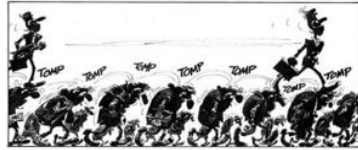




## ANBI 139

Evolution of Human Disease

### Lecture 15: Affluenza and SESitis

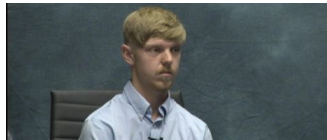


Pascal Gagneux

Spring 2019

Affluenza (running people over with dad's truck, while drunk and on drugs)

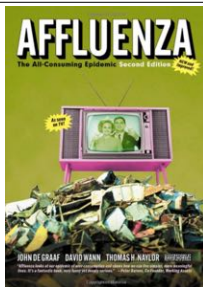
Ethan Couch



G. Dick Miller, a psychologist hired as an expert by the defense, testified in court that the teen was a product of "affluenza" and was unable to link his actions with consequences because of his parents teaching him that wealth buys privilege.

On the evening of June 15, 2013, according to authorities and trial testimony, Couch was witnessed on surveillance video stealing two cases of beer from a Walmart store, driving with seven passengers in his father's red 2012 Ford F-350 pickup truck, and speeding at 70 miles per hour (110 km/h) in a designated 40 miles per hour (64 km/h) zone. Approximately an hour after the beer theft, Couch was driving his father's truck at 70 miles per hour (110 km/h) on rural, two-lane Burleson-Retta Road where motorist Breanna Mitchell's sport utility vehicle (SUV) had stalled. Hollie Boyles and her daughter Shelby, who lived nearby, had come out to help her, as had passing youth minister Brian Jennings. Couch's truck swerved off the road and into Mitchell's SUV, then plowed into Jennings' parked car, which in turn hit an oncoming Volkswagen Beetle. The truck then flipped over and hit a tree. Mitchell, Jennings, and both Boyles were killed, while Couch and his seven teenage passengers (none wearing seat belts) survived (although one was paralyzed), as did the two children in Jennings' car and the two people in the Volkswagen. Three hours after the incident, Couch had a blood alcohol content of 0.24%, three times the legal limit for adult drivers in Texas, and he also tested positive for marijuana and Valium.

## Affluenza



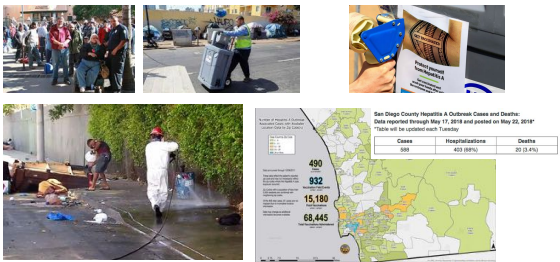
Affluenza: How Overconsumption Is Killing Us—and How to Fight Back 2014  
by John de Graaf (Author), David Wann (Author), Thomas H Naylor

Affluenza and its counterpart poverty



Life in San Diego:  
Luxury home along the beach or tent on a side walk in downtown

San Diego, Homelessness & Hepatitis A



Life in San Diego:  
Hepatitis A outbreak in early 2018: 20 deaths and ~600 cases  
Havrix vaccine: inactivated Hep A virus produced in MRC-5 (human fetal) cells.

**Current Vaccines Developed Using Human Cell Strains**  
Two main human cell strains have been used to develop currently available vaccines, in each case with the original fetal cells in question obtained in the 1950s. The WI-38 cell strain was developed in 1962 in the United States, and the MRC-5 cell strain (also started with fetal lung cells) was developed, using Hayflick's technology, in 1970 at the Medical Research Center in the United Kingdom. It should be noted that Hayflick's methods involved establishing a huge bank of WI-38 and MRC-5 cells that, while not capable of infinitely replicating like immortal cell lines, will serve vaccine production needs for several decades in the future.

