

ASSESSMENT OF PSYCHOLOGICAL STRESS



PMBC Faculty Presentation

Core C 6/30/05

University of Pittsburgh

GOALS

- Outline several of the main approaches that have been adopted for defining and measuring stress.
- Provide several examples of measures that have been used that characterize each of these approaches.
- Compare and contrast strengths and weaknesses of these approaches.
- Describe two major initiatives currently underway by Core C faculty in the development of new approaches for measuring psychological stress.

DEFINITIONS OF STRESS

- **Response-based model**
- (Selye, 1974) “Stress is the nonspecific response of the body to any demand made upon it.”
- **Stimulus-based model**
- (Holmes & Rahe, 1967) Stress involves “...events whose advent...requires a significant change in the ongoing life pattern of the individual.”
- **Transactional model**
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THE DURATION DIMENSION

ACUTE

CHRONIC

RESPONSE-
BASED

ACUTE STRESS
RESPONSES

CHRONIC STRESS
RESPONSES

STIMULUS-
BASED

SHORT TERM
STRESSOR
EXPOSURE

LONG TERM
STRESSOR
EXPOSURE

TRANSACTION

SHORT TERM
STRESSFUL
TRANSACTIONS

LONG TERM
STRESSFUL
TRANSACTIONS

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NEUROBIOLOGICAL RESPONSES:

Neuroendocrine, hemodynamic activity

ACUTE: Blood or salivary cortisol, catecholamines, blood pressure or HR responding in laboratory or field.

CHRONIC: Urinary or platelet catecholamines, aggregated measures of salivary cortisol, ambulatory BP, HR.

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NEUROBIOLOGICAL RESPONSES:

STRENGTHS:

Objective assessments

WEAKNESSES:

Many-to-one relationship between response determinants and neurobiological responses.

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SELF-REPORT RESPONSES:

ACUTE: POMS, Spielberger State Anxiety/Anger

CHRONIC: Impact of Events Scale (Horowitz, 1986)

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SELF-REPORT RESPONSES:

STRENGTHS:

Salient, face valid.

WEAKNESSES:

Psychological symptoms are frequently characterized as outcome measures in the relationship between stress and adaptation rather than as predictors.

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SELF-REPORT MEASURES OF LIFE EVENTS AND DIFFICULTIES:

ACUTE: Life Events Checklists

CHRONIC: Domain-specific measures

Dyadic Adjustment Scale, Job Content Scale

Global measures

Chronic Stress Scale (Norris & Uhl, 1993)

Examples of Life Events Checklists

- Schedule of Recent Experiences
(Holmes and Rahe, 1967)
- The Psychiatric Epidemiology Research Inventory
(PERI) Life Events Scale (Dohrenwend et al.
(1978))
- Louisville Older Person's Event Scale (LOPES)
(Murrell & Himmelfarb, 1989)
- Life Events Scale
(Fried et. al, 1991; Aldwin, 1991)

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SELF-REPORT MEASURES OF LIFE EVENTS AND DIFFICULTIES:

STRENGTHS: In theory, these measures allow us to identify the environmental sources of stress in a manner that is unconfounded by the individual's reaction or coping style.

WEAKNESSES: In reality, these measures are surprisingly subjective and unreliable. People differ in their thresholds for defining the presence or absence of events, and they are unreliable in reporting event timing and duration as well.

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ONE PROPOSED SOLUTION: INVESTIGATOR-BASED METHODS

A key distinction between Investigator-Based (IB) and Self-Report (SR) Methods

- In IB methods, the responsibility for defining and categorizing “stress” lies with the investigator not with the respondent.
- Final interpretation and ratings are made by trained staff /investigator in conjunction with the subject’s self-report, omitting any information about the respondent’s actual reaction to the occurrence...referred to as contextual and/or objective ratings rather than subjective ratings.

