FOCUS

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Let it RAIN

A Practice of Radical Compassion
by Tara Brach

Take time to explore RAIN as a stand-alone medication or return to this exercise the next time you face a challenging moment.

R - Recognize what is going on. Acknowledge your thoughts, feelings, and behaviors. Step outside of yourself and recognize any signs of a harsh inner voice, feeling of embarrassment and dread, or noticeable physical manifestations created by anxiety.

A - Allow life to be just as it is. Allow the experience to be there, just as it is. Do not attempt to alter or avoid it. When defaulting to self-judgment, let the negative emotions exist. It does not mean you are unworthy, it means you recognize painful feelings created by a stressful moment.

I - Investigate with interest and care. Lean into your natural curiosities to discover the truth. Ask yourself, "How is this experience manifesting in my body? What is it that I think I believe? What does this vulnerable place want from me and what does it need most?"

N - Nurture with self-compassion. Once you identify the wounded and hurting place inside you, offer a gesture of kindness that might address it. Ask yourself, "Does it need a message of reassurance? Of forgiveness? Of companionship?" Sincerely spark self-compassion and even if it feels awkward, it will start to soothe and strengthen the heart.

Stress and your Child's Brain

Research suggests that children are affected by stress in surprising ways. *Hank Pellissier (http://www.greatschools.org/gk/author/hankpellissier/) October 23, 2014*

Stress! Bad for the body! Bad for the brain! We've seen the articles, watched the 11 o'clock news reports on the "silent killer," and complained to friends and family about how stressed-out we are. While we all know the adult stress can lead to serious illnesses such as ulcers and hypertension, we don't associate these maladies with children. But research suggests that chronically stressed children do pay a heavy price. In fact they are at risk for cognitive damages because their brains are not yet fully developed. A host of statistics suggest that American children are indeed experiencing stress at new levels: suicides among adolescents have quadrupled since the 1950s; only 36 percent of 7th graders agreed with the statement "I am happy with my life;" and in the past decade, using pharmaceuticals to treat emotional disorders has shot up 68 percent for girls, 30 percent for boys. To get a sense of just what children are up against, it's useful to understand the physiological effects of stress on the brain. When a child experiences stress, the hypothalamus (above the brain stem) releases a hormone that rushes to the neighboring pituitary gland. The pituitary gland then mobilizes the production of a second hormone that swims via the bloodstream to adrenal gland above the kidneys. The adrenal glands activate adrenaline and cortisol. Adrenaline accelerates the child's heart rate and elevates the blood pressure. Cortisol pumps up the blood sugar level, elevating the child's muscle and memory power and boosting the pain threshold. So what's wrong with that, you wonder? Between increased memory power and elevated pain threshold, wouldn't this help children learn faster and better?

