in than to climb out. I have seen many people who came to me years after being chronically ill, and I have often had more limited success in pulling them out than patients treated at the onset of their illness. In acute psychoses, dual-brain science can locate the trauma in one hemisphere, and describe the ensuing struggle between the hemispheres. [xxxiv]

Fortunately, today we have a number of new medications such as risperidone and olanzapine which added to the list of established antipsychotic and antimanic drugs help us maintain a powerful medicinal armamentarium aimed at psychotic disorders. When dealing with such a difficult and painful problem as psychosis, we need to effectively apply all available modalities. [xxxv]

CHAPTER NINE

COCA COMPULSIONS: COCAINE ABUSE

Lenny's a little nervous. The big guy wants a cigarette. Lenny says, "Sure, here help yourself." The little guy rocks on his heels and looks around with eyes like searchlights scouring for enemy aircraft. "So, you want the stuff or not?" the big guy wants to know.

"Sure, I do. But your price is too high."

"Then you don't want it? You have to buy it, turkey. Ain't givin' this shit away."

"But you're way, w . . . way out a line."

"Two hundred. Take it or leave it. This ain't an auction."

"Two hundred. Goddamn it. You're robbing' me."

The big guy turns to leave, and the little guy begins to follow. "Hey, don't call me no more," the big guy says moving down the street away from Lenny.

"Here. Here's two hundred."

Lenny's in a dangerous neighborhood. He's heard that people going to the grocery store have been shot there by stray bullets, and here he's buying cocaine or some chemical he hopes is cocaine or at least resembles cocaine, but Lenny knows it could be talcum powder or a horse tranquilizer. But he buys it anyway, even though he knows he'd be getting ripped off even if it were cocaine. And he knows he could easily get arrested. For all he knows the big guy could be under surveillance or he could be undercover. But Lenny has to buy. He has to do it, to go through this, to risk his life, go through the humiliation and terror, go through the risk of using whatever the hell he's taken possession of.

He took the two hundred from his wife's wallet. She'll see him when he comes in in the morning half baked, exhausted, spent, depressed. And she'll lay into him. He knows this because it always happens.

I met Lenny after he was admitted to the addiction unit at McLean Hospital. The year was 1985, years before managed care, when the program was for 30 days, when the hospital could act as a kind of dynamic air bag, protecting the patient from himself and holding him still long enough so that I could come in four times a week and mentally operate on his tortured psyche. After he is discharged, our work is only beginning, but we have had enough time and psychic space to make a connection, an emotional bond, which can sustain our work and thus his safety even without the protection of the hospital. For two months after his discharge, we met twice a week, but from then on for the next 5 years we saw each other weekly. Cocaine stopped the day Lenny was admitted to the hospital, but it took another five years to repair the inner damage which led to his addiction.

Lenny was one of 9 cocaine abusers I treated in the mid-1980s with in-depth psychotherapy begun in the hospital program. Our breakthrough came when we realized that Lenny and the other cocaine abusers were addicted not only to the highs that the drug produced, temporarily relieving their everyday mental distress, but also to the lows that inevitably followed cocaine use. All of my patients had been emotionally denigrated as children. Some of their siblings were seen in their childhoods as future doctors or lawyers. But my patients, even in diapers, were usually identified as disappointments and expected to fulfil their parents' prophesy as they grew into adulthood. The disdain that they endured at home became unbearable but unavoidable. Nothing could gain the praise or even tacit approval for which they longed. These particular people whom I treated reacted to their dilemmas by participating in their inevitable failure. [xxxvi]

I came to believe that these patients so strongly believed in their inevitable humiliation and so profoundly feared the pain of that eventuality that its anticipation became unbearable. They were certain of their eventual, intolerable humiliation that they would go to great lengths to bring it about, to get it over with. And for a short time after using cocaine, when they are "coming down," they do feel the profound humiliation and do get a relief from getting it over with, only to have to go through it all over again as a new surge of anticipation soon begins to form only to come crashing full force over their heads.

Lenny revered his father, who held him in disregard. Lenny's every action seemed to invite his father's criticism. When Lenny mowed the lawn, his father pointed each area where the cut was imperfect. "You're just a fart

in a cart," his father was fond of saying. Even after 5 years of working together, we never really came to understand the reasons for his father's disdain; those answers remained locked inside his deceased father's unconscious mind.

I helped Lenny see that he had been mistreated as a child, to see that he was in fact deserving of love and admiration, and that his father, in some way beyond our in-depth understanding was profoundly troubled. Over time, the lesson took hold: gradually Lenny grew able to appreciate and value himself.

Although I had been pondering my theories about two minds, two personalities for several years, I hadn't yet conceptualized the cerebral hemispheres of dual-brain science when I was treating Lenny. Those ideas came later. As part of our studies of the lateralized goggle effects, I called Lenny and some others I had treated in the 1980s, to invite them to participate informally in our program. Each had continued to do well since our last contact a decade earlier. With Lenny, we recorded my interview of him while he wore the different pairs of experimental glasses.

"So now you're not wearing any glasses. How much anxiety are you feeling on a scale of none, mild, moderate, quite-a-bit, or extreme?"

"I would have to say, some, between none and mild."

"I would like you to pick one of those pairs of goggles. . . . So, you're looking out the right side [left brain]. How much anxiety are you feeling?"

[Within seconds.] "Actually quite-a-bit. . . . I'd rate it on a scale of 0 to 10, about an 8."

"On a scale of none, mild, moderate, quite-a-bit, or extreme?"

"Quite-a-bit."

"Is this feeling familiar?"

"I've felt this before. It would come when I would have the inability to converse and be with my dad. It's a feeling that I didn't have when I came in here today. It goes all the way to my legs and my feet. It's like a fight or flight feeling; an inability to get across to someone else."

"What comes to mind? Where does it take you?"

"It actually takes me to some of the physical fights that Dad and I used to have and not knowing why they started. But, watching him get utterly frustrated and escalate that to the point where he would lose control. I asked

my mom about that about a year ago. She doesn't remember any of that happening."

"Does this relate to any of the feelings with the substance abuse?"

"Yeah, to the acquisition of the substance. One of the things is that you would get a very anxious, paranoid feeling because it wasn't right, it wasn't legal. You didn't know when your so-called number was up. And you didn't know if the quality was good. You knew nothing about it, and every time you acted on it, you were taking a huge risk, and as I look back on it, it was not worth it at all, but I would get this feeling, I would, towards the end, I'd get such a feeling that I'd get diarrhea."

"And what would happen to this feeling when you'd use? Would using affect this feeling?"

"Don't know because the using confused the feeling and maybe that's what's in abusing substances, maybe that's what the person's looking for, in trying to confuse the feeling. So, you really don't know what going on, all you really know is that it's different. It may not be acceptable, but you do know that you've altered it."

"And after the substance is leaving your body. What's the feeling like."

"Well, you're left right back where you began. You still have a feeling similar to this because you know you'll go out and acquire more, and it's just a matter of timing as to when. So, this feeling is always there. It doesn't go away unless you alter it some way."

"And how do you feel about yourself in this condition?"

"You feel totally insecure. You feel out of control. Obviously you have no control over what's going on if you're acquiring."

"How do you feel about yourself as a person when you feel this way?"

"As a person, well, you feel pretty low about yourself because of what you're doing. You know what you're doing."

"Is this similar or different from the way you felt about yourself when your father was upset with you?"

"It's similar."

"I want you to try the other goggles, if you would."

[Seconds later] "Now I'm looking out the left side [right brain]. I'm more calm. On a scale of 0 to 10, would have to be maybe a 2 or a 3 which in your terms would be mild. Don't know why. But it's true. And it's

a very calming effect. I no longer feel anxiety racing in my legs. That's all gone. This is very curious. It's a shame I can't wear glasses like this all the time."

"Can you remember when your father was angry with you?"

"Oh, I can remember."

"And how does that feel?"

"It would be the white noise of feelings, a total array of feelings from confusion, anxiety, panic, fight, flight."

"As you remember it right now, can you feel any of that? What are you feeling right now?"

"No, I don't feel any of that now. With this pair of goggles, I have on, it's more like talking with my mom who would always have a calming effect."

"Does the feeling that you have right now bear any relation to your drug use?"

"No, I would have to say not. I've only acquired this type of feeling in the last eleven or twelve years with the comprehensive understanding and acceptance of my problems with my father."

"And how did you acquire that?"

"Well, through four and half, five years of sessions with you, and actually grieving for my dad and the relationship we didn't have. Finding out about my dad through my brother, talking it over with my mom, and just basically putting it behind me. Getting rid of all the dark and the old feelings and remembering the good times like my mom does."

"How do you feel about yourself right now?"

"Well, I feel confident."

"How do you value yourself? How do you feel about yourself as a person?"

"Well, I'm doing the most that I can in the best way that I can to exist on my own to exist as a husband and to exist as a father and to my family and doing the best job I can at work. There isn't really anything else that I can do to make my life better."

"What's the net result, how do you rate yourself? How do you rate yourself as a person?"

"As a person?"

"Yeah."

"Well, I'm a good person. I've made myself into a good person."

"I'd like you to switch glasses again."

"Can I buy these?" [laughs]

"So now you're looking out the right side [left brain]."

"The right side. Tension is back into my legs and throughout my body. Still don't know why. Maybe I'll find out some day. I just feel the phrase, "torqued up," tight; expecting verbal abuse, quips, so to speak. One of the things that I've had to work on very hard is try not to pass along to my boys what my dad passed along to me. And I'm not sure that he meant harm, but it came out to be that way. I don't want to pass it along. One of the instances that I think of is that when I would mow the lawn when I was finished he would come out and show me what I didn't do, and I would feel like this."

"And what does this feel like?"

"This feels like a person who's never been rewarded, who never knows that he's an OK person, that he can and probably will never do right and always makes mistakes. It's a real lonely feeling."

"Let's try the other pair again."

"Let's not do these [the right sided goggles] again. . . . It [left sided goggles] immediately takes that away."

"So, you're looking out the . . ."

"Left side [right brain]."

"This is the side you're feeling more comfortable on? Let's talk about how you felt when you had the other glasses on, while you have these glasses on. Do you have any idea why you were using drugs? Do these glasses give you any insight into that?"

"I think I used drugs to alter the way that I felt about myself. I also used drugs as a way to gain friends. It got me acceptance into a wide group of people that I didn't really look at from a rational point of view; it was just a group of people who shared a substance abuse concept."

"Now the feeling that you had on the other side, was that related to the substance abuse, the torqued-up feeling?"

"Yeah, I would get that feeling. One of the reasons I sought help to end the cocaine abuse was because in the end it started to accentuate the feeling I had looking out the right side. So, it wasn't helping. It was compounding my negative feelings about myself by a factor of about 10."

"Did you ever use to bring on that negative feeling?"

"That's a good question. Not in the beginning, but I think maybe by a year after the beginning, and then definitely from then on until the end."

"And how could you explain that? Could you elaborate on what you are saying?"

"You deceive yourself into thinking that it's going give you what you want, but after a short period of time, you know it will never give you that; it will really just your negative feelings about yourself."

"Now when you came down from coke, did you feel the way you felt when your dad would yell at you, demean you?"

