

HEALTH AND STRESS

*The Newsletter of
The American Institute of Stress*

July

2005

WHY DO HAPPY PEOPLE & OPTIMISTS LIVE LONGER?

KEYWORDS: Martin Seligman, Nun's Study, stress reduction effects of pets, religion and social support, Howard Friedman, Louis Terman, Stanford-Binet, IQ, conscientiousness, George Vaillant, Epictetus, HRV

Numerous studies support the belief that people with an upbeat and positive perspective tend to be healthier and enjoy longer lives than those who are generally gloomy and cynical about the future. Always expecting the worst was linked to a 25 percent higher risk of dying before age 65 in a very long-term California study of 1,500 healthy pre-adolescent boys who had been followed since 1921. (Seligman ME. *Mayo Clin Proc.* 2000;75:133-4) In another report on senior citizens, researchers rated 1000 Dutch men and women aged 65 to 85 with respect to their degree of optimism, health and longevity. Over the next ten years, participants classified as being very optimistic had 55% fewer deaths from all causes and 23% less heart-related deaths than highly pessimistic controls. These benefits of optimism were stronger in men than women. (Giltay E. *Archives of General Psychiatry* 2004; 61:1126-1135)

Harvard researchers also found cardioprotective effects when they followed 1306 men who had been rated for optimism and pessimism based on responses to a questionnaire administered in 1986. During the next ten years there were 31 deaths due to coronary disease, 243 instances of non-fatal myocardial infarction or documented evidence of coronary heart disease and 60 patients had complaints of angina. Men reporting high levels of optimism had almost half the risk of suffering any of these complications compared to peers classified as being very pessimistic. In addition, a dose-response relationship was

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demonstrated between levels of optimism and each of the above adverse developments. (Kubzansky LD et al. *Psychosomatic Medicine* 2001; 63:910-916) It had previously been shown that highly optimistic patients had faster recovery rates following coronary artery bypass surgery and were half as likely to be rehospitalized over the next six months for complications or the need for a repeat corrective surgical procedure. (Scheier MF et al. *J Pers Soc Psychol* 1989; 57:1024-40, Scheier MF et al. *Arch Intern Med* 1999; 159:829-350)

Cheerful and optimistic heart disease patients were also more likely to live longer than others in a Duke report on 866 cardiac catheterization patients who were asked how much joy they typically felt and completed questionnaires to rate optimism and pessimism. Over the next 11.5 years there were 415 deaths. It was found that cheerful patients with a positive outlook were 20% more likely to be alive than pessimists even after taking into account other factors like smoking and how ill the participants were at the time of catheterization. (Brummett BH et al. *Int J Cardiol.* 2005; 100:213-216)

Optimists and happy people may be less likely to suffer a stroke according to a University of Texas study of 2,478 black and white senior citizens in North Carolina who completed a depression questionnaire consisting of yes or no answers to 20 items. Sixteen of these were negative pronouncements such as "I felt that I could not shake off the blues, even with the help of my family and friends," "I thought that my life had been a failure" and "I felt fearful." The other four statements were positive, e.g. "I felt that I was just as good as other people," and "I felt hopeful about the future." Baseline interviews conducted to gather information on sociodemographic, psychosocial and health status revealed no history of stroke. Similar studies were conducted annually for the following 6 years during which there were 340 strokes, 75 of which were fatal. Researchers confirmed that increasing depression ratings were associated with a significantly higher incidence of stroke. But they also found that for each "yes" answer to a positive statement there was a 26% decrease in the risk of stroke. Thus, "yes" answers to all four questions were associated with complete protection from stroke, which is the leading cause of long-term disability and the third most common cause of death in the elderly. This is one of the few studies to suggest that **the benefits of optimism are not necessarily due to the absence of pessimism**. (Oster GV et al. *Psychosomatic Medicine* 2001; 63:210-215)

