



---

## Optimism, pessimism, and coronary plaque

---

 [Print Report](#)

 [Go to Library](#)

What role do emotions play in heart disease? Will they impact on your success or failure in controlling coronary plaque and reducing your heart scan score? Or is it all just fluff, the preaching of psychologists caught up in the mumbo-jumbo of feelings and emotions?

*"Twixt the optimist and pessimist  
The difference is droll:  
The optimist sees the doughnut  
But the pessimist sees the hole."*

- M. Wilson, 1915

All of us, even the most seemingly silent, conduct an active internal dialogue. It's the conversation we have with ourselves during all of our waking lives. We internally comment on events around us, our perceptions of people, on whether they like us or not, our fears, feelings, etc.

What sort of internal dialogue are you conducting? Does it sound like:

*Why is he/she always so late?  
Why do people always get in my way?  
I never have any luck.  
I feel helpless. I don't know what to do.*

Or, does it sound more like:

*He/she must have gotten tied up in something.  
I'll have to find a way around this problem.  
It didn't work out this time, but there's always a next time!  
I'm going to learn how to do better.*

Negative emotions come in a wide variety of shades and colors. Sometimes, negative emotions serve a useful purpose. Fear or worry, for instance, may be justified at times, like when your 17-year old daughter comes home an hour late smelling like alcohol. Some degree of negative emotions are an inevitable part of everyone's life, no matter how happy, wealthy, or well-adjusted. Negative emotions are programmed into us as part of a survival mechanism. If physical danger to you is imminent, fear or anxiety is justified.

Then how do we identify the emotions that magnify risk for heart disease? Once we do, are they modifiable? Or, are you doomed to a life of worry, anxiety, anger, and an escalating heart scan score that ends up in heart attack?

Negative emotions have, in numerous studies, indeed been tied to a greater likelihood of heart disease and heart attack. Emotions that have been shown to be related to heart disease risk include:

- Stress—especially stress involving loss or lack of control, lack of choice, and helplessness (Rosengren N et al 2004).
- Grief—e.g., over loss of a loved one.
- Depression—feeling sad or blue for 2 weeks or more. Depressed persons are also more likely to indulge in unhealthy lifestyles such as overeating, inactivity, and smoking. Depressed people are three times more likely to have high heart scan scores (Agatista PK et al 2005). Depression has been very strongly tied to heart disease with 16 trials consistently showing an association (Rugulies R 2002).

- Anger and hostility—Increases likelihood of an increased heart scan score as much as ten-fold. These traits are also associated with a low HDL, high blood pressure, and tendency to be overweight (Ibarran C et al 2000).
- Isolation—Lack of family and/or social networks double the likelihood of a high heart scan score (Kop WJ et al 2005).

The INTERHEART Study is a very large experience involving over 24,000 participants in 52 countries. In this trial, stress proved a stronger risk factor than diabetes, obesity, unhealthy diet, and sedentary lifestyle, with only lipids (LDL cholesterol, HDL, triglycerides) and smoking proving greater risks (Rosengren N et al 2004).

Overwhelming stress, such as that occurring during natural disasters, war, death of someone close, poses a surge of heightened risk for heart attack and death. In the first 30 days following the terrorist attack on the twin towers in New York City on September 11, 2001, people with implanted defibrillators experienced a 2.3-fold greater rate of device firing for treatment of lethal rhythms (Steinberg JS et al 2004). Incontrovertible proof of the extraordinary capacity of stress to affect the heart came from an enlightening, though frightening, study by Johns Hopkins that examined people after profound emotional stress and demonstrated a 2–4 fold surge in stress hormones (epinephrine, norepinephrine, and dopamine), resulting in 50–60% reduction in heart muscle strength, similar to the damaging effects of a large heart attack (Wittstein IS et al 2005). This may be part of the explanation behind the much heightened death rate among people experiencing profound emotional tragedies.

Interestingly, not all studies have shown that negative emotions increase heart scan scores. Some investigators have speculated that anger, depression, and hostility promote heart disease more powerfully in its later phases, e.g., heart attack and advanced disease characterized more by plaque “rupture” rather than plaque growth (Diez Roux AV et al 2006; O’Malley PG et al 2000). Negative emotions have also been strongly linked to increased inflammation and blood clotting, two factors that play an important role in triggering heart attack.

