

RICK HANSON

FAST UPPKOPPLING  
TILL LYCKAN

Fyra steg som gör din hjärna  
nöjd, lugn och trygg

Översättning: Agneta Sellin

Dana Förlag

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# Reference Notes

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## Chapter 1: Growing Good

### INNER STRENGTHS

- 4 **Researchers have identified other strengths:** Steven M. Southwick and Dennis S. Charney, “The Science of Resilience: Implications for the Prevention and Treatment of Depression,” *Science* 338 (2012): 79–82.
- 5 **A well-known idea in medicine:** I have adapted the “stress-diathesis” model that is used in health care and in research on stress and its consequences.
- 6 **just one strength, positive emotions:** Michael A. Cohn et al., “Happiness Unpacked: Positive Emotions Increase Life Satisfaction by Building Resilience,” *Emotion* 9 (2009): 361–368; Greg C. Feldman et al., “Responses to Positive Affect: A Self-Report Measure of Rumination and Dampening,” *Cognitive Therapy and Research* 32, no. 4 (2008): 507–525; Tugade and Fredrickson, “Regulation of Positive Emotions: Emotion Regulation Strategies That Promote Resilience,” *Journal of Happiness Studies* 8 (2007): 311–333.
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- 6 **They also strengthen your immune system:** Ed Diener and Micaela Y. Chan, “Happy People Live Longer: Subjective Well-Being Contributes to Health and Longevity,” *Applied Psychophysiology* 3, no. 1 (2011): 1–43; Fredrickson et al., “Open Hearts Build Lives: Positive Emotions, Induced Through Loving-Kindness Meditation, Build Consequential Personal Resources,” *Journal of Personality and Social Psychology* 95, no. 5 (2008): 1045–1062; Y. Chida and A. Steptoe, “Positive Psychological Well-Being and Mortality: A Quantitative Review of Prospective Observational Studies,” *Psychosomatic Medicine* 70, no.7 (2008): 741–756;

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#### IN THE GARDEN

- 6 **manage your mind in three primary:** There is a fourth option—transcend the mind—in which you step outside the frame of mind and brain altogether, connected to something divine, spiritual, or unconditioned, if this is meaningful to you (it is to me). Of course, by definition, this is not a way to *manage* the mind itself, so I'll bow to this possibility and then stay inside the framework of the natural world in this book.

#### EXPERIENCE-DEPENDENT NEUROPLASTICITY

- 10 **slowly but surely sculpting neural structure:** Eric R. Kandel, *In Search of Memory: The Emergence of a New Science of Mind* (New York: W. W. Norton & Company, 2007); Joseph E. LeDoux, *Synaptic Self: How Our Brains Become Who We Are* (New York: Penguin Books, 2003).
- 10 **genes inside neurons turn on or off:** Victoria Ho et al., "The Cell Biology of Synaptic Plasticity," *Science* 334 (2011): 623–628; D. Feldman, "Synaptic Mechanisms for Plasticity in Neocortex," *Annual Review of Neuroscience* 32 (2009): 33–55; Gianluigi Mongillo et al., "Synaptic Theory of Working Memory" *Science* 319 (2008): 1543–1546.
- 10 **All mental activity:** Glen O. Gabbard, "A Neurobiologically Informed Perspective on Psychotherapy," *British Journal of Psychiatry* 177 (2000): 117–122; Kandel, *In Search of Memory*.
- 10 **But intense, prolonged, or repeated:** Kandel, "A New Intellectual Framework for Psychiatry," *American Journal of Psychiatry* 155 (1998): 457–469.
- 10 **London taxi drivers:** Eleanor Maguire et al., "Navigation-Related Structural Change in the Hippocampi of Taxi Drivers," *National Academy of Sciences* 87 (2000): 4398–4403.
- 11 **Moving from the cab:** Above the brain stem, while there is just one hypothalamus and pituitary gland, most parts of the brain come in pairs, one on the left side and one on the right, including the hippocampus and insula. Unfortunately, the confusing convention in neuroscience is to refer to these paired parts in the singular (e.g., the hippocampus), and I'll follow this convention, too.