Similar rewards were reported in a study of 600 people over 50 in a small Ohio town, who, in 1975, completed another questionnaire that included items dealing with attitudes about aging. They had been asked to rate their agreement or disagreement with such statements as "Things keep getting worse as I get older," "I have as much pep as I did last year" and "I am as happy now as I was when I was younger." When researchers checked to see which participants were still alive in 1998 they found that **optimists who viewed aging as a positive experience lived about 7.5 years longer than participants with a much darker perspective**. One might argue that people in poorer health would be more apt to have negative responses and also more likely to die over the next 23 years. However, even when self-reported health, socioeconomic status, overall morale, loneliness, race, sex, and other possible confounding factors were taken into account, a positive view of aging was still highly correlated with significantly increased longevity. Indeed, this advantage was far greater than that afforded by lowering blood pressure or reducing cholesterol, each of which was found to lengthen life about four years. It was also superior to exercise, not smoking and maintaining a healthy weight that increased longevity by only one to three years. So why did the optimists live so much longer? The investigators suspected that it might be due to their greater will to live. Previous studies have shown that people of all cultures are more likely to die in the days and weeks after holidays, anniversaries and other celebrations than they are in similar time periods leading up to them. They checked back to see how the respondents had answered other questions in the original survey in which they had been asked to choose from three pairs of adjectives (empty-full, hopeless-hopeful and worthless-worthy) that best described their lives. Those who answered "full", "hopeful" and "worthy" were classified as having a greater will to live. Although this appeared to have some predictive value it still did not completely explain why people with positive views lived so much longer so other factors must contribute to this. It was suggested that one likely candidate is how people respond to stress since older people with a negative view of aging exhibited higher stress levels. (Levy B et al. *Journal of Personality & Social Psychology* 2002; 83:261-270)

Between 1962 and 1965, 839 Mayo Clinic patients completed the same questionnaire used in the Harvard study and 124 were classified as optimists, 197 as pessimists with 518 falling in between. Thirty years later, analysis of data that was available on 723 of these patients showed that the optimists had a significantly better survival rate than anticipated and lived 20% longer than pessimists. (Maruta T et al. *Mayo Clinic Proc* 2000; 75:140-143) In a follow-up study, 447 patients of this group (average age 60) also completed a 36-item physical and mental health survey in 1994. There were 101 optimists, 74 pessimists and 272 did not fall into either classification based on responses to the original questionnaire completed three decades previously. Pessimists scored lower in all physical and mental health categories and optimists were far more likely to report:

- Σ having fewer limitations due to physical health
 - Σ having less pain
 - Σ feeling more energetic most of the time
 - Σ feeling more peaceful and happy most of the time
 - Σ having fewer problems with work or other daily activities as a result of their emotional state
- (Maruta T et al. *Mayo Clin Proc* 2002;77:748-53)

Studies show that older optimists also tend to have better pulmonary function than pessimists and that this improvement increases progressively over time. In one report of middle-aged men who received periodic pulmonary function studies the difference between optimists and pessimists after ten years on one procedure was comparable to the significant difference between smokers and nonsmokers. (Kubzansky et al. *Annals of Behavioral Medicine* 2002; 24:345-353)

Are The Benefits Of Optimism Primarily Due To Less Depression?

Optimists tend to be happy people whereas pessimists are more likely to be depressed. In addition to being a risk factor for coronary heart disease, depression has also been shown to lower immune system resistance to a host of viral linked illnesses ranging from the common cold and herpes to HIV infections and some malignancies. It is therefore not surprising that numerous reports reveal that pessimists are more susceptible to premature death from AIDS and cancer in addition to cardiovascular disease. As a result, optimists have been assumed to have better health and to live longer because of the relative absence of depression. It is not clear whether being happy or optimistic can improve immune system function or provide other benefits because the vast majority of research on emotions and health has focused on the deleterious effects of distress and depression. **One authority noted that there have been 46,000 papers on depression over the past three decades compared to just 400 on joy or happiness.** As Martin Seligman, past president of the American Psychological Association and author of *Learned Optimism* and *Authentic Happiness* noted, "Social science now finds itself in almost total darkness about the qualities that make life most worth living." That's starting to change due to his research and studies by other scientists that increasingly confirm the salutary benefits of optimism and having a happy attitude.

In a very recent attempt to explore this, physicians followed 116 male and 100 female white British civil servants aged 35-55 who were participants in a much larger study to evaluate risk factors for coronary heart disease. None had been diagnosed with heart disease or hypertension and the women were either starting or had completed menopause. Subjects were asked to rate their happiness level on a scale of 1 (low) to 5 (high) at 33 different times during both work and leisure days. Heart rate and blood pressure were continually recorded using an ambulatory monitoring device. Cortisol, a stress hormone that has been implicated in the development of obesity, type 2 diabetes, autoimmune disorders and hypertension was also measured at eight points during work and leisure days. Measurements of plasma fibrinogen were obtained before and after mental stress testing to determine if there were any changes. High levels of fibrinogen, a clotting factor, can reflect an increase in inflammation

that predicts the likelihood of coronary heart disease. The particular mental challenges utilized (matching words with colors, tracing mirror images) were not designed to create severe stress but rather the type of frustrating experiences often encountered during daily activities. Participants also rated their happiness levels before and after mental stress testing.