We’ve all heard the discussion about type A vs. type B personalities and risk for heart disease. Type A people are impatient, get-out-of-my-way, critical, angry people, intolerant to annoyances and imperfections. Impatient, anxious and hostile, the Type A individual has for years been considered a walking time bomb, a heart attack waiting to happen and sure to keel over years before the calmer, happier Type B. In some situations, however, many aspects of the Type A personality may be an advantage, say, on Wall Street, or in the military. Studies have suggested that the time urgency and impatience are, in fact, not associated with increased risk for heart disease, though the probability of blood pressure is increased.

Conventional wisdom holds that venting emotions by expressing anger, frustration, etc. is good for you. However, venting does not lead to reduced risk for heart disease. Perhaps it provides momentary satisfaction or resolution, but increased risk for heart disease by act of expressing anger and hostility has been documented (Das S, O’Keefe JH 2006).

Working long hours and falling short on sleep increases heart attack risk. A Japanese study revealed that men working 61 hours or more per week or sleeping less than 5 hours two nights per week had double the heart attack risk of men working 40 hours (Liu Y, Tanaka H 2002). Likewise, according to a large U.S. study, taking regular vacations reduces risk by nearly a third (Gump BB, Matthews KA 2000).

Most experts would therefore agree that the evidence solidly indicates that negative emotions, particularly anger, hostility, stress, isolation, and depression, substantially contribute to the development of heart disease. However, it is not entirely clear what role emotions play along the entire spectrum of heart disease development, whether it is a greater factor in later phases, or is a factor along the entire course. It is, nonetheless, a factor at times along the course of disease development.

## Optimism vs. Pessimism

Psychologist Dr. Martin Seligman of the University of Pennsylvania pioneered the concept of optimism vs. pessimism as the defining emotional states that account for dramatic differences in life, success, and health.

Dr. Seligman observes that:

*“Optimists recover from their momentary helplessness immediately. Very soon after failing, they pick themselves up, shrug, and start trying again. For them, defeat is a challenge, a mere setback on the road to inevitable victory. They see defeat as temporary and specific, not pervasive. Pessimists wallow in defeat, which they see as permanent and pervasive. They become depressed and stay helpless for very long periods. A setback is a defeat. And a defeat in one battle is the loss of the war. They don’t begin to try again for weeks or months, and if they try, the slightest new setback throws them back into a helpless state.”*

Indeed, several studies have confirmed that pessimistic people are more angry, hostile, and prone to depression, and they tend to blame themselves for problems. Pessimistic people are also given to fatalism (everything seems like it’s the end of the world) and catastrophic thinking. Optimists, in contrast, were physically healthier and experienced half the deaths of pessimists over a period of 30 years (Das S, O’Keefe JM 2006). We could, for the sake of discussion, encapsulate the spectrum of negative emotions that heighten risk of heart disease as “pessimism”, its opposite as “optimism”.

Pessimists blame themselves when bad things happen. They see good events as transitory and negative ones as long-lasting. Because they expect bad things to happen, they feel hopeless about changing the future. Optimists are much more

likely to explain bad events as due to some temporary external cause and tend to have a generally positive view of life and their ability to affect their futures.

In several large, long-term clinical experiments, Seligman discovered that optimists tend to be more successful than pessimists. Optimistic politicians win more elections, optimistic students do better in school, optimistic salespeople make more money.

If your internal dialog is pessimistic, Dr. Seligman would predict that:

First...you are likely to get depressed easily. Second, you are probably achieving less at work than your talents warrant. Third, your physical health...is probably not what it should be, and this may get even worse as you get older. Finally life is not as pleasurable as it should be. Pessimistic explanatory style is a misery.

From a heart disease standpoint, optimism reduces risk of recurrent heart attack after a first heart attack and accelerates recovery after bypass surgery (Das S, O'Keefe JH 2006). A particularly interesting study in nearly 1000 people from the Netherlands showed that optimistic people (as measured by the Dutch Scale of Subjective Well-being for Older Persons testing) had less than 25% of the risk for heart attack as pessimistic people (Giltay EJ et al 2004).

In the 10-year, 1300 participant Normative Aging Study, people who tested high on the scale of optimism experienced less than half the heart attack risk of those scoring high on pessimism (Kubzansky LD et al 2001).

