

School of Medicine.

12. The exchange between Fred and Ingrid is from Gottman, *What Predicts Divorce*, p. 84.
13. The marital research by John Gottman and colleagues at the University of Washington is described in more detail in two books: John Gottman, *Why Marriages Succeed or Fail* (New York: Simon and Schuster, 1994), and *What Predicts Divorce*.
14. Stonewalling: Gottman, *What Predicts Divorce*.
15. Poisonous thoughts: Aaron Beck, *Love Is Never Enough* (New York: Harper and Row, 1988), pp. 145–46.
16. Thoughts in troubled marriages: Gottman, *What Predicts Divorce*.
17. The distorted thinking of violent husbands is described in Amy Holtzworth-Munroe and Glenn Hutchinson, “Attributing Negative Intent to Wife Behavior: The Attributions of Maritally Violent Versus Nonviolent Men,” *Journal of Abnormal Psychology* 102, 2 (1993), pp. 206–11. The suspiciousness of sexually aggressive men: Neil Malamuth and Lisa Brown, “Sexually Aggressive Men’s Perceptions of Women’s Communications,” *Journal of Personality and Social Psychology* 67 (1994).
18. Battering husbands: There are three kinds of husbands who become violent: those who rarely do, those who do so impulsively when they get angered, and those who do so in a cool, calculated manner. Therapy seems helpful only with the first two kinds. See Neil Jacobson et al., *Clinical Handbook of Marital Therapy* (New York: Guilford Press, 1994).
19. Flooding: Gottman, *What Predicts Divorce*.
20. Husbands dislike squabbles: Robert Levenson et al., “The Influence of Age and Gender on Affect, Physiology, and Their Interrelations: A Study of Long-term Marriages,” *Journal of Personality and Social Psychology* 67 (1994).
21. Flooding in husbands: Gottman, *What Predicts Divorce*.
22. Men stonewall, women criticize: Gottman, *What Predicts Divorce*.
23. “Wife Charged with Shooting Husband Over Football on TV,” *The New York Times* (Nov. 3, 1993).
24. Productive marital fights: Gottman, *What Predicts Divorce*.
25. Lack of repair abilities in couples: Gottman, *What Predicts Divorce*.
26. The four steps that lead to “good fights” are from Gottman, *Why Marriages Succeed or Fail*.
27. Monitoring pulse rate: Gottman, *Ibid*.
28. Catching automatic thoughts: Beck, *Love Is Never Enough*.
29. Mirroring: Harville Hendrix, *Getting the Love You Want* (New York: Henry Holt, 1988).

Chapter 10. Managing With Heart

1. The crash of the intimidating pilot: Carl Lavin, “When Moods Affect Safety:

Communications in a Cockpit Mean a Lot a Few Miles Up,” *The New York Times* (June 26, 1994).

