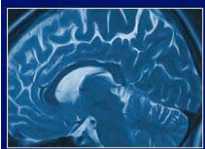


A Whole Life



A Mindful Approach to Sustainable Well-being

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*The Waisman Laboratory
for Brain Imaging and Behavior*



Madison Psychiatric Associates

What are we integrating?

Thoughts, Emotions, Body
Self, Community, Planet
7 generations



To what end?

Sustainable Well-being

How?

Lifestyle & Culture Change

Mindfulness

Recognizing & living our interdependence






“This hungry, malnourished nation exports meat to the U.S. while the cows in Honduras are better fed than the children. How can I, as a doctor, remain silent?”

- DR. JUAN ALMENDARES

Dr. Almendares (left) receives the **InterAction 2007 Humanitarian Award** for his work defending human rights and the environment, from journalist Sam Ford of ABC TV. Photo: Karl Grobl



Integrative Medicine

- Combine (one thing) with another to form a whole
- from Latin *integrat*- 'made whole' 
- Compare with *integrity*: the state of being whole and undivided

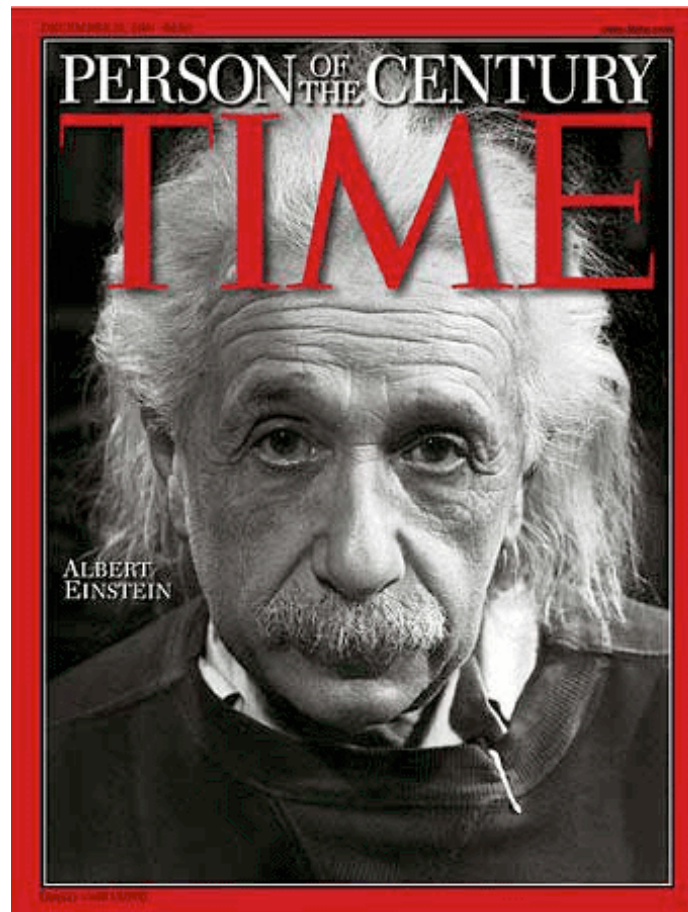
“One does not become
enlightened
by imagining figures of light
but by making the darkness
conscious.

This procedure, however,
is disagreeable and
therefore not very popular.”

– Carl Jung “The Philosophical Tree” (1945).
In CW 13: Alchemical Studies, p. 335



