News

Happiness & health

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The biology of emotion—and what it may teach us about helping people to live longer

Could a sunny outlook mean fewer colds and less heart disease?

Do hope and curiosity somehow protect against hypertension, diabetes, and respiratory tract infections?

Do happier people live longer—and, if so, why?

These are the kinds of questions that researchers are asking as they explore a new—and sometimes controversial—avenue of public health: documenting and understanding the link between positive emotions and good health.

A vast scientific literature has detailed how negative emotions harm the body. Serious, sustained stress or fear can alter biological systems in a way that, over time, adds up to "wear and tear" and, eventually, illnesses such as heart disease, stroke, and diabetes. Chronic anger and anxiety can disrupt cardiac function by changing the heart's electrical stability, hastening atherosclerosis, and increasing systemic inflammation.

Jack P. Shonkoff, Julius B. Richmond FAMRI Professor of Child Health and Development at HSPH and at the Harvard Graduate School of Education, and Professor of Pediatrics at Harvard Medical School, explains that early childhood "toxic stress"—the sustained activation of the body's stress response system resulting from such early life experiences as chronic neglect, exposure to violence, or living alone with a parent suffering severe mental illness—has harmful effects on the brain and other organ systems. Among these effects is a hair-trigger physiological response to stress, which can lead to a faster heart rate, higher blood pressure, and a jump in stress hormones.

Focusing on the positive

"But negative emotions are only one-half of the equation," says Laura Kubzansky, HSPH associate professor of society, human development, and health. "It looks like there is a benefit of positive mental health that goes beyond the fact that you're not depressed. What that is is still a mystery. But when we understand the set of processes involved, we will have much more insight into how health works."

Kubzansky is at the forefront of such research. In a 2007 study that followed more than 6,000 men and women aged 25 to 74 for 20 years, for example, she found that emotional vitality—a sense of enthusiasm, of hopefulness, of engagement in life, and the ability to face life's stresses with emotional balance—appears to reduce the risk of coronary heart disease. The protective effect was distinct and measurable, even when taking into account such wholesome behaviors as not smoking and regular exercise.

Keys to a happier, healthier life

Research suggests that certain personal attributes—whether inborn or shaped by positive life circumstances—help some people avoid or healthfully manage diseases such as heart attacks, strokes, diabetes, and depression. These include:

- Emotional vitality: a sense of enthusiasm, hopefulness, engagement
- Optimism: the perspective that good things will happen, and that one's actions account for the good things that occur in life
- Supportive networks of family and friends
- Being good at "self-regulation," i.e. bouncing back from stressful challenges and knowing that things will eventually look up again; choosing healthy behaviors such as physical activity and eating well; and avoiding risky behaviors such as unsafe sex, drinking alcohol to excess, and regular overeating

Among dozens of published papers, Kubzansky has shown that children who are able to stay focused on a task and have a more positive outlook at age 7 report better general health and fewer illnesses 30 years later. She has found that optimism cuts the risk of coronary heart disease by half.

Kubzansky's methods illustrate the creativity needed to do research at the novel intersection of experimental psychology and public health. In the emotional vitality study, for example, she used information that had originally been collected in the massive National Health and Nutrition Examination Survey, or NHANES, an ongoing program that assesses the health and nutritional status of adults and children in the United States. Starting with the NHANES measure known as the "General Well-Being Schedule," Kubzansky crafted an adaptation that instead reflected emotional vitality, and then scientifically validated her new measure. Her research has also drawn on preexisting data from the Veterans Administration Normative Aging Study, the National Collaborative Perinatal Project, and other decades-long prospective studies.

In essence, Kubzansky is leveraging gold-standard epidemiological methods to ask new public health questions. "I'm being opportunistic," she says. "I don't want to wait 30 years for an answer."

Laura Kubzansky doesn't want her research on positive emotions to be used to blame people for getting sick.

State of mind=state of body

Some public health professionals contend that the apparent beneficial effects of positive emotions do not stem from anything intrinsically protective in upbeat mind states, but rather from the fact that positive emotions mark the absence of negative moods and self-destructive habits. Kubzansky and others disagree. They believe that there is more to the phenomenon—and that scientists are only beginning to glean the possible biological, behavioral, and cognitive mechanisms.

Previous work supports this contention. In 1979, Lisa Berkman, director of the Harvard Center for Population and Development Studies, co-authored a seminal study of nearly 7,000 adults in Alameda County, California. Participants who reported fewer social ties at the beginning of the survey were more than twice as likely to die over the nine-year follow-up period, an effect unrelated to behaviors such as smoking, drinking, and physical activity. Social ties included marriage, contact with friends and relatives, organizational and church membership.

A happiness policy?

If scientists proved unequivocally that positive moods improve health, would policymakers act? Some observe that, in the U.S., we define "happiness" in economic terms—the pursuit of material goods. They contend that even an avalanche of research showing that emotional well-being protected health would have no traction in the policy world. Many Americans believe, after all, that people are responsible for their own lives.

