Life, Stress & Cardiovascular Disease

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Disclosure Statement of Financial Interest

- **I, (Sibu Saha),**

DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation

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Education Need/Practice Gap

A major practice gap exists in the management of stress in heart and vascular health of the patient. Providers need to be aware of current treatment options to reduce stress levels to improve cardiovascular health.

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- # Learning Objectives

Upon completion of this learning activity, you will be able to:

1. Review the impact of stress on the CV system.
2. Describe techniques of stress management.

Expected Outcome

The desired change/result in practice is to improve the use of available treatment options in cardiovascular disease.

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Learning Objectives

- What is "*broken heart syndrome*"?
- What is the impact of stress on cardiovascular system?
- How do you manage?

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“Stress is 15th leading cause of death.”

Curr Cardiol Rep. 2019 Jan 10;21(1):1. doi: 10.1007/s11886-019-1086-z.

Genetic Risk, Adherence to a Healthy Lifestyle, and Ischemic Heart Disease.

Whayne TF Jr[1,2], Saha SP[3].

Abstract

PURPOSE OF REVIEW:

The purpose of this review is to investigate and discuss two aspects of coronary artery disease (CAD)-genetic risk and therapeutic lifestyle change (TLC)-both of which have key importance for patients and their care but which actually receive inadequate attention.

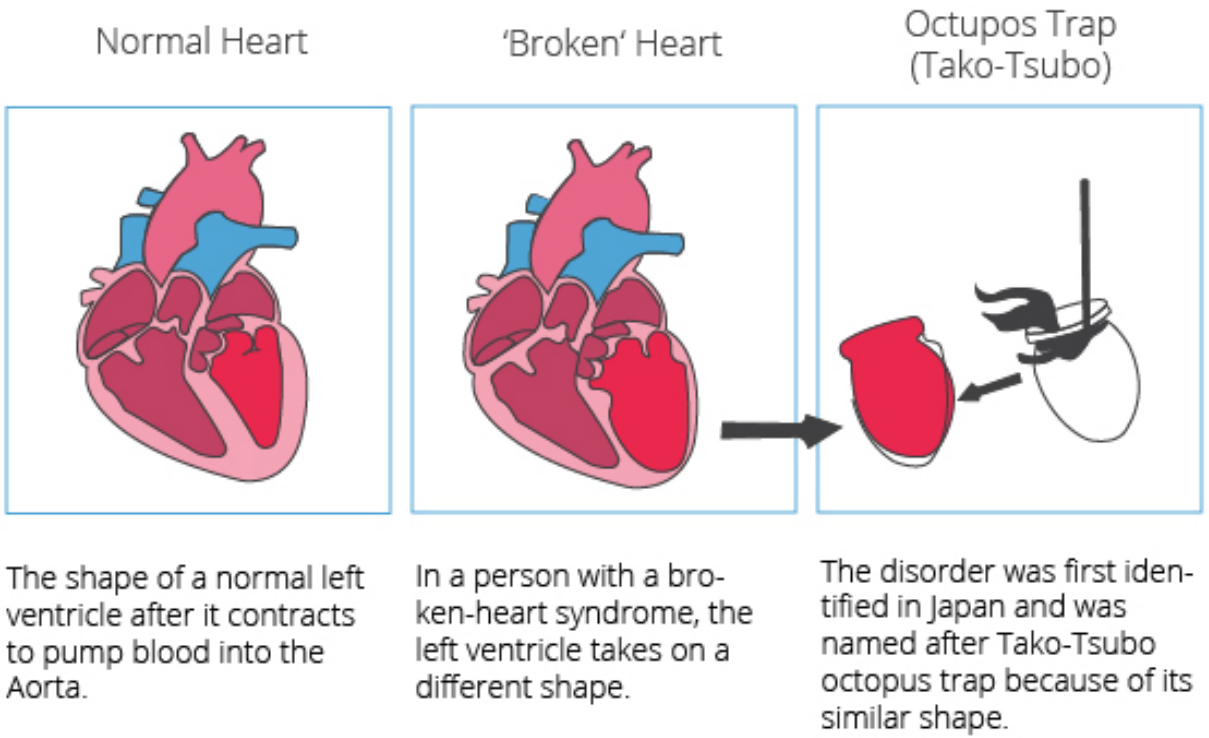
RECENT FINDINGS:

Genetic risk has generally been relegated to a broad association with the presence of one or more inherited cardiovascular (CV) risk factors such as hypercholesterolemia, family history of atherosclerosis, hypertension, and diabetes mellitus. However, the future of genetic risk is an understanding of specific genes, a genetic risk score, specific genetic loci known as selective nucleotide polymorphisms (SNPs), specific alleles, and microribonucleic acids (miRNAs). Healthy lifestyle is fashionably referred to as TLC and encompasses physical fitness, exercise, behavioral modification, diet, and stress reduction. In the past decade, aggressive treatment of cholesterol with statins has received the major emphasis for CV risk reduction. Genetics, of course, can only be modified by factors that influence epigenetics, and TLC could have an effect on genetics by this mechanism. On the other hand, each individual component of TLC has been shown to contribute to a reduction of CV risk. Although aggressive pharmaceutical approaches are now in vogue, whatever TLC can contribute, depending on the degree of individual patient adherence, should never be forgotten.

" For every affection of the mind that is attended with either pain or pleasure, hope or fear, is the cause of an agitation whose influence extends to the heart, and there induces change from the natural constitution,in the temperature, the pulse and the rest"

- Dr William Harvey, 1962

“Broken Heart Syndrome”
Stress Cardiomyopathy
Tako-Tsubo



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Stress, what is it?

- Stress is the body's response to a physical, chemical, emotional, or environmental stress.
- Stress reaction includes physiological changes in the body.
- Stress can be short term or long term and the effects are different on the body.

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Signs and Symptoms of Stress

- Physical: muscle tension, increased heart rate, aches and pains.
- Mental: forgetfulness, poor memory, constant worry.
- Emotional: anger, depression, mood swings, negative thinking.
- Behavioral: compulsive eating, explosive actions, withdrawal.

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Stress: An Everyday Event

- **Major stressors vs. routine hassles**
  - Cumulative nature of stress
  - Cognitive appraisals

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“My Life Stress”

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Factors Contributing to Stress

- Lifestyle changes
- Lack of sleep
- Job
- Exercise

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Types of Stress

- Emotional stress is
  - related to our feelings
  - linked to experiences with others
- Physical Stress
  - is related to physical exertion
  - can be healthy

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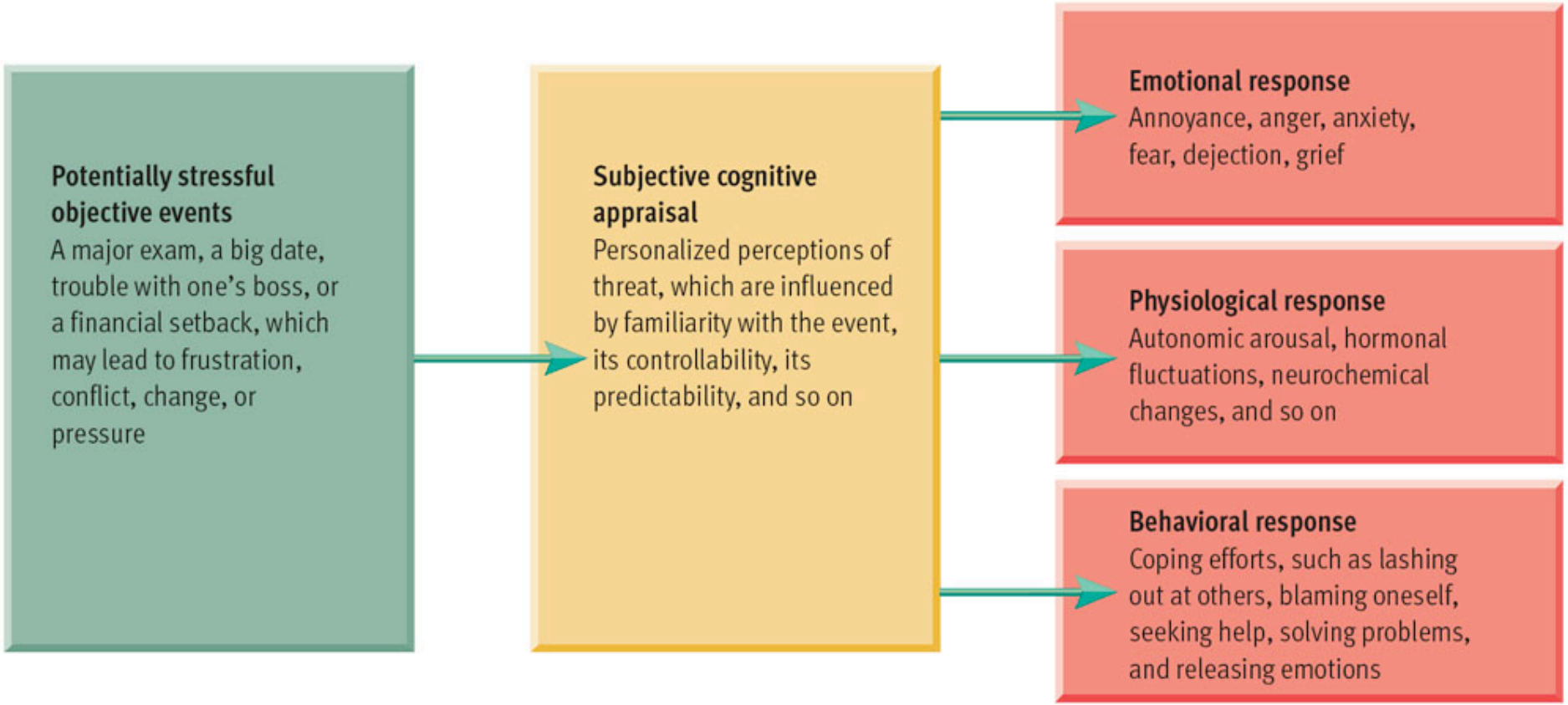
Overview of the Stress Process



