manipulated feeling, the actors' stock-in-trade, like the tears that come when sad memories are intentionally milked for their effect. But actors are simply more skilled than the rest of us at the intentional use of the second pathway to emotion, feeling via thinking. While we cannot easily change what specific emotions a certain kind of thought will trigger, we very often can, and do, choose what to think about. Just as a sexual fantasy can lead to sexual feelings, so can happy memories cheer us up, or melancholy thoughts make us reflective.

But the rational mind usually does not decide what emotions we "should" have. Instead, our feelings typically come to us as a fait accompli. What the rational mind can ordinarily control is the *course* of those reactions. A few exceptions aside, we do not decide *when* to be mad, sad, and so on.

A Symbolic, Childlike Reality

The logic of the emotional mind is *associative;* it takes elements that symbolize a reality, or trigger a memory of it, to be the same as that reality. That is why similes, metaphors, and images speak directly to the emotional mind, as do the arts—novels, film, poetry, song, theater, opera. Great spiritual teachers, like Buddha and Jesus, have touched their disciples' hearts by speaking in the language of emotion, teaching in parables, fables, and stories. Indeed, religious symbol and ritual makes little sense from the rational point of view; it is couched in the vernacular of the heart.

This logic of the heart—of the emotional mind—is well-described by Freud in his concept of "primary process" thought; it is the logic of religion and poetry, psychosis and children, dream and myth (as Joseph Campbell put it, "Dreams are private myths; myths are shared dreams"). The primary process is the key that unlocks the meanings of works like James Joyce's *Ulysses:* In primary process thought, loose associations determine the flow of a narrative; one object symbolizes another; one feeling displaces another and stands for it; wholes are condensed into parts. There is no time, no laws of cause-and-effect. Indeed, there is no such thing as "No" in the primary process; anything is possible. The psychoanalytic method is in part the art of deciphering and unraveling these substitutions in meaning.

If the emotional mind follows this logic and its rules, with one element standing for another, things need not necessarily be defined by their objective identity: what matters is how they are *perceived;*

things are as they seem. What something reminds us of can be far more important than what it "is." Indeed, in emotional life, identities can be like a hologram in the sense that a single part evokes a whole. As Seymour Epstein points out, while the rational mind makes logical connections between causes and effects, the emotional mind is indiscriminate, connecting things that merely have similar striking features.[5]

There are many ways in which the emotional mind is childlike, the more so the stronger the emotion grows. One way is *categorical* thinking, where everything is in black and white, with no shades of gray; someone who is mortified about a faux pas might have the immediate thought, "I *always* say the wrong thing." Another sign of this childlike mode is *personalized* thinking, with events perceived with a bias centering on oneself, like the driver who, after an accident, explained that "the telephone pole came straight at me."

This childlike mode is *self-confirming*, suppressing or ignoring memories or facts that would undermine its beliefs and seizing on those that support it. The beliefs of the rational mind are tentative; new evidence can disconfirm one belief and replace it with a new one —it reasons by objective evidence. The emotional mind, however, takes its beliefs to be absolutely true, and so discounts any evidence to the contrary. That is why it is so hard to reason with someone who is emotionally upset: no matter the soundness of your argument from a logical point of view, it carries no weight if it is out of keeping with the emotional conviction of the moment. Feelings are self-justifying, with a set of perceptions and "proofs" all their own.

The Past Imposed on the Present

When some feature of an event seems similar to an emotionally charged memory from the past, the emotional mind responds by triggering the feelings that went with the remembered event. The emotional mind reacts to the present *as though it were the past*.[6] The trouble is that, especially when the appraisal is fast and automatic, we may not realize that what was once the case is no longer so. Someone who has learned, through painful childhood beatings, to react to an angry scowl with intense fear and loathing will have that reaction to some degree even as an adult, when the scowl carries no such threat.

If the feelings are strong, then the reaction that is triggered is obvious. But if the feelings are vague or subtle, we may not quite

realize the emotional reaction we are having, even though it is subtly coloring how we react to the moment. Thoughts and reactions at this moment will take on the coloration of thoughts and reactions then, even though it may seem that the reaction is due solely to the circumstance of the moment. Our emotional mind will harness the rational mind to its purposes, so we come up with explanations for our feelings and reactions—rationalizations—justifying them in terms of the present moment, without realizing the influence of the emotional memory. In that sense, we can have no idea of what is actually going on, though we may have the conviction of certainty that we know exactly what is happening. At such moments the emotional mind has entrained the rational mind, putting it to its own uses.

State-specific Reality

The working of the emotional mind is to a large degree *state-specific*, dictated by the particular feeling ascendant at a given moment. How we think and act when we are feeling romantic is entirely different from how we behave when enraged or dejected; in the mechanics of emotion, each feeling has its own distinct repertoire of thought, reactions, even memories. These state-specific repertoires become most predominant in moments of intense emotion.