Why do negative emotions impact health? A spectrum of phenomena accompany negative emotions, including:

- Increased blood clotting via platelets and higher fibrinogen levels
- Higher blood pressure
- Increased measures of inflammation such as C-reactive protein and IL-6.
- Endothelial dysfunction (abnormal arterial constriction)
- Abnormal autonomic nervous system function (excessive "fight or flight" response, insufficient parasympathetic, or relaxation, response)
- Increased blood levels of stress hormones, especially cortisol and epinephrine (adrenaline).
- Obesity (Diez Roux AV et al 2006; Steptoe A et al 2005)

*"Moment to moment, as we focus on what can't be done or what horrible things are bound to happen, our autonomic nervous system, hormone levels and neurotransmitter systems are affected. It is sort of like a thought-emotion soup bath. The fundamental lack of personal empowerment that pessimists experience is toxic to your system."*

Dr. Eve Wood  
Author, 10 Steps to Take Charge of Your Emotional Life

**Dr. Georgianna Donadio**, founder and director of The New England School of Whole Health Education in Boston, defines pessimism as a "chronic cynicism and defeatism experienced by an individual that leads to feeling he/she has no control over the events or circumstances of their life, and view this loss of control with frustration, fear, anger, resentment or hostility. This individual sees circumstances as working against him/her and complains of life being unfair and that his/her attempts to make it better are futile."

Dr. Donadio adds that "a pessimistic person perceives life differently and therefore has higher levels of prolonged stress than the optimistic person who is flexible, adaptive, "goes with the flow", does not "resist" life's events but rather creatively navigates them."

She also agrees that, contrary to the conventional wisdom that holding emotions in is bad and letting them out is good, expressing emotions is not the crucial factor for health, but resolving the conflict that triggered the negative emotion in the first place is the crucial factor. A pessimistic person, for instance, who just grouses and complains but doesn't do anything to resolve the negative situation is no better off than the person who holds emotions inside.

Dr. Donadio believes that the main source of pessimism is feeling out of control of your life and circumstances, feeling as if nothing you do will make your life better: "I never win", "He thinks he's always right", "No matter what I do, it never works out." She also points out that sometimes pessimism rewards itself by providing "drama" in life. Breaking this pessimistic pattern can be especially difficult if they obtain some gain (e.g., attention) from the drama of their pessimism.

Dr. Donadio also highlights the fact that perfectionism can also create impossible expectations that encourage pessimistic dialogue. If you always expect people to be courteous to you, or always perform to your expectations, or not engage in behaviors that annoy you, you're setting yourself up for negative emotions.

Why would this be so? Because optimism and pessimism both tend to be self-fulfilling prophecies. If you think a setback is permanent, why would you try to change it? Pessimistic explanations tend to make you feel defeated — making you less likely to take constructive action. Optimistic explanations, on the other hand, make you more likely to act. If you think the setback is only temporary, you're apt to try to do something about it, and because you take action, you make it temporary. It

becomes a self-fulfilling prophecy.

Dr. Seligman points out that pessimistic people do have one advantage: They see reality more accurately. Pessimism is an advantage if you're attempting something risky or dangerous. Air traffic controllers and judges, for instance, require vigilance and a questioning, skeptical eye; blind optimism would not serve them well in these specific situations.

Among Dr. Seligman's groundbreaking research findings is that a pessimistic internal dialogue dramatically increases the likelihood of depression. You might even regard depression as simply a more persistent, deeper, more physically affecting form of pessimism.

## Are you a pessimist?

Dr. Eve Wood, author of the new book, *10 Steps to Take Charge of Your Emotional Life*, identifies six sources of "imprisoning thoughts" that lead to negative or destructive thinking:

- 1) Fear—of failure, confrontation, abandonment, of losing money, etc.
- 2) Self-devaluation—such as saying to yourself "I'm a failure and a jerk", or "I'm not as smart as Sally, or as funny as Jon".
- 3) Guilt—Dr. Wood describes guilt like this: "We feel this emotion when we neglect to say or do something that we believe should do, or when we do or say something that we think we shouldn't. Whenever the word should comes into your mind, you're holding yourself to someone else's standard. 'I should have stayed in that marriage', or 'I shouldn't have said or done what I did.'"
- 4) Pessimistic thinking—Seeing the bad in everything. Studies time and again have shown that people who expect to fail, or stumble at some effort, or irritate other people, etc. will, in fact, live up to their expectations. It is self-fulfilling. Dr. Wood elaborates: "We're imperfect beings who live in a flawed world. Perfection can't be the goal. Every single moment is full of opportunities and problems, blessings and curses. You can choose to focus on the negative and feel bad or on the positive and feel good."
- 5) Overgeneralization—"When we use words such as always and never, we're falling into this trap. Telling ourselves 'I'll never get promoted, I'll always be abandoned, or No one could possibly love me is a recipe for staying stuck in this trap. 'I can't change my life', 'You never listen to me', or 'Everyone is out to get me' also keeps us stuck. When we make global statements, we leave no space for growth, options, or creativity."
- 6) Catastrophizing—Here is where fear and pessimism come together: Your spouse is late, so we say, 'He must be dead'. When a friend needs to talk, we decide, 'She's ending the relationship.'

