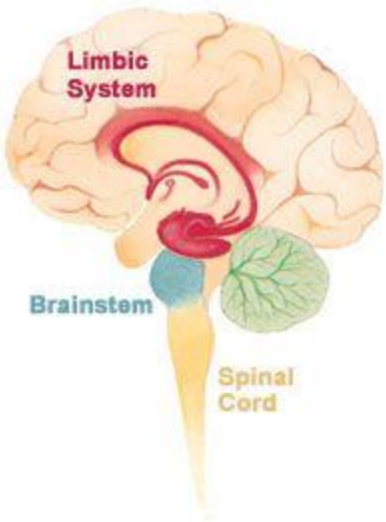
Turn Down Your Brain's Worry Center by **Susan Krauss Whitbourne Ph.D.**

Control worrying by controlling your brain's worry patterns

Worry is a natural emotion that occurs when we feel threatened. However, many of our worries are unfounded, sapping our energy and deflecting our attentionfrom life's real problems. In a recent New York Times article, Boston author David Ropeik makes the case that most of us don't know how to worry. Although we often underestimate how risky something really is, we are even more likely to overestimate the dangers of taking actions that would actually help us. In other words, when it comes to evaluating the risk-benefit ratio of our actions, we do a pretty poor job. This is because, Ropeik argues, our brains are wired to worry first and think second. This quote from the work of NYU neuroscientist Joseph LeDoux sums it up in a nutshell: "connections from the emotional systems to the cognitive systems are stronger than connections from the cognitive systems to the emotional systems."

The emotional system LeDoux refers to is the limbic system, the set of structures deep within the brain that fires up in situations which have implications for our survival and well-being. When we're threatened, a little structure called the amygdala screams out in fear. When delight comes our way, or even the anticipation of delight, other structures in the limbic system shoot off large quantities of the neurotransmitter dopamine. The limbic system sends its stimulation up to the cortex, where these sensations inform our higher-order mental structures.



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As LeDoux points out, the interaction between the limbic system and the cortex is a two-way street. Your limbic system informs your cortex, but your cortex can also control your limbic system. You can over-ride your limbic system's tendency to let your emotions control your life, but it takes effort. You have to decide to be the one in charge of your emotions, or your emotions will take charge of you.

This is where irrational worries come into play. Ropeik uses the example of parents making decisions about whether they should have their children vaccinated against disease. Although parents obviously want to help their children benefit from an intervention that could possibly be life-saving, they also worry about the risks that such vaccinations might present. When they evaluate the risk-benefit ratio, they are swayed into overestimating the risks. Their amygdalas tell them that the chances of developing a serious disease (measles, mumps, whooping cough) are small, so it doesn't "feel" right to put them at risk of potential harm from the vaccination itself. Parents then let this emotional reaction keep them from seeing that, rationally, the reason that the risks are small is because vaccinations have virtually eliminated these diseases from industrialized societies. If no one got vaccines for their children, these diseases would once again run rampant. In the 1950s, the risks of diseases such as polio were so evident, because they were highly prevalent, that parents didn't even think twice about having their children take the vaccine.

Worries in daily life often take the form of subconscious ruminations over possible threats to our well-being. Cognitive theories of emotion, such as that of Albert Ellis, use an "A-B-C" model to spell out what happens to keep us constantly on edge. In this model, the "A" is an activating event, "B" is the belief, and "C" is the consequent emotion. The worries that plague us unnecessarily are the result of irrational beliefs triggered by the event. For example, you may worry that you'll make a terrible mistake the next time you get into a new relationship. This worry comes from the belief that you're not really a very likeable person and that everyone "must" like you (what Ellis called "masturbation"). The activating event can be anything ranging from an email exchange to a goodnight kiss. It's the belief, the irrational one, which causes you to experience unnecessary worry and anxiety.

