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TYPE A AND CORONARY DISEASE: SEPARATING FACT FROM FICTION

KEYWORDS: "hurry sickness", Structured Interview, competitiveness, Cook-Medley Hostility "Ho" scale, Sisyphus, behavior modification, cardiovascular reactivity

In 1959, a paper entitled "Association of specific overt behavior pattern with blood and cardiovascular findings" by Meyer Friedman and Ray Rosenman appeared in the *Journal of the American Medical Association*. My recollection is that the term "Type A behavior" was not mentioned. The following year, in an article in the same journal they reported a correlation between coronary heart disease and "overt behavior pattern A". Pattern A had components like competitive and aggressive conduct but the chief characteristic seemed to be an unusual preoccupation with time. Type A's tended to be engaged in a perpetual attempt to achieve as much as possible in the least time even though their goals were often unrealistic or nebulous.

Rosenman and Friedman subsequently provided further evidence that this behavioral pattern was a risk factor for coronary heart disease. They also showed that the standard risk factors of smoking, cholesterol and hypertension were significantly higher in Type A's.

Their 1974 best seller *Type A Behavior And Your Heart* stimulated studies by others and Type A soon became a popular term in everyday speech. Type A was subsequently acknowledged by a committee of authorities assembled in 1978 by the National Institutes of Health to be a significant risk factor for coronary disease in middle-aged U.S. workers. This was independent of smoking, cholesterol and hypertension but of the same magnitude as each of these.

The initial support and enthusiasm waned following several studies that failed to confirm the opinion of the NIH expert panel. One problem was that like stress, Type A meant different things to different people. Researchers also used different assessment or measurement methods so it is not surprising that they reached conflicting conclusions. Consequently, some have suggested that the initial concept and definition of Type A should be discarded, or at least revised.

In particular, it is proposed that "hostility" is the core component of Type A that correlates best with coronary disease. As indicated in previous Newsletters, I believe the evidence to support this is flimsy and that while "overt behavior pattern A" has evolved into the concept of "Type A coronary prone" behavior, the original observations and conclusions are still correct. To support my contention that Type A remains alive and well, I have gone to the source and asked Ray Rosenman to comment on the above and some related controversial issues.

Emotions, Personality And The Heart

The appreciation that emotional factors can have a powerful influence on the heart, and the acknowledgment of some intimate, although poorly understood, heart-mind connection, is certainly not new. Aristotle, and later Virgil, actually taught that the heart rather than the brain was the seat of the mind as well as the soul, and a similar belief can be found in ancient Hindu scriptures and other Eastern philosophies. Almost 2000 years ago, Celsus unwittingly commented on this mind-heart relationship by noting that "*fear and anger, and any other state of the mind may often be apt to excite the pulse*." Our earliest uses of the word heart clearly indicate its conceptualization as the seat of one's inmost feelings, temperament, or character. *Broken hearted, heartache, take to heart, eat your heart out, heart of gold, heart of stone, stouthearted,* are words and phrases we still use to vividly symbolize such beliefs.

William Harvey, who discovered that the blood circulated in vessels around the body due to the mechanical action of the heart was also aware that the heart was more than a mere pump. He wrote in 1628, "every affection of the mind that is attended either with pain or pleasure, hope or fear, is the cause of an agitation whose influence extends to the heart."

John Hunter, who during the 18th century elevated surgery from a mechanical trade to an experimental science, suffered from angina, and being a keen observer complained, "*my life is in the hands of any rascal who chooses to annoy and tease me*." He turned out to be somewhat of a prophet, since in fact an argument did precipitate his death from a heart attack. Napoleon's favorite physician, Corvisart, wrote that heart disease was due to "the passions of the mind", among which he included anger, madness, fear, jealousy, terror, love, despair, joy, avarice, stupidity, and ambition.