- 11 **behind the forehead that control attention:** Eileen Luders et al., “The Underlying Anatomical Correlates of Long-Term Meditation: Larger Hippocampal and Frontal Volumes of Gray Matter,” *NeuroImage* 45 (2009): 672–678; Sara Lazar et al., “Meditation Experience Is Associated with Increased Cortical Thickness,” *Neuroreport* 16 (2005): 1893–1897.
- 11 **the insula:** Britta Holzel et al., “Investigation of Mindfulness Meditation Practitioners with Voxel-Based Morphometry,” *Social Cognitive and Affective Neuroscience* 3 (2008): 55–61; Lazar et al., “Meditation Experience.”
- 11 **the hippocampus:** Luders et al., “Anatomical Correlates of Long-Term Meditation”; Holzel et al., “Investigation of Mindfulness Meditation.”
- 11 **genes that calm down stress reactions:** Jeffery Dusek et al., “Genomic Counter-Stress Changes Induced by the Relaxation Response,” *PLoS One* 3 (2008): e2576.

#### THE EXPERIENCES THAT SERVE YOU MOST

- 13 **Negative experiences might have value:** Southwick and Charney, “The Science of Resilience.”

## Chapter 2: Velcro for the Bad

#### THE EVOLVING BRAIN

- 18 **The Evolving Brain:** The dates in this section are approximate.
- 18 **Every human being shares:** Scott W. Emmons, “The Mood of a Worm,” *Science* 338 (2012): 475–476.
- 18 **Multicelled creatures emerged:** Elizabeth Pennisi, “Nervous System May Have Evolved Twice,” *Science* 339 (2013): 391.
- 18 **Mammals arose:** There are some scholarly disagreements about this dating, depending on how one categorizes mammals and primates.
- 18 **By 2.5 million years ago:** Shannon McPherron et al., “Evidence for Stone-Tool Assisted Consumption of Animal Tissues before 3.39 Million Years Ago at Dikika, Ethiopia,” *Nature* 446 (2010): 857–860; Semaw et al., “2.5-Million-Year-Old Stone Tools from Gona, Ethiopia,” *Nature* 385 (1997): 333–336.
- 18 **and our own species—*Homo sapiens*:** Michael Balter, “New Light on Revolutions That Weren’t,” *Science* 336 (2012): 530–561.

- 18 **Over the last 600 million years:** This is a broad point. For a sampling of research that supports it, see Pierre-Yves Placais and Thomas Preat, "To Favor Survival Under Food Shortage, the Brain Disables Costly Memory," *Science* 339 (2013): 440–442; Linda Palmer and Gary Lynch, "A Kantian View of Space," *Science* 328 (2010): 1487–1488; Tobias Esch and George B. Stefano, "The Neurobiology of Stress Management," *Neuroendocrinology Letters* 31, no.1 (2010): 19–39.
- 19 **Our hominid and human predecessors:** Pontus Skoglund et al., "Origins and Genetic Legacy of Neolithic Farmers and Hunter-Gatherers in Europe," *Science* 336 (2012): 466–469.
- 19 **While some bands interacted peacefully:** Jung-Kyoo Choi and Samuel Bowles, "The Coevolution of Parochial Altruism and War," *Science* 318 (2007): 636–640.

#### BAD IS STRONGER THAN GOOD

- 19 **Bad Is Stronger Than Good:** The title of this section is taken from the paper by Roy Baumeister et al., "Bad Is Stronger Than Good," *Review of General Psychology* 5 (2001): 323–370.
- 20 **For starters, your brain is always:** Eldad Yechiam and Guy Hochman, "Losses as Modulators of Attention: Review and Analysis of the Unique Effects of Losses Over Gains," *Psychological Bulletin* 139, no.2 (2013): 497–518.
- 21 **Then when the least little thing:** Baumeister et al., "Bad Is Stronger Than Good"; Paul Rozin and Edward Royzman, "Negativity Bias, Negativity Dominance, and Contagion," *Personality & Social Psychology Review* 5 (2001): 296–320.
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- 21 **in fact, the brain will react:** J. S. Morris et al. "Conscious and Unconscious Emotional Learning in the Human Amygdala" *Nature* 393 (1998): 467–470.
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- 21 **Lasting intimate relationships:** John Gottman, *Why Marriages Succeed or Fail: And How You Can Make Yours Last* (New York: Simon & Schuster, 1995).
- 21 **People really begin to thrive:** Fredrickson, *Positivity*.
- 21 **Negative contaminates positive more than positive:** Rozin and Royzman, "Negativity Bias."
- 21 **a misdeed will harm a hero's:** Rozin and Royzman, "Negativity Bias."
- 21 **The extra impact of the bad:** Baumeister et al., "Bad Is Stronger Than Good."
- 22 **almond-sized amygdala:** Cunningham and Brosch, "Motivational Salience"; Israel Liberzon et al., "Extended Amygdala and Emotional Salience: A PET Activation Study of Positive and Negative Affect," *Neuropsychopharmacology* 28, no. 4 (2003): 726–733; Stephan B. Hamann et al., "Ecstasy and Agony: Activation of the Human Amygdala in Positive and Negative Emotion," *Psychological Science* 13, no. 2 (2002): 135–141; Hugh Garavan et al., "Amygdala Response to Both Positively and Negatively Valenced Stimuli," *Neuroreport* 12, no. 12 (2001): 2779–2783.
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- 22 **other person's anger activated your amygdala:** Hugo D. Critchley, "Neural Mechanisms of Autonomic, Affective, and Cognitive Integration," *Journal of Comparative Neurology* 493 (2005): 154–166.
- 22 **hippocampus formed an initial neural trace:** Gustavo Morrone Parfitt et al., "Moderate Stress Enhances Memory Persistence: Are Adrenergic Mechanisms Involved?" *Behavioral Neuroscience* 126, no. 5 (2012): 729–730.
- 22 **even marking new baby neurons:** E. D. Kirby et al., "Basolateral Amygdala Regulation of Adult Hippocampal Neurogenesis and Fear-Related Activation of Newborn Neurons," *Molecular Psychiatry* 17 (2012): 527–536.