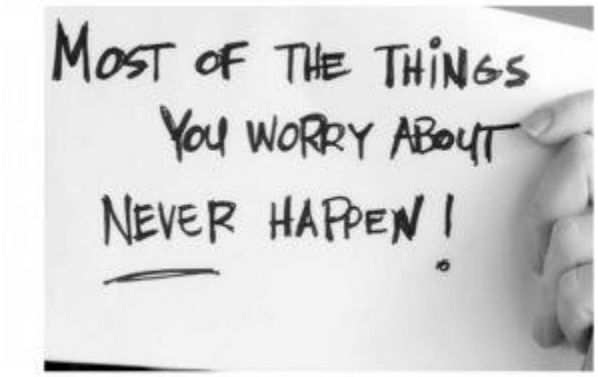
The essence of cognitive therapy involves helping clients learn to change their emotions by changing their thoughts. Cognitive-behavioral therapy goes one step farther in prescribing a series of activities that clients undertake in order to ensure that they don't just think, but also act, differently. In neuroscience terms, cognitive-behavioral therapy retrains the rational part of the cortex to take control over the irrational emotions of the limbic system. As I pointed out above, ordinarily, the cortex receives input from the outside environment through the sense organs, which in turn shoot messages through at least a part of the limbic system. That's why we feel before we think. However, if we speed up or strengthen the cortex's natural ability to inhibit the limbic system, we can change our feelings before they have a chance to impair our behavior or judgment.

In a review of studies bearing on this very question, a team of Brazilian neuroscientists headed by Patricia Ribeiro Porto (2009) concluded that cognitive-behavioral therapy in fact does change the neural circuits involved in the regulation of anxiety. Other studies have, similarly, shown

beneficial effects of cognitive and cognitive-behavioral therapy on the neurobiology of negative emotions.

Many people think that the only way to change your brain's chemistry is through medication. These studies provide clear evidence that you can change your brain's chemistry by changing how your brain interprets the data it receives from your limbic system.

Cognitive-behavioral therapy not only has fewer side effects (i.e. none) compared to medication, but it produces changes that can last for years, if not a lifetime. After you learn to change the way your limbic system reacts, you have less reason to worry because you're not processing your experiences the same way anymore.



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Sometimes it's actually good to worry, especially if there's a real danger lurking in the shadows. You should worry about losing your job if you're continually late for work, or about losing your partner if you're unfaithful. However, apart from these obvious situations where worry might be warranted, just as often it is not. As Ropeik pointed out, we sometimes place too much faith in untrustworthy sources. We believe salespersons who twist the truth to close the deal, ads for products that can't possibly live up to expectations, and people who lie to us about their true motives.

Just as you can train your brain not to worry unnecessarily, however, you can also take a page from the cognitive-behavioral playbook to slow down your impulsive tendencies and speed up your inner skeptic.

Put the neuroscience of worry to work for you. To sum up, try these 5 basic steps:

1. Examine your irrational beliefs. As Ellis pointed out, we often have irrational beliefs that lead us to see threat where no threat actually exists. Most of these beliefs, he proposed, involve our need to live up to life's "must's." Find a more realistic balance between your ideal and your actual self, and your worries will retreat.

2. Learn how to talk your way through your feelings. In cognitive-behavioral therapy, clients learn to counter their illogical thoughts with more clear-headed analyses. Much of this process involves substituting the negative ways people think with more neutral or positive thoughts.

3. Set your feelings aside when you make important decisions. Many people like to trust their gut reactions when, in fact, it's precisely those reactions they should avoid. We are easily swayed by emotional arguments. Trial lawyers make a successful business out of appealing to emotions of jurors, hoping they will let their sympathy for the victim outweigh their judgments about legal liability. No human will ever be completely dispassionate in such situations, but the more you can separate logic from emotion, the more likely it is that you'll make fair and reasoned choices.

4. Get support from someone who can help you. Our emotions react quickly and strongly to certain experiences, and try as we might, we can't rein in those feelings. This is why sponsors are so crucial to programs such as Alcoholics Anonymous. That other person can serve as your "cortex" when your own is heavily under the influence of an addiction that is ruling your limbic system.

5. Build confidence in your self-control. According to the notion of self-efficacy, people can gain control over their problematic behaviors when they see themselves as able to exert that control. As you gain strength from good decisions, from conquering your worries, or controlling your impulses, you gradually find that those impulses and fears dominate you less and less.

Some may argue that the fact we are hard-wired to worry is evolutionarily-based; in fact, Ropeik hints at this in his article ("our risk-perception system… has gotten us this far through evolution's gantlet"). However, what makes us distinctly human is precisely our ability to use our cortex to override the emotional storms that brew in our subcortical brain regions. By controlling your worries, you'll not only make better decisions, but feel better because you do.

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