It was found that subjects who scored in the top fifth for rating happiness had cortisol levels more than 32% lower than those in the bottom quintile. Greater happiness was also linked to a lower average heart rate in men. The degree of happiness did not seem to influence baseline plasma fibrinogen levels but most participants (68%) did have an increase in fibrinogen following mental stress challenges. The least happy people were nearly four times as likely to exhibit a rise, which was 12 times greater in the lowest happiness quintile when compared to controls with the highest ratings. Measurements were obtained while working and during weekend leisure time to ascertain if participants were happier on or off the job. Only a few with very low happiness ratings showed slight improvement during leisure periods. In contrast, people with moderate and high happiness levels maintained their mood while working as well as on weekends. Happy men also tended to have lower heart rates while awake as well as sleeping, which is believed to reflect good cardiovascular health. Age, sex, marital and socioeconomic status did not appear to influence happiness levels. How happy you were did not depend on whether you were younger, older, married, single, male, female or had a higher salary and position.

In addition to screening for happiness, the researchers also used an established method to measure depression and other stressful states that are known to predict coronary heart disease. Even after controlling for these they found that good health was independently related to happiness and not merely the absence of depression and distress. It is quite likely that people in poor health would be more apt to become depressed or pessimistic. However, this study supports the view that a positive and cheerful attitude promotes health and that **people aren't happy just because they are healthy. Indeed, it is likely that they may be healthier than others because they are happier.** (Steptoe A et al. *Proc Natl Acad Sc* 2005; 102:6508-6512)

While the duration of this study could not demonstrate any long-term relationships between happiness and health status or longevity, others do support such a link. One of the most compelling is the Nun study from the University of Kentucky's Center for Gerontology. It was originally designed to evaluate the relationship between aging and Alzheimer's disease in 678 nuns from the School Sisters of Notre Dame born before 1917. They agreed to undergo annual mental and physical examinations, allow access to all personal and medical records and to donate their brains after death to further Alzheimer's research. Participants were between the ages of 75 and 102 at the time of their first yearly examination and in addition to a personal interview, the examination included a very comprehensive psychological questionnaire containing scales to measure intelligence and rate various emotional and personality characteristics that were correlated with their age.

A search of the convent's archives turned up brief autobiographies handwritten in 1930 by 180 of these nuns aged 18 to 32. The purpose of this exercise is not clear but may have been designed to gather information about their educational status, career goals or to assist in preparing obituaries. These writings were carefully analyzed to identify specific differences in both high and low emotional content and the reviewers were unaware of the subject's health status or whether they were still living. The results of the study revealed that nuns who had written optimistic autobiographies also scored high on psychological tests for optimism and tended to live longer than their more pessimistic counterparts. As the ranking of positive emotion in early life (average age 22) increased there was a corresponding and stepwise decrease in mortality and a 2.5-fold difference between the

lowest and highest quartiles 6 decades later at ages 75 to 95. **Sisters who had used words like "joy", "love", "thankful" and "hopeful" in their essays were likely to outlive their peers by almost ten years.** They also had a significantly smaller incidence of Alzheimer's and other debilitating diseases. Since there is a genetic predisposition to Alzheimer's, this raises the possibility that optimism might help to delay or prevent dementia, especially since there was so little variation in things like diet and lifestyle in this highly regimented and uniform group. (Danner D et al. *Journal of Personality and Social Psychology* 2001; 80:804-813)

Does Viewing A Glass As Half Full And Not Half Empty Promote Health? Researchers have suggested various reasons to explain the link between optimism and longer life or better health, including:

- Σ Optimism may be associated with more physical activity, less smoking and avoiding excessive alcohol, especially in women.
- Σ Conversely, chronic frustration and anger could lead to smoking, excessive drinking, or poor eating habits.
- Σ Optimism is associated with better health in general since people in poor health tend to be more pessimistic and depressed.
- Σ Optimists may cope with stress more effectively than pessimists do. Cheerful and optimistic people may enjoy more emotional support from friends and family and strong social support is a powerful stress buster.
- Σ Optimists and happy people might also be less likely to pour out stress hormones that make blood platelets stickier, increase blood viscosity and constrict coronary arteries or prevent them from dilating when the heart requires more blood flow. The Baltimore Longitudinal Study of Aging, which tracks adults from their 20s to old age reported that over a 25 year period, cheerful and optimistic people complained much less about chest pain, although it is not clear if this was all due to angina.
- Σ An optimistic person might be more strongly motivated to change bad habits--or not have them in the first place.
- Σ Optimism might lead a person to seek and follow medical advice and adopt lifestyles that promote health and reduce illness.
- Σ Optimism may boost immune system resistance to infections and cancer.