"Ah, yes, because that's the reason I took it in the first place to alter that feeling. But, in fact, it wound up producing that feeling. In fact, it would accentuate the feeling by factors of five or ten. Finally, it gets so out of control that you either stop or do something stupid. As they say jails, institutions, or death, that's the only place it'll take you."

"Looking from this prospective [right brain], how do you see your father and what he did?"

"I see my father as a product of circumstances. What he passed on to me was passed on to him by his parents. I've gotten some insight through my brother and through my mom. He probably even in his lifetime tried not to pass on some things that were passed on to him. My mom also told me that by the time I came along as a fourth child that he was tired of kids and that I did not get a lot of the consideration that the other three did. I understand that now."

"Do you understand that more now from this side [looking through the left-sided glasses]?"

"Ah, yes, because the other side produces clutter and clutter does not produce clear thinking."

"It's more the way you felt as a child?"

"Right, the right side {left brain] is how I felt as a child, the left side [right brain] is how I feel now."

"Now with the glasses on do you feel any different than if you have the glasses off?"

"Yeah, if I have the glasses off I get a mixture of the feeling from the two glasses."

"Why don't you take them off."

"And it's a constant battle to minimize those old feelings and keep them under control."

"But you've been able to win that battle, so far."
"Yeah, I would never ever go back."

What this tells me is that we had been treating the troubled mind in his left hemisphere. That troubled mind still exits, even after all our therapy sessions, even after years of success in his career, in his marriage, and as a father, but it has given up its once dominant role, and perhaps finds comfort in the praise Lenny's mature side is able to obtain from the world in which he now lives.

This extraordinary interview, ten years after Lenny completed his therapy, captured that the unbearable pain Lenny felt as a child and as a young man criticized by his father. It was overwhelming in intensity and led directly to the torqued up feeling he described. Although his cocaine use was a desperate attempt to alter that feeling, to bring relief, it brought about also the criticism he anticipated and dreaded.

Freud found that many patients often retraumatized themselves by instigating situations similar to the initial traumatizing circumstance. Freud coined the phrase, "repetition compulsion," to refer to this unconscious attempt by the patient to master the trauma. I believe Lenny was caught in such a repetition compulsion. Notice the similarity between how he felt when he was criticized and how he felt when he acquired, used, and came down from his cocaine high. But the most compelling observation was that Lenny can reexperience this pain simply by putting on the right-sided goggles, stimulating his left hemisphere. Lenny had apparently improved because the mind in his right brain grew stronger and capable of maintaining its leadership and healthier view of the world. [xxxvii]

A second patient, Reggie, had a similar history of cocaine abuse which was related to his father's chronic disapproval. Reggie agreed to return to my office to try out our goggles.

"Reggie, rate for me, how anxious do you feel sitting here [without goggles], none, mild, moderate, quite-a-bit, or extreme?"
"Mild."
"Now I want you to put on either of those glasses. . . . Now you're looking out your right side [left brain]."
"Correct. My right side."
"How much anxiety are you feeling?"
"A decent amount."

"And on that scale, none, mild, moderate, quite-a-bit, or extreme, how much would you say?"

"Moderate."

"What are you feeling?"

"Anxious, cause I feel I can't see what might be comin' at me from the other side."

"Is this a new feeling or a familiar feeling?"

"Sort of familiar because I'm in business and you never know what's about to happen. Definitely unknown."

"Would you try the other goggles? . . . How much anxiety are you feeling looking out the left side [right brain]?"

"I think less."

"How would you rate it?"

"Mild."

"Can you describe the difference between how you feel on this side versus the other side?"

"I'm more relaxed on this side. The other side I was a little more uptight."

"When we were working together before did you feel generally in life more like this or more like the other side?"

"Generally, in life, more like the other side. Now, in my life I feel more like this side."

"Let's put the other pair [left brain] back on? . . . How do you feel?"

"Same as before. Not as comfortable as the other side."

"Now how do you feel about yourself at this moment on this side versus the other side."

"I feel more relaxed on the other side."

"Try the other pair again [right brain]. . . . Do you feel any differently about yourself on one side versus the other?"

"I feel better about myself on this side. I feel like a better person on this side, a little more caring, a little more sharing, open minded on this side, less anxiety, an easier walk on this side."

"And on the other side?"

"Uptight. The unknown."

"Let's put the other glasses on [left brain]. . . . Is this a familiar feeling?"

"Wow, this is an uneasy feeling. I don't want to go there. Just things about the past."

"Things you haven't felt for a while?"

"Yeah."

"What comes to mind?"

"Not a good sign here. I'm just thinking about things I did in the past and everything about me then. I don't really think about anybody but myself and the abuse, some of the things I've been through in life. This is not what I want to remember. Not good. Can I take them off now?"

"Now I just want to ask you one more question. Can you relate these uncomfortable feelings to your father?"

"I don't know. I was never comfortable around my father. With these glasses on it's sort of like dealing with him again because it's always the unknown, and it's always a pressure and a problem."

"The way these glasses make you feel, is this related to the feeling you had when you'd want to use?"

"Yeah, you feel the unknown, you have the tension."

"After you'd come down from coke, did you have feelings like you have now?"

"Yeah, yes, but not to the same degree. Bad. Why did I do it? Confused."

"Let's put the other glasses on [right brain]."

"More relaxed. More focused. Clearer."

"Now if you think of your father on this side."

"I can deal with him on this side. I know how to handle him now, and I don't think he'd get me upset, and I wouldn't do the counterproductive things if I looked at him out of this side all the time. I'd feel more pity for him and for the relationship, and I don't think I'd want to abuse myself by using drugs."

"What would someone have to do to you to get you to use drugs, feeling the way you do on this side?"

"I don't think it's an option on this side."

"Would they have to have a gun on something?"

"Oh, yeah, they'd have to do some extreme things."

"On the other side?"

"Yeah, I could see myself doin' it on the other side."

Although both Lenny and Reggie stopped using drugs over 14 years ago, the right-sided goggles (stimulating their left brains) can elicit their old-world view. This is the disturbed view they developed out of their traumatic relationships with their fathers that ultimately led to their substance abuse. And we see that the left-sided goggles offered a positive, healthy view of their worlds, views which have come to predominate in their lives.

Let's consider what this implies about the substance abuse in these two patients. It appears that a part of them, probably located in their left hemispheres, was traumatized by the rejection they experienced as children and young adults. That trauma led to convoluted, unsuccessful attempts to address their problems, which eventually led to their cocaine abuse. It appears that through their therapy they were able to access or to further develop a mind in their other hemisphere, a mind which could maturely guide them successfully to recovery, to a successful life.

* * *

We are all "creatures of habit." It is part of our human makeup that we develop habits. We brush our teeth and exercise, partly out of habit. An addiction is a habit or a compulsion to do something harmful. Lenny and Reggie both clearly had addictions. Both also had a more troubled hemisphere and a healthier hemisphere. As in most of my patients who suffered significant psychological trauma, their troubled hemisphere is on the left. In these two patients the compulsion to use clearly came from the troubled side, and I believe that within that troubled side there existed a highly developed habit to use cocaine as misguided solution to the psychologically agonizing maze in which that troubled side found itself.

Early psychoanalytic writers on addiction did not think of there being two minds. But this classic psychoanalytic work is applicable because most patients behave as if they had only one mind, one very troubled mind. The troubled side, as in my patients before they entered treatment, becomes so strong and dominant that it in effect runs the patient's entire life. Sandor Rado, a contemporary and colleague of Freud, saw the abuser's drug use as an attempt to relieve a depression by inducing a state of "elation." He felt that when the elation soon wore off, the patient would fall into an even deeper depression. Rado saw drug use as autoerotic, resembling masturbation. The abuser's failures led to heightened fears of punishment and destruction which he and other psychoanalysts called castration fears. Such

anxieties led then to more intense yearnings for the drug induced pleasures. [xxxviii]

Edward Glover, another contemporary of Freud, focused on the role of aggression in addiction. He thought that the drugs helped people lessen their intense, inner feelings of anger which chronically threatened to overwhelm their emotional lives. Thus, both Rado and Glover saw addiction as a form of self-medication administered to help deal with overwhelming feelings of anger, anxiety, and depression. In a sense the drug addict was acting as his own psychopharmacologist, prescribing a medication with many more side effects than benefits. Harvard psychiatrist, Edward Khantzian, a contemporary analyst, has also suggested this self-medication hypothesis. He and others have suggested that substance abusers suffer psychological traumas which lead to psychological deficiencies in development for which the self-administered drugs are intended, unwisely, to compensate. [xxxix]

I agree that early trauma and subsequent psychological confusion and pain are at the heart of addiction, and that self-medication is a partial explanation for the unfolding of this condition, but I also think that the role of self-abuse, copying and mentally incorporating the early abuse is an even more important factor.

In opposition to the psychological trauma theory of addiction is the so called "disease model." This is the explanation developed by Alcoholics Anonymous and supported by psychiatrist George Vallant, among others. They propose that inner psychological issues generally are unrelated to addiction. The causes of the addiction are the substances (alcohol and illicit drugs) themselves as they set in motion altered brain states, causing abnormal mental states which lead to the disease. The treatment of the disease is the elimination of the substance which repairs the brain and ends the addiction. Psychological problems result from the brain effects of the substances which once indulged in by their inherent nature become irresistible. Smoking, for example, is difficult for anyone who has taken it up to quit. One smokes not because of a deep-seated psychological problem, but rather because nicotine is so physically addictive that once indulged in it is hard to stop and leaves the person to endure the physical consequences of the compelling habit.

The disease model illuminates the degree to which the substances themselves are destructive and have very negative mental and physical consequences that add to the cycle of addiction. Removing the drug from the

patient's life is essential to any attempt at recovery, and AA has a long list of superb techniques for helping people avoid using. Indeed, I recommend AA and other "addiction anonymous" groups strongly to those who have addiction problems. But it is equally obvious to me that deep seated psychological problems are also at the root of drug abuse. Repeatedly, I observed when my patients were discharged from McLean after being off drugs for their 30 day stay, they were surprised to discover that they still felt depressed, anxious, and deeply troubled psychologically. Our work was only beginning when they were discharged. And the hospital detoxification was essential to any type of psychological treatment.

A third school of thought about addictions is an eclectic approach best represented by psychiatrists Bruce Rounsaville and George Woody. They see supportive psychotherapy as an adjunct to education and antidepressant therapy and tend not to explore deep-seated issues. [xl]

I am convinced that a deep exploration of the psychological trauma and pain of patients with addiction is essential. It is unfortunate that fewer and fewer therapists are knowledgeable about how to conduct such an enterprise. People with substance abuse problems deserve to be understood deeply and to learn profoundly that they are worthy souls who have gotten lost in the psychological maze of their early abuse. I am not saying that people who abuse drugs have no responsibility to help themselves; quite to the contrary, I know that if they don't discover and access some inner will (perhaps from their other hemisphere) then no one else will be able to be of assistance. I believe it is essential in such treatment to help to develop the person's more mature side, and to use it as an ally with which to help the more troubled side.