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What Happens During Stress?

- Body releases a stress hormone
- Results in increased:
  - Heart rate
  - Oxygen demand and breathing rate
  - Tensed muscles
  - Blood flow
  - Alertness

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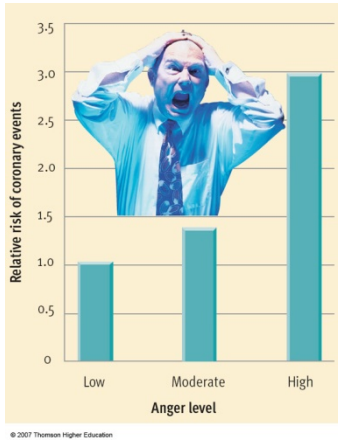
Effects of Stress: Physical

- Psychosomatic diseases
- Heart disease
  - Type A behavior - 3 elements
    - strong competitiveness
    - impatience and time urgency
    - anger and hostility
  - Emotional reactions and depression
- Stress and immune functioning
  - Reduced immune activity

Table 13.4 Health Problems That May Be Linked to Stress

Health Problem	Representative Evidence
AIDS	Stetler et al. (2005)
Appendicitis	Creed (1989)
Asthma	Lehrer et al. (2002)
Cancer	Dalton & Johansen (2005)
Chronic back pain	Lampe et al. (1998)
Common cold	Stone et al. (1992)
Complications of pregnancy	Dunkel-Schetter et al. (2001)
Heart disease	Theorell (2005)
Diabetes	Landel-Graham, Yount, & Rudnicki (2003)
Epileptic seizures	Kelly & Schramke (2000)
Hemophilia	Buxton et al. (1981)
Herpes virus	Padgett & Sheridan (2000)
Hyptertension	O'Callahan, Andrews, & Krantz (2003)
Hyperthyroidism	Yang, Liu, & Zang (2000)
Inflammatory bowel disease	Searle & Bennett (2001)
Migraine headaches	Ramadan (2000)
Multiple sclerosis	Grant et al. (1989)
Periodontal disease	Marcenes & Sheiham (1992)
Premenstrual distress	Stanton et al. (2002)
Rheumatoid arthritis	Keefe et al. (2002)
Skin disorders	Arnold (2000)
Stroke	Harmsen et al. (1990)
Ulcers	Levenstein (2002)
Vaginal infections	Williams & Deffenbacher (1983)



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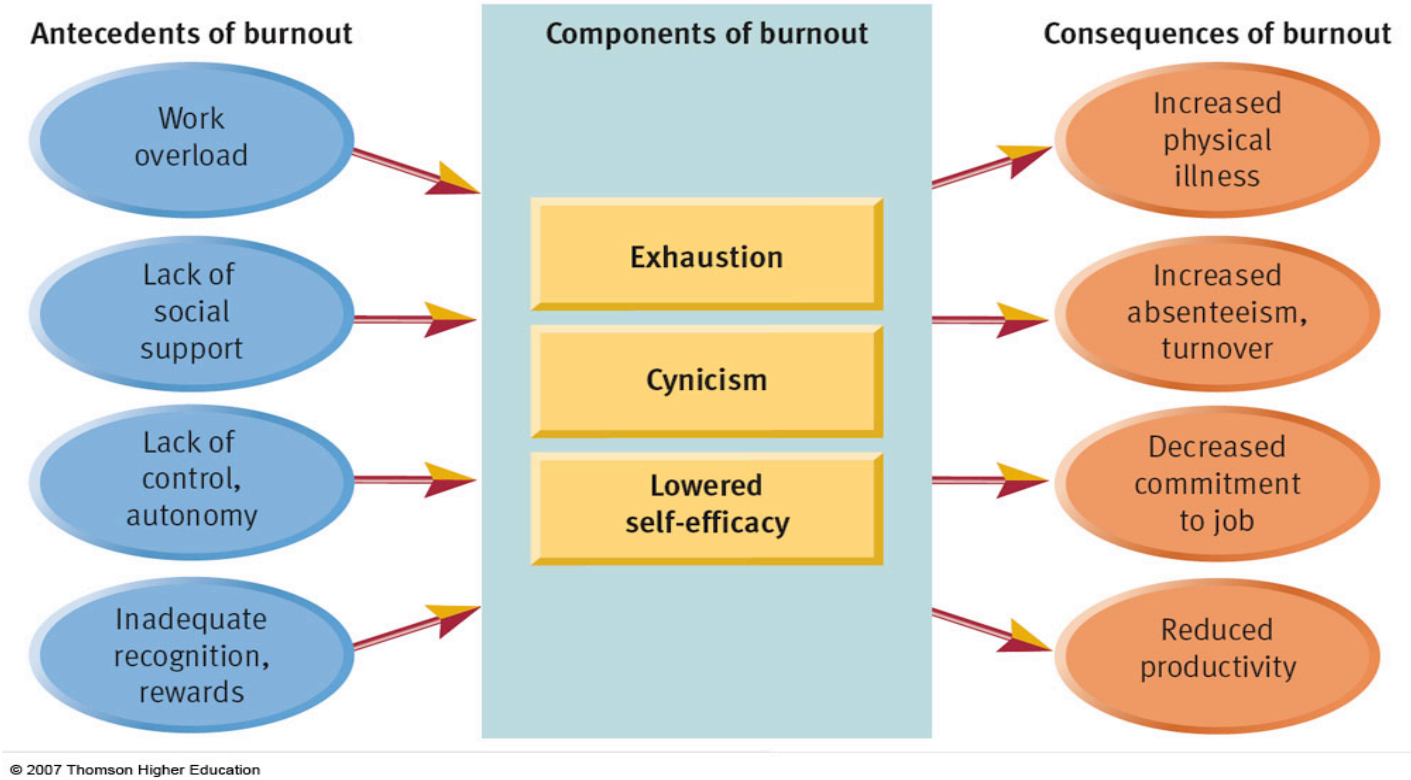
Effects of Stress: Behavioral and Psychological

- Impaired task performance
- Burnout
- Psychological problems and disorders
- Positive effects



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Responding to Stress Physiologically

- Physiological Responses
  - **Fight-or-flight response**
  - **Selye's General Adaptation Syndrome**
    - Alarm
    - Resistance
    - Exhaustion

