410.618.01 – Integrating Social and Behavioral Theory into Public Health
2010-2011

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With much thanks to Kate Fothergill, PhD, and the entire HBS faculty
Course goals

- Understand the role of theory in explaining health behavior and behavior change;
- Use multiple theoretical vantage points to describe the forces that shape complex health behaviors and to inform opportunities for intervention;
- Assess how constructs from different theories relate to each other and select appropriate theories based on audience characteristics, health issues, and desired behavior change;
- Apply different theories to proposed interventions, depending on the ecological levels at which the problem is framed.
Course outline

• Overview of determinants of health
  – Using a “social integration” model based on the idea that people live within social networks (mezzo level)

• “Upstream” macro level
  – Culture
  – Social structure
  – Political and policy environment
  – Media
Course outline

• “Downstream” micro level
  – The person-to-person relationships shaped by network and community membership
  – The bi-directional relationship between an individual brain and the interpersonal environment with implications for:
    • Behaviors
    • Changes in the body’s internal milieu
    • Health outcomes
Course format

• Lecture
  – One or two papers assigned to read
  – Please come prepared to ask questions or raise points from your own experience
  – Many supplemental readings for your reference

• Labs

• Small group discussions
Lab exercise

• An examined personal behavior change (1\textsuperscript{st} qtr)
  – Judging your motivation
  – Gaining awareness of factors that promote or hinder change
  – Designing incentives as a group
  – Taking stock of where you got and why

• Experimenting with narrative form (2\textsuperscript{nd} qtr)
  – Written and spoken
Small group discussions

• Take a paper and use it as a jumping off point for addressing a more nuanced or applied question
• Read ahead of time
• In-class time to discuss
• One of the groups present their thoughts
• Same as lab groups
Correlates of the Community of Truth

• The “answers” come from within rather than without
  – We are looking for a shared understanding that is a “unique” interaction of the class membership and what is going on in the world this semester

• We will try to present a coherent “model” but each of you will come to own and understand it in a different way
Setting up the problem

• How does the social environment in which we live influence health
  – The “epidemiologic transition”
  – Status syndrome
  – Does it function through social ties?
  – How do social ties get under your skin?

• The social integration model

• Interventions based on the model
Exhibit 4.1: Causes of death, United States, 1900 and 1998

1900
- Pneumonia and influenza
- Tuberculosis
- Gastritis, enteritis, colitis
- Heart diseases
- Symptoms, senility, ill-defined conditions
- Vascular lesions affecting central nervous system
- Chronic nephritis and renal sclerosis
- Unintentional injuries
- Malignant neoplasms
- Diphtheria
- All other causes

1998
- All cancers
- Chronic obstructive pulmonary disease
- Unintentional injuries
- Pneumonia and influenza
- Diabetes mellitus
- Suicide
- Nephritis and nephrosis
- Chronic liver disease
- Homicide
- All other causes

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1 Other causes may include typhoid fever, measles, homicide, suicide, syphilis, and diabetes.
2 Includes cirrhosis.
3 Other causes may include motor vehicle accidents, AIDS/HIV, septicemia, Alzheimer’s disease, and Parkinson’s disease.

World leading causes of disability-adjusted life-years, all ages, 2000

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause</th>
<th>% total DALYs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pneumonia</td>
<td>6.4</td>
</tr>
<tr>
<td>2</td>
<td>Perinatal conditions</td>
<td>6.2</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS</td>
<td>6.1</td>
</tr>
<tr>
<td>4</td>
<td>Unipolar depression</td>
<td>4.4</td>
</tr>
<tr>
<td>9</td>
<td>Malaria</td>
<td>2.7</td>
</tr>
</tbody>
</table>

WHO World Health Report, 2001
Disease Burden of Neuropsychiatric Disorders

- **World**: 13.5%
- **High-income countries**: 27.4%
- **Middle-income countries**: 17.7%
- **Low-income countries**: 9.1%

“Status syndrome”

- People who are lower on the SES ladder have worse health
  - Robust to multiple measures of SES including self-rated status
  - Not explained by access to care
  - Only partially explained by classic risk factors and behaviors
  - See in both genders, across multiple conditions
Mortality rates of men in St. Petersburg, Russia, by educational attainment

Adapted from Marmot M. Social determinants of health inequalities. Lancet 2005;365:1099-1104
Risks aren’t uniform depending on where you live

(A) Life expectancy for counties that make up the 2.5% of the US population with the highest and lowest county life expectancies in each year.

