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WHY DO HOSTILITY AND ANGER AFFECT HEALTH?

KEYWORDS: MMPI, Cook-Medley (Ho) scale, risk factors vs. risk markers, LifeSkills training, Type A behavior, Spielberger State, Trait, Expression of Anger Inventory, friendly versus hostile and submissive versus dominant relationships, stress, coronary calcification, and immune system function, *The Honeymooners* and Ralph Kramden

It's fairly well established that having a hostile or angry attitude makes it much more likely that you might be headed for a heart attack. One study found that hostility levels were a more accurate predictor of heart disease than high cholesterol, hypertension, smoking or obesity. Researchers followed 774 white males free of heart disease who were enrolled in a study of aging that began in the 1960's. In addition to receiving periodic preventative healthcare advice, they also had thorough medical examinations every three years and were evaluated for various heart disease risk factors.(1)

In 1986, the MMPI (Minnesota Multiphasic Personality Inventory) was administered to assess personality characteristics and emotional status based on responses to almost 600 questions. The MMPI has ten Clinical Scales that measure such things as depression, masculinity vs. femininity, hysteria, paranoia, as well as tendency to schizophrenia, mania and other psychiatric disorders. It has been in widespread use since the 1940's and has been studied so thoroughly that it is accepted by courts to provide information on defendants or litigants in situations where emotional or psychiatric factors are pertinent to the resolution of the case.

The MMPI contains so much information scattered about that numerous subscales have been developed using selected responses from its ten Clinical Scales to measure specific behaviors and personality traits. One such subscale that has attracted increased attention in recent decades is the Cook-Medley (Ho) subscale to rate hostility levels. The average age of the men was 60 when they completed the MMPI and their hostility levels were measured by using responses to this (Ho) subscale.

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When evaluated in 1989, it was found that the hostility scores obtained in 1986 predicted which men would likely suffer myocardial infarction, angina pectoris or ischemic heart disease over the following three years. In addition to the Cook-Medley Hostility Scale (Ho) score, body weight, waist to hip ratio, serum lipids, fasting insulin concentrations, blood pressure, cigarette smoking

alcohol consumption, and total caloric intake were also taken into consideration. Only (Ho) scores positively predicted future coronary events. Of those who experienced coronary heart disease symptoms or signs, almost half had hostility scores in the 80th percentile. The results also suggested that having a high HDL seemed to provide some protective effect.

The fact that the follow-up period of three years in this study was so short could explain why recognized risk factors such as smoking, elevated lipids and hypertension failed to have any predictive power. The researchers are hoping that a 15-year follow-up on this group will have the statistical strength to detect these relationships. Another possible explanation of why hostility was such a superior predictor of heart disease was that these men had for decades been participants in a study where they received regular physical examinations as well as information on how to develop healthy lifestyles. As a result, they were apt to be healthier than controls without these benefits and less likely to smoke, have high blood pressure or elevated cholesterol.

There are several important questions that this study raises.

1. If coronary heart disease was not due to what are considered to be the standard risk factors, as well as elevated insulin, triglycerides and other components that contribute to metabolic syndrome, then what other mechanisms might be involved?
2. Is it possible to lower hostility levels as measured by this (Ho) subscale? If so, would lowering this reduce the subsequent likelihood of coronary events?
3. Does the Cook-Medley (Ho) subscale of the MMPI really provide an accurate measurement of hostility or does it assess something else? As will be explained, **hostility is a multifaceted construct that includes certain emotions, attitudes and behaviors not likely to be revealed much less rated by reviewing responses to any questionnaire**.

When asked the first question, one of the authors of the study replied," It may have to do with elevated stress hormones or other factors not measured in our study." Three years is too short a period to accurately detect factors like smoking that might contribute to coronary heart disease. Abnormalities in cortisol and other stress-related hormonal levels might be detected much sooner and could certainly play an important role. Additional information may be forthcoming in the fifteen-year follow-up study that will include measurements of these and other possible pertinent factors.

The second question has been partially answered by Duke researchers who had previously shown that people with high hostility levels had more pronounced rises in blood pressure and heart rate when they were put into situations designed to make them angry — or even asked to think about them. They also followed a group of male college students for 25 years and found that when they were in their mid-40s, those with the highest (Ho) test ratings were more likely to be smokers, significantly overweight, have higher cholesterol and blood pressure levels and lower HDLs. However, **there is considerable debate as to whether any of these are risk factors that cause coronary heart disease or risk markers that merely reflect a statistical association because they are all related to something else, such as stress**.