With respect to Type A traits, von Düsch, a mid 19th century German physician, first noted that excessive involvement in work appeared to be the hallmark of people who died from heart attacks. Several decades later, Sir William Osler, an astute clinician, succinctly described the coronary-prone individual as a "keen, and ambitious man, the indicator of whose engines are set at 'full speed ahead'" and later wrote that he could make the presumptive diagnosis of angina based on the appearance and demeanor of the patient in the waiting room. In the 1930s, the Menningers suggested that coronary heart patients tended to have strongly aggressive behavior, and Flanders Dunbar, who introduced the term "psychosomatic" into American medicine, characterized such individuals as authoritarian with an intense drive to achieve unrealistic goals. Fierce ambition and compulsiveness to achieve power and prestige were emphasized by subsequent investigators.

Around the same time that Friedman and Rosenman were developing their theory, Stewart Wolf independently described what he called the "Sisyphus" reaction". In Greek mythology, Sisyphus was condemned to roll a huge marble bolder up a hill, which, as soon as it reached the top always rolled down again. Wolf characterized coronary prone people as constantly striving against real but often self-imposed challenges, and even if successful, not being able to enjoy the satisfaction of achievement or relax. All of the above and other traits were included in the description of Type A summarized as follows.

Recognizing And Rating Type A Traits

Type A's tended to exhibit the following:

"(1) Self-imposed standards that are often unrealistically ambitious and pursued in an inflexible fashion. Associated with this is a

need to maintain productivity in order to be respected, a sense of guilt while on vacation or relaxing, an unrelenting urge for recognition or power, and a competitive attitude that often creates challenges even when none exist.

(2) Certain thought and activity styles characterized by persistent vigilance and impulsiveness, usually resulting in the pursuit of several lines of thought or action simultaneously.

(3) Hyperactive responsiveness often manifested by a tendency to interrupt or finish a sentence in conversation, usually in dramatic fashion, by varying the speech, volume, and/or pitch, or by alternating rapid bursts of words with long pauses of hesitation for emphasis, indicating intensive thought. Type A persons often nod or mutter agreement or use short bursts of laughter to obliquely indicate to the speaker that the point being made has already been anticipated so that they can take over.

(4) Unsatisfactory interpersonal relationships due to the fact that Type As are usually self-centered, poor listeners, often have an attitude of bravado about their own superiority, and are much more easily angered, frustrated, or hostile if their wishes are not respected or their goals are not achieved.

(5) Increased muscular activity in the form of gestures, motions, and facial activities such as grimaces, gritting and grinding of the teeth, or tensing jaw muscles. Often there is frequent clenching of the fist or perhaps pounding with a fist to emphasize a point. Fidgeting, tapping the feet, leg shaking, or playing with a pencil in some rhythmic fashion are also common

(6) Irregular or unusual breathing patterns with frequent sighing, produced by inhaling more air than needed during speaking and then releasing it during the middle or end of a sentence for emphasis.

Type A individuals generally try to do too many things at once, are often preoccupied with what they are going to do next, and tend to have few interests outside their work.

These activities have been described in detail to illustrate that Type A is an overt action-emotion complex that is evident only by personal observation of the individual. In clinical practice its evaluation requires a structured personal interview conducted by a trained investigator using standardized challenges designed to elicit the characteristics noted above. It is almost impossible to detect in the very sick, depressed, or detached individual. Accurate assessment therefore requires considerable expertise, making, large-scale studies relatively time consuming and costly.

A variety of questionnaires have been devised to detect such aspects of Type A behavior as competitiveness, ambition, impatience, hostility, preoccupation with work, or a constant sense Of time urgency. The most commonly used instrument, the Jenkins Activity Survey, detects three main behavioral syndromes: (1) hard-driving temperament, (2) job involvement, and (3) speed and impatience. Although the three scores derived correlate with the total evaluation, they are not necessarily related to one another, and the overall accuracy is only 50-60% when compared with the structured personal interview. It should be emphasized in evaluating any self-administered questionnaire that Type A individuals are often unaware of many of their behavioral patterns or will deny them. Every Type A will not necessarily exhibit all of the above characteristics, and conversely, some Type A traits can be found in Type B individuals.

As our understanding of this complex subject expands, it is possible that certain components of Type A behavior such as time urgency, latent hostility, aggressiveness, or authoritarianism may be found to have a greater predictive significance for coronary heart disease or correlation with certain hormonal secretion patterns, vascular hyperreactivity, and other phenomena that also mediate stress-induced myocardial damage."