An **optimistic** explanatory style is characterized by the belief that the future will be enjoyable because you have the **ability to control** important outcomes. A **pessimistic** explanatory style is linked to a sense of hopelessness and the view that problems are often permanent because they are due to your shortcomings and are **beyond your control**. Stress is difficult to define because things that are distressful for some individuals are pleasurable for others and we may respond to the same stressor in very different ways. Nevertheless, all of our clinical and experimental research studies confirm that the perception of having little or no control is always distressful. There is little doubt that stress can promote illness, accelerate the aging process and decrease longevity and some of the other factors that have been shown to promote health and prolong life may do so by reducing stress.

Having a pet can add years to your life and reduce stress. One of the first studies in this area that appeared in 1980 showed that the survival rates of heart attack victims who had a pet were 28 percent higher than those of patients without pets. Jim Lynch and co-workers demonstrated that having a pet nearby or petting an animal companion blunted the sharp rise in blood pressure and heart rate that occurs with public speaking. HeartMath researchers also demonstrated that petting had dramatic effects on heart rate variability in both the petter and

the recipient and this measurement of cardiovascular activity is increasingly being used as a barometer of stress. More recently, interaction with pets has been shown to reduce levels of stress hormones. For many people, pets also provide a reason to get moving and some might not get any exercise if it weren't for walking or playing with an enthusiastic dog.

A strong religious faith and/or regular attendance at a house of worship has also been linked to greater longevity in several studies. One from Duke University that followed 4,000 people for four years found that those who attended church weekly had a 28 percent lower mortality rate overall when compared to those who did not belong to a church community. Even when income, education, chronic diseases, other illnesses, health habits, exercise, smoking, drinking, body fat, social participation and psychological status were taken into consideration church attendance was still an independent and the strongest predictor of longevity. **A five-year study of 2,025 people age 55 and older similarly reported that of all the lifestyle factors studied, attending religious services was the most significant in preventing premature mortality.** Another that tracked 5286 Californians over 28 years found that even after controlling for age, sex, ethnicity, and education, frequent religious attendees were 36 percent less likely to have died in any year. Data from the National Health Interview Survey also showed that **people who engaged in regular religious attendance lived seven years longer than controls** that were rarely or never involved in such activities.

One reason for this is the greater likelihood of developing a network of good friends and this is especially important for the elderly. The Australian longitudinal study of aging was designed to assess how economic, social, behavioral and environmental factors affected the health and longevity of people aged 70 and older. In 1992, around 1500 such senior citizens were asked how much personal and phone contact they had with various social networks, including children, relatives, friends and confidants. Participants were monitored annually for the first four years of the study and then at three year intervals. Close contact with children and relatives had little impact on survival rates over the next ten years. In contrast, a strong network of friends and confidants was associated with significant improvement and was greatest in those who had the most support from such sources. These benefits persisted across the decade regardless of stresses such as the death of a spouse or close relative, friends moving away, socioeconomic and health status or lifestyle. **Close contact with friends was much more important than contact with family for elderly individuals.** Several possible explanations for this are offered in the article and in an accompanying editorial. (Giles LC et al. *J Epidemiol Community Health* 2005; 59: 574-579)

Many of these and other studies also confirm that being religious is associated with better health. This may also be due to less stress as a result of the strong social support that church fellowship often provides. It's also possible that being in poor health might make it less likely that you would be able to attend your house of worship regularly. On the other hand, it is difficult to rule out the role of a firm religious faith. For example, researchers compared the death rates for 3,900 Israelis living either in one of 11 religiously orthodox or in one of 11 matched, nonreligious kibbutz communities. They reported that over a 16-year period, those belonging to the religious communities in every age group were about half as likely as their nonreligious counterparts to have died. This could not be explained by differences in age, economic status or apparent degree of social support in the less religious communities. Here again, it is likely that people who believe that God will protect and reward those who follow his commands are provided with a feeling of control that also reduces their stress.

