

# Heart Disease Occurs in a Social and Psychological Matrix: Risk Factors, Symptom Presentation and Adaptation

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## CHD is a Significant Public Health Problem

- In 2006, 631,636 people died of heart disease.
- Heart disease caused 26% of deaths—more than one in every four—in the United States.<sup>1</sup> (Heron MP et al., 2009)
- Heart disease is the leading cause of death for both men and women. Half of the deaths due to heart disease in 2006 were women. (Heron et al. 2009).

## CHD is a Significant Public Health Problem

- About 470,000 who have already had one or more heart attacks have another attack. (Lloyd-Jones et al., 2010)
- In 2010, heart disease will cost the United States \$316.4 billion from cost of health care services, medications, and lost productivity. (National Center for Health Statistics. Health, United States, 2008).

# Cardiac Risk Factors

- Conventional Risk Factors:
  - Gender (men >women until age 65)
  - Age
  - Family history
  - Diabetes

# Cardiac Risk Factors

- Modifiable Risk Factors:
- Hypertension
- Smoking
- Physical inactivity
- Even the best combination of conventional/modifiable risk factors do a suboptimal job of predicting new cardiac cases.

## Psychological Risk Factors: Negative Affective Dispositions

- Strongest evidence for Depression
  - Especially if patient has already had cardiac disease
  - Depressed Cardiac Patients have a two-fold risk of reinfarction.
  - Depression is also a cardiac risk factor in nominally healthy samples

## Psychological Risk Factors

- Evidence for Anxiety as a Risk Factor (Kawachi et al., 1994)- Phobic Anxiety
- Evidence for Hostility (T.Q. Miller et al., 1996; Williams et al., 2000)
- Global Type A behavior is not a reliable or robust risk factor.

## Two issues With Implications for Affective Cardiac Risk Factors

- First Issue
- Depression, Anxiety and Anger/Hostility are interrelated with correlations between .3 and .6
- (e.g., Clark, 1989)
- Measurement instrument overlap, construct overlap and mechanism overlap

## Leading to Three Non-Mutually Exclusive Scenarios\*

- Measurement overlap because instruments lack discriminant validity
- Construct overlap because the constructs are subsumed by the broader superordinate construct of Negative Affectivity
- Mechanisms of action (biologic/behavioral/social) may overlap
- \*Suls & Bunde, 2005, *Psychological Bulletin*, 131, 260-300.

## Implication

- Depressive symptoms, anxiety and anger/hostility have distinctive features BUT we don't know if it is the distinctive features or the common features that confer cardiac risk

## In Progress

- Epidemiological Studies are only beginning to consider both the overlap of psychological trait measures and overlapping vs. distinctive pathways of action leading to cardiovascular damage and dysfunction.

## The Second Issue

- Some affective dispositions are dynamically and reciprocally related to traditional cardiac risk factors or behaviors.
- e.g., smoking is correlated with depression (Luger, Lamkin & Suls, 2009)
- Odds Ratio = 1.65, *CI*= 1.48-1.84
- Both evidence for smoking -> depression And depression -> smoking.
- Reciprocal & Dynamic Relationships

# Hostility and Conventional Risk Factors

- Barefoot et al. (1991). Hostility and SES
- Bunde & Suls\* Meta-analysis of Associations between Cardiac Risk Factors and Cynical Hostility
- \**Health Psychology*, 2006, 25, 493-500.

# Meta-analysis: Hostility and Risk Factors

<b>TSC/HD L</b>	<b>BMI</b>	<b>WHR</b>	<b>Insulin</b>	<b>Glucose</b>	<b>Insulin Resist</b>	<b>SES</b>
<b>+.19</b>	<b>+.06</b>	<b>+.07</b>	<b>+.41</b>	<b>+.40</b>	<b>+.52</b>	<b>-.30</b>

## Depression and Cholesterol

- Shin, Suls & Martin\* Meta-analysis of studies assessing relationship between cholesterol and depression.
- High Total Cholesterol Associated with Lower Levels of Depressive Symptoms or Depression Diagnosis  $d = -.29$
- Even Stronger Association in Medication-Free Samples  $d = -.51$
- \* *ABM*, 2008, 36, 33-43.

## Explanations

- Cholesterol Reduces Availability of Serotonin?
- Depression Impairs Appetite?

## Such Reciprocal Relationships Complicate Statistical Inference

- In standard statistical practice, traditional risk factors are entered first so the impact of psychosocial variables, which are reciprocally and/or dynamically related to traditional factors, will be underestimated. Even simultaneous entry does not solve the problem.

## Implications for Cardiac Risk Factors

- Overlap among depression, anxiety and anger has not been addressed so Friedman and Booth-Kewley's (1987) question remains:
- “Are disease-prone people both angry and depressed or angry but not depressed, or is either state sufficient?”
- The reciprocal and dynamic relations between conventional risk factors and dispositions may underestimate the true impact of psychosocial variables.