The section, Recognizing And Rating Type A Traits, is abstracted from an article published over two decades ago.* There have been several developments since then that I was hopeful this interview could clarify.

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* Rosch, PJ. Stress And Cardiovascular Disease. Comp Ther; 9:6-13,1983

How A Basic Science In Cholesterol Metabolism Led To The Type A Concept

It is important to emphasize that Ray and Meyer (Mike) Friedman were cardiologists with no expertise in psychology. As noted, psychiatrists and others had previously described various characteristics in patients who seemed to be prone to heart attacks but these clinicians were not aware of this at the time. The careful observations that led to their Type A theory required an unusual combination of curiosity, diagnostic acumen and a bio-psychosocial approach to the patient as a person, rather than someone with symptoms and signs that required treatment in a cookbook fashion. They were the first to describe a comprehensive behavior pattern and why it might contribute to the development of coronary artery disease. (Editor's Note: Because of space constraints and concerns that certain terminology might be too technical for many lay readers, the following is an abridged and edited version of my interview with Ray. However, the complete interview including references is available on our web site at www.stress.org/TypeA.htm.)

PJR: My recollection is that you and Mike were primarily interested in cholesterol metabolism. What led you to move from this to studying the role of behavior in your coronary patients?

RHR: This evolved over several years. Mike and I were partners in our San Francisco clinical practice across the street from Mount Zion Hospital and Medical Center. Our Harold Brunn Institute for Cardiovascular Research building adjoined the hospital and following early hospital rounds we spent full mornings in the research lab and afternoons in the office. By 1950, although fat and cholesterol had long been fed to rabbits to produce vascular lesions, little was known about where plasma cholesterol came from or how it was metabolized. We also noted that this type of vascular damage was quite different from that seen in patients with coronary artery disease. We obtained Public Health Service and other grants to begin animal studies and Mike was able to solve many fundamental aspects of cholesterol metabolism. I was later able to delineate the mechanisms underlying low and high plasma cholesterol respectively in hypothyroidism and hyperthyroidism and what caused elevated lipids in patients with nephrosis. Around 1952, because of our growing interest in cholesterol, we obtained blood samples from private patients at every visit for (no-cost) accurate analyses at our research lab. We soon realized that their cholesterol levels were unrelated to diet or weight and that there were surprising fluctuations that we later studied.

We subsequently recognized and reported serious errors and omissions in papers by Keys and others about the contribution of diet to plasma cholesterol. The prevailing dogma, which still persists, was that coronary heart disease was due to an elevated cholesterol, which in turn resulted from increased dietary fat intake. Our own and other data that Keys had ignored in reaching his conclusions did not support this and reinforced our belief that socioeconomic influences played a more important role in the increased incidence of coronary disease as well as gender differences. A discerning secretary in our office practice told us that in contrast to our other patients, those with coronary disease were rarely late for appointments and preferred to sit in hard-upholstered chairs rather than softer ones or sofas. These chairs also had to be reupholstered far more often than others because the front edges quickly became worn out. They looked at their watches frequently and acted impatient when they had to wait, usually sat on the edges of waiting room chairs and tended to leap up when called to be examined. Her astute observations significantly reinforced our own awareness of similar behaviors that you have previously summarized.

PJR: Why did you decide to label this apparently male pattern of conduct "Type A" behavior?

RHR: We realized it was necessary to do a prospective study and I submitted a grant proposal that was twice rejected, and then successfully modified by a suggestion from the Public Health Service Director that we simply term the two behavior types as "Type A and B". After a site visit the grant was approved for two years. Later site visits led to grant extensions for long-term follow-up, largely due to the efforts of the remarkable

Dr. Stewart Wolf. We became good friends many years later through your annual Congress and other activities of the American Institute of Stress.

Which Type A Coronary Prone Behavior Characteristics Are The Most Important?

PJR: What finally convinced you that certain behavioral traits increased risk for a heart attack?