Far from it. Our fight-or-flight stress reaction is designed for emergency life-or-death situations. Eons ago, the physiological response to stress allowed us to escape (or battle) Paleolithic beasts enabling us to prevail against dangers that lasted about thirty seconds. Unfortunately, modern problems and challenges—perfectly exemplified by the 13 years of schooling expected of each child in our nation—aren't untangled as swiftly. They require long-term focus and fortitude—the very thing that stress can undermine. What happens when the brain is stressed—not for seconds, but year after year? Stress hormones end up swamping our bodies for days, weeks, months. Research (http://www.ncbi.nlm.nih.gov/upbmed/21430148) shows that cortisol, specifically, chews up the brain if it loiters there long-term. When lab rats in Israel, Germany, USA, China, and Italy were given daily injections of rat cortisol for several weeks, it killed bran cells in their hippocampus region, leaving them depressed, anxious, fearful, immature, needy, and unable to learn new behaviors (e.g. stuck in the same old "rat race"). Chronic stress takes it toll on the Bain in other ways as well. In *Why Zebras Don't Get Ulcers* (https://www.powells.com/book/-9780716732105), Robert M. Saplosky, a Stanford University professor of psychology enumerated the many ways that brain functions break when subjected to chronic stress: "Hippocampal neurons no longer work as well," "neural networks get disconnected," "the birth of new neurons is inhibited" and "hippocampal neurons become endangered." Translation: brains under chronic stress will have trouble learning new things and committing new material to memory. In a 2006 study, researchers (http://www/ncbi/nlm.nih.gov/pmc/articles/PMC15112384/) at Arizona State University noted that long-term stress withered the dendrites (neuron branches) in the hippocampus, and decreased dendrites length and branch numbers. Dendrites provide the avenue along which new learning takes place and hippocampus injury (central to memory functioning)leads directly to learning impairment. None of this is good for the adult brain, but children's fast developing brains with dendrites numbering in the millions are especially vulnerable to ravages of cortisol. Study after study (http://www.ncbi.nlm.nih.gov/pubmed/11876674) has found that children who (http://www.ncbi.nlm.nih.gov/pubmed/19285558) are exposed to extremely stressful situations—via violence in the home or corporal punishment—have significantly lower IQs than children not exposed to such traumas. But newer studies suggest it's not only extreme kinds of stress that can affect kid's ability to learn and think. In 2009, Virginia Polytechnic Institute and State university scientists found (http://www.ncbi.nlm.nih.gov/pubmed/19527431) that kids exposed to "household chaos" had lower IQ and more conduct problems. A joint study (http://www.ncbi.nlm.nh.gov/pubmed/21985907) between Harvard Medical School/McLean Hospital and Catholic University of Korea in 2009 found that children who experienced maternal verbal abuse had lowered verbal IQs and less white matter in their brains. (White matter affects learning by coordinating communication between different regions of the brain.) Is it enough for parents to keep the house in order, avoid spanking (and other corporal punishment), and refrain from verbal abuse? This is certainly advisable, but experts suggest that this may not be enough to protect your child from stress-related brain drain in the home. Parents' own stress levels can affect their children's cognition because tension is "contagious," explains David Code, author of *Kids Pick up on Everything: How Parental Stress is Toxic to Kids* (https://www.amazon.com/Kids-Pick-Up-Everything-Parental-ebook/dp/B005MS002Y). Cole asserts that in extreme circumstances, parental stress can weaken a child's brain development. John Medina, author of *Brain Rules: 12 Principles for Surviving and Thriving at Work, Home, and School* (http://www.powells.com/partner/31948/biblio/9780979777745?p_ti) echoes this sentiment: "The emotional stability of the home is the single greatest predictor of academic success. If you want your kid to get into Harvard, go home and love your spouse." Parents may do

their best to protect their children from stress, but sometimes life's twists and turns make stress unavoidable. Luckily, experts say they aren't calling for parents to cloister their children in a stress-free bubble. Instead, they say, it's good to expose children to the right kinds of stress and teach them ways to deal with the potentially harmful kinds. "Not all stress is bad," claims Steven Finkbeiner, professor of neurology and physiology at the University of California, San Francisco. "The act of 'learning' is a stress of sorts on the brain but this sort of mental stress can be good...(it) can lead to the production of factors that support neuronal health and synapse formation." It's also important to note these experts say, that it appears that damage to children's brains caused by stress might not be permanent. "Stress effects are not 'brain damage' but are reversible or treatable," claims Bruce McEwen neuroendocrinology researcher at The Rockefeller University. The cure? All of the experts GreatSchools.com contacted seemed to agree. "Exercise," says McEwen, pointing at studies that claim physical activity stimulates hippocampus growth, and group exercise (think team sports like soccer and games like tag) fosters neuron development. Medina concurs: "Exercise is one of the best things children can do to combat stress. It increases neurons' creation, survival, and resistance to damage and stress." Monica R Fleshner Ph.D., integrative physiologist at the University of Colorado, also agrees. Explaining, "maintaining regular physical activity is one way to help promote both stress resistance and stress resilience." It makes sense, doesn't it? Eons ago, our ancestors boldly reacted to danger using the fight-or-flight response. Afterward, they celebrate their victory with cardiovascular dancing and chest thumping. Moonlight dancing isn't required to relieve your child's stressed-out brain, but exercise, a myriad of forms, has remained the best tension relief for humanity's offspring.

Can blue light-blocking glasses improve your sleep?