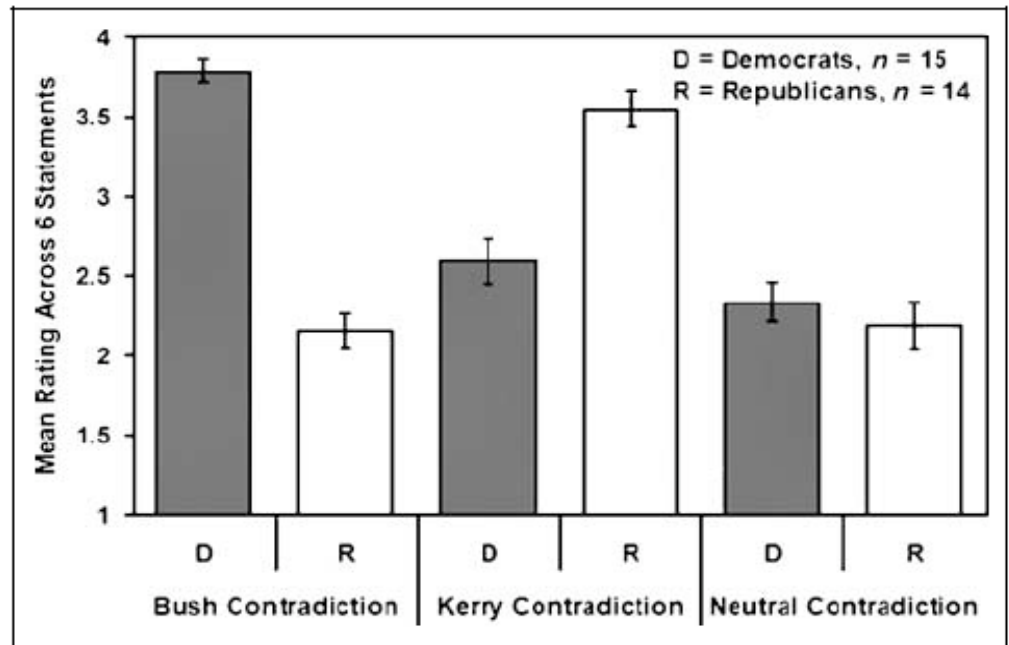
cai guo-qiang on the roof, transparent monument
the metropolitan museum of art, new york, usa, 2006



“The intuitive mind is a sacred gift, and the rational mind is a faithful servant. We have created a society in which we honor the servant and have forgotten the gift.” (Einstein, cited by Max-Neef, 2005)

Bounded rationality vs. Motivated reasoning

- All decisions are emotional
- Democrats & Republicans read statements about Bush, Kerry, or Tom Hanks (for ex)
- Consistently identified contradictions in “other” candidate but not own



- Negative emotion registered when contradiction was introduced
- With time to reach biased conclusion, negative affect gone
- “brain converges on solutions that minimize negative and maximize positive affect states” (Westin, et al., 2006, Jo of Cog Neuro, p. 1947)



Diseases of dis-integration

- Repression
 - Report low anxiety but exhibit anxious physiology (Weinberger, et al., 1973, JAP)
- Defensive Deniers
 - higher (and medically significant) cardiovascular reactivity associated with higher distress relative to genuinely healthy individuals (Shedler, Mayman, et al., 1993)

This talk may suggest contradictions
between our values and our lifestyles



negative emotion



Watch how you restore comfort to yourself



Mindfulness

- Paying attention, on purpose, non-judgmentally
- Being aware of sensations, thoughts, emotions occurring right now without judgment