RHR: We increasingly observed certain behaviors in our coronary patients, then mainly males. When asked what they thought caused their heart problems, diet or cholesterol were rarely mentioned. Sociocultural influences and job stress topped the list. We also quizzed their wives and co-workers about this and certain behaviors and were surprised at how often their assessment was the same. The cluster of behaviors that emerged from these sources was far more common in males than females and it was also evident that the increased incidence of coronary disease had occurred mainly in men without any culpable changes of diet or prevalence of diabetes, hypertension or other risk factors. Nor could the latter explain large geographic differences in coronary disease across North vs. South Europe and elsewhere. Even when combined, the standard Framingham coronary risk factors accounted for only about one third of coronary disease patients in prospective studies. It became clear that these risk factors were only markers that might predict coronary events but did not cause them. They did not explain the striking geographic differences in prevalence and incidence of coronary disease in diverse populations with identical risk factor levels. It was obvious that additional factors should be considered.

PJR: In revisiting my graciously inscribed dog-eared copy of your 30 year-old best seller, I have the feeling that time urgency impressed you the most. What other traits were considered to be key indicators?

RHR: Mike and I differed about this. There was no doubt that the increased incidence of coronary disease had occurred in association with a faster pace of living or that our coronary patients often exhibited an overt sense of time urgency and impatience that he termed "hurry sickness." However, I didn't believe this was a dominant factor and became more concerned with subliminal behaviors. Competitive characteristics emerged for me as the cardinal Type A behavior.

PJR: Is it the presence of multiple traits or the severity of some that is most important in diagnosing Type A or predicting the likelihood that it will contribute to coronary disease? In other words, is there a difference between the original "global" Type A concept and what we now call "Coronary Prone" Type A behavior?

RHR: Yes and No would probably be the safest answer. This requires some explanation. We observed and described certain behaviors that coexisted, although these varied in severity in different individuals. This became the Type A behavior pattern and its relative absence was designated as Type B behavior pattern. We later realized that Type B was not only a relative absence of Type A behaviors, but also a different way of viewing and responding to stressors. The large scale Western Collaborative Group Study showed a strong relationship between Type A behavior pattern and coronary heart disease that could not be explained by association with any single or combination of standard risk factors and was just as powerful a predictor. This soon led psychologists to label it "coronary-prone behavior pattern." As you know, they used self-scoring pen and pencil questionnaires and vast statistical analyses to rate Type A but rarely seemed to validate the answers. They also avoided upsetting subjects. The Structured Interview assessment approach that we used was entirely different. It utilized trained interviewers who carefully observed a subject's behavior during their responses to verbal questions that were purposely designed to challenge and even upset them. Interviewers also varied the questions depending on the subject's behavior and paid less attention to the content of most answers. Some psychologists attempted to develop questionnaires to assess Type A behavior pattern and others tried to "dissect" or separate it into so-called component behaviors. However, I don't believe that humans can be separated into such selective single behaviors. Although Type A is a global constellation of highly inter-related behaviors, one Type A behavior may underlie most of the others and thus represents the dominant coronary-prone behavior for that

particular individual. After five decades of observation, I personally believe that the most important trait is fierce and often inappropriate competitive behavior.

What Is The Best Way To Diagnose Type A And/Or Determine Its Degree Of Severity?

PJR: You and Mike always emphasized that Type A is an "overt" behavior pattern that cannot be assessed by pen and pencil questionnaires. Do you still believe self-report instruments are inadequate for measuring Type A traits? Has any progress been made in these or other Type A assessment approaches since then?

RHR: As indicated, I believe that the Structured Interview (SI) currently remains the best methodology to assess Type A and B behavior patterns. Self-reports fail to capture these because of inherent bias on self-appraisal and poor self-insight. Moreover, they poorly capture the stylistics and psychomotor behaviors that are essential to the construct of Type A and its assessment. Severe Type A's may often view themselves as relaxed and easy-going and slow Type B's as fast-paced. Unfortunately, self-report questionnaires were rarely validated by those who use them in so many published Type A studies and this has led to considerable confusion in this field. The Thurstone Temperament Survey's Activity Schedule and Gough Adjective CheckList measure only selective Type A behaviors. Others were designed to duplicate the SI, like the Jenkins Activity Survey, Framingham Type A Scale, Vickers Scale and some newer scales, but all fail to assess certain important Type A behaviors. Such self-report measures assess different behavioral characteristics and individual perception of attitudes, attributes, and activities, but exhibit only modest correlation among themselves or with SI results. Aside from content-dependent items, important psychological differences limit their use in different cultures and populations. The development of the promising behavioral Bortner Scale ended with its author's unfortunate premature death. Assessing Type A behavior from SI's administered by others is probably more accurately done from video-taped interviews. Friedman tried to quantify component behaviors from such SI's with a numerical scoring system but agreement among observers of the same interviews or repeat scoring by the same persons is usually less than adequate.

