good. A contrasting view, perhaps a reaction against the bleak picture of these other two, holds that anger can be prevented entirely. But a careful reading of research findings suggests that all these common attitudes toward anger are misguided, if not outright myths.[4]

The train of angry thoughts that stokes anger is also potentially the key to one of the most powerful ways to defuse anger: undermining the convictions that are fueling the anger in the first place. The longer we ruminate about what has made us angry, the more "good reasons" and self-justifications for being angry we can invent. Brooding fuels anger's flames. But seeing things differently douses those flames. Tice found that reframing a situation more positively was one of the most potent ways to put anger to rest.

The Rage "Rush"

That finding squares well with the conclusions of University of Alabama psychologist Dolf Zillmann, who, in a lengthy series of careful experiments, has taken precise measure of anger and the anatomy of rage.[5] Given the roots of anger in the fight wing of the fight-or-flight response, it is no surprise that Zillmann finds that a universal trigger for anger is the sense of being endangered. Endangerment can be signaled not just by an outright physical threat but also, as is more often the case, by a symbolic threat to self-esteem or dignity: being treated unjustly or rudely, being insulted or demeaned, being frustrated in pursuing an important goal. These perceptions act as the instigating trigger for a limbic surge that has a dual effect on the brain. One part of that surge is a release of catecholamines, which generate a quick, episodic rush of energy, enough for "one course of vigorous action," as Zillmann puts it, "such as in fight or flight." This energy surge lasts for minutes, during which it readies the body for a good fight or a quick flight, depending on how the emotional brain sizes up the opposition.

Meanwhile, another amygdala-driven ripple through the adrenocortical branch of the nervous system creates a general tonic background of action readiness, which lasts much longer than the catecholamine energy surge. This generalized adrenal and cortical excitation can last for hours and even days, keeping the emotional brain in special readiness for arousal, and becoming a foundation on which subsequent reactions can build with particular quickness. In general, the hair-trigger condition created by adrenocortical arousal

explains why people are so much more prone to anger if they have already been provoked or slightly irritated by something else. Stress of all sorts creates adrenocortical arousal, lowering the threshold for what provokes anger. Thus someone who has had a hard day at work is especially vulnerable to becoming enraged later at home by something—the kids being too noisy or messy, say—that under other circumstances would not be powerful enough to trigger an emotional hijacking.

Zillmann comes to these insights on anger through careful experimentation. In a typical study, for example, he had a confederate provoke men and women who had volunteered by making snide remarks about them. The volunteers then watched a pleasant or upsetting film. Later the volunteers were given the chance to retaliate against the confederate by giving an evaluation they thought would be used in a decision whether or not to hire him. The intensity of their retaliation was directly proportional to how aroused they had gotten from the film they had just watched; they were angrier after seeing the unpleasant film, and gave the worst ratings.

Anger Builds on Anger

Zillmann's studies seem to explain the dynamic at work in a familiar domestic drama I witnessed one day while shopping. Down the supermarket aisle drifted the emphatic, measured tones of a young mother to her son, about three: "Put … it … back!"

"But I *want* it!" he whined, clinging more tightly to a Ninja Turtles cereal box.

"Put it back!" Louder, her anger taking over.

At that moment the baby in her shopping cart seat dropped the jar of jelly she had been mouthing. When it shattered on the floor the mother yelled, "That's it!" and, in a fury, slapped the baby, grabbed the three-year-old's box and slammed it onto the nearest shelf, scooped him up by the waist, and rushed down the aisle, the shopping cart careening perilously in front, the baby now crying, her son, his legs dangling, protesting, "Put me *down*, put me *down*!"