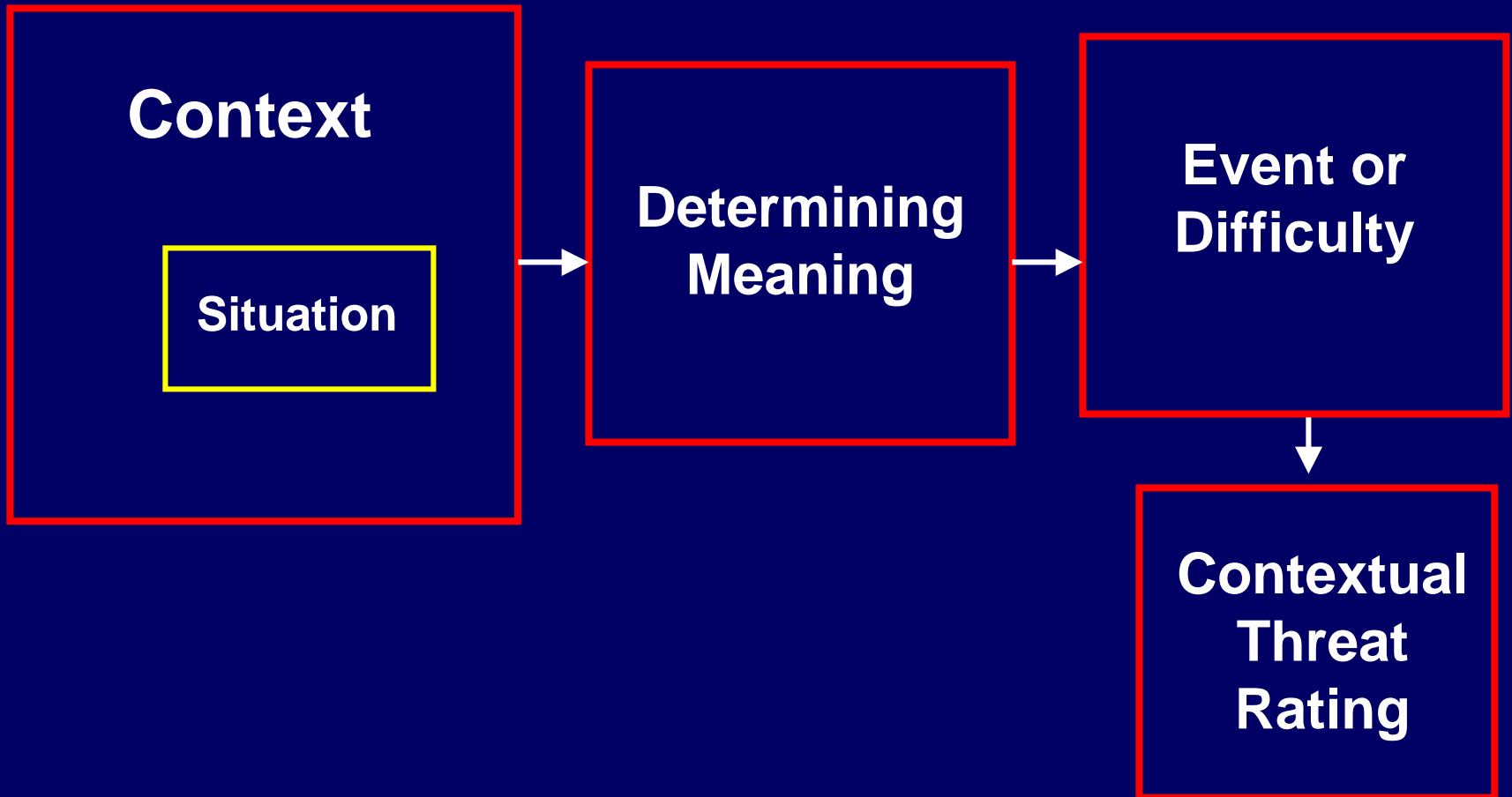
Example of a checklist item:
“Serious illness of a close family member”

- How serious is “serious”
- How close is “close”
- What constitutes an “illness”
- Who constitutes a “family member”

What is LEDS?

- * **Life Events and Difficulties Schedule (LEDS; Brown & Harris, 1979; 1989)**
 - * **LEDS is considered to be the “Gold Standard” of investigator-based assessment of life stress.**
 - * **Life Stress Profile: Temporal array of events and difficulties which are rated with respect to several dimensions— e.g., domain, severity, independence. Severity ratings are based on the life circumstances of the individual at the time that the event or difficulty occurs.**
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Figure 1
The Contextual Assessment of Life Stress



How do you implement LEDS?