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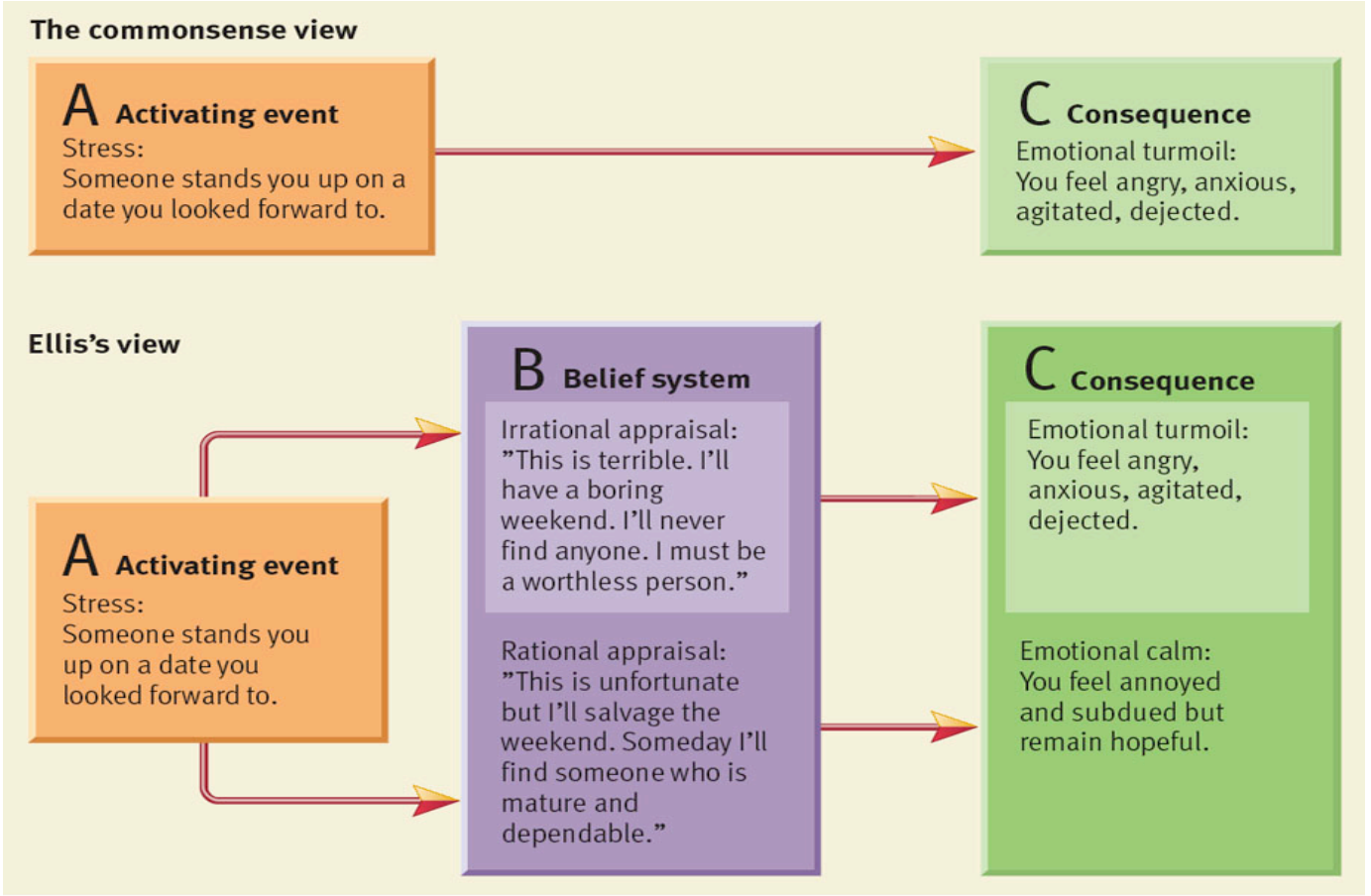
Responding to Stress Behaviorally

- Behavioral Responses
  - Frustration-aggression hypothesis
  - catharsis
  - defense mechanisms
- Coping
  - Reappraisal
  - Confronting problems
  - Using humor
  - Expressing emotions
  - Managing hostility

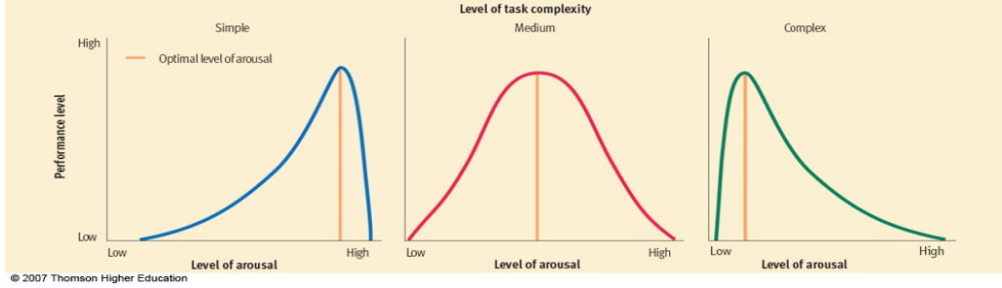


Responding to Stress Emotionally

- **Emotional Responses**
  - Annoyance, anger, rage
  - Apprehension, anxiety, fear
  - Dejection, sadness, grief
  - Positive emotions
- **Emotional response and performance**
  - The inverted-U-hypothesis

Specific Emotions	Correlation with Resilience
Negative Emotions	
Angry/irritated/annoyed	−.44*
Sad/downhearted/unhappy	−.29*
Scared/fearful/afraid	−.19
Disgust/distaste/revulsion	−.09
Positive Emotions	
Grateful/appreciative/thankful	.13
Glad/happy/joyful	.52*
Hopeful/optimistic/encouraged	.40*
Content/serene/peaceful	.47*

*Statistically significant



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Effect of Stress on the Heart

- Increased Heart Rate
- Increased Blood Pressure
- Increased risk of a heart attack.
- Increased risk for cardiac arrhythmias

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STATE-OF-THE-ART PAPER

Psychological Stress and Cardiovascular Disease

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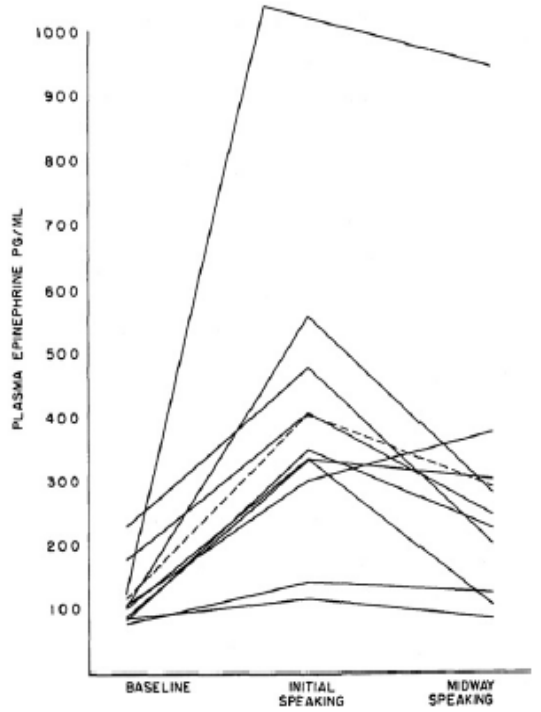

Figure 4 Effect of Public Speaking on Plasma Epinephrine

Plasma epinephrine response to different activities. Each **line** represents a single subject; the **dotted line** indicates the mean. Reprinted, with permission, from Dimsdale and Moss (7).

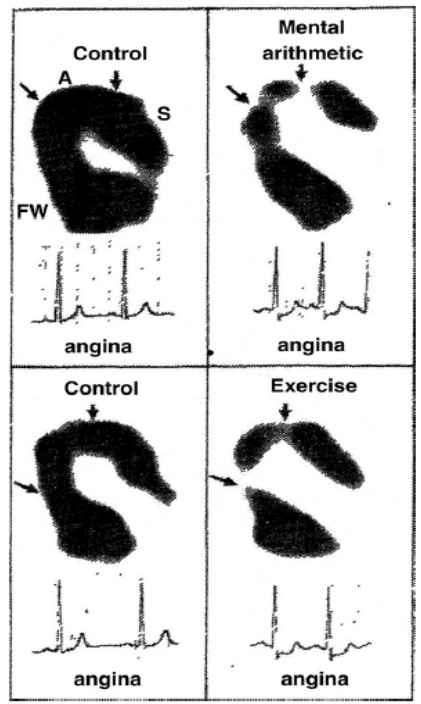

Figure 5 Effect of Mental Stress and Exercise on Regional Myocardial Uptake

Changes in regional myocardial uptake or rubidium-82 and in electrocardiogram in relation to chest pain before and after mental arithmetic or exercise. Control scans show homogeneous regional cation uptake. In the patient above there are defects in uptake **(arrows)** by the anterior wall with mental arithmetic and exercise, and these changes are accompanied by ST-segment depression and angina. A = anterior wall; FW = left ventricular free wall; S = interventricular septum. Adapted and reprinted, with permission, from Deanfield et al. (9).