## Treatment Delay and Cardiac Symptom Perception

- According to American Heart Association, the Warning Signs of Heart Attack
- Chest discomfort
- Discomfort in other areas of the upper body
- Shortness of breath with or without chest discomfort
- Breaking out in a cold sweat, nausea or lightheadedness

## Cardiac Symptom Interpretation & Action

- Most respondents—92%—recognized chest pain as a symptom of a heart attack.
- But only 27% were aware of all major symptoms. About 47% of sudden cardiac deaths occur outside a hospital.
- Suggests that many people with heart disease don't act on early warning signs.

# Women (vs. Men) May be More Vulnerable to Treatment Delay & Symptom Misinterpretation

- Older women suffer greater mortality following MI than any other group
- CHD mortality increasing among women
- Why?

# Gender Disparities in CHD Management

- Women less likely than men to receive:
  - Aggressive diagnostic procedures
  - Aggressive invasive treatments
  - Pharmacologic treatments
- Most research focuses on factors that operate within the context of the health care delivery system

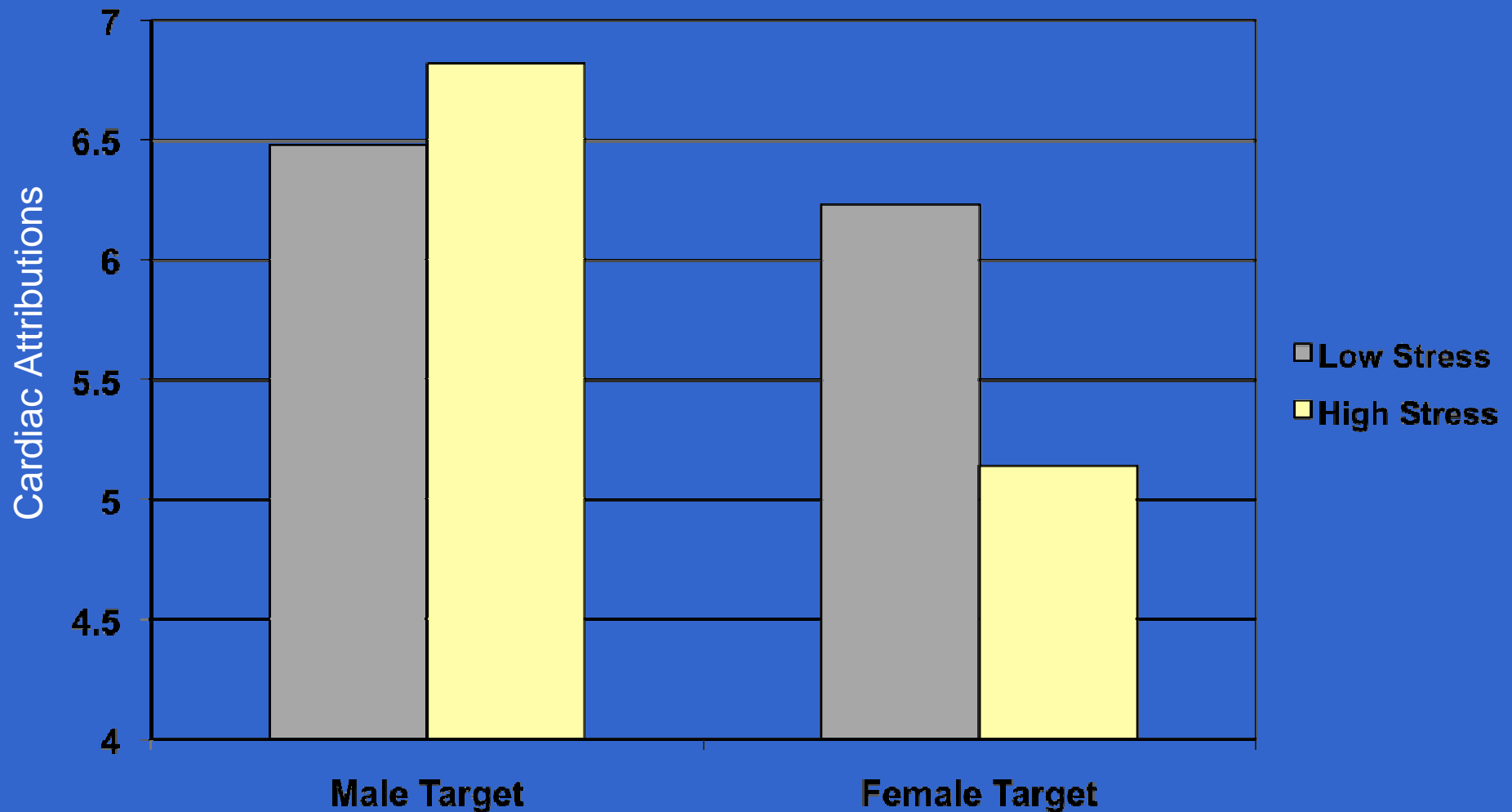
# Women Exhibit Greater MI Treatment Delay