## VICIOUS CIRCLES

- 22 **This snowballing effect occurs:** Bruce McEwen and Peter Gianaros, "Stress- and Allostasis-Induced Brain Plasticity," *Annual Review of Medicine* 62 (2011): 431–435.

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- 23 **This is a problem:** McEwen and Gianaros, “Stress- and Allostasis-Induced Brain Plasticity.”

#### PAPER TIGER PARANOIA

- 23 **still make the second mistake:** Tali Sharot, *The Optimism Bias: A Tour of the Irrationally Positive Brain* (New York: Vintage, 2011).
- 24 **But in general, the default setting:** Deborah Kermer et al., “Loss Aversion Is an Affective Forecasting Error,” *Psychological Science* 17, no. 8 (2006): 649–653; Baumeister et al., “Bad Is Stronger Than Good”; Rozin and Royzman, “Negativity Bias.”
- 24 **There are even regions:** Nadine Gogolla et al., “Perineuronal Nets Protect Fear Memories from Erasure,” *Science* 325 (2009): 1258–1261.

#### VELCRO AND TEFLON

- 25 **recollections tend to be positively biased:** Daniel L. Schachter, *The Seven Sins of Memory: How the Mind Forgets and Remembers* (New York: Houghton Mifflin Harcourt Books, 2002).
- 26 **holding most of your inner strengths:** The inner strengths as well as the feelings of inadequacy, etc., that are not based on learning and memory—in other words, they are not *acquired*—are based on *innate*, genetically determined characteristics and tendencies.
- 26 **Unfortunately, the formation of implicit memory:** For references for the statements made in this paragraph, see Baumeister et al., “Bad Is Stronger Than Good”; Rozin and Royzman, “Negativity Bias.”
- 26 **a sense of helplessness:** Seligman, *Learned Optimism*.
- 26 **a major factor in depression:** Seligman, *Learned Optimism*.

#### WASTED EFFORTS

- 28 **This is the central weakness:** Some psychotherapies are noteworthy exceptions. These include focusing (Eugene T. Gendlin, *Focusing* [New York: Random House, 1982]), EMDR (Deborah L. Korn and Andrew M. Leeds, “Preliminary Evidence of Efficacy for EMDR Resource De-

velopment and Installation in the Stabilization Phase of Treatment of Complex Posttraumatic Stress Disorder,” *Journal of Clinical Psychology* 58, no. 12 [2002]: 1465–1487); coherence therapy (Toomey and Ecker, “Competing Visions”; Ecker and Toomey, “Depotentiation of Symptom-Producing Implicit Memory in Coherence Therapy”); and broad minded affective coping (Nicholas Terrier, “Broad Minded Affective Coping [BMAC]: A ‘Positive’ CBT Approach to Facilitating Positive Emotions,” *International Journal of Cognitive Therapy* 31, no. 1 [2010]: 65–78.)