Dr. Seligman believes that the key is hope vs. hopelessness. People who have learned to be hopeless tend to explain life's events with a pessimistic style. Reactions to events will be:

- Personal—"It's my fault!"
- Permanent—"It will always be like this."
- Pervasive—"Everything in my life will be ruined."

Someone who gets turned down for a raise at work will say "They're always out to get me." Or, an investment turns sour: "That was a stupid move. I'm always picking losers." A pessimistic person becomes ill and says, "If I would take better care of myself I wouldn't always be sick." Outcomes are taken as a personal affront, are permanent and ruin all aspects of life. These responses are automatic. Sometimes the person uttering them may be unaware of this internal dialogue.

People with a pessimistic style of thinking feel helpless, have low self esteem, and are highly susceptible to depression. Dr. Seligman believes that "pessimism is a risk factor for depression in just the same sense as smoking is a risk factor for lung cancer or being a hostile, hard driving man is a risk factor for heart attack." Dr. Seligman validated this theory with numerous studies, earning him worldwide recognition for this insight into a fundamental cause for depression.

Clearly, these explanations for events are irrational. When we hear them in the light of day, uncharged by the emotions of the moment, they seem silly. But many people habitually think this way. It yields a sense of hopelessness, that you are unable to positively affect life in any way. This triggers unhealthy behaviors, like making poor food choices, overeating, smoking, lack of exercise, and excessive drinking, since you feel you can't change your future anyway. This triggers the adverse physical effects of pessimism such as increased blood coagulation, higher blood pressure, overweight, and, ultimately, heart disease.

If pessimism goes on for a long period, it can cause an avalanche of hopeless thoughts with any stressful event. This can degenerate into the most extreme form of pessimism: depression. This is when professional help, perhaps even prescription antidepressant medication, may be helpful.

But let's say that you or a loved one is simply suffering from just plain old pessimism, the flow of habitual negative thoughts that hasn't yet triggered depression but still can yield potent adverse effects on health. Is there anything you can do about it, any action you can take?

## Can a pessimist become an optimist?

*"Changing the destructive things you say to yourself when you experience the setbacks that life deals all of us is the central skill of optimism."*

Dr. Martin Seligman

From the Track Your Plaque viewpoint, we have observed that optimistic people are far more likely to achieve reversal of coronary plaque—i.e., drop in heart scan score—than pessimistic people. Our observation is that, almost without exception, participants who are hopeful, happy, see the bright side, and overcome difficulties easily are the most likely to drop their score. The angry, hostile, pessimistic, always-in-a-hurry, devastated by any setback sorts of personalities do not—also nearly without exception—achieve reduction of score.

Let's make this simple and straightforward: if you harbor a chronically pessimistic attitude, it's highly unlikely that you will reduce your heart scan score. It's that plain and simple.

*"The more we are able to shift our focus to love, gratitude, and possibility, the better we feel and the less vulnerable we seem to be to many life and health challenges."*

Dr. Eve Wood

Shaking the pessimism in your internal dialogue not only improves health, but can also yield greater enjoyment from life and improve your relationships.

Unfortunately, there's not always an easy solution for pessimism. We won't pretend to have some pop psychological key that cures everyone of deep-seated personality traits. We can't relieve someone of deeply-ingrained behaviors driven by past dysfunctional relationship with parents, an abusive relationship with a spouse, scars from an emotionally traumatic event just by throwing some light on optimism vs. pessimism. This may be much better suited to counseling from a qualified therapist.

Nonetheless, we hope to alert members to the issue of pessimism and related emotions as drivers of coronary plaque growth and heart disease risk. Just being aware that this may be a source of risk for heart disease provides some people with the motivation to finally do something about it. Perhaps your wife's been telling you for years that you should do something about your anger and pessimism. Recognizing that behaviors have real consequences for your heart and how much time you have on earth may prompt you to take constructive action.

Perhaps your pessimism is not so deeply ingrained, perhaps acquired over the years, and you are otherwise a reasonably well-adjusted person. In this situation, there are, indeed, some solutions to consider that you can use without the help of a therapist.