- Early intervention essential in minimizing MI mortality and preserving viable cardiac function
- Treatment delay linked to poor post-MI outcomes among women
- NIH identifies treatment delay among female MI victims as a problem requiring special attention from researchers and practitioners

# Why Longer Treatment Delay for Cardiac Symptoms?

- Women may take longer than men to recognize, interpret, and act upon cardiac-related symptoms
- Women's symptoms misattributed to non-cardiac causes because Cardiac Disease stereotyped as as man's disease (particularly a man presenting with chest pain).

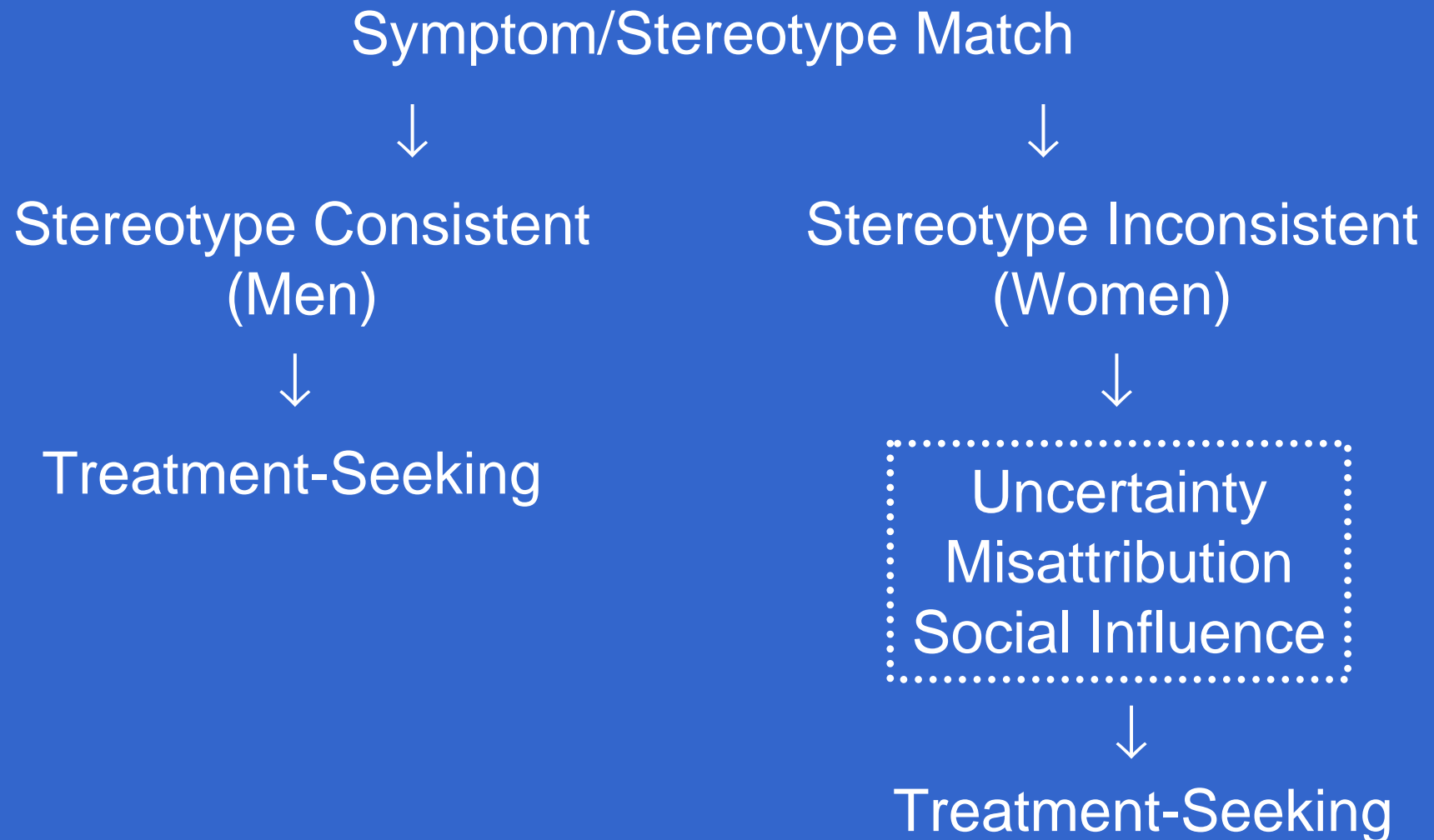
# Cardiac Attributions as a Function of Target Sex and Stressors



*N* = 224

Martin et al. 1998 *Health Psychology*

# Stereotypes can Facilitate or Inhibit Treatment-Seeking



## Another Explanation for Gender Disparity

- Perhaps heart attack presents with different symptom in women
- Women report more “atypical symptoms” ?
- Canto et al., 2007 (*Archives of Internal Medicine*) noted that chest pain was more frequently reported by men than women (37% vs. 27%).
- “Difference was on insufficient magnitude to warrant tailoring different messages to men vs. women.”