Not everyone agrees that stress necessarily shortens your life or that being happy and optimistic promotes health and longevity. Dr Marios Kyriazis, medical director of the British Longevity Society told participants at a recent London anti-aging conference that short bursts of stress can actually allow people to live longer by helping to prevent or delay degenerative

disorders like arthritis, Alzheimer's and Parkinson's disease. As he explained, "Research shows that cells subjected to stress repair themselves, allowing us to live longer. As the body ages, this self-repair mechanism starts to slow down. The best way to keep the process working efficiently is to 'exercise it', in the same way that you would exercise your muscles to keep them strong." Being overly optimistic may not always be a healthy trait and pessimism can sometimes be more protective. If you worry about an automobile accident you may be more likely to buckle up and people who fear getting sick might take better care of themselves. It is also not clear whether optimism actually promotes health or healthy people are more likely to be optimistic. Pessimism was more protective than optimism in one recent study of senior citizens. Researchers reported that when faced with the death of a family member, friend or some other stressful event, elderly pessimists were much less likely than optimists to suffer from depression, possibly because they were better able to accept life's realities. Being cantankerous was also found to be a protective characteristic in a study of elderly nursing home residents. Those who were ornery and argumentative with the nursing home staff members lived longer than others who were not. As the senior author noted, "I'm not sure it was that they got more attention because the staff found them so difficult. What caused them to live longer, what the biology is, we don't know."

The leading authority on the role of personality, behavior, traits and social support on health and longevity is undoubtedly Dr. Howard Friedman, distinguished professor of psychology at the University of California, Riverside. He has written over 100 papers and several books on various facets of this subject and has been the recipient of numerous honors and awards for his prolific and authoritative contributions. Friedman found that cheerfulness in early life was not associated with longevity and was actually linked to a shorter-than-average life span. He also agrees that being blindly optimistic can have its drawbacks. "If you are sociable and carefree, you may have lower levels of stress hormones and more friends to assist you, which is healthy, but you may also wind up with excessive drinking, smoking and partying, which is unhealthy over the long term." These opinions are based on his unique prospective study of predictors and mediators of health and longevity in individuals from Terman's original study that began in the 1920's who have now been followed for an amazing eight decades. A few of Friedman's other findings are also interesting and sometimes surprising since they contradict studies that were conducted over shorter time periods. They also raise important issues that were not considered as explanations for the conclusions that were reached by these investigators based on the information that was available.

As he noted:

"Health promotion efforts and our public health systems are too often built around a pathology model, derived from traditional conceptions of 'treating' disease. These approaches often ignore the social context of people's lives, and the psychosocial influences that push and pull them in healthy or unhealthy directions across time. In the scientific arena, this orientation often means that each result from a particular scientific study is seen as an important and direct causal step on the road to disease. **Anything that seems to be associated with an increase in a risk factor is a threat! Thus we encounter a litany of health advice - do's and don'ts sometimes relevant to the proximal causes of ill health but ignorant of the long-term causal patterns.**"

(Friedman, H.S. (2003). Healthy life-style across the life-span: The heck with the Surgeon General!. In J. Suls & K. Wallston (eds.), *Social Psychological Foundations of Health and Illness* (pp. 3-21). Boston: Blackwell Publishing)

Intelligence, Conscientiousness, Longevity And The "Termites"

In order to fully appreciate Friedman's research it is necessary to learn more about its source. Louis Terman came to Stanford in 1910, plunged into studying intelligence and became chairman of its psychology department. The first intelligence test had been designed five years earlier by the French psychologist Alfred Binet as a tool to identify "slow" children who might need special help. Terman and his Stanford colleagues translated Binet's test, adapted the content for U.S. schools, set new age norms, standardized the distribution of scores so that the mean score would always be 100 and called the new version the Stanford-Binet test. It included questions ranging from mathematical problems to vocabulary items that were designed to rate what might be called "general intelligence" as opposed to knowledge in a specific area that could be acquired by experience. Terman believed that general intelligence was dictated by hereditary factors, remained fairly constant throughout life and was not significantly altered by education, hard work or home environment. He coined the term "intelligence quotient" or IQ to refer to this attribute and in 1916 published *The Measurement of Intelligence* that included his 50-minute IQ test as well as an instructional manual explaining its basis and how to administer it. This gave teachers an objective and inexpensive way to evaluate students and possibly assign them to different courses or grades according to their scores. Over the past ninety years, almost all American school children have taken this or a competitive questionnaire. When the U.S. entered World War I, IQ tests were administered to screen more than 1.7 million draftees and IQ quickly became part of every day language rather than a term used by researchers.