Zillmann has found that when the body is already in a state of edginess, like the mother's, and something triggers an emotional hijacking, the subsequent emotion, whether anger or anxiety, is of especially great intensity. This dynamic is at work when someone becomes enraged. Zillmann sees escalating anger as "a sequence of

provocations, each triggering an excitatory reaction that dissipates slowly." In this sequence every successive anger-provoking thought or perception becomes a minitrigger for amygdala-driven surges of catecholamines, each building on the hormonal momentum of those that went before. A second comes before the first has subsided, and a third on top of those, and so on; each wave rides the tails of those before, quickly escalating the body's level of physiological arousal. A thought that comes later in this buildup triggers a far greater intensity of anger than one that comes at the beginning. Anger builds on anger; the emotional brain heats up. By then rage, unhampered by reason, easily erupts in violence.

At this point people are unforgiving and beyond being reasoned with; their thoughts revolve around revenge and reprisal, oblivious to what the consequences may be. This high level of excitation, Zillmann says, "fosters an illusion of power and invulnerability that may inspire and facilitate aggression" as the enraged person, "failing cognitive guidance," falls back on the most primitive of responses. The limbic urge is ascendant; the rawest lessons of life's brutality become guides to action.

Balm for Anger

Given this analysis of the anatomy of rage, Zillmann sees two main ways of intervening. One way of defusing anger is to seize on and challenge the thoughts that trigger the surges of anger, since it is the original appraisal of an interaction that confirms and encourages the first burst of anger, and the subsequent reappraisals that fan the flames. Timing matters; the earlier in the anger cycle the more effective. Indeed, anger can be completely short-circuited if the mitigating information comes before the anger is acted on.

The power of understanding to deflate anger is clear from another of Zillmann's experiments, in which a rude assistant (a confederate) insulted and provoked volunteers who were riding an exercise bike. When the volunteers were given the chance to retaliate against the rude experimenter (again, by giving a bad evaluation they thought would be used in weighing his candidacy for a job) they did so with an angry glee. But in one version of the experiment another confederate entered after the volunteers had been provoked, and just before the chance to retaliate; she told the provocative experimenter he had a phone call down the hall. As he left he made a snide remark

to her too. But she took it in good spirits, explaining after he left that he was under terrible pressures, upset about his upcoming graduate orals. After that the irate volunteers, when offered the chance to retaliate against the rude fellow, chose not to; instead they expressed compassion for his plight.

Such mitigating information allows a reappraisal of the anger-provoking events. But there is a specific window of opportunity for this de-escalation. Zillmann finds it works well at moderate levels of anger; at high levels of rage it makes no difference because of what he calls "cognitive incapacitation"—in other words, people can no longer think straight. When people were already highly enraged, they dismissed the mitigating information with "That's just too bad!" or "the strongest vulgarities the English language has to offer," as Zillmann put it with delicacy.

Cooling Down

> Once when I was about 13, in an angry fit, I walked out of the house vowing I would never return. It was a beautiful summer day, and I walked far along lovely lanes, till gradually the stillness and beauty calmed and soothed me, and after some hours I returned repentant and almost melted. Since then when I am angry, I do this if I can, and find it the best cure.

The account is by a subject in one of the very first scientific studies of anger, done in 1899.[6] It still stands as a model of the second way of de-escalating anger: cooling off physiologically by waiting out the adrenal surge in a setting where there are not likely to be further triggers for rage. In an argument, for instance, that means getting away from the other person for the time being. During the cooling-off period, the angered person can put the brakes on the cycle of escalating hostile thought by seeking out distractions. Distraction, Zillmann finds, is a highly powerful mood-altering device, for a simple reason: It's hard to stay angry when we're having a pleasant time. The trick, of course, is to get anger to cool to the point where someone can *have* a pleasant time in the first place.

Zillmann's analysis of the ways anger escalates and de-escalates explains many of Diane Tice's findings about the strategies people commonly say they use to ease anger. One such fairly effective strategy is going off to be alone while cooling down. A large proportion of men translate this into going for a drive—a finding that

gives one pause when driving (and, Tice told me, inspired her to drive more defensively). Perhaps a safer alternative is going for a long walk; active exercise also helps with anger. So do relaxation methods such as deep breathing and muscle relaxation, perhaps because they change the body's physiology from the high arousal of anger to a low-arousal state, and perhaps too because they distract from whatever triggered the anger. Active exercise may cool anger for something of the same reason: after high levels of physiological activation during the exercise, the body rebounds to a low level once it stops.