- The vaccines below were developed using either the WI-38 or the MRC-5 cell strains.
- Hepatitis A vaccines [Vaqta/Merck, Havrix/GlaxoSmithKline, and part of Twinrix/GlaxoSmithKline]
  - Rubella vaccine [MERUVAX II/Merck, part of MMR II/Merck, and ProQuad/Merck]
  - Varicella (chickenpox) vaccine [Varivax/Merck, and part of ProQuad/Merck]
  - Zoster (shingles) vaccine [Zostavax/Merck]
  - Adenovirus Type 4 and Type 7 oral vaccine [Bar-Lab] \*
  - Rabies vaccine [MOVAX/Ramoff Pasteur] \*

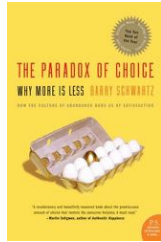
\*Vaccine not routinely given

Researchers have estimated that vaccines made in WI-38 and its derivatives have prevented nearly 11 million deaths and prevented (or treated, in the example of rabies) 4.5 billion cases of disease.

Several vaccines currently available in the United States were developed using animal cell strains, primarily using cells from African green monkeys. These include vaccines against Japanese encephalitis, rotavirus, polio, and smallpox. Of these, only rotavirus and polio vaccines are routinely given.

Recap Vaccine production: the pathogen against which a vaccine is aimed has to be produced in cells or other growth medium (eggs for Influenza A virus) growth plates for bacteria, mammalian cells for viruses. The virus has to be inactivated by chemical treatment (formaldehyde) or attenuated by passaging through unusual cells/ media. The killed/ inactivated, attenuated virus or a subunit of the virus produced by genetic engineering are then used to immunize a large proportion of the population.

## Affluenza of choices?



Barry Schwartz

Lack of choice is often felt as hardship. On the other hand, too much choice, as is the case for many of us in modern consumer societies is a recipe for unhappiness.

Practice question:

How can too many options be negative?

By overwhelming the individual who fails to satisfy his ideals and blames self for not having made the best possible choice.

## SES Socio Economic Status



An 1880 painting by Jean-Eugène Buland showing a stark contrast in socioeconomic status

**income,  
education and  
occupation**

Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

Practice question:

How is socio-economic status measured?

by combining measures of income, education, and occupation.

Socioeconomic status is typically broken into three levels (high, middle, and low) to describe the three places a family or an individual may fall into. When placing a family or individual into one of these categories, any or all of the three variables (income, education, and occupation) can be assessed.

## Wealth Distribution



The top 1% have the same amount of income as the poorest 56%!!!

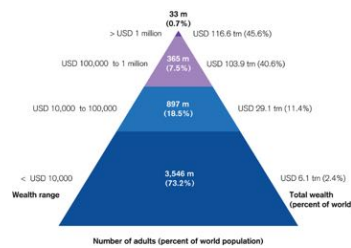
## Affluenza (wealth per adult, globally)



Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Credit Suisse Global Wealth Databook 2016

In the past 12 months, global wealth has risen by 3.5 trillion dollars to 256 trillion dollars, which represents an increase of 1.4 percent. However, wealth creation has merely kept pace with population growth. As a result, in 2016, wealth per adult was unchanged for the first time since 2008, at approximately 52,800 dollars. Among the major economies, the USA and Japan were able to generate substantial additional wealth, while the United Kingdom recorded a significant decline as a result of currency depreciation.

## Global Wealth Pyramid



Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Credit Suisse Global Databook 2016

In 2000, emerging economies accounted for a mere 12 percent of global wealth, but have contributed nearly 25 percent towards global growth since. Today, emerging nations are home to 18 percent of the world's ultra-high net worth population. China alone accounts for 9 percent of the top decile of global wealth holders, which is well above France, Germany, Italy, and the United Kingdom. Besides the recurring themes, our 2016 edition of the Global Wealth Report sheds light on the most significant trends at the bottom of the global wealth pyramid. Currently, an estimated 9 percent of adults globally are net debtors, which is without a doubt a worrying development.