By Julie Corliss, Executive Editor, *Harvard Heart Letter,* October 26, 2021

Recently, my brother mentioned he was sleeping better since he got new prescription glasses with a blue-light filter. He wears his glasses mostly for reading screens (both computer and smartphone) during the day while at work. So I was intrigued, but a little skeptical: could daytime use of blue light filtering glasses make a difference in how well he slept? How, when, and why blue light affects us seemed like good questions to pose to an expert before decoding whether those glasses could help me, too. Visible light includes a short segment of wavelengths tucked into the electromagnetic radiation spectrum.Together, the wavelengths of visible light captured by our eyes are translated into white light by our brains.You may remember looking through a prism to bend the wavelengths that make up white light into a rainbow of colors. At one end of this rainbow, blue light shades toward violet. Sunlight has a lot of light at all visible wavelengths. Measured in nanometers (nm), visible light wavelengths range from 400 to 700 nm. Blue-light wavelengths lie between about 450 and 495 nm. And different slices of blue-light wavelengths have different effects on our bodies, including on sleep and alertness. In addition to helping us see, light also has nonvisual effects on the body, says Dr. Steven Lockley, a neuroscientist at the Division of Sleep and Circadian Disorders at Harvard-affiliated Brigham and Women's Hospital. The 24 hour circadian clock in the brain regulates sleep and wake cycles, hormonal activity, eating and digesting, and other important processes within the body. "Special photoreceptors in the eye detect light to control our circadian rhythms," he says. These cells contain a nonvisual photopigment called melanopsin, which is most sensitive to 480 nm light at the blue-green end of the visible light spectrum. Other visual photoreceptors called cones allow us to see even shorter wavelengths of blue-violet light at around 450 nm. During the day blue-enriched light is desirable, because it helps synchronize our circadian clocks to a 24-hour day. So, exposure to a regular light-and-dark cycle is vital to achieve and maintain good sleep. Stimulation from certain wavelengths of blue light helps us stay alert,

whether this comes from a natural source like the sun in daytime hours, or from electronic devices that emit blue light. While the stimulation is helpful during the day, at night it can interfere with sleep. Blue-light exposure in the evening — for example, binging a TV series on your laptop right before bed — will stimulate the melanopsin-containing cells and alert the brain, making it think it is daytime. That can make it harder to fall asleep and may affect the quality of your sleep. Although a recent systematic review suggested that blue light-blocking glasses may help people with insomnia, Dr. Lockley says there's not enough detail about the studies to draw that conclusion. Most commercially available blue light-filtering glasses, and special coatings added to prescription lenses, aren't standardized. So you have no way of knowing which wavelengths are being blocked, and whether this affects only visual function, or important nonvisual functions such as alertness and the circadian clock. Also, the timing, duration, and nature of the nighttime light exposure in the summary of these studies was not clear. If you want to block stimulating blue light that could interfere with sleep, avoid screen use as much as possible after dusk — especially within two to three hours of bedtime. You can also try using computer software that reduces the amount of blue light emitted. Examples include Night Shift (available on Apple devices) or f.lux, a free download available for all computers and related devices. You should also try to address other issues that affect your sleep. To help reduce eye strain, a common concern for people who use screens often, the American Academy of Ophthalmology advises taking regular breaks using the 20-20-20 rule. Every 20 minutes, look away from your screen at an object about 20 feet away for about 20 seconds. You should also get as much daylight exposure as possible in between screen use to provide a strong circadian and alerting stimulus, particularly if you spend most of your time indoors. As for my brother, he doesn't watch much television and tends to prefer reading print books in the evenings. He agreed that he might be experiencing a placebo effect from the blue-light filter on his new glasses — or simply that he is sleeping better now that he has the correct prescription, and therefore less eye strain.

What's Hiding in the Dark Genome?

The origins of schizophrenia and bipolar disorder may lie in part, outside of what we traditionally think of as genes. Schizophrenia and Bipolar disorders are among the most heritable mental disorders. Clues to their origins may lie in what's known as the dark genome, recent research finds—a discovery that may offer new hope for treatment. The dark genome, sometimes referred to as "junk" DNA, comprises over 98 percent of the genetic sequence inside our cells, including everything other than the genes that code the roughly 20,000 known proteins. Past research, however, found that the dark genome *can* encode proteins, some of which are implicated in cancers and rare diseases. In the new study, researchers conducted a genome-wide assessment, focusing on areas of the dark genome close to regions thought to contribute to human-specific traits and that overlap with areas linked to schizophrenia and bipolar. They identified areas, not classified as genes in the traditional sense, that create proteins that appear related to the two disorders. Investigating the dark genome may one day lead to new drug targets for schizophrenia and bipolar, the authors write—perhaps changing the lives of those coping with the highly heritable, highly disruptive disorders.

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