CHAPTER TEN

ATTACK ON THE HEART

Cecil is pissed. Frank's trying to push his way past, and he lies, outright lies. He'll do anything to get ahead. And Jordon believes Frank as both he and Cecil sit before Jordon in his oak paneled corner office overlooking Boston Harbor. How many times Cecil took Frank under his wing, protected him, taught him, showed him the business, and now he can't believe Frank's bold lies about Cecil, dumping all the blame on Cecil's shoulders. He's talking hundreds of thousands of dollars, and Jordon believes him.

"I told him not to buy that shit. He knows it. I told him don't touch it," Cecil protests.

"Own up to it, C, you screwed up. It's your area. This is serious. You hurt the company." Jordon's not listening. His mind's made up. Frank must have gotten to him earlier.

"I didn't even know the fucker was buying. I told him not too."

Frank has the gall to cut in. "Don't curse at me. You don't have an answer, and you want to curse at me like we're in a school yard. Here's the memo, Cecil."

Cecil's been feeling tight in his chest since the meeting began twenty minutes ago, but now it's crushing and he's straining for air. Cecil doesn't want to quit, doesn't want to go down like a wounded warrior, and so he's tried not to say anything about his chest pain, but it is now too great to ignore, and he has no choice but to surrender. "Jordon, you better call an ambulance. I'm having chest pain."

In an instant, Cecil has become a patient. Jordon assists him to his couch and tells him to lie down. He calls an ambulance and asks Frank to leave. Cecil worries what if it's nothing, just nerves or indigestion? But he's too tired to get up.

The EMT's arrive, and with mechanical efficiency have him IV'd, wrapped and strapped to the stretcher and wheeled out past the open offices, past his former compatriots to the elevator, out to the street where onlookers gawk, into the ambulance for a sirened, turbulent, terrifying ride to the emergency ward.

He's examined, ECG'd, X-rayed, and examined twice more. Then one of the doctors, he's not quite sure which one, says, "Mr. Rollins, you're having a heart attack. The circulation to your heart is blocked and blood cannot get through to an area of your heart muscle. We want to take you upstairs and do an angioplasty. We will insert a catheter with a balloon on the end into the blocked artery and we will expand the balloon to try to reopen your artery. We need you to sign here."

Cecil doesn't know whether to feel terrified or relieved. In fact, somehow he feels both at the same time. The beeping of the heart monitors, the milling medical staff, the plastic wrapped strange, but ominous looking medical equipment surrounding him confirm that he has become a cardiac patient. This like nothing else strikes terror in his heart. Yet, relieved to be in their hands, Cecil submits to their authority.

Cecil survived, and though his internist, who knows me well, suggested that he consult with me since he came out of the hospital, it took a year before he allowed his wife to call to set up an appointment. Cecil, who is 58, appeared robust and hardy. Although dressed as an executive in an expensive suit and tie, he had the air of a truck driver. He was back at work and very successful there; he had won back Jordon's regard and forced Frank out. Still, even after his angioplasty, cardiac rehab, professional success -- he seemed full of fury. He spoke slowly, pleasantly, but still I felt waves of anger and aggression just under his starched shirt and his Armani suit. He was like a grenade, sitting there harmlessly, but if the pin is pulled all hell will break loose.

As a child, Cecil felt disregarded and unjustly criticized by his parents, especially his father. He felt that they treated his older brother much more favorably and that all his life he inarticulately resented this injustice. When we talked about it, he could feel his rage rumbling around inside. We came to realize also that there was one part of his mind that tightly held on to this resentment, and that there was another part that had made peace with the unforgotten inequity.

In later sessions we used the goggles. Looking out the left side, stimulating his right brain, he could feel his anger well up at the mere thought of his parents doting praise upon his brother. Switching to the right-sided goggles, stimulating his left brain, he felt calm and peaceful, even while we discussed the injustice of his childhood. Cecil's troubled personality "lived" in his right brain, which experienced the past as if it were yesterday. At times of frustration his feelings of outrage led to deep depressions. As with my other patients, we came to view his therapy as our teaching the troubled part of him that there was another way to view the world, a way to let go of the indignities, and a way to let the mature part of him love and appreciate the troubled part of him.

Cecil came to me a disgruntled, skeptical executive. He never expected to be helped by of all people, a psychiatrist, but he was the first to realize the great improvement he was experiencing in his life. Because of the dedication and seriousness with which he addressed the problem and his intense, life-long but unarticulated search for a solution, he put his full power to the task. This was the same mental concentration he developed to fight business adversaries, and within six months he was able to terminate dual-brain therapy with an excellent result. Cecil was in many ways a changed man. He no longer had an aggressive, ragged edge to his personality. He was in fact relaxed, and his relationships with his wife, his children, and his colleagues had all improved. They had improved because the relationship between his two minds, within himself, had improved. The loss of his excess aggressiveness improved his work performance; apparently, he was no longer tripping over himself or provoking unnecessary struggles, but was learning how to work cooperatively. Cecil's follow-up exercise stress test, a test that had demonstrated abnormal ST segment changes shortly before he started his treatment, was now entirely normal.

Cecil discovered that Jordon's favoring Frank reverberated with his own childhood memories of his father's preference for his older brother. It dawned on Cecil that these memories energized the angry, frustrated troubled part of him in his right brain. Once that part of him felt utterly defeated, it was somehow able to evoke a full blown "defeat syndrome," complete with chest pain and a brush with death.

Cecil had seen quite a few cardiologists from the time he entered the emergency room, but none had any sense of how his mind was the force leading the attack upon his heart. He was told when he left the hospital to try

to reduce the stress in his life in the same breath in which he was told to reduce the fat in his diet, but neither he nor his doctors understood how complex the "stress" mechanisms were, nor how difficult they would be to reduce if they were not understood.

Psychosomatic Medicine of the 1950's

In so many ways medicine has improved, but occasionally a piece of wisdom is left behind. In the 1950's and 60's there was a burgeoning field of psychosomatic medicine, led by a group of psychoanalysts. They appreciated the depth and complexity of the mind and its uncanny ability to affect the body, especially the heart. They produced a very sophisticated literature filled with fascinating descriptions and theories on the relationship between the mind and the heart. This literature was by the early 70's forgotten, as the field of psychosomatic medicine was taken over by leaders with a more pragmatic, more experimental approach. This led to the popularization of the type-A personality and to a wealth of epidemiologic studies showing that stressful life events were associated with a very significant increase in cardiac events. But this new approach lacked psychological depth. It established absolutely that stress was profoundly associated with heart problems, but it never attempted to deeply understand the psychological nature of the connection, and few cardiologists were aware of or appropriately influenced by their findings.

And it was the cardiologists alone, not the epidemiologists, not the researchers, and certainly not the psychoanalysts who treated and controlled the care of the cardiac patients. The problem for the cardiologist was that although they knew what smoking was and how to detect obesity and gender, they couldn't really grasp what stress looked like. It was too difficult to understand concretely, too messy. Also, the cardiac patients very often held a view of psychology similar to that of their caretakers. The angry, aggressive, depressed, type-A men were reluctant to touch their minds or have them touched. Like their cardiologists they wanted their plumbing fixed, they wanted to be rescued, they didn't want to go off into that dark ethereal space where they inarticulately but intuitively knew death lurked. For a cardiac patient to be referred to a psychiatrist meant that his esteemed cardiologist regarded him as a mental case or a weakling or both, and such rejection and punishment was to be avoided by both doctor and patient except when utterly necessary.

By the early 1970's I determined to address these problems, by enhancing the techniques of cardiology with the tools of depth psychology. I began by trying to integrate my cardiology training with my budding psychological ideas, ideas which were in harmony with the psychosomatic writings from the 1950's of Dunbar, Arlow, Alexander, and Weiss. Their various hypotheses were that cardiac patients would develop their symptoms when they were unconsciously feeling defeated. To them, the cardiac dysfunctions had meaning: a heart attack was an attack upon the heart from the unconscious mind. It was only later, that, as with Cecil, I began to appreciate that the attack was coming from the troubled hemisphere. [[xli], [xlii], [xliii],[xliv]]

For instance, one of my patients was out to dinner with his business partner when he suddenly developed chest pain and was taken to the emergency ward and admitted to the hospital with a heart attack. What I learned in talking with him in the coronary care unit was that his father died when he was ten years old, and as a consequence his mother would often lament her fate and complain desperately that she felt overwhelmed with life's problems. He learned then to say to her, "Don't worry; I'll take care of it," and he grew into adulthood with that credo. His wife had been very demanding, especially for expensive things he couldn't really afford, and he would respond to her urgent needs with, "Don't worry, I'll take care of it." In his business, his partner had been taking more and more time away from work, asking the patient to take ever increasing responsibilities. He again responded by accepting the added burden with saying, "Don't worry, I'll take care of it."

In retrospect, in our interview in the coronary care unit, to the patient's surprise as we talked, he realized that at the meal at which he had his heart attack, his pain began shortly after his partner told him that he, the partner, was going on an impromptu Caribbean vacation and needed the patient to handle his overwhelming load at the office. The patient said to me, "I guess, I couldn't 'just take care of it' anymore." I believe he had exceeded his limit of his troubled hemisphere and that all the pent-up worries and assumed overwhelming obligations finally burst their container and allowed to erupt the sense of dread and defeat which a part of him had felt since his father's early death. I believe it was that eruption which precipitated his heart attack.

Another patient, a 40-year-old machinist, suffered a massive heart attack with severe complications that left him permanently impaired. He had been chronically harassed at work, and his heart attack occurred on a day when his boss ordered him to set up tedious, complex equipment. He dutifully completed his task only to hear his boss growl, "Now take it all down." After my patient recovered, we learned in psychotherapy that his abusive, alcoholic father ridiculed and rejected him throughout his childhood. It appeared that his boss' harassment, serious in and of itself, was greatly amplified by its resonance with his father's abuse. The similarity made the patient engage more fully emotionally with his boss' abuse. I speculated that the recent engagement intensified his agony which led in turn to his catastrophic coronary assault.

Mary Beth, a 33-year-old executive, came to see me after her triple coronary bypass operation. She was referred to see me for severe depression which she was at a loss to understand. The heart surgery had been a few years earlier, and though she had a realistic concern about her health, she did not attribute her depression to her cardiac problems. We discovered that she lived with subliminal, unarticulated feelings of terror. Throughout her childhood her mother had verbally abused and viciously beaten her with a hair brush. Although she was able to find some refuge at school and in her academic work, she was deeply scared by her mother's behavior. Her childhood trauma, her constant anticipation and terror of violent physical and mental abuse, was causally related not only to her depression but also to her premature heart disease. Further I hypothesized that her heart attack intensified her chronic, inarticulate anticipation of assault.

These patients and other cardiac patients I treated shared certain similar characteristics. They were relatively young for heart disease. None seemed to be very joyful or even simply content prior to the onset of their symptoms; in fact, they each seem to have suffered a sense of danger or defeat at that time. Several recent scientific studies have demonstrated that many heart patients die, partially as a result of feelings of despair and defeat.