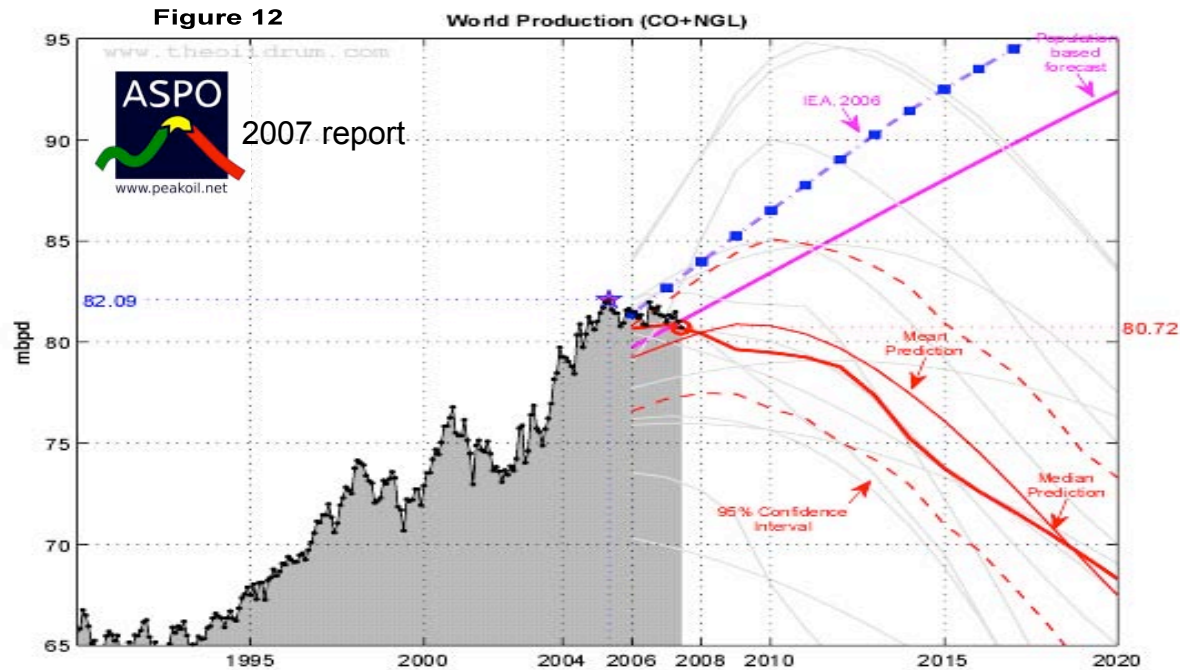
4 problems



2007 Nobel Prize
IPCC & Al Gore

- Water scarcity
 - 75-250 million by 2020 in Africa
 - Up to 50% decline in agriculture
- Ecosystem: 20-30% extinctions
- Food shortages
- Coasts: .4 - 1.4 m rise in sea level is best case stabilization scenario
- Health: malnutrition, disease, heat/floods/droughts

Peak oil & natural gas



- Never run out
- Is cheap oil significant?
 - 400 g/yr to feed each American [1]
 - Work of 1 g of oil in agriculture = 120 hrs of human labor [2]
 - \$483,840/yr (\$10.08/hr, [3]) to maintain food production w/o oil

[1] Food, Land, Population and the U.S. Economy, Pimentel, David and Giampietro, Mario, Cornell University, College of Agriculture and Life Sciences, Carrying Capacity Network, 11/21/1994

[2] Food, Land, Population and the U.S. Economy, Pimentel, David and Giampietro, Mario, Cornell University, College of Agriculture and Life Sciences, Carrying Capacity Network, 11/21/1994

[3] United States Dept of Labor, Bureau of Labor Statistics, May 9, 2008



- Widespread use of human-made chemicals begins in 1950's (Vomsaal, 1996)