PJR: Type A was considered to be an adult male behavior but time urgency, hostility and competitiveness seem to have increased in women and even young children. What factors have contributed to this?

RHR: I am no authority. Children have always been more or less Type A (or B), perhaps most apparent in their pace of activities and competitiveness. Frankenhaeuser noted increasing similarity between younger boys and girls studied over many decades and I believe that Type A behavior is more prevalent in all ages in Western societies as an American urban pace of life was adopted. There seems little doubt that women became more Type A in the U.S. as they entered male-dominated work areas and adopted the faster pace of life that has affected all ages and sexes.

PJR: What is meant by "free floating" hostility and how can this be detected or measured?

RHR: I really don't know. Terms like free-floating hostility, cynical mistrust and the like seem to be used simplistically, without either definition or validation. It is amusing to see so many studies quoting each other, albeit none defining what they are talking about. As a cardiologist I am very confused by the vast array of anger-hostility terms used by psychologists - like anger-in and -out, hostility-in and -out, verbal and silent hostility, and other similar terms. Megargee authoritatively states that those who attempt to relate dimensions of anger, hostility or aggression to cardiovascular disease may operationally define different constructs by using a confusing array of dissimilar techniques in their studies, too often interchangeably and without appropriate differentiation. He notes the ambiguity and inconsistency in how these constructs are defined, separated, or overlap, and the lack of agreement on how they are measured. The recognized problems with anger/ hostility constructs appear to be particularly relevant for the Cook Medley Hostility or "Ho" Scale, which is the questionnaire that is most widely used. Its original correlation with hostility was made in teachers, adults convicted of violent crimes, and suicidal outpatients, and do not generalize to the normal population. The "Ho" scale correlates with anger, cynicism,

mistrust, psychosocial or physical distress, social maladjustment, ineffective coping style, and poor social support. It thus appears to be a measure of neuroticism and general psychopathology rather than a standard for rating hostility.

The Significance Of Hostility And Other Controversial And Confusing Concepts

PJR: In the light of these findings why is the "Ho" Scale used so widely to measure hostility?

RHR: As you can see, this is a self-perpetuating myth. I have read so many studies by psychologists that superficially quote the initial two studies claiming the "Ho" Scale measured hostility and relating this rating of hostility to coronary disease. Their authors wanted "hostility" to replace Type A behavior pattern as the coronary-prone behavior. However, I have yet to find any such study that appears to have reviewed the facts. Surprisingly, or perhaps not, the Duke group continues to use "Ho" as a measure of hostility despite their own recognition of this fallacy. Megargee notes, "The 'Ho' scale is not a reliable measure of hostility or overtly aggressive behavior and does not correlate with other psychometric measures of hostility." He further states that "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."

PJR: Does Type A behavior pattern have any significant relationship with "Ho" scale measurements?

RHR: No. Type A behavior is correlated with psychometric measures of self-confidence, tolerance, vigor, and achievement via independence and dominance. The strongest association with "Ho" is another MMPI scale that measures social desirability, and high scores characterize neurotic persons with attributes of psychopathology not seen in Type A's. Unlike "Ho", Type A does not predict general illness or all cause mortality. In contrast, high "Ho" scores also correlated with deaths from cancer and all causes in the two studies that linked it to coronary mortality. In addition, it is important to emphasize that in these and other studies, high "Ho" scores failed to predict either the incidence or severity of coronary heart disease.

PJR: Is there such a thing as a "healthy" Type A? Do productive Type A's who are in control and achieve their goals fare better than others with identical traits but who, like Sisyphus, are constantly frustrated?