- At the Montreal Heart Institute, 222 consecutive patients, one week after being admitted to the hospital for a heart attack, were given a commonly used depression scale, the Beck Depression Inventory. Over the following year and a half, the group which initially showed higher depression scores had eight times more cardiac deaths than the group having

lower scores. After the authors statistically controlled for other coronary risk factors, the depressed group still had 6.6 times the cardiac mortality. Further, patients who had both depression and more than 10 premature heart beats per minute died over this period at a rate 29 times higher than those patients with neither depression nor that many premature beats. [xlv]

To try to put these results into some perspective, let's compare them with the findings on cholesterol from the Framingham Heart Study. Among 374 post heart attack patients followed for an average of 10 years, those with an initial cholesterol level over 275 mg/dL had 2.6 times the cardiac death rate of those with a level below 200 mg/dL. [xlvi]

- Another group of prominent researchers led by Susan Everson studied about 2500 apparently healthy men, 42 to 60, for 6 years. Those who were rated initially as feeling a high level of hopelessness had 4 times the rate cardiac deaths over this period than the group rated as feeling a low level of hopelessness. [xlvii]
- A research group from Belgium reported in the journal, *Lancet,* their findings in a study of 300 heart patients, mostly males, who were in a cardiac rehabilitation program. Initially they gave the patients a number of personality tests. The patients were followed for about 8 years. The researchers found that those patients with a tendency to suppress emotional distress had 4 times more cardiac deaths than those patients without that tendency. [xlviii]
- A group from Johns Hopkins studied over 1500 people with no know heart disease who were evaluated for the presence of depression and then followed up 13 years later. Those with mild depression had twice the rate of heart attacks as those without depression, and those with major depression had 4.5 times the rate as those without depression. [xlix]
- A Swedish study of over seven hundred men, all 50 years old, followed for six years found that those with a lack of emotional support and social integration had four times the incidence of cardiac events than those with a high degree of social support. [l]
- A study from Harvard led by research psychologist Laura Kubzansky found a strong correlation between worry, especially about social concerns, and the future incidence of coronary heart disease among 1700 initially healthy men who were followed over 20 years. [li]

- A study of about 1400 cardiac patients followed for 5 years showed that those who were unmarried and without a significant relationship had over three times the rate of cardiac death than those patients with a significant relationship. [lii]
- Since the early 1980's, Jay R. Kaplan and his associates at the Bowman Gray School of Medicine have been studying heart disease in monkeys. It turns out that the species they studied resembles the human species in two important ways. First, they are socially very interactive, and second, they get heart disease similar to their human kinsman. Kaplan was working at a primate lab in the Caribbean when he observed that when a new monkey was introduced to a group which had known each other, the new member seemed to get into a lot of confrontations. Kaplan then decided to use the stress of periodically changing the group in which a monkey was placed. A control group consisted of monkeys who remained in a stable, unchanged group. At the end of 14 months, both groups were examined for coronary artery blockages. [liii]

Kaplan also observed that some monkeys were dominant, and some were submissive. He looked at the effects of the psychological stress of being put in changing social groups on both dominant and submissive monkeys. He looked also at the effects of gender and diet (high fat and cholesterol versus low). What he found is astounding. In the stable condition, submissive males had more coronary atherosclerosis than dominant males, and submissive females had more than dominant females. Males had more atherosclerosis than females with ovaries, but females who had their ovaries removed (taking away their estrogen protection) had increased atherosclerosis. When dominant males were put in the stressful, socially unstable condition they more than doubled their amount of coronary artery disease, and that increase was not related to blood pressure, glucose levels or blood lipids. The degree of coronary artery disease was greatly lessened when the monkeys were put on a low-fat diet, but even on the low-fat diet the stressed monkeys still had 5 times the amount of coronary blockages than the unstressed. But, in a later study, neither high stress and low stress male monkeys on a low-fat diet developed significant atherosclerosis, but those on a high fat diet and high stress had 3 times the amount of coronary blockages as those on the low-fat diet. Females housed in isolation, in single cages, had significantly more coronary atherosclerosis than females housed in stable social groups. [liv]

All the studies I have cited indicate that negative emotions such as depression, hopelessness, loneliness, and intimidation are associated with cardiac disease. What becomes more interesting is why these associations exist. Meyer Friedman, one of the originators of the concept of the type-A personality, is a cardiologist who, with an associate Diane Ulmer, came up with a somewhat more sophisticated psychological theory from his many years of talking with cardiac patients in therapy groups at their cardiac rehabilitation program. Meyer Friedman and Diane Ulmer proposed that the hard driving type-A individual was under the surface actually insecure and suffered a low self-esteem which gave rise to the sense of time urgency and hyper aggressiveness -- the hallmarks of the type-A personality. From this they proposed that under stress the person's personality deteriorated and emotional exhaustion set in. They observed but could not explain that many type-A patients seemed to possess a drive toward self-destructive behavior such as forgetting to file income taxes. [lv]

From my early years as a researcher in cardiology, I began to form a hypothesis somewhat similar to Friedman and Ulmer's (which, in fact, seemed to build on the early psychoanalytic psychosomatic literature). Later, when I became interested in the cerebral hemispheres, I suspected that my patients' heart disease might relate to how their two hemispheres interacted. Instead of the immature side's creating psychological symptoms such as anxieties or depressions, or even compulsions, I now wondered if that side of the brain in addition might not, as seemed in Cecil's case, be able to affect the heart by creating so much distress that it overflowed into the body and initiated an extreme defeat syndrome, biologically linked to the heart and possibly other organ systems.

Freud proposed that man possesses what he called a "death instinct" which he saw as the opposite of a "life instinct." For this concept, Freud has probably received more criticism than for any other of his ideas. But I think he was on to something with his death instinct. Freud never articulated his concept in this way, but I think that at the bottom, he was really writing about the same biological drive to self-destruction which I place in my cardiac patients. [lvi]

How the Mind Affects the Heart

The autonomic nervous system has two main divisions, one which speeds things up and another which slows things down. The first is called the sympathetic nervous system and the second, the parasympathetic nervous system. Both systems originate in the brain. Both are affected by our thoughts and feelings. Both affect the heart through nerves which travel from the brain to the heart. Once the nerves reach the heart, they release chemicals on the heart tissue. The sympathetic system releases adrenalin and/or noradrenalin, the same chemicals released under stress by the adrenal glands, situated on top of the kidneys. The parasympathetic system releases acetylcholine. Together these two opposing systems can exert a finely tuned control over the heart's rate and force of contraction.

The mind can affect the heart first by causing the brain to send nerve impulses down the sympathetic or the parasympathetic systems, which causes changes in the heart rate or heart rhythm. Such changes can, in extreme conditions cause the heart to fail to pump adequately. These conditions are called cardiac arrhythmias and are the likely cause for many cases of sudden death.

Less proven is whether these nervous systems can cause or contribute to spasms of the coronary arteries. In the early 1970s I set out on a series of experiments to attempt to find out if emotional stress could cause coronary artery spasms. At that time coronary spasm was not considered a common, significant factor in heart disease.

I decided to study patients with recurrent chest pain diagnosed as angina pectoris. I knew the coronary arteries were equipped with muscles, nerves, and chemical receptors which could produce a temporary narrowing of these critical blood vessels, and I knew that angina patients were often temporarily adversely affected by episodes of emotional distress.

I examined the patients while they experienced an emotional stress and then while they underwent a physical stress. During an exercise test such patients usually develop a change on their cardiogram which is monitored throughout the test. The change is called an "ST segment depression" and it can be measured with a ruler. The depth of the depression of the ECG wave correlates fairly well with the degree to which the heart muscle is lacking sufficient blood to meet its needs, a condition called coronary insufficiency or ischemia. I reasoned that if a patient had the same degree of ST depression during exercise as during emotional stress, but his heart was pumping much harder during the exercise, then one could infer that he had

relatively less blood delivered during the psychological stress, and this relative decrease in blood flow, if it was very temporary, would probably be due to coronary spasm.

To put the patients through a physical stress test was easy. Exercise cardiac stress tests had been well established, relatively safe, and easy to perform. To create an emotional stress, I wanted to design a psychological stress test that would make the patient feel somewhat defeated. I also needed to engage the patient emotionally. One could put anyone on a stationary bicycle or a treadmill and make them work, but an emotional stress had to psychologically grab the patient or there would be no stress. What I decided on was an imitation of an IQ test. After the patient was wired for the ECG monitoring, I told him that I had a little test, a brief IQ test, to get a measure of his intelligence. The test consisted of twenty questions which I had earlier recorded on an audiotape. After each question on the tape there was a pause during which the patient had to give his answer. I stood before the patient in a starched white coat with a clip board in my hands and a scowl on my face. The questions by design, appeared easy but were, in fact, nearly impossible, so that the patient in front of me was being a bit defeated and embarrassed. As soon as the test was completed, I explained that the test was intended only to see how his heart responded to emotional stress. Almost without exception, the patients responded by telling me that they knew that all along, and they hadn't taken the test seriously. In fact, the patients did know they were there to undergo an emotional stress test and had given written consent. Nevertheless, the patients almost uniformly had marked increases in their blood pressure and their heart rates. A number had ST depression and number had a marked increase in palpations or premature heart beats. [lvii]

In eleven patients we were able find equal levels of ST depression, and in these we found that their hearts were working significantly less during the emotional stress than during the physical stress. This result was consistent with our hypothesis, and my colleagues and I suggesting that the results supported the notion that emotional stress can cause coronary spasm. Eight years later a group from UCLA did a similar study using more sophisticated measures of cardiac ischemia and found similar evidence of coronary spasm during mental stress, and then a few years later another group at Harvard did a study in the catheterization laboratory where coronary angiograms are performed. They emotionally stressed patients

during their angiograms and found that they could easily induce coronary spasms. Today, it is generally accepted that emotionally induced coronary spasm is an important mechanism for disease in a number of cardiac patients. [lviii]

We do not know the specific mechanisms by which the mind induces the brain to induce coronary spasms or arrhythmias. The quickness with which they occur in response to an acute stress suggests that the autonomic nervous system is involved, but exactly how is not well understood. We do know that the autonomic nervous system is more connected to the right brain than the left brain, and we know that the left side of the sympathetic system (connected to the left brain) can cause an increase in dangerous cardiac rhythms. But we have only primitive evidence about whether the higher levels of the different hemispheres might play different roles in causing coronary spasms or cardiac arrhythmias. We do know, for example, that Werner Wittling and his associates, the German group which showed upsetting movies to one hemisphere at a time, found that people responded to stressful movies with greater increases in their blood pressures when the movies were shown to their right brains than to their left brains. And Kenneth Hugdahl and his colleagues found that when they flashed emotionally evocative pictures to the left visual field (right brain) they observed higher heart rate responses than when they flashed them to the right visual field (left brain). [lix]

Werner Wittling found in some of his experiments that the physiological responses were not always associated with the person's conscious sense of emotional distress. Research psychiatrists Richard Lane and Richard Jennings suggest that patients who get emotionally upset when their left hemisphere is dominant may be more vulnerable to serious cardiac arrhythmias. I wonder if their finding might relate to my observation that my PTSD patients had more psychological distress in their left hemispheres, but more studies need to be done to evaluate this hypothesis. [lx]