Three part process:

1. Interview
 2. Rating procedure
 3. Consensus process
-

The Interview Process

- Semi-Structured interview (1-2 hrs)
 - Assessment of biographical circumstances
 - Basic demographics
 - Brief childhood assessment
 - Assessment of social network
 - Covers 10 life domains
 - Education
 - Work
 - Reproduction
 - Housing
 - Finance
 - Crime/legal
 - Health
 - Marital/Partner Relationship
 - Other Relationships
 - Death/Misc.
-

The Rating Process

- **Manualized (2 - 4 hrs)**
 - **Standard criteria for defining whether an occurrence is an event or difficulty**
 - **Standard criteria for rating core dimensions (e.g., threat, independence, focus, etc.)**
 - **Precedent examples in the “dictionaries” are used to calibrate the ratings**
 - **Check on respondent bias (an attempt to eliminate the respondent’s subjective report or reaction to an occurrence)**
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The Consensus Process

- **Consensus panel/ independent reviewer is blind to the timing of the dependent variable (e.g., depression or disease) relative to the timing of events or change points in difficulties**
 - **Check on interviewer bias (an attempt to reduce interviewer's subjective reaction to the narrative provided by the respondent)**
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How Do Investigator-Based Methods Differ from Self-Report Approaches?

(Data Collection)

Parameter	Self-Report	IB Methods
Method of data collection	Self-Report Questionnaire	Interview
Who decides inclusion of Event	Respondent	Investigator
Data recording	Paper/computer	Tape Recorder
Training necessary	No	Yes
Cost	Low	High

How Do Investigator-based Measure Differ from Self-Report Approaches?

(Standardization/Precision of Measurement)

Parameter	Self-Report	LEDS
Number of possible events	Usually fixed	Open
Standardization of Probes	Fully Standardized	Flexible
Precise criteria for events	No	Yes
Distinguish events from difficulties	No	Yes
Distinguish events/difficulties from dependent variable	No	Yes
Establish independence of the event	No	Yes

Investigator–based measures of life stress

Some Examples

Instrument	Administration	Features	Physical Health studies	Reliability reported
Life Events and Difficulty Schedule (LEDS)	Semi-structured interview	Manualized-Y Training available-Y Events and difficulties -Y	Yes	Yes
The Structured Life Events Inventory (SLI)	Structured interview	Manualized-Y Training-Y Events and difficulties -Y	No	Yes
Lesserman Stressful Life Events and Difficulties Interview (SLEDS)	PERI (112 items), structured probes, objective ratings	Manualized-Y Training available-Y Events and difficulties -Y	Yes	Yes

Why Use Investigator-Based Measures of Life Stress Assessment?

1. The magnitude of the association between life stress and illness has been modest ($r = .30$) when employing self-report measures.
 2. IB methods are better suited for assessing objective features of life circumstances, which is consistent with the stimulus-based model of psychological stress.
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Why Use These Measures? Advantages

1. Checklists have demonstrated poor test-retest reliability.

In one study (McQuaid et al., 1992) 60% of checklist-identified events reported at time 1 were inconsistent with events for the same period reported at time 2 (6 weeks later).

Males differed from females on the above inconsistencies.

2. IB methods allow for greater precision in the definition of types of stressors as well as precision in dating relative to the timing of exposure and outcome.

McQuaid et al. (1992) found that 62% of checklist- identified stressors were found to be discrepant with those identified by the LEDS.

Why Not Use These Measures? Disadvantages

1. Cost of implementation

- Training is necessary
- Respondent/investigator burden in terms of time and effort for administration is considerable
- Rating and independent review of ratings can be lengthy

2. Research considerations

- Not widely used in the literature because of cost and training
- Extant evidence supporting their use in terms of predictive validity is limited

A Next Step

1. To develop and test an time-efficient investigator-based method of life stress assessment.
 2. The goal is to reduce the level of training and rating needed to implement investigator-based assessments.
 3. Based on Wethington's work :
 - a. Design questions to screen out as quickly as possible occurrences that are not events or difficulties.
 - b. Design follow-up questions that are tightly linked to objective features to facilitate severity ratings
 - c. Employ rating algorithms that identify events and difficulties
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- ASSUMPTIONS:
 - Stress involves balance between demands and resources.
 - The mechanism by which these are compared involves a judgment or a *cognitive appraisal* process. Final common pathway for the effects of stress is inherently a subjective one.