But a cooling-down period will not work if that time is used to pursue the train of anger-inducing thought, since each such thought is in itself a minor trigger for more cascades of anger. The power of distraction is that it stops that angry train of thought. In her survey of people's strategies for handling anger, Tice found that distractions by and large help calm anger: TV, movies, reading, and the like all interfere with the angry thoughts that stoke rage. But, Tice found, indulging in treats such as shopping for oneself and eating do not have much effect; it is all too easy to continue with an indignant train of thought while cruising a shopping mall or devouring a piece of chocolate cake.

To these strategies add those developed by Redford Williams, a psychiatrist at Duke University who sought to help hostile people, who are at higher risk for heart disease, to control their irritability.[7] One of his recommendations is to use self-awareness to catch cynical or hostile thoughts as they arise, and write them down. Once angry thoughts are captured this way, they can be challenged and reappraised, though, as Zillmann found, this approach works better before anger has escalated to rage.

The Ventilation Fallacy

As I settle into a New York City cab, a young man crossing the street stops in front of the cab to wait for traffic to clear. The driver, impatient to start, honks, motioning for the young man to move out of the way. The reply is a scowl and an obscene gesture.

"You son of a bitch!" the driver yells, making threatening lunges with the cab by hitting the accelerator and brake at the same time. At this lethal threat, the young man sullenly moves aside, barely, and smacks his fist against the cab as it inches by into traffic. At this, the driver shouts a foul litany of expletives at the man.

As we move along the driver, still visibly agitated, tells me, “You can’t take any shit from anyone. You gotta yell back—at least it makes you feel better!”

Catharsis—giving vent to rage—is sometimes extolled as a way of handling anger. The popular theory holds that “it makes you feel better.” But, as Zillmann’s findings suggest, there is an argument against catharsis. It has been made since the 1950s, when psychologists started to test the effects of catharsis experimentally and, time after time, found that giving vent to anger did little or nothing to dispel it (though, because of the seductive nature of anger, it may *feel* satisfying).[8] There may be some specific conditions under which lashing out in anger does work: when it is expressed directly to the person who is its target, when it restores a sense of control or rights an injustice, or when it inflicts “appropriate harm” on the other person and gets him to change some grievous activity without retaliating. But because of the incendiary nature of anger, this may be easier to say than to do.[9]

Tice found that ventilating anger is one of the worst ways to cool down: outbursts of rage typically pump up the emotional brain’s arousal, leaving people feeling more angry, not less. Tice found that when people told of times they had taken their rage out on the person who provoked it, the net effect was to prolong the mood rather than end it. Far more effective was when people first cooled down, and then, in a more constructive or assertive manner, confronted the person to settle their dispute. As I once heard Chogyam Trungpa, a Tibetan teacher, reply when asked how best to handle anger: “Don’t suppress it. But don’t act on it.”

SOOTHING ANXIETY: WHAT, ME WORRY?

> Oh, no! The muffler sounds bad.… What if I have to take it to the shop?… I can’t afford the expense.… I’d have to draw the money from Jamie’s college fund.… What if I can’t afford his tuition?… That bad school report last week.… What if his grades go down and he can’t get into college?… Muffler sounds bad.…

And so the worrying mind spins on in an endless loop of low-grade melodrama, one set of concerns leading on to the next and back again. The above specimen is offered by Lizabeth Roemer and Thomas Borkovec, Pennsylvania State University psychologists, whose

research on worrying—the heart of all anxiety—has raised the topic from neurotic's art to science.[10] There is, of course, no hitch when worry works; by mulling over a problem—that is, employing constructive reflection, which can look like worrying—a solution can appear. Indeed, the reaction that underlies worry is the vigilance for potential danger that has, no doubt, been essential for survival over the course of evolution. When fear triggers the emotional brain, part of the resulting anxiety fixates attention on the threat at hand, forcing the mind to obsess about how to handle it and ignore anything else for the time being. Worry is, in a sense, a rehearsal of what might go wrong and how to deal with it; the task of worrying is to come up with positive solutions for life's perils by anticipating dangers before they arise.