But others see direct policy implications. "In public health, it's important to understand how we can translate guidelines into behavior," notes Eric Rimm, HSPH associate professor in the Departments of Epidemiology and Nutrition and director of the program in cardiovascular epidemiology. "Seventy to 80 percent of heart attacks in this country occur not because of genetics nor through some mysterious causative factors. It's through lifestyle choices people make: diet, smoking, exercise. Why are people choosing to do these things? Does mood come into play?"

The toll of toxic stress goes far beyond poorer health for individuals—population-wide, the cost of chronic diseases related to these conditions is enormous. "Imagine if we could enact a policy that would reduce heart disease by just 1 percent," suggests Shonkoff. "How many billions of dollars and how many lives would that save? Now what if we could also reduce diabetes—which is growing in epidemic proportions—and even stroke?" The point, Shonkoff says, is that society pays a considerable cost for treating chronic diseases in adulthood, and reducing toxic stress early in life may actually get out in front of these diseases to prevent them.

A stress test of a different sort

In Laura Kubzansky's Society and Health Psychophysiology Lab—modest and neutral as the blandest therapy office—volunteers responding to a Craigslist ad for a research study are in for a surprise. First, they are rigged up to a tangle of electrodes, which continuously monitor heart rate, cardiac output, and other measures. A cuff measures blood pressure. Test tube spittoons collect saliva to be tested for stress-related hormones such as cortisol and DHEA.

Then comes the fun. The volunteers must give a five-minute improvised speech on a knotty topic, such as the gasoline tax or welfare reform. Next, they are asked to perform a complicated math exercise, such as counting backward from 2,027 by 13—swiftly, and with a loud buzzer signaling a faulty calculation, after which they must start over. Two lab assistants occasionally toss off challenging remarks. And the nerve-wracking performance is videotaped.

The experiment gauges the potentially beneficial effects on heart health of oxytocin, a natural hormone that acts as a neurotransmitter and is thought to be both a cause and effect of positive social relationships. Kubzansky manipulates three variables: oxytocin levels, stress, and social support. She administers oxytocin—a prescription drug that cannot be purchased in a conventional drug store—through a nasal spray. She induces stress by asking the volunteers to publicly perform. And she creates social support by having some participants bring an encouraging friend with them, while others are instructed to show up alone.

The experiment is designed to answer several questions: How do the stress-reduction benefits of oxytocin compare to those of social support? Does oxytocin offer the same protective effects in women as in men? Most important, does oxytocin tamp down the damage from toxic stress hormones that course through the body under duress, causing corrosive effects over time?

Kubzansky concedes that psychological states such as anxiety or depression—or happiness and optimism—are forged by both nature and nurture. "They are 40–50 percent heritable, which means you may be born with the genetic predisposition. But this also suggests there is a lot of room to maneuver." Her "dream prevention": instill emotional and social competence in children—with the help of parents, teachers, pediatricians, sports coaches, school counselors, mental health professionals, and policy makers—that would help confer not only good mental health but also physical resilience for a lifetime.

Even in adulthood, it's not too late to cultivate these qualities, she says. While psychotherapy or meditation may work for one person, someone else may prefer faith-based activities, sports, or simply spending time with friends. "My guess is that many of the people who are chronically distressed never figured out how to come back from a bad experience, focus on something different, or change their perspective."

Mapping happiness

Drawing on recently compiled data from a nationally representative study of older adults, Kubzansky is beginning to map what she calls "the social distribution of well-being." She is working with information collected on participants' sense of meaning and purpose, life satisfaction, and positive mood. By tracking how these measures and health fall out across traditional demographic categories such as race and ethnicity, education, income, gender, and other categories, she hopes to understand in a fine-grained way what it is about certain social environments that confers better frame of mind and better physical health.

The last thing she wants, Kubzansky says, is for her research to be used to blame people for not simply being happier—and therefore healthier. Referring to one of her first major studies, which found a link between worry and heart disease, she said: "My biggest fear was that journalists would pick it up and the headlines would be, 'Don't worry, be happy.' That's useless. Not everyone lives in an environment where you can turn off worry. When you take this research out of the social context, it has the potential to be a slippery slope for victim blaming."

Being in the moment

Kubzansky, who is married and has two young children, says her work has made her think a lot more about finding balance in her own life. To that end, she says, she recently signed up for a yoga class. She also plays classical piano—both chamber music with friends and solo hours at the keyboard for her own enjoyment.

"When I'm playing piano," she explains, "I'm in the moment. I'm not worrying or thinking or trying to work out a problem. I'm just doing this thing that takes all my attention."

That insight is also at the center of her research. "Everyone needs to find a way to be in the moment," she says, "to find a restorative state that allows them to put down their burdens."

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