One sign that such a repertoire is active is selective memory. Part of the mind's response to an emotional situation is to reshuffle memory and options for action so that those most relevant are at the top of the hierarchy and so more readily enacted. And, as we have seen, each major emotion has its hallmark biological signature, a pattern of sweeping changes that entrain the body as that emotion becomes ascendant, and a unique set of cues the body automatically sends out when in its grip.[7]

APPENDIX C

The Neural Circuitry of Fear

The amygdala is central to fear. When a rare brain disease destroyed the amygdala (but no other brain structures) in the patient neurologists call "S.M.," fear disappeared from her mental repertoire. She became unable to identify looks of fear on other people's faces, nor to make such an expression herself. As her neurologist put it, "If someone put a gun to S.M.'s head, she would know intellectually to be afraid but she would not feel afraid as you or I would."

Neuroscientists have mapped the circuitry for fear in perhaps finest detail, though at the present state of this art the full circuitry for none of the emotions is completely surveyed. Fear is an apt case in point for understanding the neural dynamics of emotion. Fear, in evolution, has a special prominence: perhaps more than any other emotion it is crucial for survival. Of course in modern times misplaced fears are the bane of daily life, leaving us suffering from frets, angst, and garden variety worries—or at pathological extreme, from panic attacks, phobias, or obsessive-compulsive disorder.

Say you're alone one night at home, reading a book, when suddenly you hear a crash in another room. What happens in your brain over the next moments offers a window into the neural circuitry of fear, and the role of the amygdala as an alarm system. The first brain circuit involved simply takes in that sound as raw physical waves and transforms them into the language of the brain to startle you into alertness. This circuit goes from the ear to the brainstem and then to the thalamus. From there two branches separate: a smaller bundle of projections leads to the amygdala and the nearby hippocampus; the other, larger pathway leads to the auditory cortex in the temporal lobe, where sounds are sorted out and comprehended.

The hippocampus, a key storage site for memory, quickly sorts that "crash" against other similar sounds you've heard, to see if it is familiar—is this "crash" one that you immediately recognize? Meanwhile the auditory cortex is doing a more sophisticated analysis of the sound to try to understand its source—is it the cat? A shutter

banging in the wind? A prowler? The auditory cortex comes up with its hypothesis—it might be the cat knocking a lamp off the table, say, but it might also be a prowler—and sends that message to the amygdala and hippocampus, which quickly compare it to similar memories.

If the conclusion is reassuring (it's only the shutter that bangs whenever it gets too windy) then the general alert does not escalate to the next level. But if you are still unsure, another coil of circuitry reverberating between amygdala, hippocampus, and the prefrontal cortex further heightens your uncertainty and fixates your attention, making you even more concerned about identifying the source of the sound. If no satisfying answer comes from this further keen analysis, the amygdala triggers an alarm, its central area activating the hypothalamus, the brainstem, and the autonomic nervous system.

The superb architecture of the amygdala as a central alarm system for the brain becomes evident in this moment of apprehension and subliminal anxiety. The several bundles of neurons in the amygdala each have a distinct set of projections with receptors primed for different neurotransmitters, something like those home alarm companies where operators stand at the ready to send out calls to the local fire department, police, and a neighbor whenever a home security system signals trouble.

Different parts of the amygdala receive differing information. To the amygdala's lateral nucleus come projections from the thalamus and auditory and visual cortices. Smells, via the olfactory bulb, come to the corticomedial area of the amygdala, and tastes and messages from the viscera go to the central area. These incoming signals make the amygdala a continual sentinel, scrutinizing every sensory experience.

From the amygdala projections extend out to every major part of the brain. From the central and medial areas a branch goes to the areas of the hypothalamus that secrete the body's emergency-response substance, corticotropin-releasing hormone (CRH), which mobilizes the fight-or-flight reaction via a cascade of other hormones. The amygdala's basal area sends out branches to the corpus striatum, linking into the brain's system for movement. And, via the nearby central nucleus, the amygdala sends signals to the autonomic nervous system via the medulla, activating a wide range of far-flung responses in the cardiovascular system, the muscles, and the gut.

From the amygdala's basolateral area, arms go to the cingulate cortex and to the fibers known as the "central gray," cells that

regulate the large muscles of the skeleton. It is these cells that make a dog snarl or that arch the back of a cat threatening an interloper on its territory. In humans these same circuits tighten the muscles of the vocal cords, creating the high-pitched voice of fright.