The Duke group have developed a LifeSkills training program that reduces hostility and its adverse cardiovascular effects by teaching patients who have had heart attacks to be more aware of situations that make them angry.(2) This includes such things as having them ask themselves four questions when feelings of anger start to mount: Is this important? Is this anger appropriate? Is this action modifiable? And is it worth it to take action". Others have independently confirmed their results. A 1999 Israeli study of high-hostile men with coronary heart disease found that those who received this type of hostility reduction support had less hostility and lower blood pressures after the training period as well as two months later, when compared with a control group matched for age and hostility levels who received only regular

treatment. In addition, there was a strong correlation between the degree of lowered hostility and lowered blood pressure levels.(3) More recently, Chinese cardiologists reported similar benefits from this LifeSkills program in patients recovering from bypass surgery. After the completion of the training as well as three months later, the intervention group were "less depressed, had less anger, felt better about their social support, had lower resting heart rate and blood pressure and showed 60% less blood pressure responsiveness to talking about being angry" when compared to matched controls.(4)

What Is Hostility And What Is The Significance Of The (Ho) Rating Scale?

Hostility is a complex multidimensional construct that includes degrees of anger ranging from mild irritation to rage that also need to be rated for frequency and severity. Negative attitudes or beliefs about others such as chronic mistrust and cynicism enter into the hostility equation, as do behavioral components that are manifested by tendencies to abuse others verbally or physically. There are well over two dozen ways to measure hostility that emphasize these attitudinal, affective or behavioral aspects to different degrees.(5)

The 50-item Cook-Medley Hostility Inventory was originally derived from the MMPI to determine how well teachers were able to get along with their pupils. High scores reflect a persistent predisposition to view other people and interpret events in a cynical and negative manner. High scores also correlated with increased mortality rates from all causes rather than being specific for coronary disease. The Duke group reported that the Cook-Medley scale could be further separated into two subscales that measured cynicism and paranoid ideation. They subsequently narrowed these down to 27 items believed to have greater predictive power for coronary events. However, as they subsequently admitted, none of these subscales measure anger, aggression or irritability, which are the hallmarks of hostility. In addition, a 25-year follow-up study of almost 500 physicians found no relationship between Cook-Medley scores and the incidence of coronary heart disease or mortality rates.(6)

There are numerous other questionnaires that measure hostility, aggressiveness and anger but none of these have significant or consistent predictive power for coronary heart disease. Considerable attention has been devoted to anger, which has long been associated with premature mortality dating back to the Bible's assertion that, "envy and wrath shorten the life". (*Ecclesiastes* 30:24) Hostility is often confused with anger and while closely related, they are hardly identical. As previously indicated, hostility is a personality trait in which there is a persistent attitude of ill will, distrust and negative evaluation of people and events. Anger is an emotion that is evoked when someone is thwarted in attaining a goal or in response to some annoying event or stimulus, especially if it is perceived as being unjust. Like hostility, anger can be a persistent trait but it can also be a temporary or transient state and there may be different health consequences depending on its type, degree, and whether it is repressed or expressed.

Is It Worse To Keep Anger In Or Blow Your Top?

These anger distinctions and nuances can be evaluated by the Spielberger State, Trait, Expression of Anger Inventory. This consists of items that assess the frequency of feeling quick tempered and flying off the handle, with subscales that assess Anger–out, Anger-in and Anger-control. Anger-out is the degree to which the respondent will do something hostile to someone who provokes their anger, such as slam doors, argue, say something nasty or lose one's temper. Anger-in assesses the likelihood that angry feelings are concealed from others and Anger-control measures the extent of perceived ability to control one's expression of anger. **Most people believe that by not expressing angry emotions you literally as well as figuratively "take things to heart" and that it is better to "get things off your chest.** Some studies have shown that people who hold anger in are more likely to develop hypertension and there were several papers presented on the pros and cons of anger expression at the March 2006 annual meeting of The Psychosomatic Society.

