

# A LINE ON LIFE

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## Having a Hardy Heart <sup>1</sup>

David A. Gershaw, Ph.D.

A patient — covered with 21 electrode patches — is hooked up to a \$40,000 readout machine. Six researchers monitor his reactions, as he is asked to count backward by sevens from a four-digit number. As he responds, he is pushed to go faster without making any errors. As the researchers keep yelling, "*Faster, faster,*" the patient becomes more agitated and angry.

The experiment is part of **behavioral cardiology**. Psychologists are working with cardiologists to find the effects of mental stress on people with coronary artery disease. One of these researchers, psychologist David Krantz, cites the purpose of the research.

"We're not studying how long-term stress affects the development of heart disease. We are interested in what triggers heart attacks or sudden death in people who have heart disease."

The patient is the 10th enrolled in a large study of men and women to assess their risk for sudden death. They are cardiac patients who needed to have **internal cardiac defibrillators (ICDs)** installed in their chests. If heart rates get too high or too irregular (arrhythmia), the ICDs regulate the heart.



The researchers are not trying to cause a heart attack in the laboratory. They only want to cause ischemia. Ischemia (pronounced "*ish-KEY-me-ah*") is a painless and harmless condition that occurs when the heart is not getting enough blood. However, people with ischemia are at greater risk for later heart problems.

With similar research, psychologist James Blumenthal (Duke University) found that both exercise and mental stress cause ischemia. Exercise can protect people from heart problems. However, if people with heart disease are not accustomed to exercise, it can be dangerous. Heart patients need to build their stamina *slowly*. As their stamina increases, their risk of ischemia decreases.

Standard **electrocardiograms (EKGs)** easily measure exercise-induced ischemia, but research indicates that they may miss mental stress-related ischemia. **Nuclear imaging** can be used by injecting patients with a radioactive marker. **Angiography** can also be used. With a dye inserted into the arteries, they can be viewed with a type of X-ray photography.

Angiograms have allowed researchers to examine physiological differences between the effects of exercise ischemia and the effects of ischemia from mental stress. Mental stress triggers ischemia at lower heart rates than exercise. In other words, ischemia from mental stress is triggered when the heart is demanding less blood. Suppose you have a fight with your spouse. Blood flow would become inadequate more quickly than if you were exercising.

Using angiography, Krantz and his associates found that mental stress causes restriction of coronary arteries at the points where there is coronary artery disease. This means that — not only does mental stress demand more blood flow — it simultaneously decreases blood flow to the heart.

These studies would have been impossible without the recent development of more accurate measurement procedures and the interdisciplinary cooperation between cardiologists and psychologists. Psychologists can't interpret heart measurements without the help of cardiologists. Likewise, cardiologists benefit from the behavioral expertise of the psychologists.

To produce mental stress, Krantz' team uses a battery of methods. One is the arithmetic task described above. Another is an anger-recall task. Patients are asked to describe aloud a personal event that made them angry.

Depending on the task, people respond differently. Patient 10 barely responded when he recalled a recent fight with his wife. However, he became extremely agitated with the mental arithmetic test. After the tests, patients are debriefed. Researchers explain that they were purposely trying to induce anger and allow the patients time to calm themselves. When patient 10 was done, he was smiling and joking.

Several research teams have found that about half of cardiac patients show indications of mental-stress ischemia. These patients are at greater risk for problems like heart attack and angina, which could lead to death. Mental stress in daily life can cause these problems as easily as excessive exercise. With reduced exercise levels found among those with coronary-artery disease, mental stress may be a more powerful source of cardiac problems.

In another study, Blumenthal developed a mental stress-reduction program.<sup>2</sup> It was more effective in preventing cardiac relapse in patients than a program to build up patients' physical fitness. The stress-reduction intervention significantly reduced the risk of heart attacks and other cardiac problems for up to five years. The exercise intervention program did not show any significant effect.

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**Rather than raging about something you cannot change,  
concentrate your efforts where you can be effective.**

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Even without Blumenthal's program, you can reduce your chances of heart problems due to mental stress. You can choose to accept many of life's frustrations rather than fuming about them. If you can take any immediate action to effectively deal with the frustration, do it! However, if nothing can be done, don't sit and rage about it. Focus on other problems that you can control and deal with them. You will feel more in control of your life — and happier. By reducing your mental stress this way, it can also help you to live a longer life.

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1 Adapted from Beth Azar's "Probing factors behind heart attacks," [\*The APA Monitor\*](#), May, 1998, pages 14-15.

2 *Archives of Internal Medicine*, Vol. 157, pages 2213-2223.