# Gender Differences in Cardiac Presentation

- Canto et al. also argued that the literature on “atypical symptoms” in women was inconclusive.
- Different symptom assessment methods prohibited a quantitative review.
- Shin, Martin & Suls (in press; *Heart & Lung*) conducted a meta-analysis of the literature on gender differences in cardiac symptom presentation (1966-2007) with attention to different assessment methods.

## Gender Differences in Symptom Reporting

Shin, Martin & Suls, in press (H&L)

Symptom	No. of studies	Sample size (men/women)	Average effect size
Chest pain	19	10, 309/4924	+ .19*
Back pain	12	3725/1924	- .47**
Neck pain	10	3769/1964	- .30**
Loss of appetite	4	163/147	- .68**
Jaw pain	10	3223/1659	- .28**
Nausea	19	5895/3122	- .28**
Vomiting	10	3339/1440	- .26**
Palpitations	11	1380/835	- .32**

# Gender Differences in Cardiac Presentation

- Gender differences of moderate or larger magnitude were evident ( $d$ 's of  $\frac{1}{2} SD$  or more)
- Women more likely to report back pain, palpitations, nausea/vomiting and loss of appetite.
- Men more likely to report chest pain.
- Measurement method (medical chart; interview; questionnaire) did not influence results.
- Gender-specific public health campaigns targeting cardiac symptoms **may** be warranted.

# Gender Differences in Cardiac Rehabilitation

- Despite its benefits (e.g., Maes et al.), only about 20-40% of cardiac patients attend cardiac rehabilitation.
- Women cardiac patients show lowest motivation and attendance.
- Just more severe disease and older?
- We propose women are more reluctant to give-up domestic/care-giving tasks- cooking, cleaning because of traditional gender-roles.

# Gender Differences in Adaptation: Empirical Results

- Lemos, Suls et al.\* surveyed 63 men and women cardiac patients and their spouses over 5 months post-hospital discharge.
- Assessed engagement in domestic activity.
- •Women consistently engaged in more domestic activity than their husbands regardless of who had cardiac disease.
- \**ABM, 2003, 25, 8-15.*

# Gender Differences in Adaptation

- Rose, Suls et al. \* also followed men and women cardiac patients and their spouses:
- Women reassumed domestic chores within a couple of weeks after leaving the hospital. Their partners helped a little but soon returned to earlier low levels of domestic activity.
- Activity can be good but vacuuming, scrubbing floors and changing bed linens- all high energy requirement activities and engage upper-body movement.
- \* *ABM*, 1996, 18, 267-272.

# Gender Differences in Adaptation

- Jenson, Suls & Lemos\* had cardiac patients keep diaries about their activities for 3 day periods.
- •Entries converted to Metabolic Equivalents (1 MET = 3.5 ml/kg per min) using Ainsworth et al.'s (1993) comprehensive norms.
- •Men and women patients had similar overall totals, but women's activity was expended in the morning whereas men distributed activity across the day.
- \* *Women & Health*, 2003, 37, 31-48

## What is the Point?

- Causes, Treatment-Seeking, Symptom Presentation/Treatment-Seeking and Recovery are embedded in a complex matrix. Clinical interventions, preventive efforts and public health campaigns need to be developed and tested with recognition and appreciation of this complex matrix.
- (It's not just Rx, but you know that!!)

# What is the Call?

- Need more recognition of the overlap and distinctive features of affective dispositions to better understand cardiac risk and identification of at-risk populations.

# What is the Call?

- Recognition that symptoms are interpreted in accord with social stereotypes and may be manifested differently in men and women can affect treatment-delay and medical diagnosis

# What is the Call?

- Traditional social roles may have adverse effects of cardiac rehabilitation and recovery, especially for women patients

# The MATRIX

- Without increased recognition of the influence of interactive and interconnected multiple factors at the micro level (symptom manifestation), molar (dispositional) and macro (social stereotypes) levels we will fail to appreciate the matrix in which cardiac disease unfolds.

# The MATRIX

- At the start of the film *The Matrix*, Keanu Reeves was clueless. He didn't understand. He's not our superhero. Spiderman flying from one level to the other and creating interconnective webs. Spiderman- a true role model for our field.