Still another pathway from the amygdala leads to the locus ceruleus in the brainstem, which in turn manufactures norepinephrine (also called “noradrenaline”) and disperses it throughout the brain. The net effect of norepinephrine is to heighten the overall reactivity of the brain areas that receive it, making the sensory circuits more sensitive. Norepinephrine suffuses the cortex, the brainstem, and the limbic system itself, in essence setting the brain on edge. Now even the ordinary creaking of the house can send a tremor of fear coursing through you. Most of these changes go on outside awareness, so that you are not yet aware you feel fear.

But as you begin to actually feel fear—that is, as the anxiety that had been unconscious pierces awareness—the amygdala seamlessly commands a wide-ranging response. It signals cells in the brainstem to put a fearful expression on your face, make you edgy and easily startled, freeze unrelated movements your muscles had underway, speed your heart rate and raise your blood pressure, and slow your breathing (you may notice yourself suddenly holding your breath when you first feel fearful, all the better to hear more clearly what it is you are fearful of). That is only one part of a wide, carefully coordinated array of changes the amygdala and connected areas orchestrate as they commandeer the brain in a crisis.

Meanwhile the amygdala, along with the interconnected hippocampus, directs the cells that send key neurotransmitters, for example, to trigger releases of dopamine that lead to the riveting of attention on the source of your fear—the strange sounds—and put your muscles at readiness to react accordingly. At the same time the amygdala signals sensory areas for vision and attention, making sure that the eyes seek out whatever is most relevant to the emergency at hand. Simultaneously cortical memory systems are reshuffled so that knowledge and memories most relevant to the particular emotional urgency will be most readily recalled, taking precedence over other less relevant strands of thought.

Once these signals have been sent, you are pitched into full-fledged fear: you become aware of the characteristic tightness in your gut, your speeding heart, the tightening of the muscles around your neck and shoulders or the trembling of your limbs; your body freezes in

place as you strain your attention to hear any further sounds, and your mind races with possible lurking dangers and ways to respond. This entire sequence—from surprise to uncertainty to apprehension to fear—can be telescoped within a second or so. (For more information, see Jerome Kagan, *Galen's Prophecy*. New York: Basic Books, 1994.)

APPENDIX D

W. T. Grant Consortium: Active Ingredients of Prevention Programs

Key ingredients of effective programs include:

Emotional Skills

- Identifying and labeling feelings
- Expressing feelings
- Assessing the intensity of feelings
- Managing feelings
- Delaying gratification
- Controlling impulses
- Reducing stress
- Knowing the difference between feelings and actions

Cognitive Skills

- Self-talk—conducting an "inner dialogue" as a way to cope with a topic or challenge or reinforce one's own behavior
- Reading and interpreting social cues—for example, recognizing social influences on behavior and seeing oneself in the perspective of the larger community
- Using steps for problem-solving and decision-making—for instance, controlling impulses, setting goals, identifying alternative actions, anticipating consequences • Understanding the perspective of others
- Understanding behavioral norms (what is and is not acceptable behavior)
- A positive attitude toward life
- Self-awareness—for example, developing realistic expectations about oneself

Behavioral Skills

- Nonverbal—communicating through eye contact, facial expressiveness, tone of voice, gestures, and so on
- Verbal—making clear requests, responding effectively to criticism, resisting negative influences, listening to others, helping others, participating in positive peer groups

Source: W. T. Grant Consortium on the School-Based Promotion of Social Competence, "Drug and Alcohol Prevention Curricula," in J. David Hawkins et al., *Communities That Care* (San Francisco: Jossey-Bass, 1992).

APPENDIX E

The Self Science Curriculum

Main components:

• *Self-awareness:* observing yourself and recognizing your feelings; building a vocabulary for feelings; knowing the relationship between thoughts, feelings, and reactions

• *Personal decision-making:* examining your actions and knowing their consequences; knowing if thought or feeling is ruling a decision; applying these insights to issues such as sex and drugs

• *Managing feelings:* monitoring "self-talk" to catch negative messages such as internal put-downs; realizing what is behind a feeling (e.g., the hurt that underlies anger); finding ways to handle fears and anxieties, anger, and sadness

• *Handling stress:* learning the value of exercise, guided imagery, relaxation methods

• *Empathy:* understanding others' feelings and concerns and taking their perspective; appreciating the differences in how people feel about things

• *Communications:* talking about feelings effectively: becoming a good listener and question-asker; distinguishing between what someone does or says and your own reactions or judgments about it; sending "I" messages instead of blame

• *Self-disclosure:* valuing openness and building trust in a relationship; knowing when it's safe to risk talking about your private feelings

• *Insight:* identifying patterns in your emotional life and reactions; recognizing similar patterns in others

• *Self-acceptance:* feeling pride and seeing yourself in a positive light; recognizing your strengths and weaknesses; being able to laugh at yourself

• *Personal responsibility:* taking responsibility; recognizing the consequences of your decisions and actions, accepting your feelings and moods, following through on commitments (e.g., to studying)