(B) Difference between highest and lowest life expectancies in (A) on a year-by-year basis.

Worsening maldistribution of income

• The income gap between those in the top 5% of US income distribution and those in the bottom 40% has been steadily increasing since in the early 1980s.
Winner take all

Change in Share of Aggregate US Household Income

- Top 5%: 17.7%
- Highest Quintile: 7.3%
- Fourth Quintile: -2.8%
- Third Quintile: -6.5%
- Second Quintile: -8.7%
- Lowest Quintile: -11.6%

Source: APA report
Characteristics of social networks

• Structure
  – Size – sheer numbers
  – Density of connections and interactions
  – Homogeneity of membership

• Characteristics of network ties
  – Frequency of contacts
  – Reciprocity
  – Intimacy/trust
Networks then condition...

• Social support
  – Instrumental and access of various kinds
  – Information and appraisal
  – Emotional support/regulation

• Social norms
  – Constraints, influences, competition

• Opportunities for social engagement
  – Who am I and what is my social role
What conditions social networks

- Culture
- Race/ethnicity
- Gender
- The policy/political environment
- The built environment
- Media
But how does this “get under your skin?”

• Primary processes that shape “brain” (neurophysiologic) development
  – Peri-natal and early childhood experiences
  – Subsequent influence on
    • Cognitive capabilities
    • Interpersonal behavior
    • Internal homeostasis

• “Mirror neurons” and other ways the brain learns from the environment
“Social neuroscience”

• Epigenetics: environmental influences on gene expression

• Critical periods (?) for early nurturing that
  – Permanently (?) set level at which glucocorticoid receptor gene is expressed
    • Varies response to stress
  – Permanently (?) set level at which oxytocin receptor gene is expressed
    • Varies nurturing and other affiliative behaviors
Learning mechanisms dependent on environment

• Brains are wired to learn by observation
  – Happens automatically and unconsciously
  – Designed to make it hard to forget learned patterns, especially when linked to an emotion

• Learning system that needs priming
  – Ignores or devalues patterns that are not familiar and sticks to explanations that “make sense”

• Default models of social world based on early relationships
Early childhood and developmental physiologic inequality

• SES (family home ownership) at ages 2-3 predicts “pro-inflammatory” state in adolescence (Miller and Chen)

• Early life SES predicts blood pressure in adolescence but current SES does not; unrelated to BMI
Early childhood and developmental cognitive inequality

• Relative low SES children and learning issues
  – Relative family income predicts prevalence of developmental language delays across many cultures
  – Risley & Hart 1995: estimated that by age 3 lower SES (US) children heard 30 million fewer words than higher SES
Inequality in early cognitive development of children in the 1970 British Cohort Study, at ages 22 months to 10 years

Attachment

• Bowlby: a “system” that links our body and brain states to our social relationships
• Develops in early childhood and to some extend persists into adulthood
• “Attachment” to one or more potentially nurturing figures
Attachment

• Broadly:
  – “secure” attachment – expectation of support, nurturing, promotion of individuation
  – “insecure attachment – uncertain expectation for support or nurturing, mixed signals about individuation
Attachment

• Secure attachments related to trust, confidence, reciprocity, relaxed and well-regulated internal states

• Insecure (or avoidant or disorganized) attachments related to lack of trust, decreased reciprocity, self-doubt, increased arousal and internal deregulation
Behavioral implications of adult attachment styles for diabetes care

- Dismissing (36% of population) vs. Secure (44%)
- Odds* of being in the lowest 25th %tile for adherence to care or to ongoing smoking:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic diet</td>
<td>1.41</td>
</tr>
<tr>
<td>Exercise</td>
<td>1.36</td>
</tr>
<tr>
<td>Foot care</td>
<td>1.21</td>
</tr>
<tr>
<td>Medication taking</td>
<td>1.23</td>
</tr>
<tr>
<td>Continuing to smoke</td>
<td>1.42</td>
</tr>
</tbody>
</table>