## Chapter 3: Green Brain, Red Brain

### THREE OPERATING SYSTEMS

- 34 **the influential work of Paul MacLean:** Paul D. MacLean, *The Triune Brain in Evolution: Role in Paleocerebral Functions* (New York: Springer, 1990).
- 34 **Jaak Panksepp:** Jaak Panksepp, *Affective Neuroscience: The Foundations of Human and Animal Emotions* (New York: Oxford University Press, 1998); Panksepp, “Affective Consciousness: Core Emotional Feelings in Animals and Humans,” *Consciousness & Cognition* 14, no. 1 (2005): 30–80; Jeffrey Burgdorf and Panksepp, “The Neurobiology of Positive Emotions,” *Neuroscience and Biobehavioral Reviews* 30 (2006): 173–187.
- 34 **Stephen Porges:** Stephen W. Porges, *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-Regulation* (New York: W.W. Norton & Company, 2011).
- 34 **Paul Gilbert:** Paul Gilbert, “Introducing Compassion-Focused Therapy,” *Advances in Psychiatric Treatment* 14 (2009): 199–208.
- 34 **E. Tory Higgins:** E. Tory Higgins, “Beyond Pleasure and Pain,” *American Psychologist* 52, no. 12 (1997): 1280–1300.

### THE RESPONSIVE MODE

- 39 **when your brain is not *disturbed*:** Porges, *The Polyvagal Theory*.
- 39 **Neurochemical systems involving *oxytocin*:** Waguih William IsHak et al., “Oxytocin’s Role in Enhancing Well-Being: A Literature Review,” *Journal of Affective Disorders* 130, no. 1 (2011): 1–9; Inga D. Neumann, “Brain Oxytocin: A Key Regulator of Emotional and Social Behaviours in Both Females and Males,” *Journal of Neuroendocrinology* 20 (2008): 858–865.

- 39 **natural opioids:** Pawel K. Olszewski et al., “Oxytocin as Feeding Inhibitor: Maintaining Homeostasis in Consummatory Behavior,” *Pharmacology Biochemistry and Behavior* 97 (2010): 47–54; Esch and Stefano, “The Neurobiology of Stress Management.”
- 39 **regions such as the subgenual cingulate:** Hugo D. Critchley and Yoko Nagai, “How Emotions Are Shaped by Bodily States,” *Emotion Review* 4, no. 2 (2012): 163–168.
- 39 **and neural networks:** Critchley, “Neural Mechanisms.”
- 39 **In it, you’ll often feel:** Critchley, “Neural Mechanisms.”
- 39 **Mammals, including us, become friendly:** Panksepp, *Affective Neuroscience*.

#### IT’S GOOD TO BE HOME

- 40 **Our ancestors evolved this setting:** Ilia Karatsoreos and Bruce McEwen, “Psychobiological Allostasis: Resistance, Resilience, and Vulnerability,” *Trends in Cognitive Sciences* 15, no. 12 (2011): 576–584; Porges, *The Polyvagal Theory*; Esch and Stefano, “The Neurobiology of Stress Management”; Panksepp, “Affective Consciousness”; Panksepp, *Affective Neuroscience*.
- 41 **For example, the endorphins:** Esch and Stefano, “The Neurobiology of Stress Management.”
- 41 **Unlike pathogenic processes:** Craig M. Becker et al., “Salutogenesis 30 Years Later: Where Do We Go From Here?” *International Electronic Journal Health Education* 13 (2010): 25–32.
- 41 **Responsive type experiences prepare your mind:** Critchley, “Neural Mechanisms.”
- 41 **your hypothalamus becomes less active:** Olszewski et al., “Oxytocin as Feeding Inhibitor”; Panksepp, *Affective Neuroscience*.
- 41 **are gradually extinguished:** Resting in the responsive mode with a deeply internalized felt sense of your core needs already being met is not itself enlightenment. For that, I believe that one also needs profound insight, virtue, love, and perhaps grace. But the de-fueling of the neuropsychological “fires” of hatred and greed (to use Buddhist terms), and heartache—in the avoiding, approaching, and attaching systems—both supports and clears the way for very deep engagement with religious or spiritual practice and the upper reaches of human potential.
- 42 **Challenges are faced, competition and confrontations:** Douglas P. Fry, “Life Without War,” *Science* 336 (2012): 879–884.