2. The survey of 250 executives: Michael Maccoby, “The Corporate Climber Has to Find His Heart,” *Fortune* (Dec. 1976).
3. Zuboff: in conversation, June 1994. For the impact of information technologies, see her book *In the Age of the Smart Machine* (New York: Basic Books, 1991).
4. The story of the sarcastic vice president was told to me by Hendrie Weisinger, a psychologist at the UCLA Graduate School of Business. His book is *The Critical Edge: How to Criticize Up and Down the Organization and Make It Pay Off* (Boston: Little, Brown, 1989).
5. The survey of times managers blew up was done by Robert Baron, a psychologist at Rensselaer Polytechnic Institute, whom I interviewed for *The New York Times* (Sept. 11, 1990).
6. Criticism as a cause of conflict: Robert Baron, “Countering the Effects of Destructive Criticism: The Relative Efficacy of Four Interventions,” *Journal of Applied Psychology* 75, 3 (1990).
7. Specific and vague criticism: Harry Levinson, “Feedback to Subordinates” *Addendum to the Levinson Letter*, Levinson Institute, Waltham, MA (1992).
8. Changing face of workforce: A survey of 645 national companies by Towers Perrin management consultants in Manhattan, reported in *The New York Times* (Aug. 26, 1990).
9. The roots of hatred: Vamik Volkan, *The Need to Have Enemies and Allies* (Northvale, NJ: Jason Aronson, 1988).
10. Thomas Pettigrew: I interviewed Pettigrew in *The New York Times* (May 12, 1987).
11. Stereotypes and subtle bias: Samuel Gaertner and John Davidio, *Prejudice, Discrimination, and Racism* (New York: Academic Press, 1987).
12. Subtle bias: Gaertner and Davidio, *Prejudice, Discrimination, and Racism*.
13. Relman: quoted in Howard Kohn, “Service With a Sneer,” *The New York Times Sunday Magazine* (Nov. 11, 1994).
14. IBM: “Responding to a Diverse Work Force,” *The New York Times* (Aug. 26, 1990).
15. Power of speaking out: Fletcher Blanchard, “Reducing the Expression of Racial Prejudice,” *Psychological Science* (vol. 2, 1991).
16. Stereotypes break down: Gaertner and Davidio, *Prejudice, Discrimination, and Racism*.
17. Teams: Peter Drucker, “The Age of Social Transformation,” *The Atlantic Monthly* (Nov. 1994).
18. The concept of group intelligence is set forth in Wendy Williams and Robert Sternberg, “Group Intelligence: Why Some Groups Are Better Than Others,” *Intelligence* (1988).
19. The study of the stars at Bell Labs was reported in Robert Kelley and Janet Caplan, “How Bell Labs Creates Star Performers,” *Harvard Business Review* (July-Aug. 1993).

20. The usefulness of informal networks is noted by David Krackhardt and Jeffrey R. Hanson, "Informal Networks: The Company Behind the Chart," *Harvard Business Review* (July-Aug. 1993), p. 104.

Chapter 11. Mind and Medicine

1. Immune system as the body's brain: Francisco Varela at the Third Mind and Life meeting, Dharamsala, India (Dec. 1990).
2. Chemical messengers between brain and immune system: see Robert Ader et al., *Psychoneuroimmunology*, 2nd edition (San Diego: Academic Press, 1990).
3. Contact between nerves and immune cells: David Felten et al., "Noradrenergic Sympathetic Innervation of Lymphoid Tissue," *Journal of Immunology* 135 (1985).
4. Hormones and immune function: B. S. Rabin et al., "Bidirectional Interaction Between the Central Nervous System and the Immune System," *Critical Reviews in Immunology* 9 (4), (1989), pp. 279–312.
5. Connections between brain and immune system: see, for example, Steven B. Maier et al., "Psychoneuroimmunology," *American Psychologist* (Dec. 1994).
6. Toxic emotions: Howard Friedman and S. Boothby-Kewley, "The Disease-Prone Personality: A Meta-Analytic View," *American Psychologist* 42 (1987). This broad analysis of studies used "meta-analysis," in which results from many smaller studies can be combined statistically into one immense study. This allows effects that might not show up in any given study to be detected more easily because of the much larger total number of people being studied.
7. Skeptics argue that the emotional picture linked to higher rates of disease is the profile of the quintessential neurotic—an anxious, depressed, and angry emotional wreck—and that the higher rates of disease they report are due not so much to a medical fact as to a propensity to whine and complain about health problems, exaggerating their seriousness. But Friedman and others argue that the weight of evidence for the emotion-disease link is borne by research in which it is physicians' evaluations of observable signs of illness and medical tests, not patients' complaints, that determine the level of sickness—a more objective basis. Of course, there is the possibility that increased distress is the result of a medical condition, as well as precipitating it; for that reason the most convincing data come from prospective studies in which emotional states are evaluated prior to the onset of disease.
8. Gail Ironson et al., "Effects of Anger on Left Ventricular Ejection Fraction in Coronary Artery Disease," *The American Journal of Cardiology* 70 1992. Pumping efficiency, sometimes referred to as the "ejection fraction," quantifies the heart's ability to pump blood out of the left ventricle into the arteries; it measures the percentage of blood pumped out of the ventricles with each beat of the heart. In heart disease the drop in

pumping efficiency means a weakening of the heart muscle.