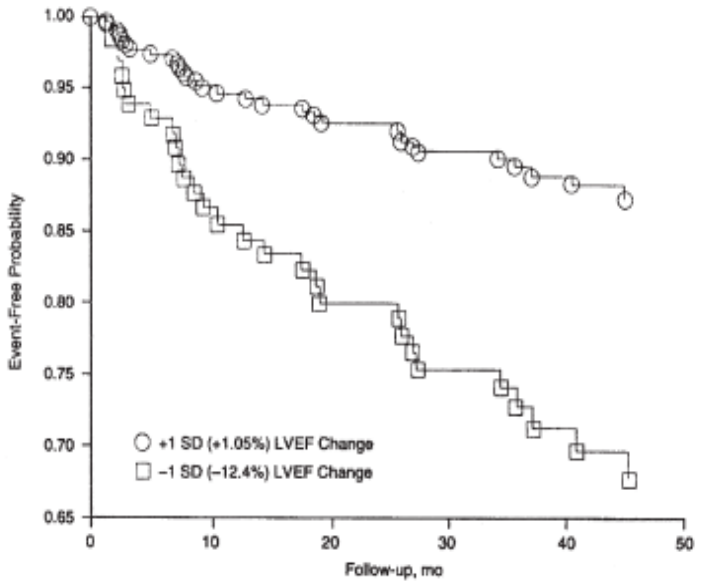

Figure 6 **Probability of Cardiac Event–Free Survival in Patients With and Without a Stress-Induced Drop in LVEF**

Probability of event–free survival as a function of mental stress-induced left ventricular ejection fraction (LVEF) change plotted at 2 prototypical values, 1 standard deviation (SD) below (LVEF change = −12.40%) and 1 SD above (LVEF change = +1.05%) the mean of the entire sample (LVEF change = −6.73%). Curves are adjusted for baseline LVEF, history of myocardial infarction, and age. The risk ratio associated with the lower curve compared with the higher curve is 2.40 (p = 0.02). Reprinted, with permission, from Jiang et al. (12).

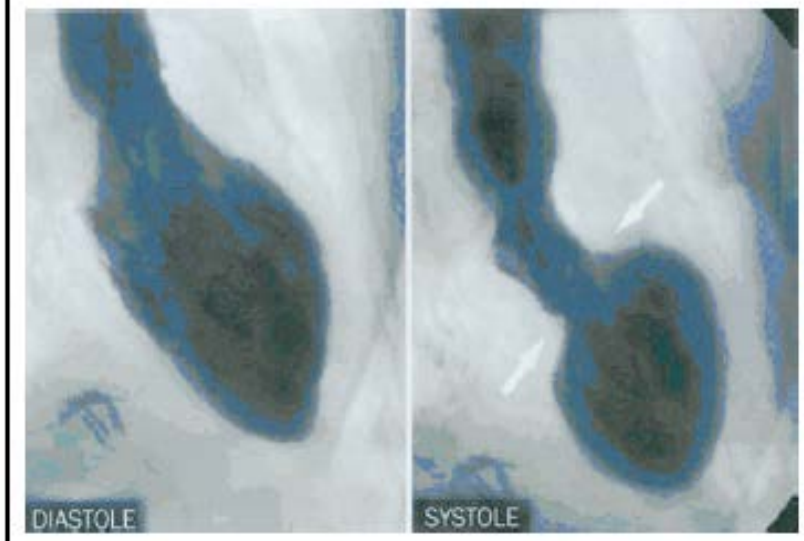

Figure 7 **Angiogram in Stress Cardiomyopathy**

Left ventricular angiogram in diastole **(left)** and systole **(right)** in right anterior oblique projection demonstrating wall motion abnormality characteristic of stress cardiomyopathy. At end systole, left ventricular chamber adopts distinctive "short neck with round flask" configuration in which distal (apical) portion is akinetic/hypokinetic whereas, in contrast, the remaining proximal (basal) segment is hypercontractile (sharp area of transition is shown by **arrows**). Reprinted, with permission, from Sharkey et al. (16).

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Long Term Impact of Stress

- Changes in heart rate
- Increased blood pressure
- Increased cholesterol level
- Increased triglyceride level
- Fat deposition around waist
  - Metabolic syndrome

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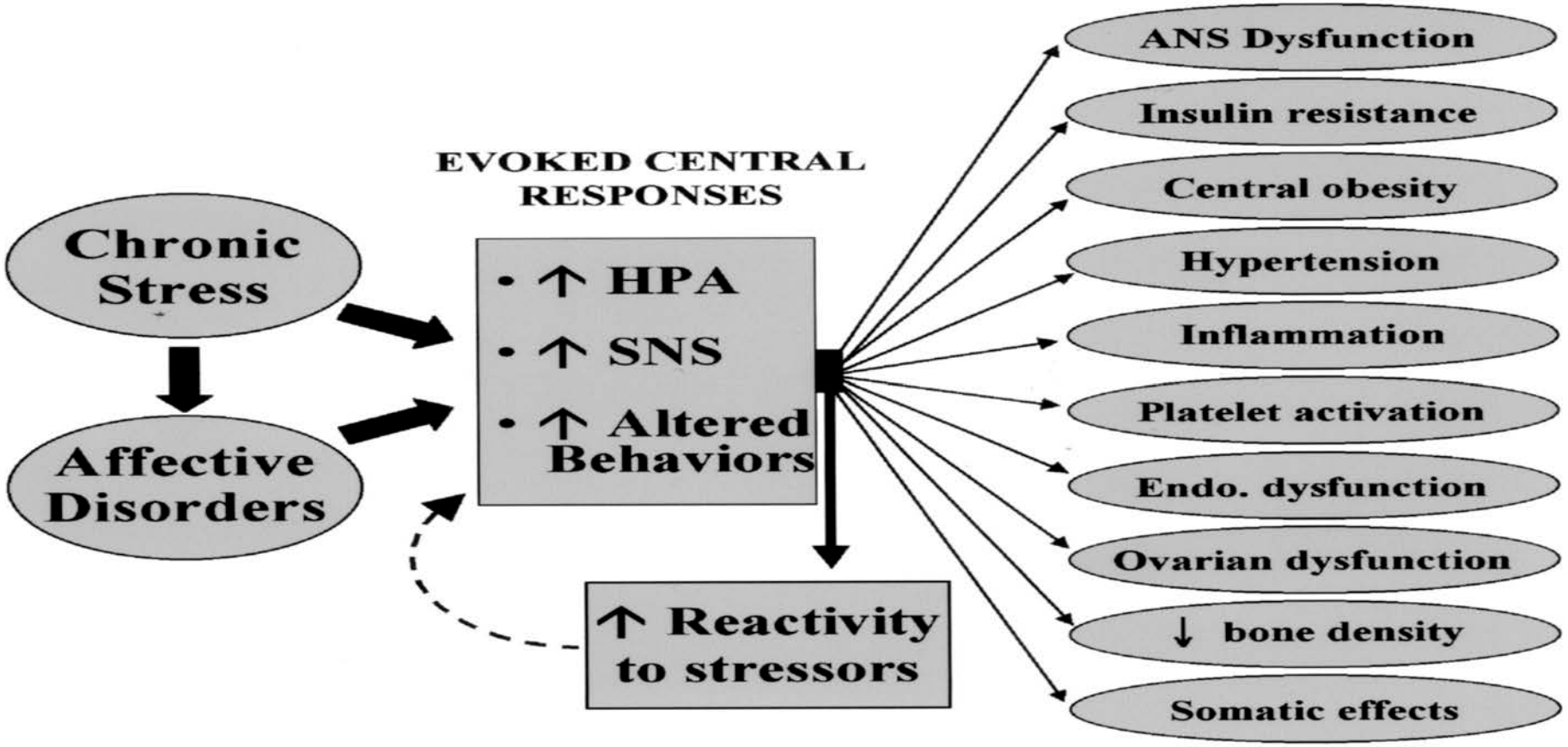
Proposed Mechanisms Relating Chronic Stress to Atherosclerosis



