

How Mindfulness Training Works

Brent J. Atkinson, Ph.D.

The skills that are needed for successful relationships are easy to understand but can be hard to do because people often experience automatic tendencies or inclinations that take them in the wrong direction. It's really hard to *avoid a judgmental attitude* and *find the understandable part* of your partner's explanation if your internal reactions are too intense when your partner does upsetting things. It's normal to feel upset, but there is a level of negative intensity that is clearly counter-productive. People usually don't try to have intense negative reactions – they just happen. Their nervous systems are programmed to generate strong reactions. Intense negative reactions may not be your problem, but you might find that it's hard to listen to your partner without interrupting – even when you really try. Or you may have a tendency to jump to conclusions about your partner's intentions or motives. Or instead of feeling genuine interest and affection, you might find yourself feeling detached, preoccupied or unfeeling.

The internal mechanisms that generate internal moods, motivations and dispositions cannot be changed simply by good intentions or wishful thinking. So what can you do if you find that your negative reactions to your partner are too strong, or if you can't seem to muster up the feelings that are needed to nourish your relationship? Thanks to hundreds of scientific studies, we know that the automatic motivations and inclinations generated by our brains can be changed – even those that have been in place since early in a person's life. In the same way that you can train your brain to type complete sentences without consciously moving your fingers from key to key, you can condition your brain to produce inclinations that help you be calmer, less reactive, more flexible, less preoccupied, more heartfelt, caring and tuned-in to others. Through daily exercises that involve giving sustained attention to your body, emotions, and intentions, you can change the settings of your nervous system so that you are naturally less edgy, more open-minded, less preoccupied, and more caring and interested in your partner.

Benefits of Mindfulness

What is it about the mindfulness exercises that promote positive changes in the brain so powerfully? Broadly speaking, our nervous systems have two operating modes. One mode naturally directs thoughts and inclinations toward improving life circumstances. When in this "striving" mode, our minds are occupied with thoughts about how to make things better, why things aren't better, how life would be if things were better, what's wrong with us for not having made things better, and/or who else is to blame for why things aren't better. In this striving mode, we spend a lot of time in our heads – analyzing, judging, evaluating and categorizing. To be in striving mode, people don't have to be actively planning or taking action. They can be passive, hopeless and depressed and still be in striving mode if their minds are occupied with thinking about what they do not have and wishing that things were different.

Nervous systems are capable of a second mode that is vastly different than the striving mode. When we're in the "experiencing" mode, we're not trying to get anything to be different. Rather, we're opening up to, accepting, and "taking in" what is already here. We're not analyzing as much as we are relaxing and allowing ourselves to have direct, moment-to-moment experience of the present moment.

There is substantial evidence suggesting that people who have nervous systems that operate too much in striving mode and too little in experiencing mode have more difficulties in life than people who are more balanced. Mindfulness exercises work by interrupting the nervous system's tendency to get stuck in striving mode and help it operate more naturally in experiencing mode.

How do Mindfulness Exercises Change Automatic Nervous System Tendencies?

First and foremost, *mindfulness exercises increase the ability to notice when one's mind is shifting from experiencing to striving mode.* Mindfulness programs often begin with that involve sustaining ongoing attention on (experiencing) body sensations while maintaining an attitude of curiosity, openness, and acceptance. One exercise asks people to systematically scan each part of their bodies from head to toe, noticing sensations in each area of the body. Another variation involves paying attention to the physical sensations that accompanied the movements of walking, stretching and doing mild forms of yoga. A third variation involves simply paying attention to physical sensations that accompany breathing. As people try to maintain the focus of attention on internal sensations (experiencing mode), their minds automatically begin to shift into striving mode. Thoughts pop into their heads about things like what they are going to have for lunch, or how they are going to organize their weekends. The instructor encourages them to simply notice that their minds have wandered, and then without judging themselves, refocus attention back to the internal sensations.

In ongoing life, things are so complex that it's hard for people to realize when their nervous systems are in striving mode. Mindfulness exercises create a context where a conscious attempt is made to stay in experiencing mode. The focus of experiencing is narrowed to the single task of experiencing specific sensations – for example, just noticing sensations in the body. Because the focus is so simple, it becomes blatantly to people obvious when their brains are shifting into striving mode. At these moments, mindfulness exercises allow them to interrupt the auto-takeover process. By consciously refocusing attention, they let go of their brain's automatic, involuntary inclinations and replaced them with voluntary ones. Mindfulness exercises provide a stripped-down, bare-bones forum that enabled automatic processes to be made conscious and voluntary processes to be strengthened.