## VELCRO FOR THE GOOD

- 42 **Its messages guide the executive control:** William W. Seeley et al., “Dis-sociable Intrinsic Connectivity Networks for Salience Processing and Executive Control,” *Journal of Neuroscience* 27 (2007): 2356–2349.
- 43 **Less amygdala reactivity to the bad:** Wil Cunningham and Tabitha Kirkland, “The Joyful, Yet Balanced Amygdala: Moderated Responses to Positive But Not Negative Stimuli in Trait Happiness,” *Social Cognitive and Affective Neuroscience* (2013 April 5, e-pub ahead of print).
- 43 **You need what Wil Cunningham:** Cunningham and Kirkland, “Joyful Amygdala.”
- 43 **In terms of amygdala activation:** Cunningham and Brosch, “Motivational Salience”; Cunningham and Kirkland, “Joyful Amygdala.”
- 43 **the ones with a joyful amygdala:** Cunningham et al. “Neural Correlates of Evaluation.”
- 44 **an “approach orientation”:** Daniel J. Siegel, *The Mindful Brain* (New York: W.W. Norton & Company, 2007).
- 44 **These people also have relatively high positive:** Cunningham and Kirkland, “Joyful Amygdala.”
- 44 **In fact, these happier individuals:** Cunningham and Kirkland, “Joyful Amygdala.”
- 44 **prolong dopamine inputs to your amygdala:** Douglas Roberts-Wolfe et al., “Mindfulness Training Alters Emotional Memory Recall Compared to Active Controls: Support for an Emotional Information Processing Model of Mindfulness,” *Frontiers in Human Neuroscience* 6 (2012): 1–13.

## THE REACTIVE MODE

- 45 **the other setting of your brain:** I’m referring to the responsive and reactive modes of the brain in a dichotomous way, consistent with the categorical distinctions made by scholars in reference to homeostatic/allostatic and sympathetic/parasympathetic activations. In the complex and messy biology of real animals, including us, these distinctions get blurry in that at any time there can be a mix of homeostatic-responsive and allostatic-reactive processes. But in general, these categories used by scholars are accurate and helpful. In the language of systems theory, the responsive and reactive modes are global “strange attractors.”
- 45 **bodily resources are depleted:** Bruce McEwen and Peter Gianaros, “Central Role of the Brain in Stress and Adaptation: Links to Socioeconomic Status, Health, and Disease,” *Annals of the New York Academy of Sciences* 1186 (2010): 190–222.

- 46 **The natural, biologically based rhythm:** McEwen and Gianaros, “Central Role of the Brain in Stress and Adaptation”; Robert Sapolsky, *Why Zebras Don't Get Ulcers* (New York: Holt Paperbacks, 2004).
- 46 **Just entering the red zone:** Esch and Stefano, “The Neurobiology of Stress Management.”
- 46 **Even though reactive experiences feel bad:** McEwen and Gianaros, “Stress- and Allostasis-Induced Brain Plasticity.”
- 48 **All this puts the brain:** McEwen and Gianaros, “Central Role of the Brain in Stress and Adaptation”; Critchley, “Neural Mechanisms.”
- 48 **As a result, while the reactive:** Esch and Stefano, “The Neurobiology of Stress Management.”
- 48 **Going red feels bad emotionally:** Esch and Stefano, “The Neurobiology of Stress Management.”
- 49 **they are risk factors for depression:** Byung Kook Lim et al., “Anhedonia Requires MC4R-Mediated Synaptic Adaptations in Nucleus Accumbens,” *Nature* 487 (2012): 183–189.
- 49 **Many psychological disorders involve reactive extremes:** While depression is often a reaction to loss (e.g., bankruptcy), and one of its most common features is lack of pleasure in things that were once enjoyable—both of which are related to the approaching rewards system—depression also appears after trauma (avoiding system) and after rejection or shaming (attaching system). Therefore, I think of depression as potentially involving all three operating systems, sometimes one more than the others.
- 49 **In your body, the gradually accumulating:** McEwen and Gianaros, “Central Role of the Brain in Stress and Adaptation.”
- 49 **which increases inflammation:** Esch and Stefano, “The Neurobiology of Stress Management”; Paul H. Black, “The Inflammatory Response is an Integral Part of the Stress Response: Implications for Atherosclerosis, Insulin Resistance, Type II Diabetes, and Metabolic Syndrome X,” *Brain, Behavior, & Immunity* 17 (2003): 350–364; Black, “Stress and the Inflammatory Response: A Review of Neurogenic Inflammation,” *Brain, Behavior, & Immunity* 16 (2002): 622–653.
- 49 **weakens your immune system:** McEwen, “Stress Adaptation, and Disease: Allostasis and Allostatic Load,” *Annals of the New York Academy of Sciences* 840 (1998): 33–44.
- 49 **and wears on your cardiovascular system:** McEwen and Gianaros, “Central Role of the Brain in Stress and Adaptation.”
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### EVERYDAY JEWELS

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## Chapter 5: Take Notice

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#### RECENT EVENTS

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#### THE FUTURE

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### ENRICHING AN EXPERIENCE

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## Chapter 8: Flowers Pulling Weeds

### HOW NEGATIVE MATERIAL WORKS IN YOUR BRAIN

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#### POWERFUL POSSIBILITIES

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## Chapter 9: Good Uses

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## HEALING CHILDREN

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## HANDLING BLOCKS

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