Rozanski et al., JACC 2005

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Depression and CHD

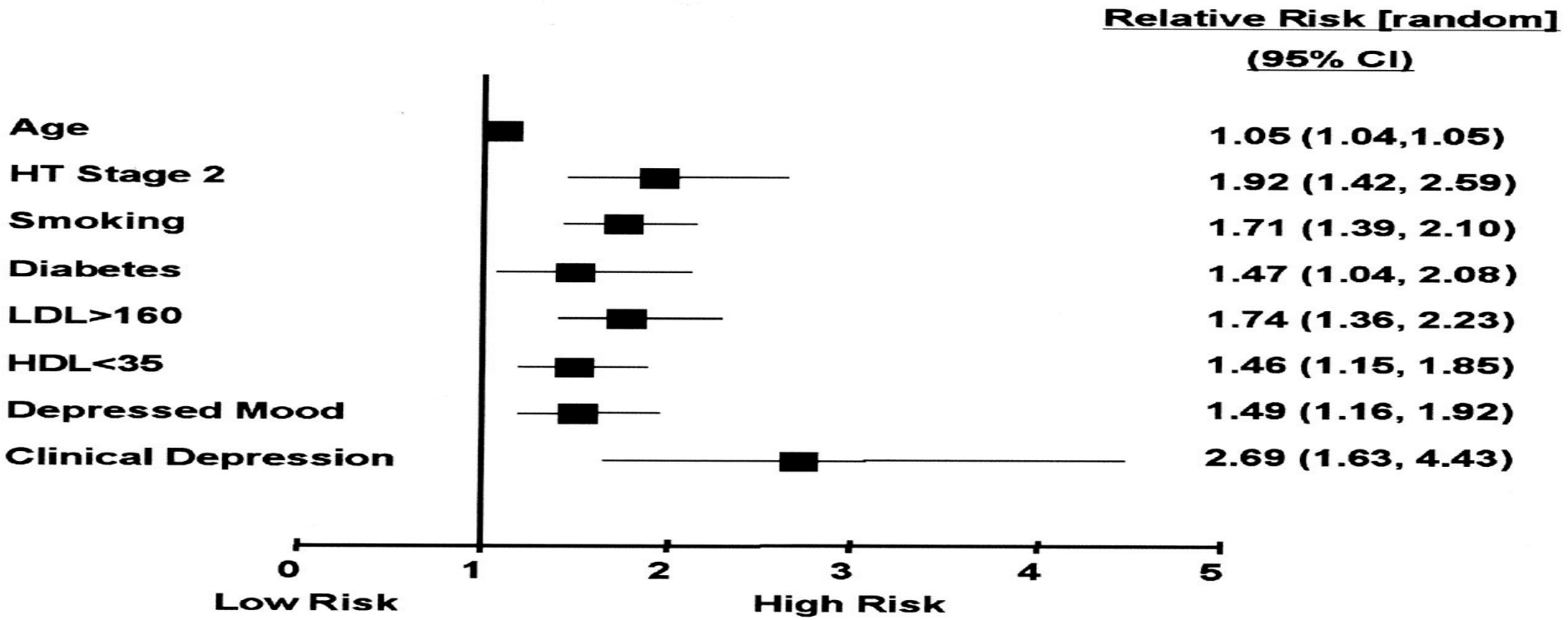

Figure 4. The risk ratios for traditional risk factors reported for men in the Framingham study (28). The risk ratios for depressive symptoms and clinical depression are from a recent meta-analysis by Rugulies et al. (3). The risk ratios for traditional risk factors are for death due to cardiac disease, myocardial infarction, coronary artery insufficiency, and development of angina. For depressive symptoms and clinical depression, the risk ratios are for death due to cardiac disease and myocardial infarction. CI = confidence interval; HT = hypertension; LDL = low-density lipoprotein; HDL = high-density lipoprotein.

Depressive Symptoms and Cardiac Free Survival in Post-MI Patients

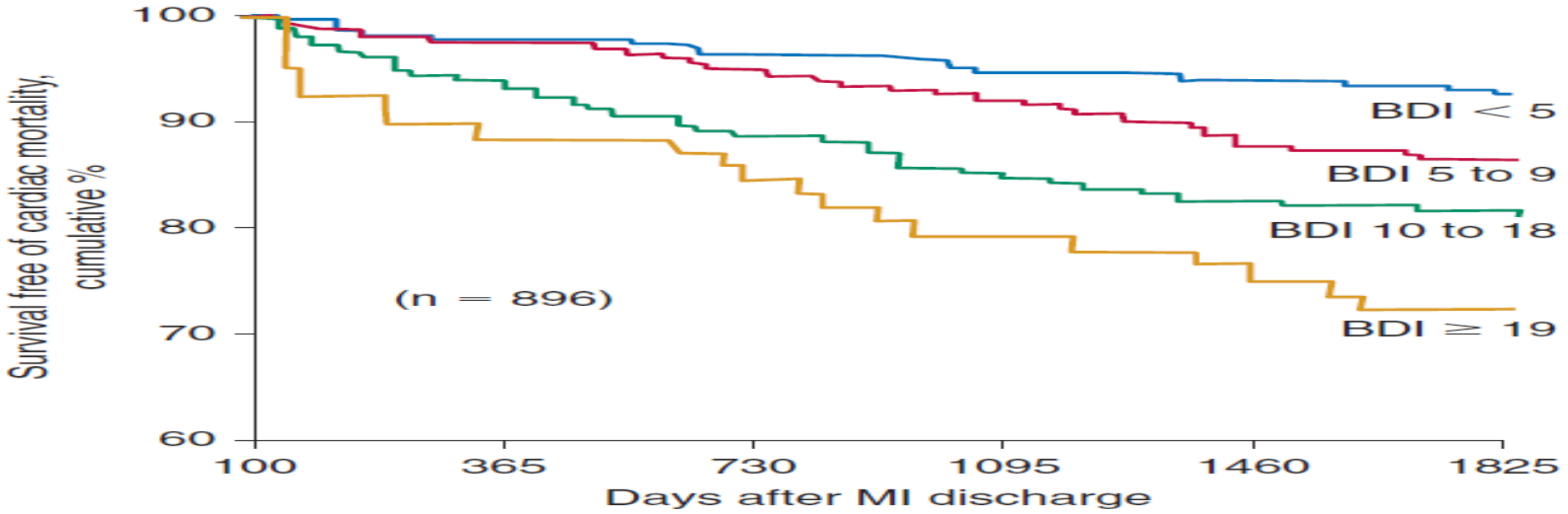

FIGURE 34-1 Grouping of post–myocardial infarction (MI) patients according to their Beck Depression Inventory (BDI) scores, ranging from those with no depressive symptoms (BDI < 5) to those with moderately severe depression (BDI ≥ 19). A gradient relationship was observed for frequency of death according to the magnitude of depressive symptoms. Notably, increased events occurred even among patients with mild depressive symptoms (BDI scores of 5 to 9).

Lesperance et al. Circulation 2002

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Job Strain and CHD

- Falk et al (Am J Pub Health 1992) showed job strain to be associated with a 2-fold increase in mortality this was amplified when accompanied with poor social networks.
- Other studies have shown a higher prevalence of MI in those with increased job strain, and higher job control to be associated with a lower prevalence of hypertension.
- Some studies have shown no relation of job demands or strain with hypertension or elevated blood pressure.

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Conceptual Models of Work Stress

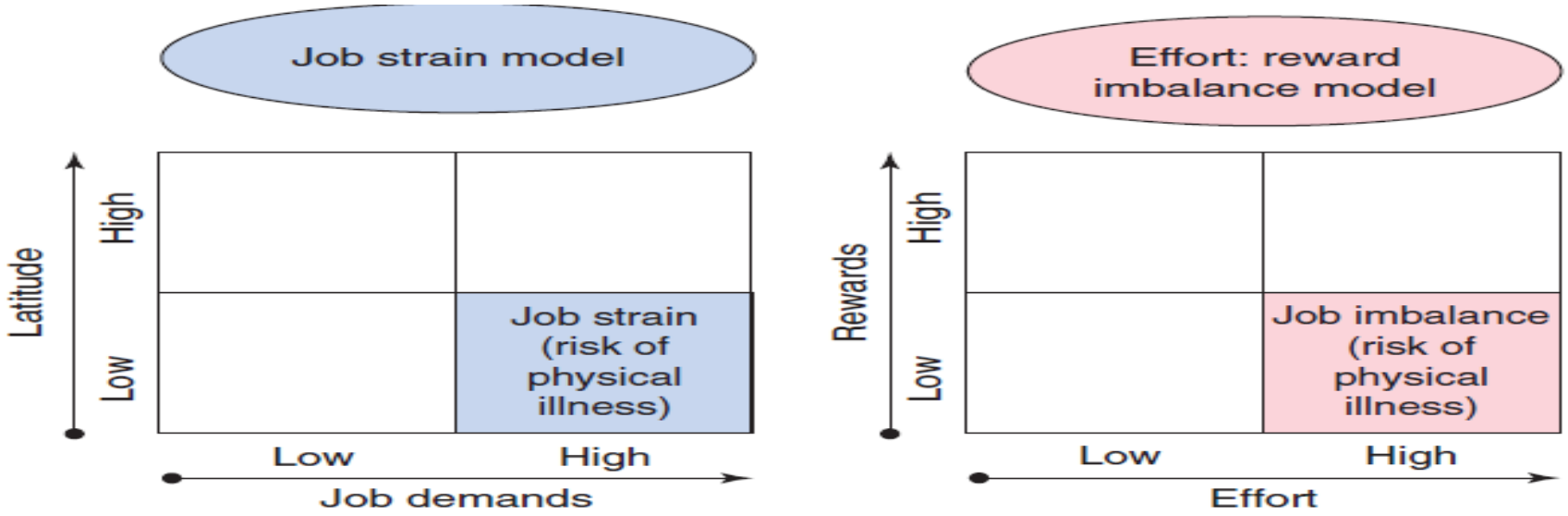

FIGURE 34-3 Two common conceptual models of job stress. The job strain model **(left)** is based on assessment of the amount of job demand and decision latitude at work. The presence of high demand but low decision latitude is characteristic of job stress. The effort-reward imbalance model **(right)** is based on assessment of job demand versus "reward" at work, whether financial or in terms of nonfinancial factors such as recognition, advancement, and prestige at work. High effort with low reward is characteristic of job imbalance. *(From Rozanski A, Blumenthal JA, Davidson KW, et al: The epidemiology, pathophysiology, and management of psychosocial risk factors in cardiac practice: the emerging field of behavioral cardiology.* J Am Coll Cardiol *45:637, 2005.)*

Effort-Reward Imbalance (ERI)

- This construct argues that risk is increased when workplace effort is not commensurate with tangible—eg salary or intangible—support rewards.
- Prospective studies show ERI predicts CVD incidence. even after adjustment for other risk factors.