9. Of the dozen or so studies of hostility and death from heart disease, some have failed to find a link. But that failure may be due to differences in method, such as using a poor measure of hostility, and to the relative subtlety of the effect. For instance, the greatest number of deaths from the hostility effect seem to occur in midlife. If a study fails to track down the causes of death for people during this period, it misses the effect.
10. Hostility and heart disease: Redford Williams, *The Trusting Heart* (New York: Times Books/Random House, 1989).
11. Peter Kaufman: I interviewed Dr. Kaufman in *The New York Times* (Sept. 1, 1992).
12. Stanford study of anger and second heart attacks: Carl Thoreson, presented at the International Congress of Behavioral Medicine, Uppsala, Sweden (July 1990).
13. Lynda H. Powell, Emotional Arousal as a Predictor of Long-Term Mortality and Morbidity in Post M.I. Men,” *Circulation*, vol. 82, no. 4, Supplement III, Oct. 1990.
14. Murray A. Mittleman, “Triggering of Myocardial Infarction Onset by Episodes of Anger,” *Circulation*, vol. 89, no. 2 (1994).
15. Suppressing anger raises blood pressure: Robert Levenson, “Can We Control Our Emotions, and How Does Such Control Change an Emotional Episode?” in Richard Davidson and Paul Ekman, eds., *Fundamental Questions About Emotions* (New York: Oxford University Press, 1995).
16. The angry personal style: I wrote about Redford Williams’s research on anger and the heart in *The New York Times Good Health Magazine* (Apr. 16, 1989).
17. A 44 percent reduction in second heart attacks: Thoreson, op. cit.
18. Dr. Williams’s program for anger control: Williams, *The Trusting Heart*.
19. The worried woman: Timothy Brown et al., “Generalized Anxiety Disorder,” in David H. Barlow, ed., *Clinical Handbook of Psychological Disorders* (New York: Guilford Press, 1993).
20. Stress and metastasis: Bruce McEwen and Eliot Stellar, “Stress and the Individual: Mechanisms Leading to Disease,” *Archives of Internal Medicine* 153 (Sept. 27, 1993). The study they are describing is M. Robertson and J. Ritz, “Biology and Clinical Relevance of Human Natural Killer Cells,” *Blood* 76 (1990).
21. There may be multiple reasons why people under stress are more vulnerable to sickness, apart from biological pathways. One might be that the ways people try to soothe their anxiety—for example, smoking, drinking, or bingeing on fatty foods—are in themselves unhealthy. Still another is that constant worry and anxiety can make people lose sleep or forget to comply with medical regimens—such as taking medications—and so prolong illnesses they already have. Most likely, all of these work in tandem to link stress and disease.
22. Stress weakens the immune system: For instance, in the study of medical students facing

exam stress, the students had not only a lowered immune control of the herpes virus, but also a decline in the ability of their white blood cells to kill infected cells, as well as an increase in levels of a chemical associated with suppression of immune abilities in lymphocytes, the white blood cells central to the immune response. See Ronald Glaser and Janice Kiecolt-Glaser, "Stress-Associated Depression in Cellular Immunity," *Brain, Behavior, and Immunity* 1 (1987). But in most such studies showing a weakening of immune defenses with stress, it has not been clear that these levels were low enough to lead to medical risk.