The Benefit of Psychological Treatment for Heart Disease

Whatever the mechanisms turns out to be by which stress or depression contributes to heart disease, the good (but generally unappreciated) news is that there are effective psychological treatments for cardiac illnesses. The early psychoanalytic writers reported cases of

cardiac patients successfully treated with individual psychotherapy, but they didn't have a large enough sample to do outcome studies. The first controlled study to show a positive benefit of group psychotherapy was in 1974. Then in 1979, another group, led by renowned stress researcher Richard Rahe, reported a four-year follow-up of post-heart attack patients given brief group therapy after their heart attack. Rahe showed that among 39 patients who were given the group therapy, none had another heart attack, and none died. Two of the 39 did have to undergo a bypass operation. In a matched control group of 22 post-heart attack patients not offered group therapy, 4 had another heart attack, another 4 required by-pass surgeries, and another 3 died. [lxi]

The most impressive data come from Meyer Friedman's rehabilitation program in California. Friedman and his colleagues' aim was to change the personality of type-A patients, to make them more easy going. As I pointed out earlier, Friedman noticed that the patients had an underlying sense of insecurity which led to their type-A personality, and in on-going group therapy sessions this insecurity was addressed along with other issues. Over one thousand post-heart attack patients were enrolled in the rehabilitation program which emphasized the group counseling. These patients were followed for 4.5 years and compared to a control group. The treated group had 44% fewer recurrent heart attacks over this period than the control group, and when the control group was eventually offered the group therapy, they too had a similar reduction in recurrent heart attacks. [lxii]

More recently, another group tried to replicate Friedman's work. They divided 265 post by-pass patients between an intensive cardiac rehab treatment group resembling Friedman's program and a "usual" treatment group. At 4.5 years after surgery the control group had 3 times more cardiac deaths than the treatment group. [lxiii]

In Finland where there is a high incidence of coronary heart disease, 275 post heart attack patients were give a comprehensive 3-month cardiac rehab program with a strong psychological component and over the following 10 years they had half the rate of sudden cardiac deaths as a matched control group. [lxiv]

Dean Ornish and his colleagues studied 48 cardiac patients divided so that half received his intensive cardiac rehabilitation program which included a strong dose of group psychotherapy and the other half received "routine care." They found that the patients in the program had an

average 9% decrease in their coronary artery blockages determined by coronary catheterization and visualization while the control group had a 24% increase. They also found an improvement in coronary blood flow in the treatment group but a decline in the control group. [lxv]

These impressive results remind me of an advertisement played on the radio during one summer in the late 50s in Atlantic City. Referring to Duke Hazlett, a singer who imitated Frank Sinatra when he was at the height of his popularity, the announcer said, "If you like Duke Hazlett, you'll love Frank Sinatra." My feeling is that if group therapy can get impressive results, then intensive individual therapy as I offered Cecil, might get overwhelming results if it could be offered to enough patients to do a controlled study. My new idea of proper treatment harkens back to the kind of work the psychoanalysts did with cardiac patients in the 40s and 50s.

But the problem is that cardiac patients and cardiologists do have an antipathy to intense psychological work. If the patient is sent to a rehab program which includes a stress reduction component, then that is usually acceptable, but many such programs do little in the way of effective psychological treatment. A recent study surveyed 65 cardiac rehabilitation programs and found 40 offered stress reduction programs but only 3 of those were considered by the authors to be at a level which could be expected to give a benefit, the rest were judged useless in terms of stress reduction. [lxvi]

I think a part of the problem is that cardiac patients like their cardiologists tend to be left brained in the popular sense. That is, many tend to avoid the ethereal and the poetic, but attend almost exclusively to their external lives, trying to ignore their inner psychological pain and insecurity. One patient in his 30's came to see me for episodes of chest pain and palpations which his cardiologist felt might be aggravated by some underlying, hidden stress. I found that the patient grew up in a war zone in which he was constantly exposed to artillery fire. The alarm he felt when he had his cardiac symptoms seemed to me to be remarkably similar to what one might feel if he were exposed to shellings. I offered an interpretation to the patient which related his symptoms to his early experiences, and he had an immediate resolution of his cardiac problems. They just stopped cold. The patient called me to cancel our next appointment because he had found that the cause of his symptoms was something he had been eating. He consciously denied that my interpretation was related to his symptoms or

their relief, but nevertheless he maintained his improvement. I think that unconsciously he was able to use what I had offered him, but that he was too terrified to face consciously how frightened he was on another level.

I believe that if patients like Cecil can get past their initial fear and reluctance, they can do excellent psychological work in the right setting, and I believe, especially in younger patients, that that would have consequential physical benefits. And, oh, yes, and Cecil sends his regards. He's been doing very well emotionally and physically since we finished well over a year ago.

CHAPTER ELEVEN

DUAL-BRAIN THERAPY TO DISCOVER AND ASSIST YOUR TROUBLED MIND

I hope that through the course of this book, I demonstrated the essential principal of the dual-brain model: that we are of two minds, each associated with one cerebral hemisphere. Dual-bran therapy is the application of this principal toward helping people better understand and repair their psychological distresses. The lateralized glasses assisted me in my quest to understand how the mind works, and in those patients who had a robust response to them, they were of enormous therapeutic value. But, whether a given patient had a reaction to the glasses, he was almost always aided greatly by the principals which they helped establish about how the mind functions.

In this chapter I will gather together the therapeutic ideas from the preceding chapters and show how they can be applied by you in your attempt to improve your life. First, each patient I described came to me because of a symptom which was bothering him. Your first step is to try to identify what problems or symptoms you would like to work on. Are you depressed, anxious, insecure? Do you procrastinate or avoid relationships? Do you feel unfulfilled? Do you have a problem with substance abuse? Do you deal poorly with current stresses or with past traumas? These are some of the many problems which can be helped with Dual-brain Therapy.

After you have a clearer idea of the symptoms or problems you would like to address, consider how you understand these difficulties. Why do you think you feel depressed or insecure or over-stressed or under-related to? How do you now understand yourself?

The patients I described in the earlier chapters were chosen in part because they had problems which were typical of patients I see. Usually, they had little insight into their problems when they entered treatment. I asked them to describe their problems for me, as I am asking you to describe yours to yourself. Try to elaborate your description of your difficulties. When did they begin? What has seemed to aggravate them? To help them?

Next, I asked my patients to describe their childhoods. I wanted to know what was the quality of their relationships with their parents, siblings and other significant people. What was your general feeling about the past? What were some of the more significant events?

As you have seen, I then encourage my patients to try to relate the feelings associated with their symptoms to any feelings from their past. All this is typical "therapy" stuff, but it is very useful.

You may have noticed that my patients have more similarities than differences. Even their most different aspect, their individual symptoms tended to overlap. This is typical of the hundreds of patients I have treated. The causes for their symptoms were always related to past insults, injuries, or traumas, usually in the form of neglect, derision, or overt abuse. None were injured by excessive love, admiration, or consideration although often they were treated alternately derisively and lovingly. Sexual abuse is often rationalized as love by the perpetrator, but it is in fact an expression of ultimate disregard for the child.

It is often difficult for patients to appreciate that their early life involved mistreatment. This acknowledgement, when it is true, often feels like a shameful cop out. Joe told me, "You shrinks always want to lay all the blame on the parents," when he described for me how his father throughout his childhood beat him with a belt as he verbally excoriated him. Children are made to feel responsible for their ridicule, neglect or other mistreatment, and when they grow into adults, they often retain the same attitude and feel guilty when I ask them to face what was done to them often by the people who were supposed to love and protect them.

The Essence of Dual-brain Therapy

Where dual-brain therapy comes in is in the conceptualization of how past traumas might still affect you. The idea is that there exists an actual mind in one of your hemispheres that is still living in the past, still seeing the world as you saw it at a painful earlier time in your life. As we have shown,

this part of you may be your dominant personality as it was in the cocaine addicts before their treatment, or in Mark when he became psychotic, or in Carol or Ryan when they were in their initial distress.

As in Harold, if you have a troubled hemisphere, it might operate behind the scenes, creating inexplicable behaviors, compulsions, or inhibitions. Or perhaps like Joe you might have an intense anxiety that on the surface has no reasonable explanation, but beneath the surface, inside his left hemisphere, was a part of him which was living in the past and waiting for his father's mental and physical abuse.

Dual-brain Therapy begins with the realization that there is an actual intact troubled person in one hemisphere. Some people may not have a troubled mind in either hemisphere, but these people should not symptomatic. If you are troubled by anxiety, unexplained sadness, inhibitions or any of a long list of problems, then you are likely to have a troubled hemisphere.

The idea of a troubled hemisphere is intended to be clarifying, not frightening. The troubled part is hurting and will be appreciative of your help. If you come to recognize that your symptoms are the expressions of a troubled part, a part of you that you can, with effort, compassionately understand, then you will achieve a tremendous insight into the nature of your symptoms. You will also be given a blueprint for how to work yourself out of your problem.

In some patients it is rather easy to identify the two intact minds that exist within. With Carol, because her distressed state was a radical change from her usual mature personality, I found it relatively easy to help her recognize the two parts of her. In other patients, because one side is so dominated and repressed by the other, as in Cecil (the executive with the heart attack), the task of getting the patient to appreciate that there is another significant part to his personality is more of a challenge. In a few others, perhaps because both sides are troubled, as I believe may be the case in some of my chronically ill patients, I have not succeeded in locating two separate minds.

For years before I discovered the glasses, I worked successfully with this concept of two autonomous minds in my patients, but in patients who respond to them, the glasses are remarkably helpful. Dorothy, a woman in her 60's, a victim of horrendous childhood abuse came into my office wheezing as she had been since being awakened by a nightmare in the middle

of the night. I had her cover her left eye with her left hand and the middle half her right eye with her other hand and within seconds her wheezing stopped as did her emotional distress. I had her look out the other side and she immediately felt great distress, and we quickly returned to the other side. She said (half-jokingly), "This makes me so mad. I can't stand this. This means it's all in my head, doesn't it?"

"Well, yes," I said, "in half your head."

I don't want to give the impression that Dual-brain Therapy is simply having someone put on a pair of glasses. Quite the contrary. The glasses or the hand covering is only a tool to assist us in the true task of the treatment, that of recognizing the troubled part and then of helping it. Patients who do not respond to the glasses, can still succeed by working with the concept of two minds and then discovering and working with their troubled mind. The glasses are helpful in clarifying these principals, but they are by no means necessary for a full recovery.

So, the first part of Dual-brain Therapy is the recognition and experience of a troubled personality within. I help my patients to experience the actuality of this part of them, and this discovery is always clarifying and helpful. If you have already considered what your symptoms are and how they may relate to your life's difficult experiences, then you are ready to feel around inside yourself for your troubled mind. Your troubled part may be childlike, or it may simply be a terrified adult, but it almost always is somewhat impulsive or reactive because it is usually on guard. It has a tendency to catastrophize; to see the worst in everyone and everything. It does this because it expects an old abusive situation to be repeated, and often it successfully sets things up to fulfil that expectation. Harold could have lost Jane through his hesitancy, and he would likely have seen that in his troublde mind as proof that Jane, like his mother, was destined to reject him, confirming the wisdom of his reluctance.

Sometimes the troubled mind attacks the person as we saw in Earl (the troubled part of Don). Often when we are depressed, our troubled side is attacking us, and recognizing this situation when it is occurring is extremely helpful in resolving the depression.