The beauty of the mindfulness method is that it provided the opportunity for this interrupting-and-bringing-attention back process to happen many times during a single practice session. Any self-respecting experimental psychologist knows that reconditioning a habit happens most readily when reconditioning sequences occur *frequently*, and in *close proximity* to each other. This is exactly what happens during mindfulness exercises. The process of stopping their brains from automatically shifting from experiencing to striving, repeated over and over again in episodes that occurred just minutes (sometimes seconds) apart, literally changes the wiring of one's brain, strengthening neural mechanisms that automatically sustain

experiencing. Neuroscientist Richard Davidson believes that the repetitive process of “noticing and bringing back” may be the mental equivalent to physical weightlifting “reps.” Like the weight placed on a barbell, involuntary mind-wandering is the weight or “resistance” needed to strengthen voluntary processes.

Why is Spending Time in Experiencing Mode Such a Big Deal?

People whose nervous systems naturally move back and forth between striving and experiencing modes (vs. getting stuck in striving mode) are calmer, less reactive, more flexible, less preoccupied, more capable of tuning into others, and more effective in getting the changes they need from others. Let’s take a look at each of the major types of mindfulness exercises, and examine why they are so effective in producing the benefits summarized in the chart above.

Mindfulness exercises come in four varieties: 1) Breath and Body Awareness, 2) Mindful Attention to the External World, 3) Distress-Tolerance and Self-Soothing, and 4) Mental Rehearsal. The theme that runs through all of the exercises is an emphasis on sustaining moment-to-moment awareness of ongoing experience.* (Throughout this paper, click on asterisks for further references and resources)

Breath and Body Awareness

As mindfulness practitioners sustain attention on their bodies and spend less time following mind’s conditioned thought tendencies, over a period of weeks a natural relaxation and restorative process is kicked off in their bodies, resulting in an across-the-board reduction in stress and anxiety. Heart rates and respiration levels slow and blood pressure rates drop. Recent Harvard* and Stanford* studies found that practicing mindfulness exercises for as little as 8 weeks reduces activity and density of the amygdala, the part of the brain that plays a central role in the chronic activation of the body’s “fight or flight” response. Across 39 studies, researchers have found that mindfulness reduces anxiety in people suffering from a wide variety of conditions, including cancer, social anxiety and eating disorders.*

When individuals sustain attention on bodily sensations, they strengthen connections between the mind and the body. New neural connections literally reach out and connect all the way through the torso to the extremities. Mindfulness students often report that they begin to “feel” their bodies more vividly. So what’s the big deal about being connected to the body? You can’t regulate your physiology unless you are well-connected to your body, and regulating your physiology is a big deal because it translates into the ability to relax and regulate stress. People who have stronger mind/body connections operate with less agitation, restlessness, and irritability. A good connection with your body also lays the foundation for exercises that enable the nervous system to calm down.

Mindful Attention to the External World

While the first group of exercises promotes awareness of internal body sensations, a second group involves present moment-to-moment engagement with the *external world*.

External awareness exercises differ from internal awareness exercises in that they are not done while sitting quietly in a removed setting but rather while actively interacting with one's surroundings. Many people proceed through life only vaguely aware of the sights, sounds, tastes, smells and touch sensations available to them, spending much of their lives preoccupied with thoughts about the past or plans for the future. Exercises for giving mindful attention to the external world involve giving full attention to sensations generated while engaging in ordinary activities such as washing the dishes, eating or driving to work.

The ability to avoid being preoccupied is strongly correlated with happiness. In fact, the ability to get out of one's head and into one's life is one of the strongest correlates of personal happiness. In studies spanning three decades, Mihaly Csikszentmihalyi, former chair of the Department of Psychology at the University of Chicago, found that happier people spend more time in a state that he calls "flow," where they are so thoroughly engaged with their moment-to-moment experience that they lose track of time.* "Flow" and "mindfulness" refer to similar states of mind in which people are fully present and focused on the details of immediate experience. People are substantially less happy when they are preoccupied than when their minds are on what they are doing at the moment. A massive study involving 15,000 subjects found that people were less happy when they were preoccupied compared to when they were present-focused, even when the thoughts they were preoccupied with were pleasant and their present-moment circumstances were less than desirable.* For example, commuting to work was an activity that was rated by most people as one of their least enjoyable activities. Yet people were happier when they were focused only on their commute than when their minds were preoccupied with something else – even when their minds wandered to things people described as pleasant. There appears to be something nourishing about staying present with one's moment-to-moment experience.