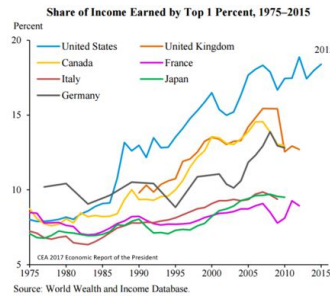
## Income inequality (Global)



The Gini coefficient (sometimes expressed as a Gini ratio or a normalized Gini index) is a measure of statistical dispersion intended to represent the income or wealth distribution of a nation's residents, and is the most commonly used measure of inequality. It was developed by the Italian statistician and sociologist Corrado Gini and published in his 1912 paper Variability and Mutability.

The U.S., in purple with a Gini coefficient of 0.450, ranks near the extreme end of the inequality scale. Looking for the other countries marked in purple gives you a quick sense of countries with comparable income inequality, and it's an unflattering list: Cameroon, Madagascar, Rwanda, Uganda, Ecuador. A number are currently embroiled in or just emerging from deeply destabilizing conflicts, some of them linked to income inequality: Mexico, Côte d'Ivoire, Sri Lanka, Nepal, Serbia.

## Income inequality



The Top 1% is earning a larger share of the total income (more than doubled in the last 30 years).

Income inequality and perceived inequalities can lead to social instability.

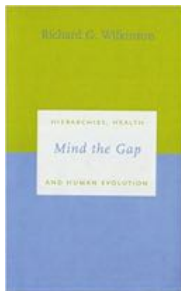
Practice question:

What has happened to income inequality in the US since the early 1980s?

More than doubled.

## Private Affluence & Public Squalor?

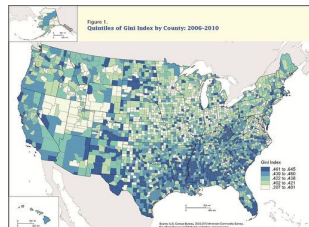
Secession of the wealthy



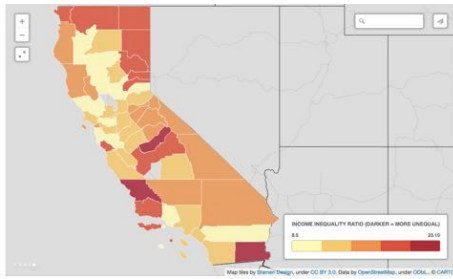
Psycho-social factors seem to mediate most of the SES/health gradient.

Beyond a certain level of social inequality, the wealthy completely lose interest in the rest of the population: private schools, private cooks, private gardeners, private security, body guards etc....

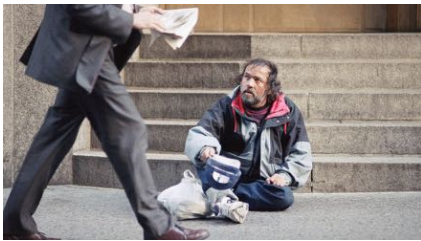
## Income inequality (USA)



## Income inequality California



## Income inequality & Social Stability



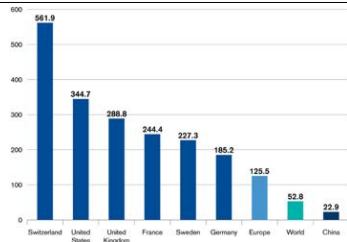
Practice question:

What effects can extreme income inequality have on human societies?  
Strongly destabilizing.

## More equal than the US (blue)



## Affluenza (wealth per adult)



Wealth per Adult among Major Economies in Mid-2016 (in thousand USD)

Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Credit Suisse Global Wealth Databook 2016

In 2016, Switzerland's total household wealth was 3.5 trillion dollars, or 1.4 percent of global assets, while it was home to only 0.1 percent of the world's adults. The Swiss are eleven times wealthier than the average world citizen. To be among the wealthiest 1 percent in Switzerland, a person requires a minimum of 5 million dollars. This is more than twice as much as it was at the turn of the century.

## Social Darwinism (second half of 19th Century)



Herbert Spencer



Francis Galton



Ernst Haeckel



William Graham Sumner

Spencer is best known for the expression "survival of the fittest", which he coined in *Principles of Biology* (1864), after reading Charles Darwin's *On the Origin of Species*

A drunkard in the gutter is just where he ought to be, according to the fitness and tendency of things. Nature has set upon him the process of decline and dissolution by which she removes things which have survived their usefulness

## Practice question:

Describe the idea of Social Darwinism:

The rich are rich because they are better (fitter) than the poor.