23. Stress and colds: Sheldon Cohen et al., "Psychological Stress and Susceptibility to the Common Cold," *New England Journal of Medicine* 325 (1991).
24. Daily upsets and infection: Arthur Stone et al., "Secretory IgA as a Measure of Immunocompetence," *Journal of Human Stress* 13 (1987). In another study, 246 husbands, wives, and children kept daily logs of stresses in their family's life over the course of the flu season. Those who had the most family crises also had the highest rate of flu, as measured both by days with fever and flu antibody levels. See R. D. Clover et al., "Family Functioning and Stress as Predictors of Influenza B Infection," *Journal of Family Practice* 28 (May 1989).
25. Herpes virus flare-up and stress: a series of studies by Ronald Glaser and Janice Kiecolt-Glaser—e.g., "Psychological Influences on Immunity," *American Psychologist* 43 (1988). The relationship between stress and herpes activity is so strong that it has been demonstrated in a study of only ten patients, using the actual breaking-out of herpes sores as a measure; the more anxiety, hassles, and stress reported by the patients, the more likely they were to have herpes outbreaks in the following weeks; placid periods in their lives led to dormancy of the herpes. See H. E. Schmidt et al., "Stress as a Precipitating Factor in Subjects With Recurrent Herpes Labialis," *Journal of Family Practice*, 20 (1985).
26. Anxiety in women and heart disease: Carl Thoreson, presented at the International Congress of Behavioral Medicine, Uppsala, Sweden (July 1990). Anxiety may also play a role in making some men more vulnerable to heart disease. In a study at the University of Alabama medical school, 1,123 men and women between the ages of forty-five and seventy-seven were assessed on their emotional profiles. Those men most prone to anxiety and worry in middle age were far more likely than others to have hypertension when tracked down twenty years later. See Abraham Markowitz et al., *Journal of the American Medical Association* (Nov. 14, 1993).
27. Stress and colorectal cancer: Joseph C. Courtney et al., "Stressful Life Events and the Risk of Colorectal Cancer," *Epidemiology* (Sept. 1993), 4(5).
28. Relaxation to counter stress-based symptoms: See, for example, Daniel Goleman and Joel Gurin, *Mind Body Medicine* (New York: Consumer Reports Books/St. Martin's Press, 1993).
29. Depression and disease: see, e.g., Seymour Reichlin, "Neuroendocrine-Immune Interactions," *New England Journal of Medicine* (Oct. 21, 1993).

30. Bone marrow transplant: cited in James Strain, "Cost Offset From a Psychiatric Consultation-Liaison Intervention With Elderly Hip Fracture Patients," *American Journal of Psychiatry* 148 (1991).
31. Howard Burton et al., "The Relationship of Depression to Survival in Chronic Renal Failure," *Psychosomatic Medicine* (March 1986).
32. Hopelessness and death from heart disease: Robert Anda et al., "Depressed Affect, Hopelessness, and the Risk of Ischemic Heart Disease in a Cohort of U.S. Adults," *Epidemiology* (July 1993).
33. Depression and heart attack: Nancy Frasure-Smith et al., "Depression Following Myocardial Infarction," *Journal of the American Medical Association* (Oct. 20, 1993).
34. Depression in multiple illness: Dr. Michael von Korff, the University of Washington psychiatrist who did the study, pointed out to me that with such patients, who face tremendous challenges just in living from day to day, "If you treat a patient's depression, you see improvements over and above any changes in their medical condition. If you're depressed, your symptoms seem worse to you. Having a chronic physical disease is a major adaptive challenge. If you're depressed, you're less able to learn to take care of your illness. Even with physical impairment, if you're motivated and have energy and feelings of self-worth—all of which are at risk in depression—then people can adapt remarkably even to severe impairments."
35. Optimism and bypass surgery: Chris Peterson et al., *Learned Helplessness: A Theory for the Age of Personal Control* (New York: Oxford University Press, 1993).
36. Spinal injury and hope: Timothy Elliott et al., "Negotiating Reality After Physical Loss: Hope, Depression, and Disability," *Journal of Personality and Social Psychology* 61, 4 (1991).
37. Medical risk of social isolation: James House et al., "Social Relationships and Health," *Science* (July 29, 1988). But also see a mixed finding: Carol Smith et al., "Meta-Analysis of the Associations Between Social Support and Health Outcomes," *Journal of Behavioral Medicine* (1994).
38. Isolation and mortality risk: Other studies suggest a biological mechanism at work. These findings, cited in House, "Social Relationships and Health," have found that the simple presence of another person can reduce anxiety and lessen physiological distress in people in intensive-care units. The comforting effect of another person's presence has been found to lower not just heart rate and blood pressure, but also the secretion of fatty acids that can block arteries. One theory put forward to explain the healing effects of social contact suggests a brain mechanism at work. This theory points to animal data showing a calming effect on the posterior hypothalamic zone, an area of the limbic system with rich connections to the amygdala. The comforting presence of another person, this view holds, inhibits limbic activity, lowering the rate of secretion of acetylcholine, cortisol, and

catecholamines, all neurochemicals that trigger more rapid breathing, a quickened heartbeat, and other physiological signs of stress.