By focusing the brain on present ongoing experience mindfulness exercises have been shown to shift frontal brain activity toward a left-side activation pattern that is associated with positive, "approach-oriented" emotional states — states that make us more likely to engage the world rather than to withdraw from it.**** In a Wisconsin study, biotech workers who engaged in an 8-week mindfulness program not only evidenced a shift to greater left prefrontal brain activity, but they spontaneously said that they were in touch again with what they loved about their jobs and with why they had gotten into the field into the first place.* Across studies, neuroscientist Richard Davidson has discovered that the biggest shift to greater left prefrontal activation happens in the first months of mindfulness training. In the Wisconsin study, biotech workers experienced a significant brain changes after practicing daily mindful awareness exercises for just two months.*

Most people are much more inclined to be fully present when they're engaging in interesting and/or fun activities that "pull" them into full engagement. It's much easier to be present when you're riding a roller-coaster than when you're brushing your teeth. But you can't go to Disneyland every day, and the ability to be present during ordinary life moments separates people who consistently enjoy life from those who only occasionally enjoy life. Mindfulness exercises give people the means to help their minds stop wandering off into their worries and concerns in the midst of daily living. Mindfulness students learn to relax and "take in" enjoyable aspects of the ongoing life around them on a consistent basis.

During the first few weeks of mindfulness training, people sometimes feel like they are going through the motions, forcing themselves to pay attention. But after several weeks of daily practice something different happens. It is as if their minds finally begin getting the message: “I’m not going to go along with your attempts to take my attention somewhere else.” Eventually, the mind realizes that it won’t do any good to keep trying. It stops wanting to be somewhere else and it relaxes, taking in what is immediately available in the external world at a different level. Attention stops flitting from one thing to another and instead begins to feed on incoming sensory information. Awareness of subtle nuance increases, and so does enjoyment.

The process of developing a “palate” for ordinary experience is similar to the process of becoming a wine connoisseur. To a person who hasn’t spent much time paying close attention to different types of wine, all of them tend to taste the same and enjoyment is limited. But sustained attention to small differences yields a more refined palate, capable of fully appreciating the qualities of each wine. People who regularly engage in mindfulness exercises become similarly refined in their appreciation of sensory experience. They become less preoccupied and more available to enjoy the simple pleasures of life. They feel more moved by beautiful sunsets, the laughter of children, and the fragrance of flowers. They get out of their heads and into their lives. They fret less about what they don’t have (or can’t seem to get) and open themselves more fully to what they do have – the enjoyment that comes through full moment-to-moment engagement with the world around them. After weeks of practice, one mindfulness student remarked, “My senses were clouded by my constant preoccupations. Now there are more wide open spaces between the clouds. I can feel the warmth of the sunshine again. It’s like my senses are waking up.”

Many people report similar experiences when their minds begin to settle and they become more able to “take in” the richness of the world around them. They stop sacrificing beauty for the sake of efficiency and they are more able to enjoy their lives -- even as they attempt to improve their circumstances. The continuous feed of sensory nourishment settles them at a very basic level. They know that it is a source of satisfaction that can never be taken away from them. It serves as a source of calm and stability, making them less anxious and more successful as they pursue their goals.

Distress Tolerance and Self-Soothing

A third group of mindfulness exercises increase one’s ability to feel calm during upsetting circumstances. People are often unable to successfully implement these exercises unless they have spent previous weeks engaging in daily exercises described earlier (*Mindful Attention to Bodily Sensations* and *Mindful Attention to the External World*). These “pre-requisite” exercises are done at moments when a person is not feeling particularly upset. It’s easier to practice when emotions aren’t stirred up so strongly. Mindful awareness exercises practiced while one is relatively calm lay the foundation for mindful attention to upset feelings. The more connected you get with your body through exercises involving mindful attention to bodily sensations when you are calm, the more you will be able to regulate and calm physical reactions when you are upset. The more able you are to let go of your mind’s preoccupations and engage fully with the world around you when you are calm, the better your chances are of being able to do this when you are upset.

Exercises for mindful calming of upset feelings begin by building in an instinct to question vs. blindly accept initial impressions that could be inaccurate and fuel distress needlessly. Mindfulness students stop when they feel upset, identify gut-level judgments that they are operating on, and then remind themselves that these judgments could be a product of their brains' self-protective tendencies, and could be inaccurate or incomplete. People who practice such exercises don't discount gut-level impressions, they just learn to develop a healthy skepticism, saying to themselves things like, "Maybe things are as they seem, and maybe they aren't." In short, mindfulness exercises help practitioners develop the habit of keeping open minds even when things seem clear-cut.