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The Organizational Injustice Model

- The Organization Injustice Model, a more recent model, claims that stress-related disease occurs if an individual does not feel that he/she is treated fairly in the organization. A feeling of injustice was significantly associated with the risk of IHD in 2 analyses with male participants.

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The Effort-Reward Model

The Effort-Reward Model refers to the individual's experience of the balance between the effort made and the reward received.[9,41] According to the Effort-Reward Model, the most stressful condition occurs when the effort made is not followed by sufficient reward. Reward is not only a financial matter, but also includes the esteem associated with the work, as well as the security of the work and future prospects. An effort-reward imbalance, according to the model, will lead to stress. People with personalities characterized by over-commitment are more likely to accept such an imbalance, and face greater risk of becoming stressed.[41]

Arch Intern Med. 2005 Oct 24;165(19):2245-51.

Justice at work and reduced risk of coronary heart disease among employees: the Whitehall II Study.

Kivimäki M[1], Ferrie JE, Brunner E, Head J, Shipley MJ, Vahtera J, Marmot MG.

RESULTS: Cox proportional hazard models adjusted for age and employment grade showed that employees who experienced a high level of justice at work had a lower risk of incident CHD than employees with a low or an intermediate level of justice (hazard ratio, 0.65; 95% confidence interval, 0.47-0.89). The hazard ratio did not materially change after additional adjustment for baseline cholesterol concentration, body mass index, hypertension, smoking, alcohol consumption, and physical activity. Although other psychosocial models such as job strain and effort-reward imbalance predicted CHD in these data, the level of justice remained an independent predictor of incident CHD after adjustment for these factors.

- **CONCLUSION:** Justice at work may have benefits for heart health among employees.

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Am J Epidemiol. 2004 May 15;159(10):950-8.

Does job strain increase the risk for coronary heart disease or death in men and women? The Framingham Offspring Study.

Eaker ED[1], Sullivan LM, Kelly-Hayes M, D'Agostino RB Sr, Benjamin EJ.

Author information

Abstract

- Conflicting findings in the literature have made the relation between job strain and coronary heart disease (CHD) controversial. The effect of high job strain on the 10-year incidence of CHD and total mortality was examined in men and women participating in the Framingham Offspring study; 3,039 participants, 1,711 men and 1,328 women, aged 18-77 years, were examined between 1984 and 1987 and followed for 10 years. Measures of job strain, occupational characteristics, and risk factors for CHD were collected at the baseline examination. Before and after controlling for systolic blood pressure, body max index, cigarette smoking, diabetes, and the total/high density lipoprotein cholesterol ratio in Cox proportional hazard models, the authors found that high job strain was not associated with morality or incident CHD in either men or women over the follow-up period. Contrary to expectation, women with active job strain (high demands-high control) had a 2.8 fold increased risk of CHD (95% confidence interval: 1.1, 7.2) compared with women with high job strain (high demands-low control). For men, higher education, personal income, and occupational prestige were related to decreased risk of total mortality and CHD. These findings do not support high job strain as a significant risk factor for CHD or death in men and women.

The role of hypertension, left ventricular hypertrophy and psychosocial risks in cardiovascular disease: prospective evidence from blue–collar men

J. Siegrist ✉, R. Peter, W. Motz, B. E. Strauer

European Heart Journal, Volume 13, Issue suppl_D, 1 September 1992, Pages 89–95,

- Epidemiological studies have demonstrated that, compared with the population as a whole, there is increased cardiovascular morbidity and mortality among lower socio-economic groups. To explore determinants of the increased risk within this group, a prospective 6.5 year investigation of a cohort of 416 middle-aged (40.8 +/- 9.6 years) male blue-collar workers was undertaken. In addition to established somatic and behavioral risk factors, psychosocial influences that measured chronic occupational stress in terms of an imbalance between high effort and low reward were assessed. Multivariate logistic regression analysis shows that hypertension (odds ratio (o.r.) 3.85; 95% CI 1.59-9.34), left ventricular hypertrophy (o.r. 3.62; 95% CI 1.06-12.37), hyperlipidaemia (o.r. 2.55; 95% CI 1.08-6.00), status inconsistency (measuring low reward at work) (o.r. 2.86; 95% CI 1.04-7.80) and 'immersion' (measuring high intrinsic effort at work) (o.r. 3.57; 95% CI 1.22-10.47) independently contribute to the prediction of fatal or non-fatal cardiovascular events (acute myocardial infarction, stroke). Expected probabilities of cardiovascular events are clearly elevated if the combined effects of left ventricular hypertrophy and psychosocial risks are analyzed. In conclusion, increased incidence of cardiovascular disease among lower socio-economic groups is explained by a co-manifestation of established risk factors including left ventricular hypertrophy (by ECG) and psychosocial factors measuring chronic stress at work.

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The baroreflex function and the autonomic nervous system

- It is interesting to notice about the impairment or decrease of baroreflex sensitivity in front of some key factors for atherosclerosis, coronary myocardial disease and stroke, like in ageing, ingestion of sugars, in special high-fructose diets, and smoking. Indeed there are some studies showing that in bilateral carotid atherosclerosis and in greater intima-media thickness the baroreflex sensitivity is reduced or impaired.
- On the other hand the result of the baroreceptor improvement is the inhibition of the sympathetic nervous system and activation of the parasympathetic nervous system. Drugs like Betablockers and Digitalis glycosides may enhance baroreflex sensitivity with possible positive effects on atherosclerosis.

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β blockers, a double edged sword?

- A recent study confirm that the use of beta blockers do not appear to be of any benefit in three distinct groups of stable outpatients: those with coronary artery disease but no history of MI; those with a remote history of MI (one year or more); and those with coronary risk factors only.
- Also, the effect of betablockers as a treatment for primary hypertension has been questioned. In a meta-analysis study published at Lancet Journal in 2005 the authors say that the effect of betablockers compared to placebo is less than optimum, with no difference for myocardial infarction but with a raised risk of stroke.
- Moreover in a randomized trial study published in Lancet Journal in 2008 the authors say that there were more deaths in the metoprolol group than in the placebo group in patients undergoing non-cardiac surgery (129 versus 97 patients).
- So, while betablockers seems useful in atherosclerosis its poor results in these clinical situations might be related to their effects of generalized hypocontractility, as suggested by Dr. Mesquita in 1979.

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Positive Emotions and Well-Being

- Recent research has focused on positive psychological factors.
- Positive emotions have been defined to include happiness and states of being that reflect a positive engagement with the environment such as curiosity and interest.
- This gives the individual increased ability to cope with stress.
- Metaanalyses involving 70 studies shows positive well-being to be associated with lower mortality (Chida, Psychosom Med 2008).
- A study of 1238 elderly persons showed those who identified with a higher purpose in life had a 40% lower risk of mortality over 2.7 years (Boyle, Psychosom Med 2009).

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Purpose in Life and Mortality