The difficulty is with chronic, repetitive worries, the kind that recycle on and on and never get any nearer a positive solution. A close analysis of chronic worry suggests that it has all the attributes of a low-grade emotional hijacking: the worries seem to come from nowhere, are uncontrollable, generate a steady hum of anxiety, are impervious to reason, and lock the worrier into a single, inflexible view of the worrisome topic. When this same cycle of worry intensifies and persists, it shades over the line into full-blown neural hijackings, the anxiety disorders: phobias, obsessions and compulsions, panic attacks. In each of these disorders worry fixates in a distinct fashion; for the phobic, anxieties rivet on the feared situation; for the obsessive, they fixate on preventing some feared calamity; in panic attacks, the worries can focus on a fear of dying or on the prospect of having the attack itself.

In all these conditions the common denominator is worry run amok. For example, a woman being treated for obsessive-compulsive disorder had a series of rituals that took most of her waking hours: forty-five-minute showers several times daily, washing her hands for five minutes twenty or more times a day. She would not sit down unless she first swabbed the seat with rubbing alcohol to sterilize it. Nor would she touch a child or an animal—both were "too dirty." All these compulsions were stirred by her underlying morbid fear of germs; she worried constantly that without her washing and sterilizing she would catch a disease and die.[11]

A woman being treated for "generalized anxiety disorder"—the psychiatric nomenclature for being a constant worrier—responded to the request to worry aloud for one minute this way:

> I might not do this right. This may be so artificial that it won't be an indication of the real thing and we need to get at the real thing.… Because if we don't get at the real thing, I won't get well. And if I don't get well I'll never be happy.[12]

In this virtuoso display of worrying about worrying, the very request to worry for one minute had, within a few short seconds, escalated to contemplation of a lifelong catastrophe: "I'll never be happy." Worries typically follow such lines, a narrative to oneself that jumps from concern to concern and more often than not includes catastrophizing, imagining some terrible tragedy. Worries are almost always expressed in the mind's ear, not its eye—that is, in words, not images—a fact that has significance for controlling worry.

Borkovec and his colleagues began to study worrying per se when they were trying to come up with a treatment for insomnia. Anxiety, other researchers have observed, comes in two forms: *cognitive*, or worrisome thoughts, and *somatic*, the physiological symptoms of anxiety, such as sweating, a racing heart, or muscle tension. The main trouble with insomniacs, Borkovec found, was not the somatic arousal. What kept them up were intrusive thoughts. They were chronic worriers, and could not stop worrying, no matter how sleepy they were. The one thing that worked in helping them get to sleep was getting their minds off their worries, focusing instead on the sensations produced by a relaxation method. In short, the worries could be stopped by shifting attention away.

Most worriers, however, can't seem to do this. The reason, Borkovec believes, has to do with a partial payoff from worrying that is highly reinforcing to the habit. There is, it seems, something positive in worries: worries are ways to deal with potential threats, with dangers that may come one's way. The work of worrying—when it succeeds—is to rehearse what those dangers are, and to reflect on ways to deal with them. But worry doesn't work all that well. New solutions and fresh ways of seeing a problem do not typically come from worrying, especially chronic worry. Instead of coming up with solutions to these potential problems, worriers typically simply ruminate on the danger itself, immersing themselves in a low-key way in the dread associated with it while staying in the same rut of thought. Chronic worriers worry about a wide range of things, most of which have almost no chance of happening; they read dangers into life's journey that others never notice.