When upsetting things happen, most people tend to dwell on thoughts about the upsetting situations. "Why did this happen?" "Should I have seen it coming?" "What are people thinking about me?" "What am I going to do?" The problem is that when a person is already upset, thinking about upsetting circumstances only fuels distress and often results in unsound conclusions and unwise decisions. Experienced mindfulness practitioners react differently when they feel upset. Unless immediate actions are required, they postpone thinking about upsetting situations and focus first on trying to relax and soothe upset feelings. To accomplish this, they *turn toward* physical sensations that come along with difficult feelings. They invite the sensations to come into full awareness, allowing them to be in the body just as they are while they "accompany" these sensations, engaging in physiological soothing/relaxation using the body and breath awareness exercises described earlier.

Practitioners temporarily "turn off" thoughts about the upsetting circumstances for a few minutes and instead engage in mindful awareness of the bodily sensations. Only when they feel calmer do they then refocus attention on the upsetting circumstances. The process is similar to safety instructions given on airlines: "When oxygen masks drop down, *first put on your own mask.*" Safety experts know that people can't operate effectively when they are worried about their own oxygen intake. In the same way, relationship experts know that people can't operate effectively when they're upset unless they first calm themselves down, and then try to address the upsetting circumstances.

To become more effective in calming upset feelings, mindfulness students practice self-soothing *every day*. Brain scientists have discovered that new habits are formed most readily when new behaviors are practiced at *close intervals*. The brain will become wired to calm upset feelings more quickly if a person practices self-soothing one time per day for 14 days than if a person practices it one time per week for 14 weeks. Recognizing the importance of practicing at close intervals, mindfulness students practice with *every* frustration, annoyance, and disappointment that they experience during the course of each day. Negative reactions don't need to be intense or overwhelming to serve as an opportunity for practice. Small practice moments with mild upset feelings can take just 1-3 minutes, but when students practice faithfully these moments can lead to significant changes in the brain's automatic reactions during upsetting situations.

Mental Rehearsal

A fourth group of mindfulness exercises involves visualizing, thinking about, and cultivating desire for specific feelings, personal habits, dispositional qualities, skills or abilities that one would like to have. Focused mental exercises have been used for decades by athletic coaches and trainers to help athletes increase skill by visualizing goals and focusing intention on steps toward the goals. ^{*} However, it's only recently that we've discovered how powerful mental exercises are in changing the brain. In a Harvard study conducted by Alvaro Pascual-Leone^{*}, subjects who had never played the piano before were given instruction and asked to practice a song for five days, two hours per day (10 hours total). Their brains were scanned before and after. As anticipated, subjects showed brain changes in the areas of the motor cortex that corresponded to the physical movements that they had practiced. Another group of subjects who were randomly assigned to a second practice condition did the same thing as the first group with one exception: They never pressed the keys of the piano. They just went through each of the practice movements mentally. Researchers were amazed to find that these mental-rehearsal-only subjects evidenced almost the same changes in their brains as the subjects who had actually practiced using their hands. Mental practice produced changes in the motor cortex even though subjects hadn't moved their fingers – they just visualized moving their fingers. But the researchers went one step further and tested the proficiency of subjects at the end of the study. Again, the results were profound. The first time that mental rehearsal group pressed the keys, they could already play the rehearsed piano piece almost as well as physical rehearsal group. After just one day of physical practice, they could play just as well as the group who had practiced physically for five days.

The Harvard piano studies aren't the only ones that show brain and performance-level changes in response to mental rehearsal. A study at the Cleveland Clinic found that subjects could increase finger strength 53% through physical exercises over a 12-week period.^{*} Amazingly, a second group evidenced a 35% strength increase through mental visualization only. In a more recent study, college athletes who engaged in hip flexor exercises increased muscle strength 28%, but without doing physical exercises a mental-rehearsal only group strengthened hip flexor muscles by 24%.^{*}