## Mani Matter



1936-1972

Dene wos guet geit  
Giengs besser  
Giengs dene besser  
Wos weniger guet geit  
Was aber nid geit  
Ohni dass's dene  
Weniger guet geit  
Wos guet geit

Drum geit weni  
Für dass es dene  
Besser geit  
Wos weniger guet geit  
Und drum geits o  
Dene nid besser  
Wos guet geit

Those well off  
would be better off  
if those less well off  
were better off  
which does not work  
without  
those better off  
being less well off

that's why little happens  
in order  
for those less well off  
to be better off  
and that is why  
those better off  
aren't doing well

<https://www.srf.ch/play/tv/news-clip/video/mani-matter-singt-dene-wos-guet-geit-1972?id=210e82dc-3895-4c75-b053-870379bb2959>

## Made to Feel Poor



Takeshita *et al.* 2018 *Primates*

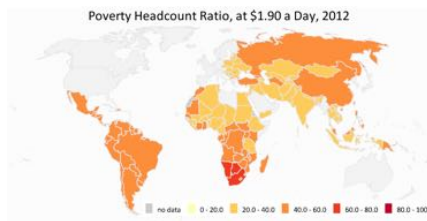
Japanese macaques use social rank to exclude lower ranking monkeys from the hot springs so crucial for their survival of the cold mountain winters.

Practice question:

What do primates do with power?

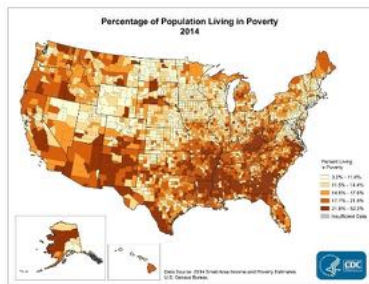
They use it.

## Poverty (Global)



Many countries still include large number of very poor people.

## Poverty (USA)



Poverty is a very real phenomenon in the USA,

What are the current poverty thresholds?

Some 2015 poverty thresholds were:

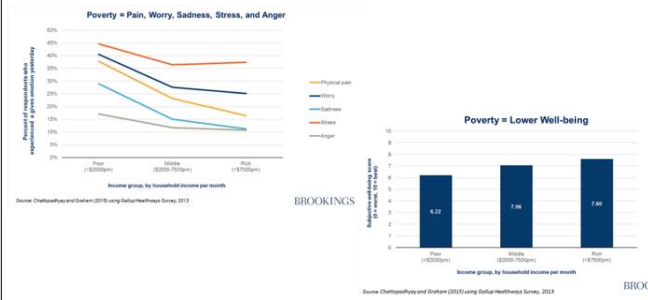
\$12,331 for a single individual under age 65

\$14,326 a household of two people with a householder 65 years or older with no children

\$24,036 for a family of four with two children under age 18

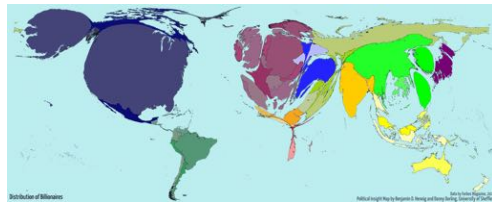


## Poverty & Well-being (USA)



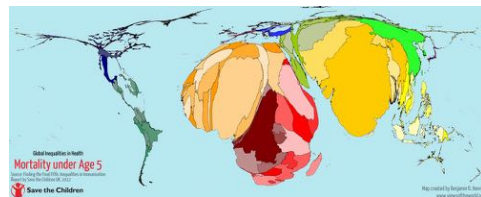
Self reported well-being is lower for the poor.

## Affluenza (billionaires and their wealth)



Billionaires reside mostly in the northern hemisphere.