Dr. Seligman originated the very common sense technique of disputation. Disputation is simply posing a counter-argument to a pessimistic thought. If someone cuts you off in traffic and it immediately triggers anger, find a reason to dispute it: "He was probably distracted, or in a hurry. Maybe his wife's ill and he's in a hurry to get to the hospital. Or maybe his teenage daughter is giving the family a hard time and he's got his mind on other things." Or, say you try to lose weight and you exercise and follow a healthy diet. But the scale shows only a 2 lb. weight loss over two weeks. You're discouraged and feel like giving up. Instead, dispute it: "I'm proud of myself for sticking it out for two weeks. I've had plateaus before and maybe this is just a tough one. I've got to keep on trying. After all, I've already started to get some compliments even with this modest weight loss." The more consistently you use this technique, the more effective it becomes and the more positive control you will exert over life and health.

Dr. Seligman's simple technique effectively de-fuses anger, frustration, and the cascade of physical effects triggered by pessimistic thoughts. In time, if performed habitually, disputation becomes the rule in your thoughts, and you may find yourself recognizing the positive side in most situations.

Let's try a few more:

### **A co-worker underperforms at work, making your job much more difficult.**

**Pessimistic:** "He/she is always screwing up. They're useless. It's making my life miserable. I can barely stand it."

**Optimistic:** "I wonder if something's really wrong at home. I'm going to talk to him/her and see if there's something I can do to help fix the problem."

### **You're in the hospital and you get few visitors.**

**Pessimistic:** "No one gives a damn." Or, "I'm worthless. No one even cares if I'm sick."

**Optimistic:** “I guess I really have been too deeply involved in my work. I think this is a sign that I need to get out of my little world.” Or, “Maybe my husband/wife didn’t want to bother me while I was sick. Maybe I’ll call some people myself.”

**Your boss is rude to you.**

**Pessimistic:** “I can’t stand that guy. He’s always had it out for me.” Or, “Screw him. See if I try my best anymore. That’ll teach him.”

**Optimistic:** “I bet he’s under pressure himself from above. I’ll give him a while to cool off then see if I can help out in some way.” Or, “I’d heard he’s been having some financial problems. I’ll do my job the best I can and hope he gets back on his feet soon.”

Life inflicts the same setbacks and tragedies on the optimist as on the pessimist, but the optimist weathers them better.

Dr. Martin Seligman

The New England School of Whole Health Education’s Dr. Donadio has some useful street-level advice for removing negative emotion-generating factors from your life:

- Don’t watch the news before bed. Perhaps the evening news should be called “Bad news”. We all know bad things happen around us. Watching the last murder, multiple car accident, or natural disaster just before bedtime is just indulging your morbid curiosity, “rubbernecking,” and is not going to encourage an optimistic outlook.
- Be aware of the media exposure that you allow in your home.
- Remove yourself from toxic relationships with friends, acquaintances, etc. As humans, we tend to acquire the thoughts and attitudes of people we spend a lot of time with. A critical, pessimistic friend who habitually expresses suspicions about others will infect your thoughts, as well. An optimistic friend will confer some of his/her optimism on you.
- Remove yourself from toxic work environments. For many people, work fills half or more of your waking life. If work provokes excessive anxiety, worry, anger, hostility, hate, then it may be time for a change.

Dr. Donadio advises finding activities, friends, and events that bring joy, commonality and a sense of belonging, and to find reasons for gratitude every day—“count your blessings”.

There are also strategies that heighten your sense of optimism but don’t require a conscious effort to change thought patterns. Contributing in some way to a charitable institution or helping other people can be an especially effective method to change thought habits. This is particularly true if the charitable activity actually requires your involvement, e.g., volunteering at your church or place of worship, donating a few hours a week to help feed the poor, tutoring inner city schoolchildren, fundraising for a chosen charity. People gain a sense of contribution, being needed, and of making a difference. Feelings of optimism and dissolution of pessimistic thoughts can be powerful. This route, in fact, is one of Dr. Seligman’s favorite methods of “therapy” for the pessimist.

Other optimistic behaviors include having a pet, especially a dog, an animal that receives and returns affection; gardening, since it involves caring for something outside yourself and anticipation of the future; and prayer and regular attendance at a place of worship.

### **“Don’t worry, be happy”**

Those simple pop music words from the 1989 Bobby McFerrin song hold great wisdom for those of us trying to gain control over coronary plaque, reduce our heart scan scores, and do away with heart disease risk.

If pessimism has run rampant in your internal dialogue, threatened relationships, compromised success in work, family, and life, then professional help may be necessary for you to regain control over this habitual behavior.