39. Strain, "Cost Offset."
40. Heart attack survival and emotional support: Lisa Berkman et al., "Emotional Support and Survival After Myocardial Infarction, A Prospective Population Based Study of the Elderly," *Annals of Internal Medicine* (Dec. 15, 1992).
41. The Swedish study: Annika Rosengren et al., "Stressful Life Events, Social Support, and Mortality in Men Born in 1933," *British Medical Journal* (Oct. 19, 1993).
42. Marital arguments and immune system: Janice Kiecolt-Glaser et al., "Marital Quality, Marital Disruption, and Immune Function," *Psychosomatic Medicine* 49 (1987).
43. I interviewed John Cacioppo for *The New York Times* (Dec. 15, 1992).
44. Talking about troubling thoughts: James Pennebaker, "Putting Stress Into Words: Health, Linguistic and Therapeutic Implications," paper presented at the American Psychological Association meeting, Washington, DC (1992).
45. Psychotherapy and medical improvements: Lester Luborsky et al., "Is Psychotherapy Good for Your Health?" paper presented at the American Psychological Association meeting, Washington, DC (1993).
46. Cancer support groups: David Spiegel et al., "Effect of Psychosocial Treatment on Survival of Patients with Metastatic Breast Cancer," *Lancet* No. 8668, ii (1989).
47. Patients' questions: The finding was cited by Dr. Steven Cohen-Cole, a psychiatrist at Emory University, when I interviewed him in *The New York Times* (Nov. 13, 1991).
48. Full information: For example, the Planetree program at Pacific Presbyterian Hospital in San Francisco will do searches of medical and lay research on any medical topic for anyone who requests it.
49. Making patients effective: One program has been developed by Dr. Mack Lipkin, Jr., at New York University Medical School.
50. Emotional preparation for surgery: I wrote about this in *The New York Times* (Dec. 10, 1987).
51. Family care in the hospital: Again, Planetree is a model, as are the Ronald McDonald houses that allow parents to stay next door to hospitals where their children are patients.
52. Mindfulness and medicine: See Jon Kabat-Zinn, *Full Catastrophe Living* (New York: Delacorte, 1991).
53. Program for reversing heart disease: See Dean Ornish, *Dr. Dean Ornish's Program for Reversing Heart Disease* (New York: Ballantine, 1991).
54. Relationship-centered medicine: *Health Professions Education and Relationship-Centered Care*. Report of the Pew-Fetzer Task Force on Advancing Psychosocial Health Education, Pew Health Professions Commission and Fetzer Institute at The Center of Health

Professions, University of California at San Francisco, San Francisco (Aug. 1994).

- 55. Left the hospital early: Strain, "Cost Offset."
- 56. Unethical not to treat depression in heart disease patients: Redford Williams and Margaret Chesney, "Psychosocial Factors and Prognosis in Established Coronary Heart Disease," *Journal of the American Medical Association* (Oct. 20, 1993).
- 57. An open letter to a surgeon: A. Stanley Kramer, "A Prescription for Healing," *Newsweek* (June 7, 1993).