Almost all of my patients easily recognize the troubled aspect of themselves after they have delineated their symptoms and deeply considered the subtleties of their life experiences. Usually, when a patient can't discover their troubled part, they are too repressed, and over time within the

safety of therapy the troubled part becomes apparent as it either emerges from its hiding place or is permitted to surface by a dominating side which has learned to relax its grip.

Often, I will use the lateralizing glasses, or simply the patient's hands to restrict vision to one side or the other, in order to assist the patient in discovering his troubled mind. As an exercise you can try this now, if you wish. (If you believe you have experienced significant trauma that you aren't able to work through alone, you may want to find professional help and the information I have provided in this book may be a good adjunct to your therapy, and your therapist a good adjunct to the book.

Trying a Technique for Lateralizing Your Vision

Choose your left or right side to look out of first. (I will begin with a description of how to look to your right, but you may begin on your left side. It does not matter which side you choose.) Cover your left eye with your left hand, then cover the middle half of your right eye with your right hand. You should cover your right eye so that you can see out of only its right half. You can move your hand slightly to cover more of your eye and see if that enhances any effects. Remain still for about a minute before measuring your level of anxiety, using the scale from 0-5 (none, mild, moderate, quite a bit, or extreme). Switch to the other side and cover your entire right eye with your right hand and the middle half of your left eye with your left hand, just as you did on the other side. Again, wait a minute before rating your level of anxiety.

Did you notice a difference? What was your rating for your left side? Your right side? Were you more distressed on one side, and calmer on the other? If you felt a difference between sides, did the experiences feel familiar?

Many of my patients do not respond to this technique. Usually over the course of therapy, the technique does work at least enough to give them the experience of having two separate views of the world. I have found that to a degree, patients are more responsive when they are more symptomatic, although this is not always the case. Frequently, patients who do not respond initially can later have robust responses. But, again, I want to emphasize that patients who do not respond to lateralize vision, can still appreciate and greatly benefit from the concept and inner experience of having two minds. That is to say that the experience of two minds does not depend on the

lateralizing techniques, although it can be aided by them. Again, I used this dual-brain concept in my work with my patients well before I discovered the lateralized glasses.

If you did experience a response to this technique of lateralized vision, did you recognize a familiar anxiety or insecurity? If you noticed a distinction between sides, this may have been your first experience of your two minds as separate, distinct entities. Move back and forth, repeat the exercise several times, become familiar with how each side feels and how you feel as you activate and isolate the hemispheres. Feel the novelty of having contrary views of the world. Which view is more familiar? Which view seems to dominate? Which feels more realistic?

For many patients who have a robust response and feel distress on one side and calmness on the other, the experience is literally mind boggling. Patients will laugh and say, "What is this? This is strange. What does this mean?" I never intended this technique as a mere curiosity. I apply it to the primary aim of every patient's treatment: the education and assistance of the troubled part of the patient.

What is most important in the course of therapy is the relationship between the healthier and the more troubled mind. Only after a person has been able to experience and appreciate the existence of these two minds, does the work of therapy begin. Psychotherapy, in this context, resembles couples therapy in which one partner is more troubled. I use the glasses or the hand covering to facilitate that relationship. As an example, I will share a transcript of a session with a patient in which we used the hand covering technique, not so much to recognize the two parts, but more to facilitate a healthy dialogue between them, to improve their relationship, to assist the troubled part to appreciate that his world had greatly improved since the past.

An Example of Lateralized Vision to Assist in Therapy

Abe is a thirty-five year old patient of mine, a single man who had been in therapy for a year before I had discovered the lateralizing techniques. Abe had an unusual story to tell. As a child of five he was abducted by his estranged father who tended to treat him over the ensuing years with an unexplained contempt, and at times would terrorize Abe with cruel stories of evil creatures lurking in the dark.

Abe had been diagnosed with severe anxiety and depression. Despite his symptoms, he was very successful in his field, yet his success in business didn't help him conquer his deep and chronic pangs of insecurity. Over the course of the year, we used traditional psychotherapy to help him gain insight, and he achieved periodic symptomatic relief. He took Prozac, but as far as we could tell it had little effect on his symptoms.

In the following session in which we used his hands to block his vision, we achieved a dramatic breakthrough, and since this session which occurred four months earlier, he has remained symptom free. The session shows how lateralized vision can be used to enhance the relationship between his two minds.

Abe came into the session feeling a very intense despair and, in fact, had been having some passing thoughts of committing suicide. After I asked Abe to use his hands to block his vision so that he could see out of the right side (enhancing his left brain) he immediately began to feel relief. With his permission, I tape recorded the remainder of the session.

"Do you feel differently from before you covered your eyes [looking to the right (left brain)]?"

"I don't feel any despair . . . though I still feel a heaviness."

"How sad are you feeling?"

"Mildly sad."

"How about loneliness?"

"It's there, but it's not unmanageable. It's very familiar."

"Would you try switching to the other side [looking out his left side (right brain)]?"

(a minute pause.)

"Very different. Distinctively different. Very very profound sadness, I feel extreme sadness."

"How does this compare with before, when you first came in?"

"It's about the same."

"How much anxiety?"

"Extreme."

"And loneliness?"

"Extreme."

"So, this is what you've been living with? What comes to mind about this feeling? What's it remind you of?"

"There's this great fear that I don't know how to get out of it. That it has its clutches in me, and I don't know how to fight it. Just leaves me feeling quite vulnerable and alone --the way I used to when I was a little boy."

"And helpless? Not sure where to turn?"

"Exactly." (Abe's crying interrupted our dialogue for about a minute)

"Try looking out the other side." [He again moves his hands so that he's looking to his left side (right brain).]

(After a minute)

"Again, a very distinct sort of shift of emotions. It's manageable. On your scale it's moderate, but I'm still aware there is something that isn't right."

"Tell me."

"Well, this lack of energy and desire to perform my simple everyday tasks is due to all this stuff that's going on right now."

"How does the world look now?"

"It's grey, but I know that what's happened to me is surmountable, that it's not hopeless."

"That's important. This isn't something you knew as a child?"

"No."

"Something you learned somewhere as an adult?"

"Right."

"And it seems there's another part of you that doesn't know this."

"That's right."

"And that we need to tell that part that there is hope and that the vulnerable position that you were actually in is different today. Today you are a powerful person."

"That's right. I can make choices today where I couldn't as a child."

"And you can protect yourself today, whereas you couldn't as a child, when you were frightened as a child. Today you're not threatened except for what's coming from inside."

"Yes."

"And can you let the other side look out this side?"

(a pause of about a minute.)

"He's not used to this."

"What's that feel like?"

"It's a little scary."

"Tell me."

"He's so used to feeling helpless. To see that it doesn't have to be this way, that's quite a revelation, but it's a whole new, what's the word I want to use, sort of a whole new frontier for him."

"He has to learn how to live in a different world."

"Right. And change is scary for a little boy."

"Even good change."

"Yeah. . . He needs to learn to trust that I'm not here to hurt him, that I'm here to help him."

"Try looking to the other side." [He again looks to his right side (left brain) which had initially stimulated his distress.]

(Pause.)

"Yes. . . . Well, the levels of anxiety and sadness don't feel the same anymore. They're still there, but they aren't as strong."

"And can this side remember what it looked like on the other side?"

"Yes."

"How did it look on the other side?"

"A lot calmer. Manageable."

"And was there someone present to protect you?"

"Yes."

"Different from the past?"

"Very different."

"And was there someone there to abuse you?"

"No."

"That's different."

"Yes, it is."

"And can you see that?"

"Yes, I can."

"On this side too?"

"Yes. . . It's been a long road, and it's been hard to trust, to trust that you won't be crushed down. And that even though all this tragedy is present, there are people out there who care and want to help and nurture for that condition."

"And one of those people is the other side of you?"

"That's right."

"Seems like a lot of protection."

"Yeah, . . . when I bring together, when I bring this side [the distressed side] with the other side, this one can look into there and extrapolate and take and see what's going on and I can bring it together with the other side with feeling. It neutralizes a lot of the pain that's been here on this side. It becomes clearer and a lot more obvious as the adult comes together with the child and is able to clarify and help understand why those feelings are the way they are, where they're coming from. And in a way as important as they are today, they're also things that happened in the past and don't have any bearing on the reality of what's happening in the present."

"And also, it's not as dangerous."

"Right."

What is happening in the session is that remarkable is that Abe is able to get his two sides not only to communicate but even to share their views of the world. When one side of the brain is stimulated to become dominant, the other side is still active and present. The two minds are in this sense co-conscious, even though only one may be the active dominant mind at the time. Imagine you and I are in a room with a third person. When I direct my conversation to you and you engage in the conversation with me, we may lose sight of the fact that for a few moments we are ignoring the third person. But this third person still exists and observes and thinks even when he is not actively engaged in the conversation. This is my vision of how the two minds generally work. When one side is stimulated, the other still exists and functions. When we look at the brain wave changes with the glasses, we see a clear measurable shift in the power of the EEGs over each hemisphere, but it is a relative shift. We do not see one hemisphere light up and the other become dark.

The two hemispheres relate to each other as two people relate to each other. They both listen and talk and consider. They both have feelings and attitudes towards the other. In addition, these two minds exist in the same skull, and they are connected through the corpus callosum and other connecting fibers. I believe it is through these neural connections that the mind of one hemisphere can actually experience, can feel directly what the other side experiences. When Abe says that he is letting his troubled side look out the view of his healthier mind, I believe that this is actually what is happening.

What is most important to our discussion is that Abe's two minds are relating to one another, and his healthier mind is working to comfort his troubled mind.

I then asked Abe to switch again to his more comforting left side (right brain)."

"Yes. The emotions are less, I'm still in a moderate place, but it feels different. The intensity of that moderate level is less. I'm still feeling a certain sadness a certain amount of loneliness and anger but it's not . . . ."

"Is there any sense of well-being?"

"Yes, there is, there's a sense that I can handle this, that I can make it better."

"That there's some hope?"

"Yes."

"What do you make of that?"

"Well, it's an exercise that I need to be very much aware of and practice, so I have a lot more balance and control over what stirs inside."

"There's another view?"

"Yes. It's not all that bleak. There's hope."

"Is there a future?"

"Yes, there is."

"How's that look?"

"Challenging but good."

"Why don't put your hands down. . . . How do you feel?"

"Remarkably better than I did when I walked in through this door. I'm exhausted, but I feel much lighter. It's amazing what we do to ourselves. Honestly, when I walked though these door today I was just ready to give up, I sat in my car earlier wondering if I was even going to make it up the stairs."

Essentially, what Abe's session teaches us is that he has two distinct minds, two distinct ways of viewing the world. One perspective is that the world is extremely dangerous and that he is almost certainly going to be injured and humiliated. This view is complete and internally consistent. The other view is also complete, though at variance with the first. Here, he sees himself as safe, powerful, and successful, that his world is for the most part under his control.

Both views are his views. Depending on which side he looks out, Abe will see one view or the other. The experience of changing one's view of the world by changing one's lateral vision is remarkable and striking and challenges the dogmatic stance of his negative view.