Yet chronic worriers tell Borkovec that worrying helps them, and

that their worries are self-perpetuating, an endless loop of angst-ridden thought. Why should worry become what seems to amount to a mental addiction? Oddly, as Borkovec points out, the worry habit is reinforcing in the same sense that superstitions are. Since people worry about many things that have a very low probability of actually occurring—a loved one dying in a plane crash, going bankrupt, and the like—there is, to the primitive limbic brain at least, something magical about it. Like an amulet that wards off some anticipated evil, the worry psychologically gets the credit for preventing the danger it obsesses about.

The Work of Worrying

> She had moved to Los Angeles from the Midwest, lured by a job with a publisher. But the publisher was bought by another soon after, and she was left without a job. Turning to freelance writing, an erratic marketplace, she found herself either swamped with work or unable to pay her rent. She often had to ration phone calls, and for the first time was without health insurance. This lack of coverage was particularly distressing: she found herself catastrophizing about her health, sure every headache signaled a brain tumor, picturing herself in an accident whenever she had to drive somewhere. She often found herself lost in a long reverie of worry, a medley of distress. But, she said, she found her worries almost addictive.

Borkovec discovered another unexpected benefit to worrying. While people are immersed in their worried thoughts, they do not seem to notice the subjective sensations of the anxiety those worries stir—the speedy heartbeat, the beads of sweat, the shakiness—and as the worry proceeds it actually seems to suppress some of that anxiety, at least as reflected in heart rate. The sequence presumably goes something like this: The worrier notices something that triggers the image of some potential threat or danger; that imagined catastrophe in turn triggers a mild attack of anxiety. The worrier then plunges into a long series of distressed thoughts, each of which primes yet another topic for worry; as attention continues to be carried along by this train of worry, focusing on these very thoughts takes the mind off the original catastrophic image that triggered the anxiety. Images, Borkovec found, are more powerful triggers for physiological anxiety than are thoughts, so immersion in thoughts, to the exclusion of catastrophic images, partially alleviates the experience of being anxious. And, to that extent, the worry is also reinforced, as a halfway antidote to the

very anxiety it evoked.

But chronic worries are self-defeating too in that they take the form of stereotyped, rigid ideas, not creative breakthroughs that actually move toward solving the problem. This rigidity shows up not just in the manifest content of worried thought, which simply repeats more or less the same ideas over and over. But at a neurological level there seems to be a cortical rigidity, a deficit in the emotional brain's ability to respond flexibly to changing circumstance. In short, chronic worry works in some ways, but not in other, more consequential ones: it eases some anxiety, but never solves the problem.

The one thing that chronic worriers cannot do is follow the advice they are most often given: "Just stop worrying" (or, worse, "Don't worry—be happy"). Since chronic worries seem to be low-grade amygdala episodes, they come unbidden. And, by their very nature, they persist once they arise in the mind. But after much experimentation, Borkovec discovered some simple steps that can help even the most chronic worrier control the habit.

The first step is self-awareness, catching the worrisome episodes as near their beginning as possible—ideally, as soon as or just after the fleeting catastrophic image triggers the worry-anxiety cycle. Borkovec trains people in this approach by first teaching them to monitor cues for anxiety, especially learning to identify situations that trigger worry, or the fleeting thoughts and images that initiate the worry, as well as the accompanying sensations of anxiety in the body. With practice, people can identify the worries at an earlier and earlier point in the anxiety spiral. People also learn relaxation methods that they can apply at the moment they recognize the worry beginning, and practice the relaxation method daily so they will be able to use it on the spot, when they need it the most.

The relaxation method, though, is not enough in itself. Worriers also need to actively challenge the worrisome thoughts; failing this, the worry spiral will keep coming back. So the next step is to take a critical stance toward their assumptions: Is it very probable that the dreaded event will occur? Is it necessarily the case that there is only one or no alternative to letting it happen? Are there constructive steps to be taken? Does it really help to run through these same anxious thoughts over and over?

This combination of mindfulness and healthy skepticism would, presumably, act as a brake on the neural activation that underlies low-grade anxiety. Actively generating such thoughts may prime the