Culture, social status, and physiology: An integrative approach to health disparities research

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Objectives: Models and methods for an integrative research agenda

- Why stress?
- Methods: Biomarkers of physiology/health for population-level research
- Models: How do we model social status?
The challenge of the gradient

- Gradient applies to all-cause mortality, most categories of morbidity
- Found across industrialized countries
- Gradient vs. threshold: not just a problem of poverty
Pathways linking SES and health

Socioeconomic status

- Health selection
- Resources (material/social)
- Access to health care
- Health behaviors
- Psychosocial stress

HEALTH
Psychosocial stress is an important public health issue

STRESSOR

physiological and behavioral responses

depression/anxiety
cancer
birth complications
autoimmunity
cardiovascular dx
infectious disease

All-cause mortality
Venipuncture

- Syringes
- Vacutainer tubes
- Centrifuge
- Freezer/dry ice
- Phlebotomist
Dried blood spots: a minimally-invasive alternative for collecting whole blood

- #903 collection papers, Schleicher & Schuell (NCCLS & FDA performance standards)
- Micro-lancets
- Alcohol preps
Blood spot EBV Antibody assay

- Commercially available ELISA kit: DiaSorin, Inc.
- Assay cost: ~$5.00/sample
- Biosafety level 2 immunoassay laboratory
- Collaborative, population-based research on human biology and health
- Development of minimally-invasive methods
- Assays for biomarkers in saliva, blood spots, and plasma
  - hsCRP, EBV ab, leptin, TfR, cortisol, T, E2
Promoting the integration of biomarkers into national health disparities research

National Social Life, Health, and Aging Project (NSHAP) N~3,000
Health and Retirement Study (HRS) N~3,000
National Longitudinal Study of Adolescent Health (AddHealth) N~15,000

Outreach & training
Biomarker Workshop, June 9-10, 2005 (co-sponsor: UC)
Summer Biomarker Institute, July 2006
Models: Social status and health

Think of this ladder as representing where people stand in the United States.

At the top of the ladder are the people who are the best off – those who have the most money, the most education and the most respected jobs. At the bottom are the people who are the worst off – who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

Where would you place yourself on this ladder?

Please place a large “X” on the rung where you think you stand at this time in your life, relative to other people in the United States.
Social status and stress in the context of culture change: Samoa
Matai title as a source of social status
Engagement in western lifestyles as emerging source of social status
Alternative hypotheses linking culture, social status, and stress

Social status gradient?

![Bar chart showing stress levels across different social status and cultural groups.](chart.png)
Alternative hypotheses linking culture, social status, and stress

**Cultural incongruunity?**

**Status incongruunity?**

[Bar charts showing stress levels across different cultural and social status categories]
Status incongruity is a source of stress for Samoan adolescents (Apia)
Conclusions: Social status and stress in Samoa

- Culture change, stress, and immune function in Samoan youth
  - Status incongruity as a source of stress
  - A process of negotiation and integration, not replacement

- Measures of social status are dynamic, locally constructed
  - Limitations of the gradient approach
Beyond the gradient: Models and methods for integrative health disparities research
Methods: Biology in social context

- Tools for measuring stress
- Physiological/health consequences of social relationships, inequality, etc.
- Insight into psychosocial/cultural dynamics
Models: Social status and health
Social status, stress, and health in the U.S.

- Measures of social status are embedded in diverse socio-cultural contexts
- What are meaningful markers of social status in the U.S.?
  - Ethnography and social theory can help reveal
  - Health disparities: *is skin color a measure of social status in a color-conscious society with a history of discrimination and concentrated disadvantage?*
Skin color, discrimination, and blood pressure among African-Americans

**Hypothesis 1** Skin pigmentation is a measure of “genetic admixture”

**Hypothesis 2** Melanin production and blood pressure regulation are physiologically linked

**Hypothesis 3** Darker skin is a marker of subordinate social status in a racially-stratified society
Coronary Artery Risk Development in Young Adults (CARDIA) Study

- 4 site, 15 year longitudinal study of development of heart disease risk factors (6 waves of data collection)
- Baseline: 5115 black and white men and women, aged 18-30 years
- Equal numbers in each race, gender, education, and age group
- Physiology, physical measurements, lifestyle, behavior, and psychosocial factors examined
Year 15 sample

- 1,688 African Americans
  - 700 men, 988 women
- Mean age = 39.6 years
- All data from Year 15 (exam 6)
  - Except skin reflectance data from year 7
Skin color by race
Skin color is a predictor of socio-economic status in African-Americans

![Graph showing income and education levels by skin color]
Is there an income gradient in blood pressure?

Covariates: age, sex, BP medication, BMI, smoking
SBP: Skin color x income

![Graph showing systolic BP (mm Hg) across different skin colors and income levels. The graph indicates a significant difference in systolic BP (p=0.025) between the two skin color groups across income levels. The graph compares darker and lighter skin colors with low, mid, and high income categories.](chart.png)
Probability of hypertension

Darker

Lighter

p=0.009

Predicted probability of hypertension

Income

Low

Mid

High
Health behavior:
8 year BMI gain as a function of year 7 predictors

\( p = 0.054 \)
Cognitive/emotional: Symptoms of depression

Income

CESD score

Low  Mid  High

Dark

Light

p=0.04
Conclusions: Models and methods for integrative health disparities research

- Beyond self-reports of stress/health
  - Biomarkers for population-based research
- Beyond income/occupation/education
  - What are meaningful markers of social status?
- Beyond the gradient
  - How do we model social status, stress and health?