But if pessimism has not yet been allowed to jeopardize your life but still dominates your thoughts, then it’s worth giving serious consideration to pursuing some of the advice above. Not only will adopting a more optimistic internal dialogue make you a happier, more successful person, it may also extend your life without heart disease by many years.

This Track Your Plaque Special Report was prepared with the kind and generous assistance of:

#### **Eve Wood, MD**

Dr. Eve Wood is a psychiatrist and Clinical Associate Professor of Medicine in the Integrative Medicine program at the University of Arizona and author of the recently released book, 10 Steps to Take Charge of Your Emotional Life and There’s Always Help; There’s Always Hope

[www.DrEveWood.com](http://www.DrEveWood.com)

**Georgianna Donadio MSc, DC, PhD**

Dr. Donadio is founder and director of [The National Institute of Whole Health](#) in Boston, Massachusetts, and is well known for her work as an integrated health expert, medical educator, author and health care provider. In addition to raising three children, teaching and practicing Integrative Health Care for over 30 years, she is the host of a nationally syndicated, weekly cable TV program, [Woman to Woman®](#), and the acclaimed web radio program, [Celebrating Whole Health!™](#).  
[niwh.org](#)

Also, for further reading:

**Martin Seligman, PhD**

[Learned Optimism: How to Change Your Mind and Your Life](#)

**References:**

- Agatista PK, Matthews KA, Bromberger JT, Edmundowicz D, Chang YF, Sutton-Tyrrell K. coronary and aortic calcification in women with a history of major depression. *Arch Intern med* 2005 Jun 13;165(11):1229–1236.
- Das S, O'Keefe JH. Behavioral cardiology: recognizing and addressing the profound impact of psychosocial stress on cardiovascular health. *Curr Atheroscler Rep* 2006;8:111–118.
- Diez Roux AV, Ranjit N, Powell L, Jackson S, Lewis TT, Shea S, Wu C. Psychosocial factors and coronary calcium in adults without clinical cardiovascular disease. *Ann Intern Med* 2006;144:822–831.
- Giltay EJ, Geleijnse JM, Zitman FG, Hoekstra T, Schouten EG. Dispositional optimism and all-cause and cardiovascular mortality in a prospective cohort of elderly Dutch men and women. *Arch Gen Psychiatry* 2004;61:1126–1135.
- Gump BB, Matthews KA. Are vacations good for your health? The 9-year mortality experience after the multiple risk factor intervention trial. *Psychosom Med* 2000;62:608–612.
- Ibarran C, Sidney S, Bild DE, Liu K, Markovitz JH, Roseman JM, Matthews K. Association of hostility with coronary artery calcification in young adults: the CARDIA Study. *JAMA* 2000;283:2546–2551.
- Kop WJ, Berman DS, Gransar H et al. Social network and coronary artery calcification in asymptomatic individuals. *Psychosom Med* 2005 May-Jun;67(3):343–352.
- Kubzansky LD, Sparrow D, Vokonas P, Kawachi I. Is the glass half empty or half full? A prospective study of optimism and coronary heart disease in the Normative Aging Study. *Psychosom Med* 2001;63:910–916.
- Liu Y, Tanaka H. Overtime work, insufficient sleep, and risk of non-fatal acute myocardial infarction in Japanese men. *Occup Environ Med* 2002;59:447–451.
- O'Malley PG, Jones DL, Feuerstein IM, Taylor AJ. Lack of correlation between psychological factors and subclinical coronary artery disease. *N Engl J Med* 2000;343:1298–1304.
- Rosengren N, Hawken S, Ounpuu S et al for the INTERHEART Investigators. Association of psychosocial risk factors with risk of acute myocardial infarction in 11,119 cases and 13,648 controls from 52 countries (the INTERHEART study): case-control study. *Lancet* 2004;364:953–962.
- Rugulies R. Depression as a predictor for coronary heart disease: a review and meta-analysis. *Am J Prev Med* 2002;23:51–61.
- Steinberg JS, Arshad A, Kowalski M et al. Increased incidence of life-threatening ventricular arrhythmias in implantable defibrillator patients after the World Trade Center Attack. *J Am Coll Cardiol* 2004;44:1261–1264.
- Steptoe A, Wardle J, Marmot M. Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *Proc Nat Acad Sci* 2005;102:6508–6512.
- Wittstein IS, Thiemann DR, Lima JA et al. Neurohumoral features of myocardial stunning due to sudden emotional stress. *N Engl J Med* 2005 Feb 10;352(6):539–548.