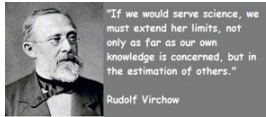
## Child Mortality



South East Asia have remarkably low child mortality despite relative lack of massive Wealth.

Child mortality remains high mostly in Africa and Indian subcontinent

#### 1847 Typhoid Outbreak (*Salmonella enterica*)



"Physicians are the natural attorneys of the poor."

Virchow, "founding father of modern pathology" was acutely aware of the link between poverty and disease.

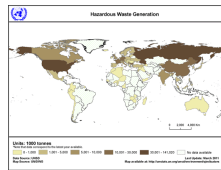
Practice question: Why would Rudolf Virchow have commented that "Physicians are the natural attorneys of the poor"?

Because physicians can easily see the brutal effects of poverty on health.

#### Basel Convention



Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal  
United Nations treaty  
Signed 22 March 1989  
Location Basel, Switzerland



After decades of numerous scandals involving the transboundary shipment of hazardous waste from Northern industrialized countries to highly unsafe disposal sites in the tropics, the international community agreed on a convention (international law). The USA and Afghanistan are the only two countries that did not sign (ratify) that law.

#### Basel Convention

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal  
United Nations treaty  
Signed 22 March 1989  
Location Basel, Switzerland



Practice question:

Can you name a way in which rich countries can directly cause disease in poorer countries?

By disposing of their hazardous waste there illegally.

## Hans Rosling and the “Third World”



[https://www.ted.com/talks/hans\\_rosling\\_on\\_global\\_population\\_growth](https://www.ted.com/talks/hans_rosling_on_global_population_growth)

Hans Rosling on economic development, using ikea boxes to illustrate 1 billion people and their economic aspirations: If we keep 2 billion people in a state of fighting for food and shoes, they will not lower their birth rate and the global population will reach 11 billion by 2050! Offering new economic opportunities to all would allow global population to level off at 9 billion.

[https://www.ted.com/talks/hans\\_rosling\\_on\\_global\\_population\\_growth](https://www.ted.com/talks/hans_rosling_on_global_population_growth)

## Hans & Ola Rosling's Gapminder Foundation



<https://www.gapminder.org/dollar-street/matrix>

Factfulness by the late Hans Rosling, his son and Daughter in Law, is a very impressive book about the world today!

Ask you friends to take the Gapminder Test!

# GAPMINDER

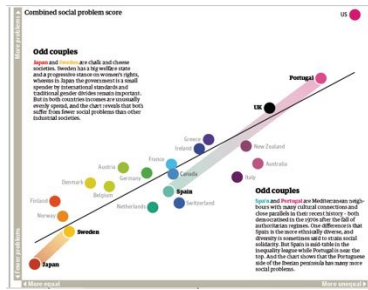
TOOLS DOLLAR STREET VIDEOS DOWNLOADS TEACH IGNORANCE DATA Search

Almost nobody knows the basic global facts!

Take the Gapminder Test

<http://forms.gapminder.org/s3/test-2018>

## Income inequality and social problems



Japan and Sweden, two countries very far apart share low levels of economic inequality and low levels of social problems. The neighbors Portugal and Spain have very different economic inequality and social problems (both much higher in Portugal).

## Psychosocial stress



Marmot MG, Smith GD, Stansfeld S, Patel C, North F, Head J, White I, Brunner E, Feeney A. Health inequalities among British civil servants: the Whitehall II study. *Lancet*. 1991

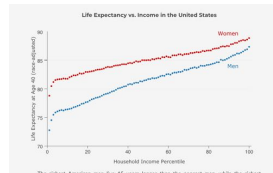
Being low in the social hierarchy (in the UK civil service) is associated with higher mortality for males and females. The initial prospective cohort study, the Whitehall I Study, examined over 18,000 male civil servants between the ages of 20 and 64, and was conducted over a period of ten years, beginning in 1967. A second cohort study, the Whitehall II Study, was conducted from 1985 to 1988 and examined the health of 10,308 civil servants aged 35 to 55, of whom two thirds were men and one third women.