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- **EXAMPLE**
- Perceived Stress Scale (Cohen et al., 1983)
 - UNPREDICTABILITY, UNCONTROLLABILITY, OVERLOAD
- *In the last month, how often have you felt that you were unable to control the important things in your life?*
- *In the last month, how often have you felt that you were on top of things?*

DEFINITIONS OF STRESS

- Transactional model
- Perceived Stress Scale (Cohen et al., 1983)
Associated with wide variety of outcomes: smoking relapse, markers of inflammation, telomere length in lymphocytic chromosomes.
- *STRENGTHS*
- Takes into consideration individual differences in perception or appraisal.
- *WEAKNESSES*
- Confounded with a number of dimensions, such as depressive symptoms and neuroticism, which may be important to disaggregate from the construct of stress.

ECOLOGICAL MOMENTARY ASSESSMENT (EMA) APPROACH TO THE ASSESSMENT OF STRESS

- Data collected in “real time” and in the natural environment, usually using electronic diary reports.
- Not associated with one specific model or set of assumptions about psychological stress.
- Are associated with unique set of assumptions about the assessment process.
- Currently under investigation as a strategy for examining the relationship between stress and subclinical cardiovascular disease.

ECOLOGICAL MOMENTARY ASSESSMENT (EMA) APPROACH TO THE ASSESSMENT OF STRESS

RATIONALE

1. Compared to retrospective self-reports, EMA measures may allow us to more accurately characterize the frequency and duration of psychosocial “risk exposure” that characterize our daily lives.
2. EMA measures allow us to examine mechanistic hypotheses linking stress with disease— can be linked with moment-to-moment changes in biological processes, e.g., endocrine or hemodynamic activity.
3. EMA measures allow us to examine the importance of setting effects relevant to the occurrence and consequences of stress (e.g., social interactions with partner vs. others; health effects of job demands vs. household demands vs. neighborhood demands).

Five psychological processes linked with stress, acute cardiovascular activation, and disease risk

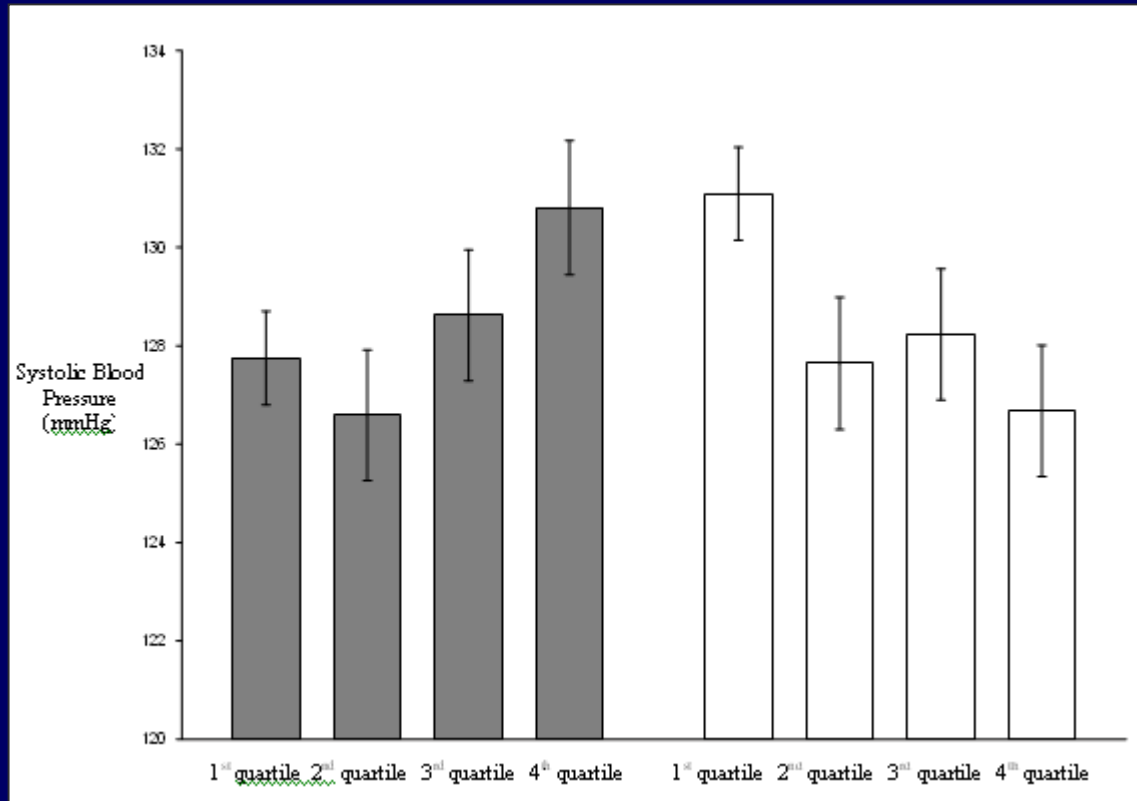
- *NEGATIVE AFFECT*
- *AROUSAL*
- *TASK DEMAND*
- *TASK CONTROL*
- *SOCIAL CONFLICT*