RHR: Although disputed by Homer, the gods had condemned Sisyphus to ceaselessly roll a large rock to the top of a mountain whence the stone would fall back of its own weight, since they thought, with some justification, that there is no more dreadful punishment then futile and hopeless labor. Regardless, I never considered either Type A or B behavior patterns to be healthy or unhealthy. Just as some people are shorter or taller or have black or blonde hair for entirely natural reasons, people are more or less Type A or B for genetic and other entirely natural reasons, albeit variably later modified by all of the many factors that influence such behaviors at different stages of life. I consider "ceaseless" inappropriate competitiveness as the dominant coronary-prone Type A behavior and, since it is not physiological, to be unhealthy. In contrast to a poorly defined hostility construct, enhanced and inappropriate Type A competitiveness is the "toxic" factor in Type A behavior since it appears to have the seminal importance for Type A aggressive drive, accelerated pace of activities, impatience, and Type A hostility.

PJR: Is there any evidence that behavioral modification using "stress inoculation" and other approaches can reduce Type A behavior? Is it true that, following a heart attack, Type A's are actually at less risk for a subsequent coronary event compared to Type B's?

RHR: I have found in my own clinical experience that Type A's can frequently modify inappropriate behaviors that may reduce their risk for recurrence of coronary events. After a heart attack, Type A's can fare more easily and change their attitude so that they now often say the "hell" with this or that. I also believe that there may be some evidence to support the belief that behavior modification can reduce certain Type A behaviors before a heart attack occurs. However, I think successful modification requires specific attention to these Type A behaviors, rather than to general "stress inoculation" approaches. If we disregard the possible influences of behavior modifications, I

doubt that we have enough valid follow-up studies to know if Type A's are at less risk for recurrent events, presumably because they are more apt to eliminate unhealthy Type A behaviors and other risk factors.

Is Type A Simply Another Form Of Stress That Contributes To Coronary Disease?

PJR: Although Type A's have exaggerated cardiovascular responses to stressors and Type A is often viewed as another example of how stress can contribute to coronary disease, you have long maintained that Type A and "stress" are quite different in this regard. Could you comment on this?

RHR: Like hostility, the word "stress" seems to have many different meanings to different people. I am amazed at how many books and vast numbers of publications use the word stress so glibly and entirely without definition. I think that what most people call stress actually refers to anxiety or feelings of mental and emotional strain. Cardiovascular reactivity to a great variety of physical and mental stressors has been widely studied for many decades, with literally thousands of published studies. In reviewing this subject for a publication, I was amazed at the plethora of such studies and also at how many had been so poorly conceived and done so simplistically.

Behaviorists have long assumed that exaggerated reactivity plays a causal role in hypertension and coronary artery disease. However, there is little if any data to support a belief that behavioral differences of cognitive perception of stressors account for observed differences of reactivity. Cardiovascular reactivity in the laboratory doesn't predict hypertension or account for differences of blood pressure variability in the natural environment. Hypertensives don't exhibit increased blood pressure variability. Antihypertensive therapy consistently fails to lower cardiovascular reactivity either in the laboratory or natural milieu, supporting the dual and largely independent regulation of the basal and reactive blood pressures. We must conclude that there is little support for the use of stress testing to delineate either the cause of hypertension, evaluation of hypertensive subjects, or efficacy of antihypertensive therapy. The same appears to be true for ischemic heart disease. People vary by height, weight, and a host of physical and other attributes, and also for cardiovascular reactivity. Since this is entirely physiological, I prefer the term cardiovascular responses, since it is a response and not a reaction to stressors that is being tested. As you can see, Type A behavior pattern and stress are quite different. Type A's rarely perceive stress and never admit to being stressed. Someone properly stated that Type A's cause stress in others, but rarely personally feel stressed. However, it is probably true that some factors in what we call stress do contribute to coronary heart disease. After all, it is difficult to escape this conclusion when one considers that the 20th Century epidemic of coronary disease cannot be blamed on diet or traditional risk factors, despite common misconceptions about such factors.

PJR: Many thanks for clearing up some of these confusing issues and it is reassuring to learn that the Type A Behavior Pattern you have described is alive and well. I regret that we did not have enough space to transcribe your complete responses, but have tried to condense and edit them to retain their meaning. However, the entire interview and references will be available on our web site at www.stress.org/TypeA.htm.

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