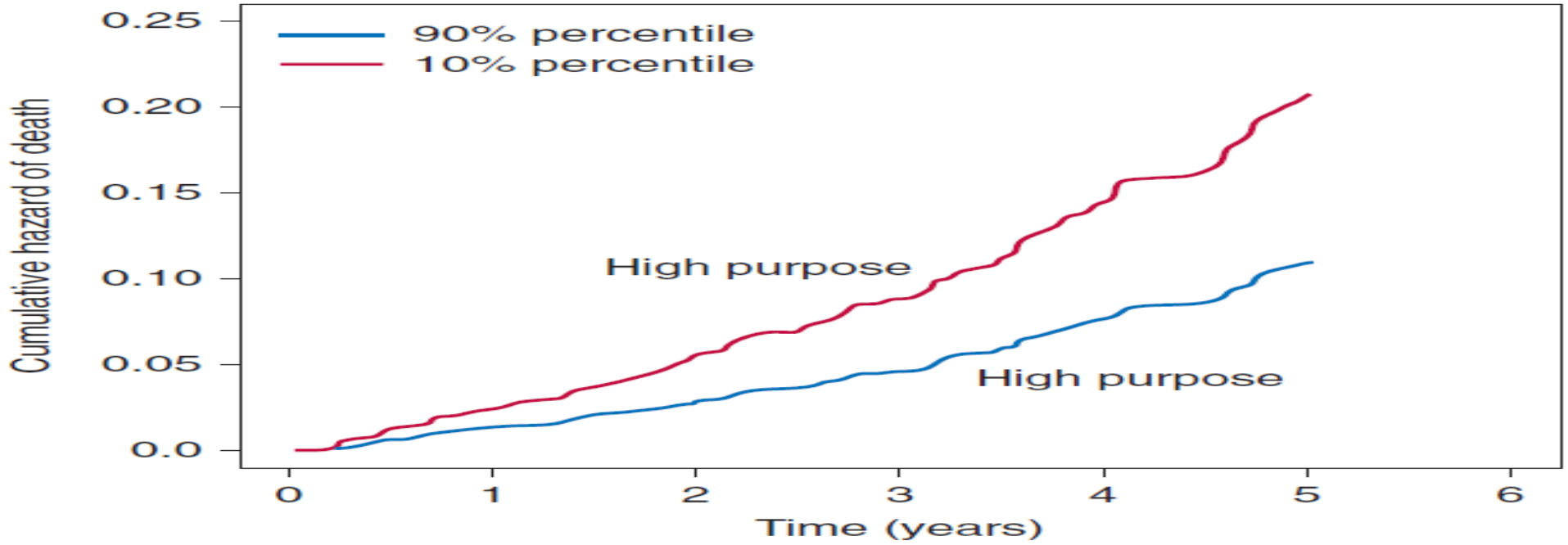

FIGURE 34-5 Cumulative hazard among 1238 older community-dwelling individuals observed for 5 years, according to the presence of a low versus high sense of purpose. The hazard rate for mortality in persons with high scores for purpose in life was about 57% of that for persons with low scores. *(From Boyle PA, Barnes LL, Buchman AS, et al: Purpose in life is associated with mortality among community-dwelling older persons.* Psychosom Med *71:575, 2009.)*

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Stress reduction show reversion or lower progression of atherosclerosis

- Regression of coronary atherosclerosis in women who were free of stress showed through the use of serial quantitative angiography;
- Decrease of carotid intima media thickness in African Americans with hypertension submitted to stress reduction through Transcendental Meditation ;
- Decrease in carotid intima media thickness in older persons with multiple factors for coronary heart disease submitted to the Maharishi Vedic Medicine treatment -- which also includes stress reduction through Transcendental Meditation program;
- Yoga intervention retards progression and increases regression of coronary atherosclerosis in patients with severe coronary artery disease .
- Slow breathing increases baroreflex sensitivity and reduce sympathetic nervous system with beneficial effects to coronary myocardial disease.

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Simple Ways of Coping with Stress

- Eating and drinking sensibly
- Remembering that it is okay to say no
- Stopping smoking
- Exercising regularly
- Relaxing every day
- Taking responsibility for your actions
- Examining your values and living by them
- Setting realistic goals and expectations
- Reminding yourself about things that you do well
- Getting adequate rest

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Factors Moderating the Impact of Stress

- **Social support**
  - Increased immune functioning
- **Optimism**
  - More adaptive coping
  - Pessimistic explanatory style
- **Conscientiousness**
  - Fostering better health habits
- **Autonomic reactivity**
  - Cardiovascular reactivity to stress

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Yin & Yang

Yin and yang

In Chinese philosophy, yin and yang describes how seemingly opposite or contrary forces may actually be complementary, interconnected, and interdependent in the natural world, and how they may give rise to each other as they interrelate to one another. Wikipedia

Hanyu Pinyin: yīnyáng

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Pessimism and Optimism

- Optimists tend to see negative events as temporary and positive events are more permanent; negative events are attributed to external causes rather than self-condemnation.
- Pessimists have an opposite explanatory style to events.
- One study of 7216 subjects showed the extent of pessimism to be directly related to the risk of all-cause mortality (Grodbardt, Psychosom Med 2009)
- In the largest such study, the Women's Health Initiative showed among 97,253 women that those those who were optimistic had a 30% lower rate of cardiac mortality (Tindle, Circulation 2009)

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Pessimism vs. Optimism and Cardiac Events

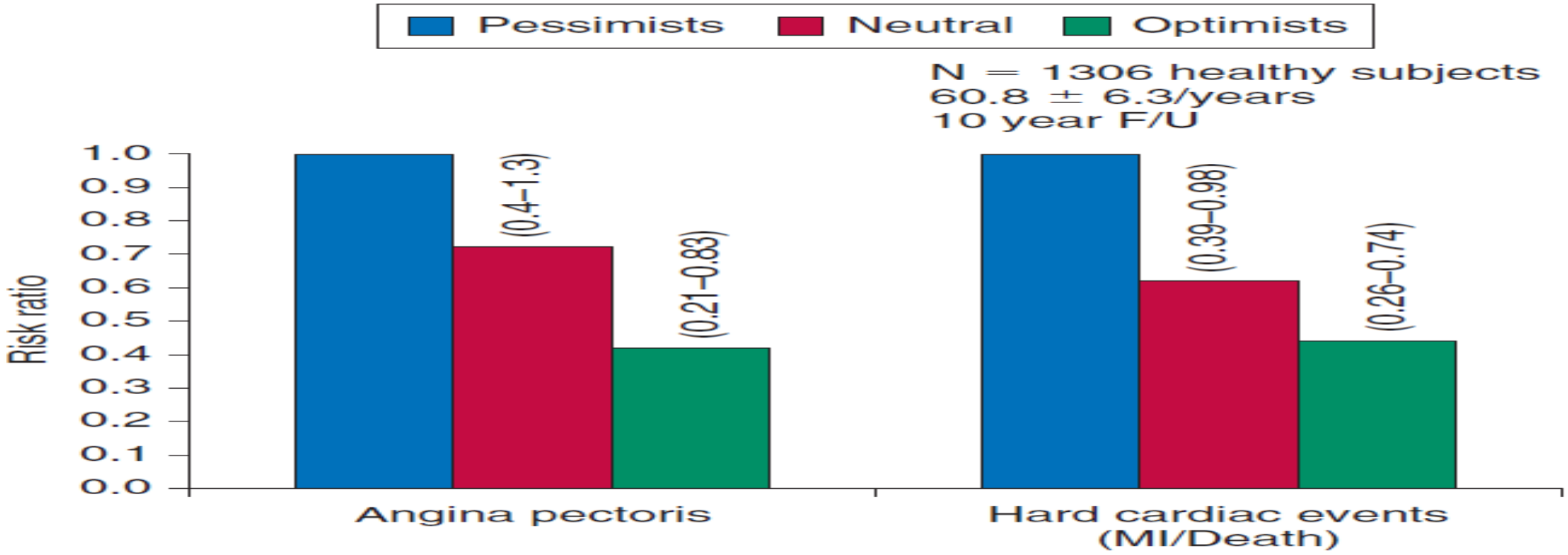

FIGURE 34-2 Occurrence of incident angina and hard cardiac events among 1306 healthy subjects in the Normative Aging Study, followed up for 10 years.[37] A gradient relationship was noted for outcomes for subjects classified as having a pessimistic, neutral, or optimistic explanatory speaking style.

Kubzansky LD, Sparrow D, Vokonas P, et al: Is the glass half empty or half full? A prospective study of optimism and coronary heart disease in the normative aging study. *Psychosom Med* 63:910, 2001.

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Managing Stress

- Some ways to prevent/manage the stress in your life include:
  - Avoiding situations that you know are stressful.
  - Exercising 30 minutes daily.
  - Eating a diet that is rich in fruits, vegetables, and whole grains.
  - Stopping smoking.
  - Limiting alcohol intake.
  - Managing stress by having quiet time, participating in meditation, prayer, reading, yoga, and other relaxation techniques.
  - Bonding with family and friends.
  - Expressing your feelings.
  - Making and keeping an appointment with a physician.