Five psychological processes associated with moment-to-moment changes in blood pressure

	<u>SBP</u>	<u>p</u>
• <i>NEGATIVE AFFECT</i>	.38	.0001
• <i>AROUSAL</i>	.54	.0001
• <i>TASK DEMAND</i>	.18	.0003
• <i>TASK CONTROL</i>	-.09	.02
• <i>SOCIAL CONFLICT</i>	.41	.0001

Aggregated over 6-day period, mean ratings of Task Demand and Task Control Associated with chronic elevations of blood pressure during daily life



Mean Task Demand / Mean Task Control

Mean ratings of Task Demand and Task Control related in the expected direction with measures of carotid artery atherosclerosis

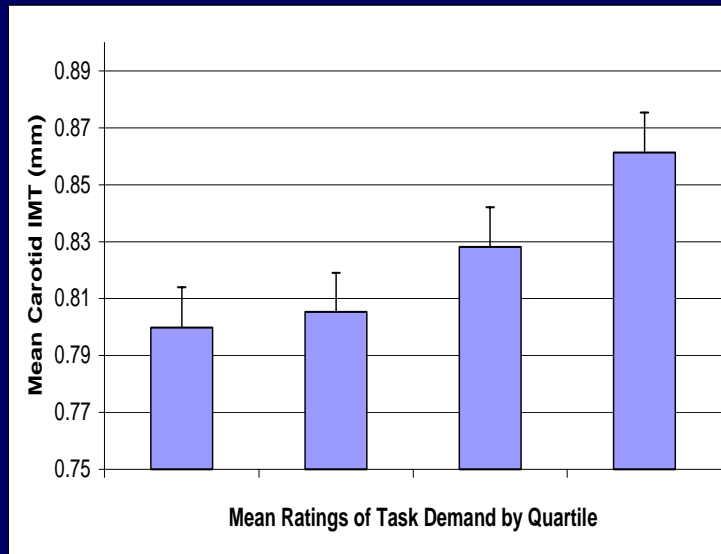