Abe is also helped by our talking to his troubled right brain and by our encouraging it to look out his healthier side. We are actively trying to teach his troubled side that there is another view of the world, a view that Abe is safe, strong, and well regarded. During the session it seems to us that we have succeeded in reaching his troubled side. We see his anxiety melt away. By the end of the session, even looking out of the troubled side does not evoke anxiety. The lesson his right brain learned through this exercise has lasted eight months so far, and I believe that the longer it lasts, the stronger it will grow.

Abe's healthier side is also strengthened by its alliance with me. I encourage this side to believe in itself as well as to assist his other side. As in Abe's case there are often defining moments in therapy when the troubled mind "gets the message" and learns that it is truly safer and more valued than it had believed. Further, even when the troubled side forgets what it was taught, it becomes easier to teach it the next time (and the next). Teaching the troubled mind, the heart of therapy, generally requires great patience and repetition. Abe's enduring response was exceptional but not rare.

So, as you look from one side or the other, if you get a response, begin a conversation between the two aspects of yourself. Let each part of you notice the way the other part of you sees the world. Then you must think about this, and work to teach your more troubled side that there is another view, a more realistic view.

Another technique I have used with my patients is to talk directly to the troubled mind. I described this in the chapter on depression when I talked with Don's troubled side. The most surprising thing about taking to a troubled part of a person is that it listens. I know this because frequently I have asked a troubled part of a person to stop attacking the other part of him, and suddenly the person feels remarkable relief. I suggest that you talk to yourself.

What I suggest is that when you have a sense of your troubled self, talk with it. I mean talk out loud to it (but not in a public place). Tell it you care about it and want to help it. I have a patient who silently tells his

troubled part to go sit on the bench while he plays tennis. His troubled part liked to take control during the games but would have a tendency to swing wildly. To my patient's amazement when he asked that part of him to sit on the bench and watch the game, he could feel that this was happening, and his game improved dramatically.

More importantly, I have taught patients like Don to talk firmly with their troubled minds when it is attacking them and causing intense anxiety or depression. It is an amazing experience to talk very firmly with your troubled self and tell it to stop attacking you, much as I spoke with Don's troubled side, and find that you suddenly feel better. I have had many patients succeed at this. Not only does it relieve distressing symptoms, but it clarifies the existence of the troubled mind and improves the communication and relationship between the two sides.

Another technique which I have found very helpful in my practice is what I call focusing. In essence, I ask patients to look at an object in the room, perhaps a plant or their shoe. I ask them to attend to it actively, paying strict attention to it, to try to see the details of it-in essence, the reality of it. I have found that if a patient can strongly focus their attention on the object in this way, the process pulls them out of their own head and into the external reality of the room. When this exercise works, the person's contact with reality increases and can lead to a sudden calmness and clarity, quite similar to the effect some people have with the lateralized vision. For people in whom this works I encourage them to "focus" to look perhaps at their shoe if they are in a meeting and feeling stress and anxiety. By pulling the mind into close contact with reality it very often has a calming, grounding effect.

For people who are calmed by the glasses, I encourage them to use their hands to block their vision before (or after) going to a stressful meeting. Some patients have made a pair of goggles (taped to evoke calmness) and put them on as a kind of meditation or respite for a half hour before they go to sleep each night.

General Principals for Enhancing Communication between the Two Minds

The troubled mind often clings to it old views. We have difficulty just getting it to hear us, let alone to seriously consider our opinion, or change its mind. Psychotherapists have a term that describes a troubled mind's reluctance to change:"resistance." When a patient has difficulty

getting in touch with his feelings or cooperating with the therapeutic enterprise, the psychotherapist says the patient is "resistant." Although the term can be used pejoratively, it shouldn't be. Freud understood that much of the benefit of therapy had to do with the constructive working through of the resistances which continuously came up in treatment.

I see resistance as simply the troubled side's distrust of anything that challenges what it believes to be true. Very often it was traumatized or disturbed by some past events, and it remains vigilant, even many years later, against the anticipated recurrence of disturbing situations. Sometimes this side will even influence situations so that they end up recreating the feared circumstance as Harold almost did. It is not that the troubled side wants to repeat their trauma, it is in fact that it so desperately doesn't want to repeat it, that motivates it. This mind believes that it knows the traumas will be repeated, and it anticipates the repetition of the trauma. When the trauma does not occur, the troubled mind feels not relief but only more anxiety because it "knows" the trauma will recur and becomes even more expectant as the anticipated trauma gets "delayed."

If this mind believes that the recurrence of some old unbearable pain is inevitable, it will remain preoccupied with it, and any effort to reassure it will be seen as imprudent advice to be avoided at all costs. Getting this troubled side to reconsider what it believes it "knows," getting it to trust someone else (a mature-sided mind or a therapist), getting it to consider that what happened in the past need not be repeated in the future -- all this is extremely difficult, but it is the essential task in helping our troubled minds.

To convince your troubled mind to change, you need to use the same techniques used to change other peoples' minds. You need to demonstrate that you are trustworthy, that you care and that you are responsible and intelligent. In a sense you need to be a good leader or a good parent to your inner mind.

Strengthening your more mature mind is, perhaps, the first step in learning how to talk with your more troubled mind. The more mature mind needs to be a healthy leader who guides the other side, while being strong enough to listen to and to consider that side's troubled thoughts and feelings. Thus, the mature side is the executive. This mind should be more mature, more grounded, more responsible, and less impulsive.

How can the mature mind be strengthened? Well, like any executive it can be strengthened by receiving encouragement and education, by utilizing determination and perseverance, by forming alliances, and by paying attention to information. A strong mature side has a large capacity to bear pain and other feelings, as well as the restraint or temperance required to reach prudent judgements.

Perhaps the greatest strengthener of any mind is success. I believe that as animals, we have inherited a biological system whereby when we perceive ourselves as successful, a whole set of helpful organic mechanisms are released. It is a "Success Syndrome," if you will. It is the opposite of a "Defeat Syndrome," in which our bodies and minds sabotage ourselves.

An example of the Success Syndrome would be if you were playing tennis against someone you were not supposed to beat, and you found yourself closing in or taking the lead. Suddenly you might find yourself playing better than you had ever played before. Your body would be pumped up and every part of you would feel and function superbly. Mentally you would be focused and clear, and in both mind and body, you would have a great sense of wellbeing.

Now your opponent might feel his Success Syndrome and rally. He might start to ace his serves or come to the net and destroy you. You then realize that you are going to lose. It's hopeless. Your mind sees this and suddenly, just as quickly as you entered the Success Syndrome, you now find yourself in the midst of the Failure Syndrome that we described in the chapter on depression. No part of you works any longer as it was intended. You feel fatigued. Your timing is off, as is your concentration. Mentally, you feel a depression settling in. You can't wait to get off the court. Your body, which not long ago felt new and lubricated, now feels pained and decrepit.

What happened? Your perception of your situation along a continuum of success/failure released intense, innate, biological responses commensurate with your view. If you want to see how profoundly important these innate responses are to our well-being, just notice the number of illnesses which bear a relationship to a person's having a sense of defeat: depression, ulcers, colitis, coronary artery disease, hypertension -- just to begin the list. There are no illnesses which result from a sense of success; in fact, such perceptions promote wellness.

What does this have to do with the mature side? Well, we were discussing how to strengthen this side, and an important way to strengthen it

is to increase its real power in the world. Success breeds success. To strengthen the mature side, we need to find encouragement from our relationships with friends, mentors, lovers, colleagues, or families. Encouragement should also come from ourselves; in fact, self-encouragement is probably the most important source. We need to believe in ourselves.

Education can also help empower the more mature mind. We need to be familiar with and open to the ideas of others. Yet, we also need to retain our ability to intelligently challenge those ideas by processing them through our own judgement.

Making wise decisions empowers our more mature mind by both increasing its power and circumstance, and by increasing our trust in its decisions. That is, the better our decisions, the better our circumstances become and the more we will learn to trust ourselves.

To begin to help our more troubled minds, it seems we need to have a mature side as strong as Schwarzenegger, as wise as Lincoln, and as temperate as a saint. But the first problem is that the mature side's most important source of strength and wisdom is the other side. To improve ourselves we must strive to get both parts of us to participate constructively.

In any relationship, whether between two people or between two minds in one person, both must respect each other and be about equally influenced by each other in a cooperative, harmonious manner. Unfortunately, many relationships are such that one person overpowers the other. One person may always have to be right and may be able to unduly influence the other person and dominate him or her. In some relationships the participants may covertly attempt to sabotage each other.

There is a relationship between your two minds and that relationship, like all relationships, follows certain principals. First, in any relationship, one party can influence another. Secondly, relationships vary along continuum of cooperation/antagonism and dominance/submission. Third, any relationship can be modified by changes in the power of the individuals relative to one another. In order to achieve the highest level of mental well-being, we must develop a loving *human relationship* between our two minds, and the issues which apply to any relationship will apply to the one within us.

Work on the relationship between your two minds. When you are in a focused frame of mind, decide if you are willing to direct your energies toward becoming more able to tolerate distressing feelings or memories,

impulses and urges without taking immediate action. You will need to make a conscious effort to try to be more mature and wise. Towards your troubled side you will need a very caring, patient attitude. If you can help your more troubled mind become a strong, healthy ally, then your life will be remarkably improved.

To be truly healthy one must have a fit mind on both sides with a constructive relationship between them. If we as individuals become deeper and wiser and develop more harmony between the disparate parts of ourselves, we will become more able to identify and address with effort and compassion, the serious problems of those around us. In this small way, we can contribute in our attempt to make this human endeavor succeed, to permit our species to achieve its full meaning and its magnificent potential.

Since the original publication of this book in 1998, much more research has been performed in our lab and elsewhere, and this has served to strengthen the ideas and hypotheses put forth in the original publication. For example, the results of the study Alvaro Pascual-Leone and his associates began in 1998 (as described on pages 139 and 140) are published (Neuropsychiatry, Neuropsychology, and Behavioral Neurology 2002; 15:18-27).

Transcranial Magnetic Stimulation Study Results

Dr. Pascual-Leone is a leader in a new treatment for depression called "Transcranial magnetic stimulation." This entails placing a strong electromagnet over the left hemisphere and stimulating the underlying brain.

Initially transcranial magnetic stimulation was used to test the nerves in the arms or legs. The motor cortex would be stimulated by the electromagnet and a movement in the hand or foot would be evoked depending on where the magnet was placed. The neurologists would measure the time from the stimulation to the response, and this offered useful clinical information. A few years later some neurologists, including Dr. Pascual-Leone, began stimulating other areas of the brain, and they noticed that when they stimulated the frontal areas of the brain in fellow researchers, they observed emotional responses. Eventually it was discovered that when patients with very severe depressions had the left front of their head stimulated with the electromagnet, about 40 to 50 percent had significant improvements in their depression. These findings were simply empirical observations, and there was no sound hypothesis to explain them.

My suggestion to Dr. Pascual-Leone, as described earlier, was that perhaps patients who responded did so because he was stimulating a healthier hemisphere which, after the activation was able to dominate or influence a more troubled right-sided hemisphere. Those 50 to 60 percent of patients who did not respond to the transcranial stimulation might have had their depression located more in their left hemisphere and activating a troubled hemisphere would not be expected to lead to improvement.