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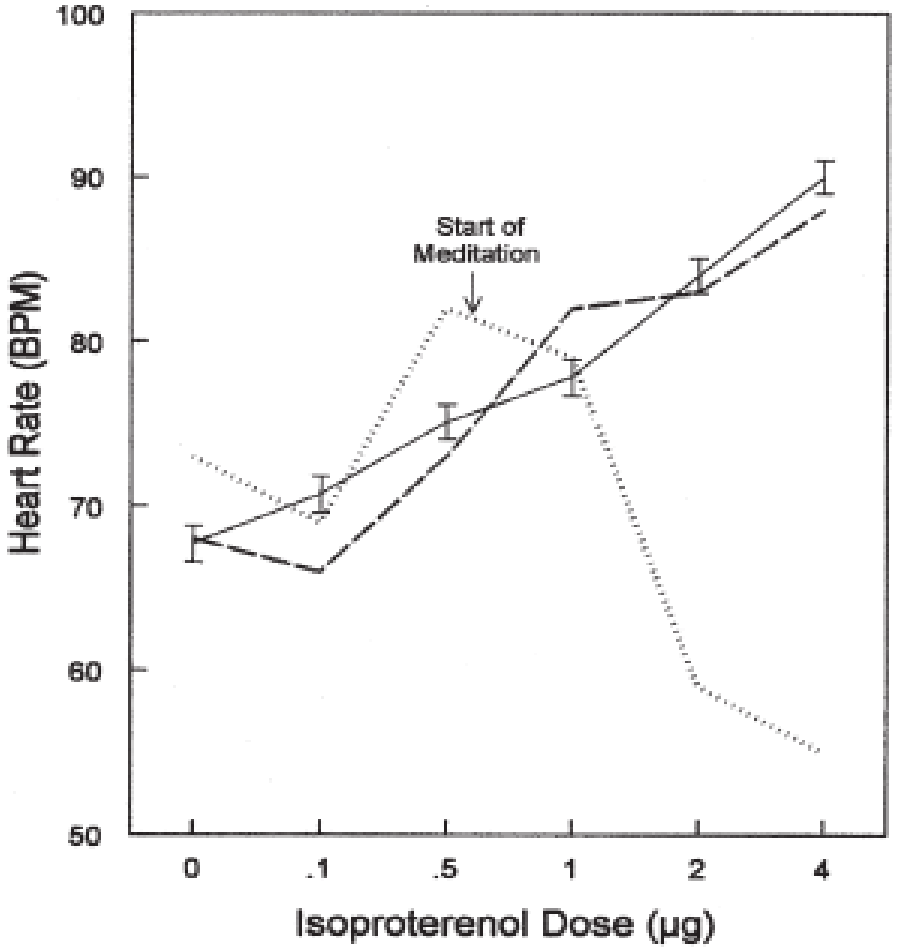

Figure 9 **Effect of Meditation on HR Response to Infused Isoproterenol**

Effects of meditation on chronotropic responses to isoproterenol. **(Solid line)** Mean ± standard error response to isoproterenol in 93 women; **(dotted line)** patient's response while meditating; **(dashed line)** patient's response while instructed not to meditate. BPM = beats/min; HR = heart rate. Reprinted, with permission, from Dimsdale and Mills (39).

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Treatment For Stress

- Relaxation Techniques
- Becoming Sensitive to Personal Needs
- Deep Muscle Relaxation
- Biofeedback Training
- Anxiety Management
- Anger Management/Stress Inoculation Therapy

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Summary

- Evidence of associations between a number of psychosocial factors--including depression, anxiety, hostility, social networks and support, and occupational stress with cardiovascular disease.
- Adverse psychosocial characteristics to cluster with traditional biological and behavioral risk factors
- The highest levels of psychosocial risk are generally found among the socially disadvantaged.

From Bennett and Berkman, Preventive Cardiology 2005

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Summary (cont.)

- Results of large-scale clinical trials of psychosocial interventions have been mixed with respect to their impact on CVD outcomes.
- Screening of certain psychosocial factors, especially depression, is recommended in the primary and secondary prevention setting.
- Greater consideration of psychosocial influences on cardiovascular outcomes and behavioral risk factors may enhance clinical efforts to improve both primary and secondary prevention outcomes.

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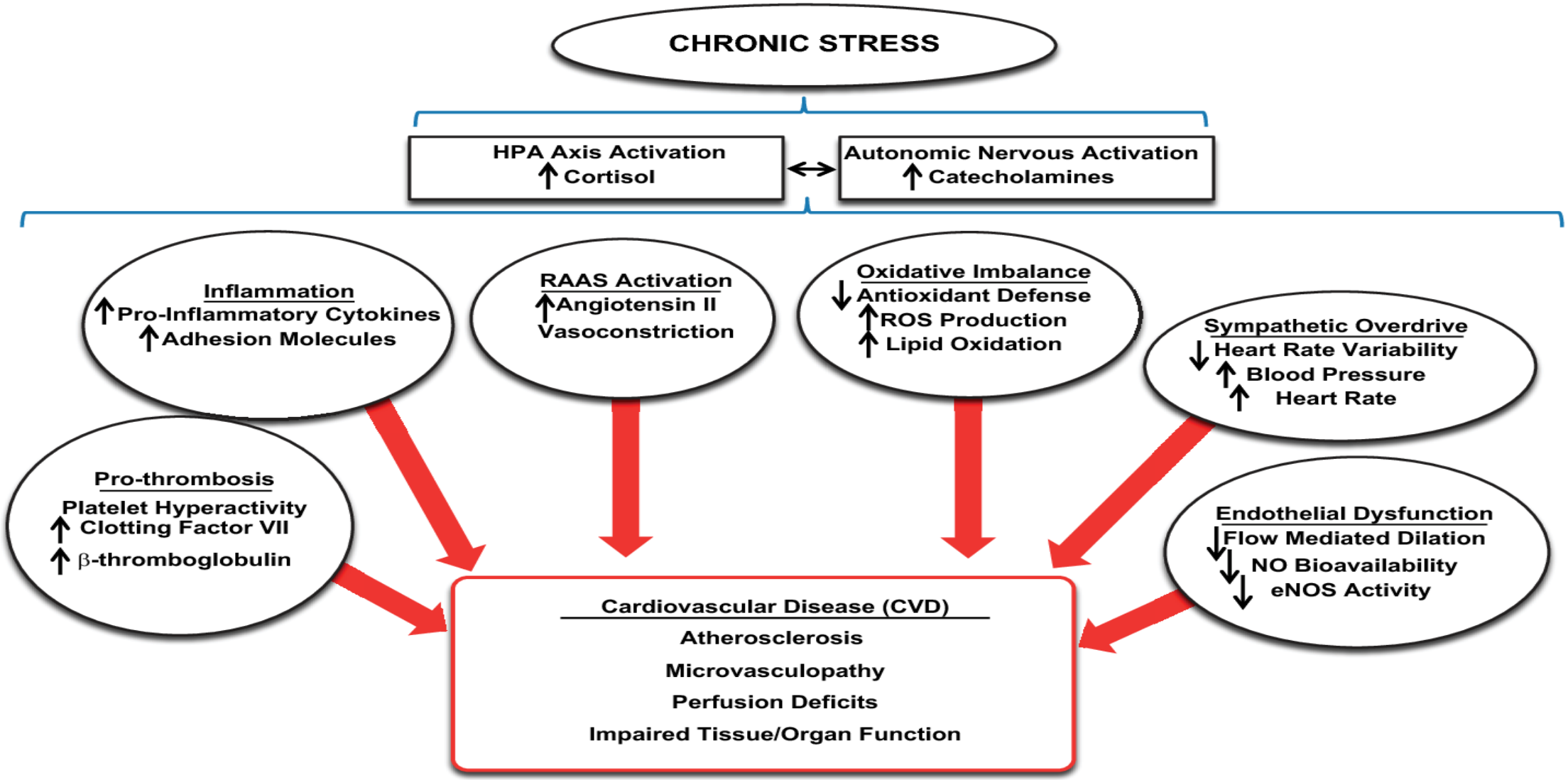

Some of the mechanisms involved in stress-induced cardiovascular adverse effects. HPA, hypothalamic-pituitary-adrenal; RAAS, renin-angiotensinaldosterone system; ROS, reactive oxygen species; eNOS, endothelial nitric oxide (NO) synthase.
Laher of Al: Stress and Cardiovascular Complications. Am J Physiol Heart Circ Physiol 308, 2015

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1964

THE EMOTIONS

Sibu Pada Shaha:
3rd. yr. M. B. B. S.*

Emotion is a disturbed or agitated state of mind characterized by a strong feeling of tone, as joy, sorrow, fear or anger. Emotions activate and energize behaviour and express our ideas, which give warmth and colours to life and create the very joy of living. It also gives a short of spark to the body systems resulting in a raised state of vitality which vivify and beautify life.

Our emotions are the heart of our mind. They are necessary and significant for the maintenance of mental functioning like the heart to the body for the continuance of cellular activities. Cessation of emotion (as in profound senility results mental death as the cardiac arrest causes somatic death.)

Most of the great achievements in the world are done emotionally. The writing of a great novel, engraving of a figure on a block of enduring beauty are no doubt subjective expressions of emotion. In fact, every great achievement in the world, mainly in arts, are emotionally, and not intellectually, inspired.

Emotion has got marked influence on our body. Arrest of emotion or conflict of emotions produces disharmony in the systems. Emotional conflict must be relelved or compromised, even if the compromise is pathologic. Functional disorders of vision and audition in the soldires of 1st world war, as their protection against horrible sights and sounds of the battle field, can be cited as an example of pathological relief of emotional conflict. Thyrotoxicosis in disappointed lovers can also be given as an example of pathological solution of interrupted emotion in love-life. Thus disease can be precipitated by emotional conflict.

THANK YOU

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