Mental rehearsal may be most important in situations where physical practice is not possible. Enter the world of emotions. Many of the problems that couples experience cannot be solved simply by having partners try to act differently. People know when their partners are just going through the motions. Attitude matters, and so do feelings. Can feelings be changed through mental exercises? The answer would appear to be "yes." The past decade has seen dozens of studies on a particular form of mental rehearsal known as compassion meditation. The exercise involves extended periods of time focusing on the intent and desire to have feelings of compassion and loving-kindness for others. Just as mental rehearsal promoted changes in the motor cortex of Pascual-Leone's piano players in the Harvard study, brain scans have revealed that brain circuits involved in empathy, positive emotion and emotional regulation are dramatically changed in subjects who have extensive experience practicing compassion meditation.^{**} A study at the University of Wisconsin-Madison showed that simply focusing daily on the intention to be loving and compassionate strengthened not only feelings

of compassion and related neural underpinnings, but also increased concrete altruistic behavior of subjects.* Another study at Emory University found that compassion meditation boosted empathic accuracy – a person’s ability to read the facial expressions of others. In this study, the meditators, in comparison to those in the control group, also had significant increases in neural activity in areas of the brain important for empathy, and these brain changes accounted for changes in the empathic accuracy scores of the participants.* In yet another recent study, researchers found that after just 7 hours of training in compassion meditation, participants showed significant brain changes when viewing scenes of human suffering.*

Simply dwelling on the intention to have a specific feeling activates the neural circuits responsible for producing the feeling, making the circuits more likely to fire with less external stimulation. In focusing on the intention to be compassionate, mindfulness practitioners primed their brains for compassion. Likewise, if one spends five minutes per day thinking about things that one is grateful for, one will energize and create more connection with brain circuits that produce feelings of gratitude. If one spends five minutes per day remembering vividly times when he or she felt happy (or playful, affectionate, sexual, etc.), this person will energize and strengthen brain circuits that can produce these feelings in the future. Neuroscientists explain that anything you give attention to on a consistent basis you teach the brain to produce more of. If you give attention to negative thoughts, you’re teaching your brain to produce negativity.

Studies on mental rehearsal and compassion meditation suggest that not just any kind of attention will produce significant changes. Sustained, detailed intentions are needed. The subjects in Pascual-Leone’s piano study didn’t just wish occasionally wish for increased piano skills, they spent hours per day specifically imagining the piano moves necessary to develop the skills. Similarly, those involved in the compassion meditation studies didn’t have just fleeting thoughts about wanting to have more feelings of compassion and loving-kindness, they spent time dwelling on the desire to have more compassion – in some studies up to 40 minutes per day.

Focused intention exercises work for building interpersonal skills as well as motor skills and emotional dispositions. Just as the subjects in the Harvard piano study developed the ability to develop musical skills through mental rehearsal, people can develop interpersonal skills through mental rehearsal. In Couples Clinic programs, one of the first exercises completed by people who are on the road to more satisfying relationships involves 1) accurately identifying exactly where they went wrong in their reactions to their partners in stressful situations, 2) developing a clear picture (in hindsight) of how they could have responded more effectively, and 3) *spending time mentally revisiting the situations, visualizing themselves interacting more skillfully with their partners as the stressful situations unfolded.* The more time people spend visualizing performing differently in past upsetting situations, the more they are able to perform differently in future situations.

Mindfulness exercises help people hold sustained and specific intentions in ways that prime their brains to more readily generate desired dispositions or skills. Many people go through their whole lives without ever devoting 5 full minutes to sustained mental rehearsal or dwelling on specific intentions or desires. People don’t do it because they don’t believe it will do any good. Early in their lives, children are told, “Wishful thinking won’t get you anywhere! You need to get off of your butt and make things happen!” But scientific studies suggest that

mental rehearsal and physical effort aren't mutually exclusive. While wishful thinking alone will not get people where they want to go, people who bolster their concrete efforts with mental rehearsal and focused, sustained intentions have more success in making needed changes than those who use behavioral efforts alone.

Conclusion

Every living person has at least some experience giving mindful attention to aspects of their experience. We all pay attention to sensations in our bodies, take in the beauty of our surroundings, try to calm down when we feel upset, and focus on our goals. What distinguishes people who lead the most satisfying lives from the rest of us is their ability to do this effortlessly. Their nervous systems seem to be wired to produce calmness, stability and vibrancy. Brain studies have established that a reconditioning of nervous-system-level tendencies happens through *repetition*. If you want more of the abilities described in this paper, you will need to do more than attempt to be mindful on an "as-needed" basis. If you wait to try to be calmer until the moments when you need to be calm, it's too late. You must groom your nervous system, day-by-day, for an increased capacity for calmness. Strengthening the brain requires the same level of attention and commitment as do fitness routines for strengthening the body. You can't engage in physical exercise once a week and expect to become stronger.

Mindfulness groups start with exercises that take just 10 minutes per day. Gradually, participants are encouraged to expand their daily practice to 30 or 40 minutes. In the majority of the studies showing significant brain changes through mindfulness, participants practiced 30-40 minutes per day for eight consecutive weeks. If you engage in this level of practice, you can be certain that your brain will begin operating differently.