To test this hypothesis, Dr. Pascual-Leone offered the left and the right-sided taped safety goggles to each of thirty-seven consecutive patients enrolled in a study to evaluate the effectiveness for treating depression with a two week course of electromagnetic stimulation, given in daily half-hour sessions. As

part of each patient's baseline evaluation, Dr. Pascual-Leone asked each patient to wear a pair of taped goggles for forty-five seconds, and he then asked him or her to rate, on an 11 point scale whether the depression was made better or worse (or was unchanged) by the goggles. If the goggles improved their depression (within forty-five seconds) the patient could rate the improvement from +1 to +5. If the goggles did not change his or her level of depression, he would rate the goggles as 0. And if the goggles worsened their depression, the patients could rate that worsening from -1 to -5. After the patient rated his or her experience with the left or the right-sided goggle, he or she was given the goggle for the other side and evaluated the change in depression in response to the second goggle.

All of the thirty-seven patients experienced changes in their level of depression with the right-sided goggle (stimulating the left brain). The ratings ranged from +5 to -5. Twenty-one experienced an improvement averaging 2.6, and sixteen felt it had worsened, averaging -2.5.

After the brief goggle evaluation, the patient then received the two-week course of transcranial magnetic stimulation. As part of the evaluation of the magnetic stimulation each patient was given a scale to measure his general level of depression. This scale is called the Hamilton Depression Rating Scale and is a standard test for depression. The scale was given prior to the stimulation, and again at four weeks (two weeks after the treatment). We examined the changes in the Hamilton Scale between baseline and four weeks as an indication of how effective the transcranial magnetic stimulation was for treating the patients' depressions.

So essentially what we want to know is whether those twenty-one patients who put on the right-looking goggles (thought to activate the left hemisphere) and felt an improvement within forty-five seconds responded better to the left-sided transcranial magnetic stimulation than those sixteen patients for whom the goggles indicated that they had a more psychologically troubled left brain. The answer is: YES. The twenty-one patients had an improvement in their depression of 42 percent. The sixteen patients in the second goggle group had only an 11percent improvement.

In other words, those patients who appeared with the right visual field goggle to have a healthier left brain did well when their left brains were activated by the magnetic treatment, but those who seemed to have a troubled left brain did not do well.

We also tested each patient with the opposite goggle, the one looking to the left, activating the right hemisphere. Again, those patients, who according to this goggle had healthy left hemispheres, did much better with the left sided magnet treatment than those with apparently troubled left hemispheres. In thirty-five of the thirty-seven patients, the response to one side was different from the other, so that we could identify thirty-five patients who felt better in either their left brain or their right brain according to both goggles. We wanted to know if the patients, who felt better after wearing the right-looking goggles rather than the left, had better responses to the magnetic stimulation than those with the opposite responses to the two pairs of goggles.

Twenty patients felt better when looking out of the right-sided goggles than when looking out of the left-sided ones; fifteen patients felt the opposite responses. We interpreted this to mean that the first group of twenty had healthier left brains, and we predicted that if we stimulated these healthier left brains then we could expect the patients to improve. This group of twenty had a decrease in depression of 43 percent while the group of fifteen who seemed to have troubled left brains had a decrease in depression of only 11percent. This result was almost identical with that found with the right-sided goggles alone. Of those ten patients who had achieved a 50 percent reduction in their depression scores at four weeks, nine (90 percent) were in the group with apparently healthier left brains, and of the eighteen who had less than a 20 percent improvement (considered a poor result), 71 percent were in the second group with troubled left hemispheres (according to the glasses). The degree of goggle response correlated with the degree of improvement from the magnetic stimulation.

What this study shows is, first, Dr. Pascual-Leone replicated my observations that people have emotional changes to the goggles. In fact, the changes observed by Dr. Pascual-Leone were considerably greater than those that I had observed in my private practice. This is probably because the patients in this study were more severely depressed than the average patient who attends my practice.

Secondly, this study shows that the changes induced by the goggles seem to be due to their stimulating the opposite cerebral hemisphere. No other explanation that I can think of can account for these findings.

Thirdly, because the doctors giving the magnetic stimulation and the laboratory assistants who gave the Hamilton Depression Rating Scales did

not know of the existence of the goggles and because the glasses predicted a future outcome, these results cannot possibly be due to suggestion or placebo effects.

A Replication of the Transcranial Magnetic Stimulation Study

Recently we completed a study to see if we could replicate Dr. Pascual-Leone's findings. A private Canadian clinic, MindCare Centres of Vancouver, BC, where transcranial magnetic stimulation is routinely used to treat patients with depression performed the study. I sent them the lateralized goggles and as Dr. Pascual-Leone had done, they had patients use the goggles to see out of the two visual fields and measure their degree of depression as they look out the left and right visual fields. The clinic used the Beck Depression Inventory to measure the patients' level of depression before the two week course of transcranial magnetic stimulation and again at the end of the treatment. Again we found that the goggles predicted which patients would respond best to the lateralized treatment for depression (the magnetic stimulation). Those who had less depression when they looked out the right visual field than the left (expected to do better to the magnetic treatment) had a 61% decrease in depression, according to the Beck Depression Inventory. Those who had the opposite goggle response, whom we predicted to do poorly, had only a 31% decrease in depression in response to the two week course of transcranial magnetic stimulation. We noticed that men were for some reason much more predictable than women. For males the predictions were correct 100% of the time; for females 81%. When we look back at the first study we saw a similar advantage for predicting the responses to the magnetic treatment for males than females. In the paper that reports these findings from Canada, which is in submission, we discuss the possible reasons for the discrepancy between males and females, but we could not arrive at any robust hypothesis. Still, it is interesting that both studies found the similar results. Again, the people who gave the electromagnetic treatments and who measured the Beck Depression Inventories were not aware of the baseline visual field depression measurements.

fMRI Study

The EEG and ear temperature study referred to in an earlier chapter, has now been published in *Comprehensive Psychiatry* 1999;40:221-225. This study reports that the experimental goggles, but not the placebo control goggles,

caused significant changes in brain waves, lateral ear temperature, and emotion in asymptotic college students. This study and that of Steven Levick's group at the University of Pennsylvania with partially occluded contact lenses both showed evidence that lateral visual field stimulation was activating the opposite brain hemisphere, but EEGs are not the most accurate measure of brain activation. Functional MRI, on the other hand, is a very accurate and sensitive measure of localized blood flow in the brain, and blood flows to the areas of the brain that are active. Ordinary MRIs give a static, but detailed anatomical image of the body. Most of us have had MRIs and have seen how clearly the inner structures of the body, including the brain are revealed. Functional MRI (fMRI) uses ingenious technical procedures on the MRI signals to enable the blood flow over a time period to be revealed. The details of how fMRI works are not going to be discussed here, but it is a reliable method of seeing which brain areas are active during a time period when the brain is engaged in an activity. In our study (Psychiatry Research: Neuroimaging 2004; 131:1-9), I asked 7 subjects to wear one set of goggles taped in the center so that looking to the left allowed the subject to see out of only the left half of his left eye. His right eye was completely blocked by the tape. When he simply looked to the right, his left eye became completely blocked and he could see out of only the right half of his right eye. In other words, by keeping the subject in the scanner, holding his head fixed, we were able to perform both left and right lateral visual field stimulation by simply asking him or her to look to the left for 30 seconds and then to the right for thirty seconds, and then to repeat both sides. When we looked at the brain's blood flow during the two right visual field trials and during the two left visual field trials, we saw what I feel is a remarkable result.

What we found was that when the subjects looked to the left, much of their right brains became activated while their left brains were relatively inactive, and when they looked to the right, their left brains became activated, and their right brains became relatively inactive. This study then adds very strong evidence that lateral visual field stimulation with the taped goggles can stimulate the brain hemisphere opposite to the open visual field.

Probe Auditory Evoked Potentials

Previously, I discussed a study we had published using auditory evoked potentials. In essence, the technique involves playing clicks into each ear of

experimental subjects. We record a subject's brain waves on the two sides of his head, and we can measure how intensely he attends to the clicks. If we give the subject a task that involves one hemisphere more than the other, his brain will show less attention to the clicks on that side. We used this technique while we engaged the subject in a psychiatric interview and had him recall an upsetting or traumatic memory. We wanted to see if one hemisphere seemed to be more active when he recalled the difficult memory. We also had the subject recall a neutral memory for a comparison. In our initial report, we found that the right hemisphere was more active when the upsetting memories were recalled. More recently we repeated this study to see if we could replicate it. We were able to replicate it. But we found that although on average, the right hemisphere was more active during the upsetting memory recall, about 35 percent of subjects actually showed more activity in their left hemispheres during the upsetting memories. When we looked back to our first study, we found that there too, about 30% of the subjects actually had left sided activation during the upsetting memories. During our replication, we decided to add the lateral visual field glasses and measure which side evoked more negative affect. We found a very high correlation between the side of the brain that was active during the recall of the negative memory and the side of the brain that was associated with negative affect according to the lateralized glasses. We feel that our findings suggest that different individuals have a lateralized hemispheric emotional valence and that the side with the negative valence varies among subjects. We found that for a given subject it was a consistent trait. This study is submitted for publication.

Use in Psychotherapy of the Lateralized Glasses

I continue to use the lateralized glasses in my clinical practice, and I continue to be amazed at what I find. Recently, a patient who had grown up in a family dominated by a violent alcoholic father, was reporting that he was finding that the love he had felt for his girlfriend was vanishing. He was a man in his 40's who had been divorced and after two years of dating found a lovely woman with whom he fell deeply in love. I asked him if he had a photograph of his girlfriend, and he thought for a moment and said, "Yes, I think I have one of her on my cell phone." He did and I asked him to put on the lateralized glasses and look at the photograph. He looked at it and after a

brief period I asked him how he felt about her. He said he didn't feel very much for her. I asked how he felt she regarded him, and he said that she too wasn't feeling much affection. I then asked him to look at the photograph out of the other visual field and after a few seconds he said, "I'm crazy about her, and she's crazy about me." We then used this experience in his therapy. His relationship has since prospered, and I don't know how I could have reached him without the glasses. I have these dramatic experiences every week in my practice.

Not Everyone Responds to the Glasses

The patients I have described in the book are patients who have had intense responses to the glasses. About 40% of my patients have no response to the glasses, and only about 30% have the type of intense responses that I have reported in this book. If I were testing people on the street, a much lower percentage would respond, so a number of people who read this book will be disappointed that the glasses don't work for them. I feel that this is just the way it is with biological phenomena. Only about 30% of people will respond better to Prozac than to a placebo. When I look at patients with posttraumatic stress disorder then I expect the majority will have intense responses. In the transcranial magnetic stimulation studies, most of these patients with severe depression responded. Future studies will attempt to clarify why certain patients respond and others don't. Still, I think it is remarkable that 30% of the patients in my practice have intense responses that can be of great help to them in their struggles to overcome their psychological difficulties. I use the psychological ideas gleaned from those who respond with patients who don't respond to the glasses, and these ideas give us a powerful framework from which to address their issues.

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