Fig. 4. Association between mean Task Demand and Carotid IMT

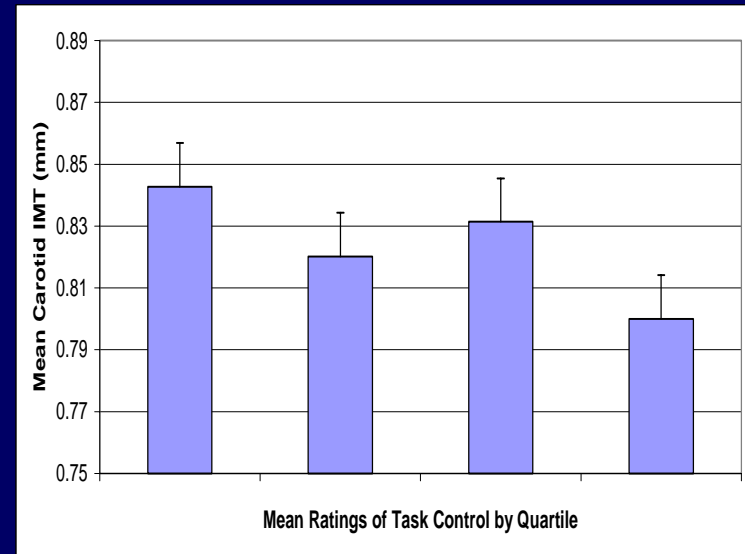
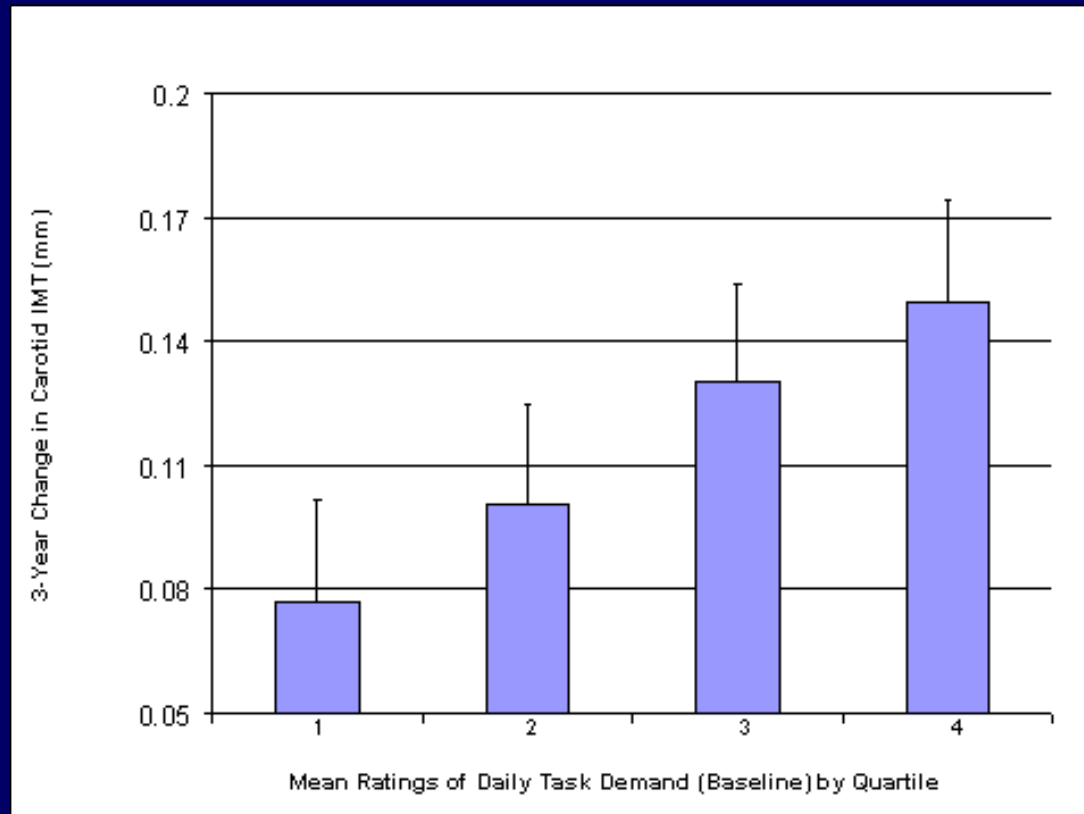


Fig. 5. Association between mean Dec Control and IMT

Mean ratings of Task Demand and Task Control related in the expected direction with measures of carotid artery atherosclerosis



ECOLOGICAL MOMENTARY ASSESSMENT (EMA) APPROACH TO THE ASSESSMENT OF STRESS

We conclude that there may be some important utility to this new assessment approach as a means of understanding the effects of both acute and chronic stress as they impact health outcomes over the course of daily living.