Terman believed that very highly intelligent children would tend to be more successful, have better health and live longer than others. He was disturbed that most Americans did not share his high opinion of precocious kids and often considered their genius as being close to or an antecedent of some form of insanity such as that seen in idiot savants. Terman was determined to debunk this "early ripe, early rot" viewpoint with his Genetic Study of Genius project that began by identifying 643 children from California elementary schools with IQs of 135 or higher. A thick dossier on each was assembled that detailed physical health, interests, hobbies, ancestry, habits, how much they played, home life, household income, parental occupations and anything else he thought might be relevant. In addition to interviewing the gifted children he sent assistants to interview their families, evaluate their homes and even find out how many books their parents owned (more than 300 on average). By 1928 he had enrolled over 1500 subjects but even before this he had published *The Mental and Physical Traits of a Thousand Gifted Children* in 1925. This 650-page book concluded that these were well-rounded, happy and healthy normal kids. The study was supposed to end there but Terman decided to follow them as their lives and careers developed. Questionnaires were sent out periodically and most "Termites", as they were known, willingly supplied information about their physical and mental health, sex lives, occupation, income, religious beliefs, political attitudes and quality of life. Some surveys sent out during World War II came from servicemen around the world, including several who filled them out in foxholes at the front. Terman later contributed to four books that charted the changing attitudes, fortunes and health of the group. He continued to be immersed in the study after he retired from Stanford in 1942 up until his death in 1956. Robert Sears, a Termite himself who took over, renamed the project the Terman Study of Gifted Children and focused on how the group coped with aging.

Howard Friedman was particularly interested in links between personality traits and longevity. His analysis of the Terman archives published in 1993 concluded that **conscientiousness had the greatest life-extending effect and that things like self-esteem had little influence. Cheerfulness actually seemed to shorten lives, and as he told a *New York Times* reporter, "perhaps because it led people to ignore risks to their health . . .** Score one for those pious voices of prudence: being cautious and somewhat dour is a key to longevity." Subsequent papers reported that:

- Σ while highly intelligent people may have certain advantages in maintaining health there was **no strong relationship between intelligence and longevity.**
- Σ increased teenage sexual activity predicted increased mortality and this relationship was influenced by childhood conscientiousness, adult alcohol use and cumulative level of education.
- Σ frequency of orgasm for married females was somewhat protective against mortality.
- Σ increased "masculine" traits were associated with higher mortality rates in both men and women. (Although not measured, this supports the Type A behavior hypothesis.)
- Σ individuals who are well adjusted, socially stable and well integrated into their communities are healthier and live longer than those who are unstable, impulsive, isolated and/or alienated.
- Σ with respect to longevity, sociability has been over-rated, conscientiousness has been under-rated and neuroticism has been confused.
- Σ when assessed at four points over a 51-year period men who were married the whole time had significantly lower mortality risk compared to those who were separated, divorced, widowed, or who had remarried. No such effect of marital status was seen in women but their mortality risk was lower when they had a greater number of children and belonged to more organizations. These relationships were more robust for men under the age of 70 and women 70 years and older.
- Σ women who viewed themselves as more religious in adulthood (approximately age 40) had a lower risk for premature mortality than those who were less religiously inclined. (These women also had healthier behaviors, more positive feelings about their futures, and reported being somewhat happier than their less religiously inclined peers.)
- Σ catastrophizing (always expecting the worse) predicted premature mortality, particularly from accidental or violent deaths and especially in males.
- Σ adolescent smoking was more likely to occur in children who were cheerful, not conscientious and who had experienced parental divorce.
- Σ playing with pets was not associated with greater longevity for the total sample or for those who were unmarried or less satisfied with their human relationships.
- Σ There is no strong evidence that breast-feeding promotes longevity. Neither cancer or cardiovascular disease survival was significantly associated with duration of breast-feeding for either sex.

Friedman concluded that of **all the personality traits, IQ status and other influences, conscientiousness was the most important determinant of longevity. This was defined as self-discipline, dependability, prudence, care, and the will to achieve. These characteristics were found to be more important to health over a lifetime than happiness or optimism.** On the other hand, all these attributes are hard to accurately define and measure. Thinking carefully before you act, a component of conscientiousness, may not be not the same as optimism but could certainly contribute to it. And for what it's worth, the Termites that survived the longest were those who had played the most during their lives.