PART FOUR: WINDOWS OF OPPORTUNITY

Chapter 12. The Family Crucible

1. Leslie and the video game: Beverly Wilson and John Gottman, "Marital Conflict and Parenting: The Role of Negativity in Families," in M. H. Bornstein, ed., *Handbook of Parenting*, vol. 4 (Hillsdale, NJ: Lawrence Erlbaum, 1994).
2. The research on emotions in the family was an extension of John Gottman's marital studies reviewed in Chapter 9. See Carole Hooven, Lynn Katz, and John Gottman, "The Family as a Meta-emotion Culture," *Cognition and Emotion* (Spring 1994).
3. The benefits for children of having emotionally adept parents: Hooven, Katz, and Gottman, "The Family as a Meta-emotion Culture."
4. Optimistic infants: T. Berry Brazelton, in the preface to *Heart Start: The Emotional Foundations of School Readiness* (Arlington, VA: National Center for Clinical Infant Programs, 1992).
5. Emotional predictors of school success: *Heart Start*.
6. Elements of school readiness: *Heart Start*, p. 7.
7. Infants and mothers: *Heart Start*, p. 9.
 8. Damage from neglect: M. Erickson et al., "The Relationship Between Quality of Attachment and Behavior Problems in Preschool in a High-Risk Sample," in I. Betheron and E. Waters, eds., *Monographs of the Society of Research in Child Development* 50, series no. 209.
9. Lasting lessons of first four years: *Heart Start*, p. 13.
10. The follow-up of aggressive children: L. R. Huesman, Leonard Eron, and Patty Warnicke-Yarmel, "Intellectual Function and Aggression," *The Journal of Personality and Social Psychology* (Jan. 1987). Similar findings were reported by Alexander Thomas and Stella Chess, in the September 1988 issue of *Child Development*, in their study of seventy-five children who were assessed at regular intervals since 1956, when they were between seven and twelve years old. Alexander Thomas et al., "Longitudinal Study of Negative Emotional States and Adjustments From Early Childhood Through Adolescence," *Child Development* 59 (1988). A decade later the children who parents and teachers had said were the most aggressive in grade school were having the most emotional turmoil in late adolescence. These were children (about twice as many boys as girls) who not only continually picked fights, but who also were belittling or openly hostile toward other children, and even toward their families and teachers. Their hostility was unchanged over the years; as adolescents they were having trouble getting along with classmates and with their families, and were in trouble at school. And, when contacted as adults, their

difficulties ranged from tangles with the law to anxiety problems and depression.

11. Lack of empathy in abused children: The day-care observations and findings are reported in Mary Main and Carol George, "Responses of Abused and Disadvantaged Toddlers to Distress in Agemates: A Study in the Day-Care Setting," *Developmental Psychology* 21, 3 (1985). The findings have been repeated with preschoolers as well: Bonnie Klimes-Dougan and Janet Kistner, "Physically Abused Preschoolers' Responses to Peers' Distress," *Developmental Psychology* 26 (1990).
12. Difficulties of abused children: Robert Emery, "Family Violence," *American Psychologist* (Feb. 1989).
13. Abuse over generations: Whether abused children grow up to be abusing parents is a point of scientific debate. See, for example, Cathy Spatz Widom, "Child Abuse, Neglect and Adult Behavior," *American Journal of Orthopsychiatry* (July 1989).

Chapter 13. Trauma and Emotional Relearning

1. I wrote about the lasting trauma of the killings at Cleveland Elementary School in *The New York Times* "Education Life" section (Jan. 7, 1990).
2. The examples of PTSD in crime victims were offered by Dr. Shelly Niederbach, a psychologist at the Victims' Counseling Service, Brooklyn.
3. The Vietnam memory is from M. Davis, "Analysis of Aversive Memories Using the Fear-Potentiated Startle Paradigm," in N. Butters and L. R Squire, eds., *The Neuropsychology of Memory* (New York: Guilford Press, 1992).
4. LeDoux makes the scientific case for these memories being especially enduring in "Indelibility of Subcortical Emotional Memories," *Journal of Cognitive Neuroscience* (1989), vol. 1, 238–43.
5. I interviewed Dr. Charney in *The New York Times* (June 12, 1990).
6. The experiments with paired laboratory animals were described to me by Dr. John Krystal, and have been repeated at several scientific laboratories. The major studies were done by Dr. Jay Weiss at Duke University.
7. The best account of the brain changes underlying PTSD, and the role of the amygdala in them, is in Dennis Charney et al., "Psychobiologic Mechanisms of Posttraumatic Stress Disorder," *Archives of General Psychiatry* 50 (April 1993), 294–305.
8. Some of the evidence for trauma-induced changes in this brain network comes from experiments in which Vietnam vets with PTSD were injected with yohimbine, a drug used on the tips of arrows by South American Indians to render their prey helpless. In tiny doses yohimbine blocks the action of a specific receptor (the point on a neuron that receives a neurotransmitter) that ordinarily acts as a brake on the catecholamines. Yohimbine takes the brakes off, keeping these receptors from sensing the secretion of