One entitled *"Keeping it All Inside" Can Worsen Chronic Low Back Pain* followed 88 chronic low back pain patients who performed a mental stress task while being severely criticized ("stress with harassment"). Half of the subjects were then allowed to express their anger and the other half were prevented from venting their emotions. The anger-in group exhibited significantly greater low back muscle tension that persisted even after a five-minute recovery period. Those who were able to express their anger not only had lesser increases in muscle tension levels during harassment but these quickly returned to baseline levels as soon as they had finished speaking. As the lead author explained, chronic low back pain patients who typically express anger but are forced by circumstances to keep the anger inside (e.g., when speaking to a supervisor at work) are likely to experience a worsening of their condition. On the other hand, another study found that high levels of anger-out were associated with a greater degree of coronary calcification in men and women aged 30-60 followed for around nine years. Support came from a study reporting that healthy young adults with high anger-out but not high anger-in scores had increased levels of proinflammatory chemicals, suggesting that inflammation may partially explain the link between anger and coronary artery disease. Finnish researchers found that high levels of expressed anger in men were also associated with a greater incidence of stroke, especially in patients with a history of coronary disease. Any way you look at it, anger is not healthy. In one study of persons with normal blood pressures, those more prone to anger were almost 3 times more likely to suffer a heart attack or sudden cardiac death than others who scored low on the Trait Anger scale. **It is important to recognize that these adverse health consequences correlate not with self-rated hostility levels but various anger measurements and that anger and hostility are not synonymous.** Animosity is a synonym for hostility but anger is not, even though it is often used as a substitute.

Like Type A, anger and hostility are overt behaviors that are best measured by observation rather than responses to questionnaires. There are several interview rating methods for assessing hostility that have been derived from the Type A Structured Interview or Videotaped Structured Interview. These interviews require extensive training in recognizing overt signs of annoyance and argumentativeness as well as more subtle signs of sullenness, uncooperativeness and irritation. While answers to provocative questions do provide some information, personal observations about how people react while responding is the most accurate way to measure hostility. What is disturbing about the (Ho) scale is that it shows no correlation with such observational assessments of hostility. In the NHLBI twin study the (Ho) scale results correlated positively with anxiety, neuroticism and a tendency to "fake good" but not with coronary heart disease.(7) Hostility ratings obtained from questionnaires do show a correlation with all cause mortality but only interview assessments of hostility have been demonstrated to specifically predict coronary disease and mortality.

It has also been proposed that hostility is the core component of Type A behavior that explains its ability to predict coronary events. This was thoroughly debunked in a prior Newsletter interview with Ray Rosenman, who, with Mike Friedman, first proposed the Type A coronary prone behavior hypothesis. This interview cites other deficiencies of the (Ho) assessment, including Megargee's thorough analysis, which concluded, "The (Ho) scale is not a reliable measure of hostility or overtly aggressive behavior and does not correlate with other psychometric measures of hostility. Most distressing is the failure of (Ho) to measure hostility. All in all, the evidence for the construct validity of the (Ho) Scale is minimal. **Thirty years after its derivation it is difficult to say with any confidence what (Ho) measures**."(8)

Despite all these uncontested flaws and criticisms, virtually all studies on the relationship between hostility and disease are based on (Ho) measurements. The reason for this is that since it was first developed over 6 decades ago, the MMPI has been administered to hundreds of thousands of school children, prospective employees, individuals in certain occupations and others. Although the (Ho) data that is derived from the MMPI may not be reliable, it is readily

obtainable at little or no cost and in vast amounts for different demographic groups. Since these results are usually kept on file, it is possible to compare them with medical reports that may be available on some employees as well as obituary and death notices that are a matter of public record throughout the U.S. However, it is not clear whether (Ho) levels obtained several decades ago remain constant over time or might have changed significantly during this period. It is important to keep all of the above in mind when evaluating the significance of studies purporting to show the relationship between hostility and various disorders. As will be seen, very recent studies now tend to rate hostility and its associated attributes by evaluating how people behave when they are subjected to situations designed to elicit hostile responses.