While these observations may be valid for those considered to be geniuses, how well do they apply to the vast majority of people with IQ's between 80 and 120? An Australian study used IQ at induction into the military along with 56 other psychological, behavioral, health and demographic variables to predict noncombat deaths by age 40 in 2,109 veterans. When all other confounding factors were considered, each additional increase in IQ predicted a 1% decrease in risk of death. IQ was the best predictor of the major cause of death, automobile accidents. Vehicular death rates doubled and then tripled at successively lower IQ ranges (100-115, 85-100, 80-85). (O'Toole BJ. 1990; *Accident Analysis and Prevention*, 22:211-221) Intelligence also predicted health and premature mortality in the remarkable Scottish Mental Health Survey of 1932. On June 1, 1932, a test that is highly correlated with the Stanford Binet rating for IQ was administered to all children born in 1921 attending school on that day. Health data was collected over the next 65 years, at which time information was available on 2,239 (80%) of the children who were students in Aberdeen. Those who were 15 points lower than other participants were only 79% as likely to be alive at age 76. A drop of 15 points was also associated with a 27% increase in deaths from cancer in men and a 40% increase in women. Studies conducted in other parts of Scotland also confirmed this correlation between higher IQs and better health and longer life in children with average intelligence. (Gottfredson LS. 2004; *Current Directions in Psychological Science* 13:1-4)

But **what good is living to a very old age if you can't enjoy your final years? As an old saying goes, "everyone wants to live long but nobody wants to grow old"**. This issue has been deftly explored in the Harvard Study of Adult Development, the longest, most comprehensive examination of aging ever conducted. Since the 1930s, researchers have studied more than 800 men and women, following them from adolescence into old age, and seeking clues to the behaviors that translate into happy and healthy longevity. Some of the results surprised George Vaillant, the current director of the study who "expected that the longevity of your parents, the quality of your childhood, and your cholesterol levels would be very influential", but were not. Keeping mentally active and having lots of friends were much more important. **A happy marriage or good long-term relationship at age of 50 was a leading indicator of aging well at 80 but low cholesterol level at age 50 was not. Avoiding cigarettes, maintaining a healthy weight, good adjustment or coping skills, being** curious and creative, having a playful and happy attitude and finding younger friends as older ones were lost were also characteristics of being able to enjoy old age. A happy disposition or optimistic attitude was more important than genes and the study found that people with these traits and a tendency to give to others were also likely to be more financially successful. (Vaillant G. *Aging Well* (2003) Little Brown & Co., London)

People can learn to maintain a healthy weight, exercise regularly, stop smoking, stay mentally active and adopt other lifestyle changes that promote healthy aging but changing your disposition is more difficult because it is influenced more by heredity. Our brains seem to be hard-wired based on advanced imaging technology that has pinpointed the left prefrontal cortex as the center for optimistic and happy feelings. Those who have naturally higher than normal activity in this area of the brain are more likely to feel positive moods. The Declaration of Independence describes one of our inalienable rights as "the pursuit of happiness", but as C. P. Snow noted, "The pursuit of happiness is a most ridiculous phrase: if you pursue happiness you'll never find it." One study compared the well being of lottery winners with people who had suddenly become paralyzed as a result of an accident. Following the initial euphoria of their newfound wealth, the lottery winners were no happier than the accident victims. The paralyzed individuals had to adjust to the shock of their new physical limitations, but after this had eased they were much better able to appreciate the small pleasures and victories of life than those who were overnight millionaires and actually felt more optimistic about the future. Ability is what you're capable of doing and motivation determines what you do. But attitude determines how well you do it and is much more difficult to change. Happiness is not a state to arrive at but rather the manner in which you travel.