## Psychosocial stress



### The Gross Inequality of Death in America

The richest Americans live 10-15 years longer than the poorest Americans. It will take a lot more than Medicare for All to close the gap.



Chetty et al. 2016 *JAMA*

Lack of autonomy, control over one's life results in stress.

Whitehall studies, Michael Marmot, UCL

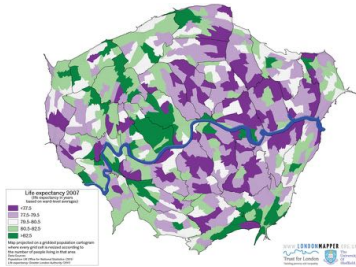
Lack of predictability (lack of control over one's life) is associated with chronic stress. Chronic stress affects the brain, the immune system, the circulatory system and reproductive organs.

Practice question:

What did the Whitehall studies on the health of British civil servants find?

The people at the bottom of the hierarchy had more disease.

## A tale of two cities London



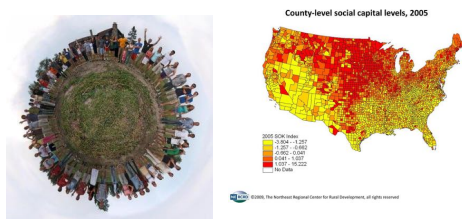
Health inequalities in London have many stories. They are part of living in an unequal country, where the differences within London reflect the differences that occur in the United Kingdom. But they are also part of the unique problems of large urban areas where people come together, but where people also separate each other because they can (or can't) afford to live different lives. We all die at some point in life. But how we die depends a lot on how we were able to live our lives.

## Drug resistant TB in our neighborhood



Even from a strictly selfish perspective, reducing the occurrence of homeless people with drug resistant TB would make a lot of sense.

## Social Capital



the collective value of all social networks (who people know), and the inclinations that arise from these networks to do things for each other (norms of reciprocity). Tom Sanders, Harvard

Social capital is hard to measure, but is independent of hard currency.

Practice question:

How could social capital be positive for health?

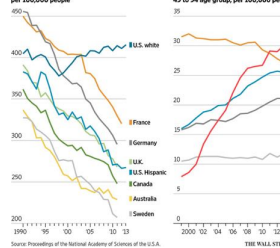
Social interactions are important for health especially when these are supportive and stable.

## Feeling Poor (sea of despair?)

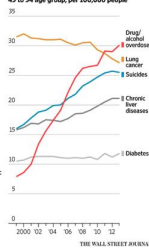
### On the Rise

Death rates have been climbing for middle-age white Americans, which experts attribute to drug abuse, alcoholism and suicide.

Mortality rates, 45 to 54 age group, per 100,000 people



Mortality by cause for white non-Hispanics, 45 to 54 age group, per 100,000 people



Anne Case and Angus Deaton *PNAS* 2015

Anne Case and Angus Deaton , 2015. Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. *PNAS*. Is this increase in mortality in American “whites” a sign of the plight of the middle class?

Could some of this anxiety and discontent directly led to the Trump victory in 2016?

## Poverty and global migration



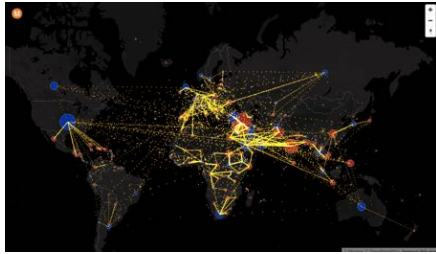
At a global level, poverty and political conflicts associated with it are leading to mass migration.

## Poverty and global migration



Poverty, War and Climate Change all drive Global Migration.

## Global migration



<http://metrocosm.com/global-immigration-map/>

## Summary



Poverty and Wealth have effects on health and well-being.

Affluenza is a new concept. Too much stuff and too much choice can hurt you.

Socio-economic status (income, education, occupation) is correlated with health.

Inequality exacerbates the effect of SES.

Feeling poor and being made to feel poor have health effects.

Laissez-faire capitalism versus socially oriented systems..

Economic development and education impact population growth and poverty.

The US stands out among industrialized nations for its degree of inequality.