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Why Spats With Your Spouse Can Be Harmful To Your Health And Heart

As noted in a recent Newsletter, the Harvard Study of Adult Development is the longest and most comprehensive investigation of the aging process ever conducted. Since the 1930's, researchers have closely followed more than 800 men and women from adolescence to old age to seek clues about behaviors and activities that are associated with healthy longevity. Some of the findings surprised George Vaillant, the current director of this project and author of *Aging Well*. He had anticipated that "the longevity of your parents, the quality of your childhood and cholesterol levels would be very influential". They were not. Keeping mentally active and having lots of friends were much more important. **A happy marriage or good long-term relationship at age 50 was a leading indicator of being healthy at age 80 but a low cholesterol level had very little significance.**

How can such findings be explained? With respect to cholesterol, past Newsletters have presented mounting evidence that elevated cholesterol, like premature baldness and a deep earlobe crease, may be associated with a higher incidence of heart attacks, but does not cause them. **Similarly, the cardioprotective benefits of statins are not due to cholesterol lowering since they are also seen in patients with low LDL and cholesterol.** It is much more likely, that, like aspirin, reduction of inflammation and other activities are responsible and, like aspirin, lower statin doses may be just or more effective. In addition, numerous studies show that lowering cholesterol is of little value in reducing mortality in senior citizens and that a low cholesterol is actually associated with increased death rates and numerous health problems. But why would a happy marriage or having lots of friends promote healthy aging? The most likely explanation is that stress can accelerate the aging process and that having strong social support from friends or family reduces the harmful effects of stress. Stress can contribute to illness and

premature mortality in many ways, including suppression of the immune system's ability to ward off infections and certain cancers.

British researchers recently reported that in a study of more than 180 senior citizens who received influenza vaccine, those who said they were happily married developed higher antibodies and received more protection than others who reported less marital satisfaction.(1) Participants also completed questionnaires designed to rate exposure to stressful life events and those who had experienced a significant bereavement in past 12 months had poorer antibody responses than controls. Prior studies have shown that medical students who were severely stressed because of concerns about an impending important exam had lower than normal antibody responses to Hepatitis-B vaccine. Students who were less stressed and/or had greater social support developed much higher antibody levels. A similar poor response to influenza vaccine compared to well-matched controls was seen in those caring for a spouse with Alzheimer's. Another study showed that such caregivers took an average of 9 days longer than controls to completely heal a small biopsy wound because of impaired immune responses. Caregivers had higher levels of interleukin-6, which disrupts immune system function and increases risk for heart disease, arthritis, osteoporosis, Type-2 diabetes and possibly certain malignancies. What is particularly disturbing is that this increase in interleukin-6 as well as its associated immune system disturbances persisted for up to three years after care-giving activities had ceased.

There is little doubt that having to provide continuous care to a spouse suffering from Alzheimer's can cause chronic and severe stress that might impair wound healing and increase susceptibility to disease due to disturbed immune system function. However, a recent study showed that **the stress caused by a brief spat could have a similar effect in couples who normally got along quite peacefully**.(2) Researchers studied 42 healthy couples married on average for 12.5 years who were admitted to their inpatient facility on two separate occasions. During the first admission, all participants completed questionnaires assess their stress and hostility levels and had blood tests to evaluate general health status and to measure various immune system components. They were also were subjected to a suction blister device that produced eight identical tiny wounds on one forearm. Each spouse was asked to identify an important personal characteristic, problem, or issue that he or she wished to change with the explicit restriction that this could not be a source of marital dissent. They were then asked to engage in a 10-minute discussion with their mates about these issues during which they would either ask for or provide comforting emotional social support without anyone else being present. The procedure was the same during the second visit one month later except that the 10-minute discussions were now about areas of disagreement designed to produce emotional and possibly hostile responses. The discussions were videotaped so that responses and behaviors could be rated for hostility and the wounds were closely monitored after each admission until all the lesions had healed.

Researchers reported that wound healing was delayed slightly more after the hostile encounter compared to the first admission in all participants. However, **couples who were classified as "high hostile" took a day longer to heal than others, not only after the conflict visit, but also after the social support encounter**. Differences were found in immune system component measurements in the delayed healing group that could explain these results. As documented in this article, prior studies have shown that unhappy marriages are associated with a 10-25 fold increase in depressive disorders and were three times more likely to cause recurrent coronary events in women with a history of coronary disease. This report demonstrating that even a brief argument in a laboratory setting can have significant adverse health effects quite likely underestimates the consequences of marital discord and its prevalence. Fights at home are likely to be much more contentious and belligerent and to last longer. In addition, unhappy couples would probably be less apt to volunteer for a marital research study such as this, suggesting that their inclusion might have made the results even more impressive.