* All significant p<.05; Ciechanowski, Psychosomatic Medicine 2004;66:720.
The social-ecological “comet”

http://www.cdc.gov/ncipc/dvp/Social-Ecological-Model_DVP.htm
<table>
<thead>
<tr>
<th>Upstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment (real and perceived)</td>
<td>Individual</td>
</tr>
<tr>
<td>Macro</td>
<td>Mezzo</td>
</tr>
<tr>
<td>Culture</td>
<td>Social networks structure</td>
</tr>
<tr>
<td>Socio-economic factors</td>
<td>Characteristics of network ties</td>
</tr>
<tr>
<td>Political structure and policies</td>
<td>Social capital</td>
</tr>
<tr>
<td>Gender and Race</td>
<td>Access to resources</td>
</tr>
<tr>
<td>Media</td>
<td>Communication about health and social conditions (cultural &amp; scientific knowledge, education, entertainment, interpersonal interaction)</td>
</tr>
<tr>
<td>Lifespan development</td>
<td>Theories of interpersonal influences on health behavior</td>
</tr>
</tbody>
</table>

Behavioral challenges – the obesity “perfect storm” (US figures)

- Average 13 year-old girl is 16 pounds heavier than in 1970


<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>15.7%</td>
<td>15.3%</td>
</tr>
<tr>
<td>Obese</td>
<td>14.8%</td>
<td>16.4%</td>
</tr>
<tr>
<td>Publicly Insured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>17.6%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Obese</td>
<td>22.0%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Privately Insured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>14.9%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Obese</td>
<td>11.8%</td>
<td>12.7%</td>
</tr>
</tbody>
</table>

Trends in food intake

• Average daily US per capita food intake increased from 2160 to 2679 calories from 1970 to 2006 (USDA)

• USDA uses 2200 as average daily need
## Trends in food groups

<table>
<thead>
<tr>
<th>Food group</th>
<th>1970</th>
<th>2006</th>
<th>increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added fats and oils</td>
<td>403</td>
<td>612</td>
<td>209</td>
</tr>
<tr>
<td>Flour and cereals</td>
<td>432</td>
<td>613</td>
<td>181</td>
</tr>
<tr>
<td>Added sugars</td>
<td>402</td>
<td>468</td>
<td>66</td>
</tr>
<tr>
<td>Meat</td>
<td>439</td>
<td>468</td>
<td>29</td>
</tr>
<tr>
<td>Dairy fats</td>
<td>8</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>Vegetables</td>
<td>122</td>
<td>127</td>
<td>5</td>
</tr>
</tbody>
</table>

Calories ingested. Source: USDA
Contribution of Snacking to Total Daily Energy Intake, by Year and Age Group, Selected Years 1977-2006

Adapted by CTLT from Piernas and Popkin. Health Affairs 2010;29:398.
Trends in exercise

• The proportion of children walking or biking to school decreased from 50% or more to 10-20% in the same period
• Urban children use transportation even when walking might be possible because of safety concerns
• 50% of children are driven to school by their parents
  – Accounts for about 20% of AM rush hour traffic
Macro level influences

• Transportation policy that favors driving among higher SES and decreases mobility among lower SES
• Housing policy fosters concentrated poverty and reduces access to exercise or healthy food
• Food policies that favor increased caloric intake
US food policies

• Focus on large-scale commodity production
  – Based on early 20\textsuperscript{th} century ideas about nutrition and late 20\textsuperscript{th} century ideas about global markets
  – Fed by university agricultural research
  – Propped up by subsidies when overproduction drove prices too low

• Resulting changes in affordability of food
  – Inflation-adjusted prices of junk foods falling while prices of fruits and vegetables rise
Mezzo level influences

• Social networks conditioned by racism and income inequality...
  – Fewer and less stable connections
  – Decreased reciprocity
  – Increased homogeneity

• ...favor and re-enforce
  – development of distinct norms for eating, activity, body image
Micro level influences

- Reduced instrumental and emotional social support
  - Greater swings of mood
  - Less buffering of feast or famine responses
- More homogeneous social influence
  - Greater pressure to conform
  - Greater mistrust of messages from outside
- Reduced access to services, information
Internal pathways to risk

- Altered metabolic pathways conditioned by stress
- Emotional states that color decision-making processes and are linked to abnormal metabolic states
Is there hope?

• Multi-modal interventions

Macro: Transportation, school, community planning policies, re-direct financing

Mezzo: Create new partnerships among and within communities around shared and overlapping concerns

Micro: Increase self-efficacy with regard to walking or biking, establish new behavioral norms, teach new skills

www.saferoutestoschools.org