

Measurement issues in the assessment of psychosocial stressors at work

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Reliability*

The degree of stability exhibited when a measurement is repeated under identical conditions (replicability)

Unreliability

Measurement error – due to observer or instrument variation, or instability of the attribute being measured

***From LAST 4th Edition**

Validity

Construct – extent to which a measure corresponds to theoretical concepts (constructs) concerning phenomenon under study. (e.g., demands varies with work pace)

Content – extent incorporates domain of the phenomenon under study (JCQ control – how measured?)

Criterion – extent measure correlates with an external criteria (e.g, predictive - Job strain and BP, or concurrent – visual inspection of wound and “culture” etc.)

High Blood Pressure ?

What is it?

How is it measured?

What is difference between HBP and hypertension?

How are cutpoints for determining hypertension decided on?

Residual Risk of Developing Hypertension

- Framingham Heart Study - The residual lifetime risks for developing hypertension and stage 1 high blood pressure or higher ($\geq 140/90$ mm Hg regardless of treatment) were 90% in both 55- and 65-year-old participants.*
- Ramachandran S. et al Residual Lifetime risk for Developing Hypertension in Middle-aged Women and men. JAMA 2003

From NIH HLBI

Definition of Heart Attacks from NIH:

Coronary heart disease (CHD) is the leading cause of death for both men and women in the United States. CHD is caused by a narrowing of the coronary arteries (CAD) that supply blood to the heart, and often results in a heart attack.

Each year, about 1.1 million Americans suffer a heart attack. About 460,000 of those heart attacks are fatal. About half of those deaths occur within 1 hour of the start of symptoms and before the person reaches the hospital

Heart Attacks (generic)

What are they? Must distinguish cause!

CAD – coronary artery disease – what is it?

CVD – cardiovascular disease

Can you have a heart attack without CAD?

Measurement of psychosocial stressors at work

- **Imputation of job characteristics scores**
- **Self-report questionnaires**
- **Expert-observer assessment**

Typical occupations found in four quadrants of Karasek's job strain model (1969-1977 data)

		<i>Psychological Job Demands</i>	
		Low	High
<i>Job Decision Latitude</i>	High	Forester Repairman Dentist Low Strain	Banker Physician HS teacher Active
	Low	Janitor Watchman Billing Clerk Passive	Assembler Waiter Nurse aide High Strain

Imputation of job characteristics scores

- **A procedure for averaging self-reports across a job title**

- Take a national database which contains job characteristics data for each job title
- Average the scores for demands, authority, skill, support, etc., For everybody within the same job title
- Assign your study subject (in the database you are interested in) the average score for their job title

- **Advantages**

- More objective measure -- avoid criticisms due to self-reports
- Use them in studies that contain job title, but not job characteristics

- **Limitations**

- Loss of within-occupation variability
- Lack of precision of means for small occupations
- Generalize scores to other groups or time periods?

Expert-observer assessment

- **Primary techniques**

- examination of company records
- expert assessment w/o actual observation of workers
- supervisor or coworker assessments
- work site observations by trained observers

- **Advantages**

- helps to validate self-reports (e.g., job demands)
- if suspect “repressive coping” or “denial”
- in companies with a large number of similar work tasks
- gather detailed information for intervention studies

- **Limitations**

- time-consuming
- expensive

SF Muni Bus Drivers

**Job strain and BP – no relationship
using self report questionnaires**

**Time constraints – determined by trained
observer found + relationship between
constraints and BP in same drivers.
Greiner, etal. 2000, 2002 JOHP**

Self-report questionnaires

- **Which aspects of work should be measured?**
 - Perceptions of stress at work
 - Interactions between personality and work environment
 - Type A behavior
 - Job (task) characteristics
 - Job demands
 - Job decision latitude or control
 - Social support
 - Higher-level influence
 - Organizational climate
 - Participation
 - Support
 - Hours, shifts, schedule
 - Systems of work organization
 - Lean production
 - Total Quality Management

Self-report questionnaires

- **Occupation-specific**
 - Developed for bus drivers, nurses, teachers, etc.
 - Provide rich detailed information especially useful for intervention efforts
- **Generic (global) measures of job characteristics**
 - Can compare job stressors across different occupations
 - Less useful for intervention studies
 - Essential for development of theories and testing hypotheses
- **New method which combines general and occupation-specific questions**
 - Occupational Stress Index (OSI)

Self-report questionnaires

- **Generic job characteristics questionnaires**
 - NIOSH – 20 scales, over 100 questions
 - Karasek's Job Content Questionnaire, based on U.S. Quality of Employment Surveys
 - Swedish Demand-Control questionnaires
 - Effort-Reward Imbalance (ERI) questionnaire
 - Whitehall study questionnaire
 - Danish version of Whitehall questionnaire

Self-report questionnaires

- **Job stressors commonly measured in generic job characteristics questionnaires**
 - Psychological demands
 - Skill discretion
 - Decision-making authority
 - Decision latitude (control)
 - Social support (supervisor or co-worker)
 - Job insecurity
 - Exposures to physical and chemical hazards

Self-report questionnaires

- **Advantages**

- Inexpensive
- Easy to administer
- When national occupational survey data is available, comparisons can be made between study participants and national averages of job characteristics by job title

Self-report questionnaires

- **Limitations**

- Possibility of self-report bias
- Difficulties due to low literacy levels
- Lack of translation of questions into the participants' native language or other problems of transcultural validation

Measurement of psychosocial stressors at work -- Recommendations

- **Self-report questionnaires**

- Supplement generic job stressor questionnaires with questions specific to the occupation(s) and target groups being studied

- **Use multimethod strategies -- to achieve “convergent validation”**

- Self-report questionnaires
- Imputation of job characteristics scores
- Expert-observer assessment
- Qualitative methods (interviews, focus groups)

END

Activity 2: Measuring concepts through questionnaire items

- Goal:
To understand how questionnaire items are combined to measure various concepts and constructs.
- Task:
In your small groups, answer the following questions about the correlation matrix that is handed out.
- Please select a reporter to take notes who will report back to the group as a whole. Make sure that everyone in the small group has had an opportunity to speak or participate in the activity.

Activity 2: Measuring concepts through questionnaire items

1. What items belong together in a scale? The two basic guidelines for scale construction are:
 - a) which items are similar in concept
 - b) which items are highly correlated with each other
2. What would you call these scales?
3. What is the internal consistency reliability of the scales you have created? You can use the following formula to compute reliability:
 - **Cronbach's alpha** = $ND/[1 + D(N - 1)]$, where D is the average inter-item correlation

Activity 2: Measuring concepts through questionnaire items

4. Is there any other information you could use to decide what scales to construct and use in your research?
5. Should your scales be weighted so that some items have greater weight than others?