A presentation at last month's Psychosomatic Society meeting also confirmed the benefits of a happy marriage devoid of spousal spats. It began in 2002 and involved 150 married couples with at least one member being between 60 and 70 years of age and the other one no more than five years younger or older. Volunteers with a history of heart disease were excluded from the study. Participants were recruited through newspaper advertisements indicating that each husband and wife would receive $150 and a free $300 CT scan designed to detect and measure calcification in their coronary arteries. In healthy people, such calcification represents hardening and narrowing of these arteries that increases risk for a heart attack. Each couple was told to pick a topic such as money, in-laws, children, vacations or household duties that had been responsible for disagreements during their marriage. Then, while sitting in comfortable chairs and facing each other across a table, each couple discussed their chosen topic for six minutes, during which they were videotaped. The videotaped conversations were rated for the comments of each individual to indicate the extent to which they were friendly versus hostile, and submissive versus dominant or controlling. For example, comments like, "You can be so stupid sometimes" or "you're too negative all the time", were coded as hostile and dominant. Another dominant or controlling comment would be, "I don't want you to do that; I want you to do this." A very warm, submissive comment might be, "Oh that's a good idea, let's do it." This would have a higher rating than one in the same category such as "If it's important to you, I'll do what you want." An unfriendly, submissive comment might be, "I'll do what you want if you get off my back."

Many of the marital discussions were relatively calm and peaceful but in some cases the couples were so hostile that they were later offered referrals for marriage counseling. The basic assumption was that a couple's conduct and comportment during the discussion reflected their long-term patterns of behavior even though a marital spat in front of researchers that was being videotaped was likely to be "a muted version of what went on at home." Two days after their discussion, all participants underwent a CT scan of the chest and their degree of coronary artery calcification was rated according to established criteria. Since all were healthy, none of the calcifications detected were alarmingly high but some patients were urged to discuss the results with a physician since their scores placed them at a statistically increased risk for a coronary event.

An analysis of the results revealed:

1. The more hostile the wives' comments during the discussion, the greater the extent of calcification or hardening of the arteries. Particularly high levels of calcification were found in "women who behaved in a hostile and unfriendly way and who were interacting with husbands who were also hostile and unfriendly."
2. The extent to which either wives or husbands acted in a dominant or controlling manner was unrelated to the severity of hardening of the arteries in the wives.
3. The extent to which wives or husbands spoke with hostility had no relationship to the severity of hardening of the arteries in the husbands.
4. Husbands who displayed more dominance or controlling behavior – or whose wives displayed such behavior – were more likely than other men to have more severe hardening of the arteries.(2)

In other words, either being controlling or being married to someone who is controlling is enough to promote atherosclerosis in men. For couples whose relationship was not characterized by a contest or struggle for control, husbands had much lower levels of atherosclerosis. Hostility during marital disputes was bad for women's hearts, while controlling behavior during marital disputes was bad for men's hearts. Prior studies have demonstrated that loneliness and social isolation increases risk for heart disease as well as the cardioprotective effects of close relationships and emotional support. This study also suggests that in addition, the quality of these relationships is also important. As the lead author noted, "the dimensions of quality that are important differ for men and women. Warm

versus hostile interactions are indeed important for women, but a different dimension of quality is more important for men, and that has to do with power and control in relationships." **The common culprit that causes coronary disease in both is most likely anger: wives' anger from feeling hostility or being subject to hostility; and husbands' anger from experiencing or at least perceiving a challenge to their sense of control.**

Differences of opinion are inevitable in any relationship. Some are trivial and transient but others can lead to quarrels, arguments or heated battles that persist or tend to recur if not resolved to the satisfaction of both parties. These can also spill over into unrelated areas that result in more discord and recriminations. There are no easy solutions and the best advice for couples who care and are concerned about each other is to make a sincere effort to take time out to appreciate their partner's position and to avoid hostility and trying to control them during disagreements. As noted, if short spats in a laboratory setting can have such widespread effects on the immune system, the heart and who knows what else, one can only wonder what the response would be to a full-fledged fight at home that lasted hours or days. Such prolonged spats could also significantly influence things like recovery after surgery, since preoperative stress might result in increased risk of infection, longer hospital stays and higher medical costs. *The Honeymooners* might well have been headed for trouble and Ralph Kramden is probably fortunate that he never needed any emergency surgery.

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