Stress, Healthy Aging, Allostatic Load And Heart Rate Variability

As I was putting the finishing touches on this issue, an excellent two-page article by Tara Parker-Pope appeared in the June 20 *Wall Street Journal* entitled "The Secrets of Successful Aging". It referred to some of the above studies and also included Bob Sapolsky's research on baboons and Bruce McEwen's concept of allostatic load as a measure of stress. The thrust of the article was that having little control was stressful and "how much stress we face in a lifetime, and how well we cope with it -- as one of the most significant factors for predicting how well we age." George Vaillant had come to a somewhat similar conclusion but was surprised that in his study, the number and severity of stressful events did not predict future health, noting, **"Some people had a lot of stress, but aged very well . . . but how you deal with that stress does matter quite a bit."**

There's nothing very new about this observation and we can learn a lot from the writings of the early 2nd Century Greek Stoic philosopher Epictetus. He spent his youth as a slave in Rome where he read and learned as much as he could about philosophy. He became permanently crippled due to cruel treatment by his master, was later freed and eventually exiled to Greece where he founded a philosophical school and became famous as a teacher. Epictetus believed that all human beings were perfectly free to control their destinies. He encouraged his students to live simply, virtuously and according to the laws of nature in order to achieve a state of *eudaimonia* ("happiness" or "flourishing"). Epictetus clearly understood that **both lack of happiness as well as distress stemmed from the feeling of having little control and that often this was due to faulty perceptions that could be corrected**. Some of his aphorisms that succinctly illustrate this include:

- Σ There is only one way to happiness and that is to cease worrying about things which are beyond the power of our will.
- Σ The essence of philosophy is that a man should so live that his happiness shall depend as little as possible on external things.
- Σ Gather the crumbs of happiness and they will make you a loaf of contentment.
- Σ Make the best use of what is in your power, and take the rest as it happens.
- Σ People are not disturbed by things, but by the view they take of them.
- Σ It is not death or pain that is to be dreaded, but the fear of pain or death.
- Σ It's not what happens to you, but how you react to it that matters.

The *Wall Street Journal* article goes on to describe the concept of allostatic load developed at Rockefeller University. Allostatic load depends on a complex formula that takes into consideration such things as blood pressure, variations in heart rate, cholesterol, various hormone levels and waist-hip ratio. A high allostatic load has been shown to be highly predictive of premature death as well as stress-related disorders like heart disease and mental decline. A low allostatic load is associated with stress busters like strong social support and regular exercise. However, as the article emphasized, "Unfortunately, there's no way for the average person to get a reading of his or her allostatic load."

Although it is difficult to objectively measure stress, advances in heart rate variability (HRV) research may correct this deficiency. HRV refers to the minute beat-to-beat alterations in heart rate that occur with respiration. In healthy people, heart rate increases with inspiration and decreases with respiration largely due to involuntary nervous system influences. Low HRV was first found to predict poor survival after a heart

attack as well as risk for sudden death due to rhythm disturbances. Studies now suggest that **low HRV can also predict premature death in people without heart disease and may be a marker for increased anxiety, depression, hostility, metabolic syndrome and other stressors that contribute to coronary disease and mortality from other causes.** HRV was originally assessed by measuring time differences in beats on an electrocardiogram using various types of arithmetic manipulations. More recently, advances in microprocessor and power spectrum analysis technology have made it possible to calculate variations in frequency and amplitude domains that may have a higher correlation with stressful feelings. Several studies reported at a May conference indicate that **HRV may be used to objectively measure job stress. Reduced HRV may also serve as a barometer of aging.** Although resting heart rate does not change significantly with advancing age there is a decline in HRV. Exercise raises HRV and studies show that elderly sedentary individuals with low HRVs can significantly increase this by regular aerobic activities they can easily perform.

More importantly, the ability to readily and inexpensively measure HRV may provide an effective tool for stress reduction. Feedback techniques that allow immediate visualization of HRV patterns have been used to teach people to restore potentially dangerous ones to normal by summoning up feelings of appreciation and love that they can then practice at any time without being hooked up to any equipment. This technique has proved successful in reducing stress in competitive athletes, school children, and the workplace and may also provide other benefits that improve performance and quality of life. HRV may also be affected by stress-related hormonal as well sympathetic and parasympathetic nervous system influences. A future Newsletter will be devoted to the potential significance of this and possible clinical applications. Until then, heeding the advice of Epictetus can help you to lead a happier, healthier, and less stressful life.

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Health and Stress

*The Newsletter of
The American Institute of Stress*

124 Park Avenue Yonkers, NY 10703

ANNUAL SUBSCRIPTION RATES:

E-MAIL..... \$25.00
PRINT (DOMESTIC)..... \$35.00
PRINT (FOREIGN)..... \$45.00

ISSN # 1089-148X

Paul J. Rosch, M.D., F.A.C.P.
Editor-in-Chief
www.stress.org
e-mail: stress124@optonline.net