What we don't know about chemicals

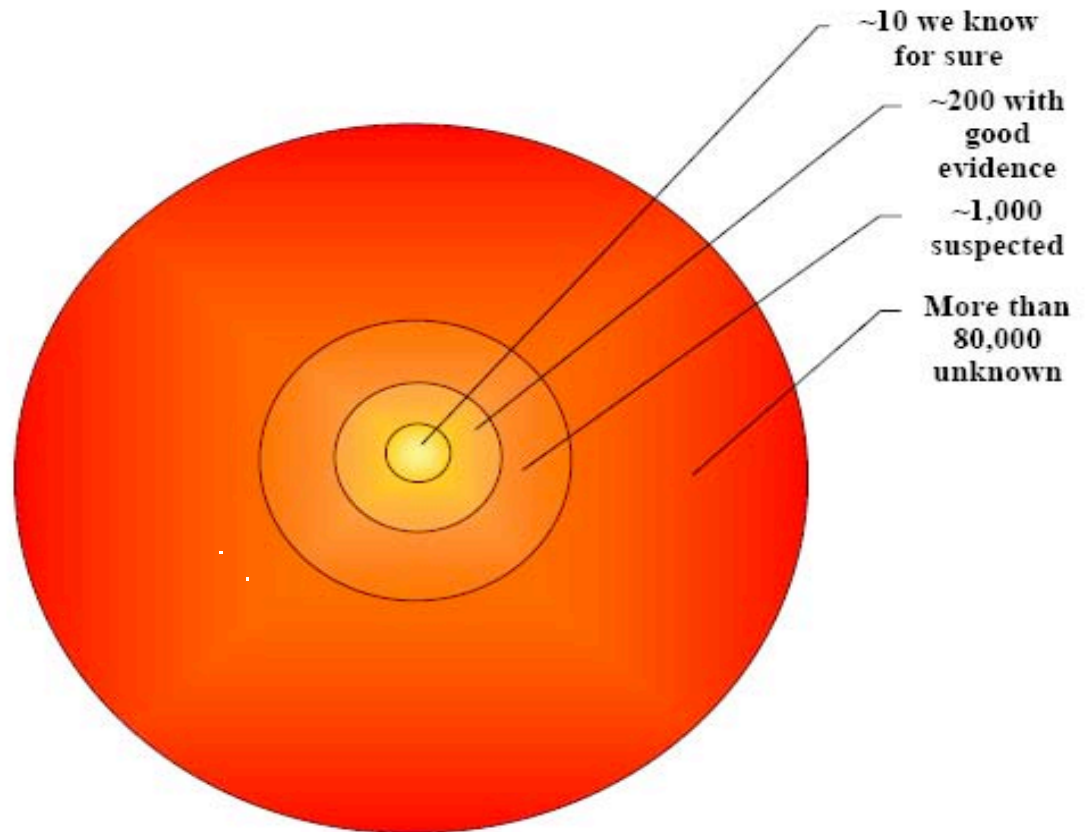
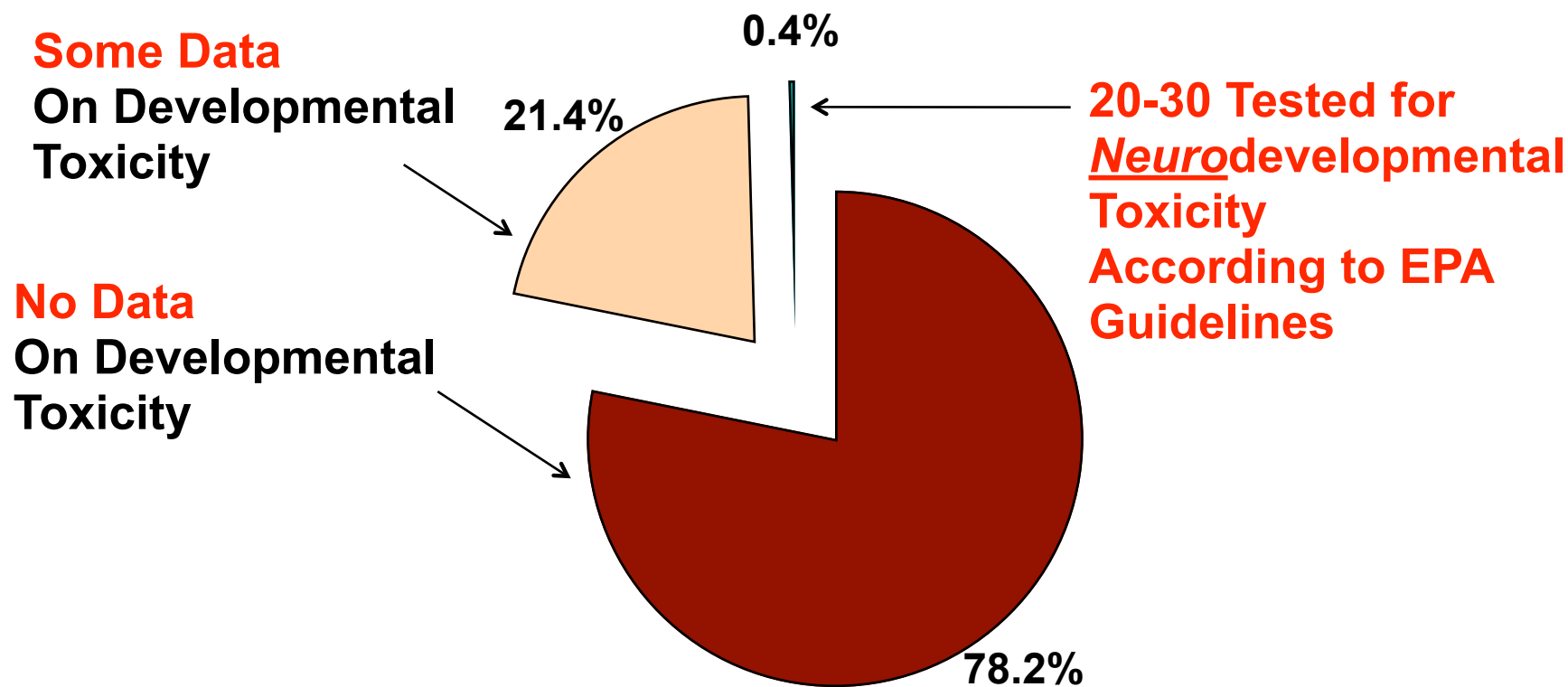


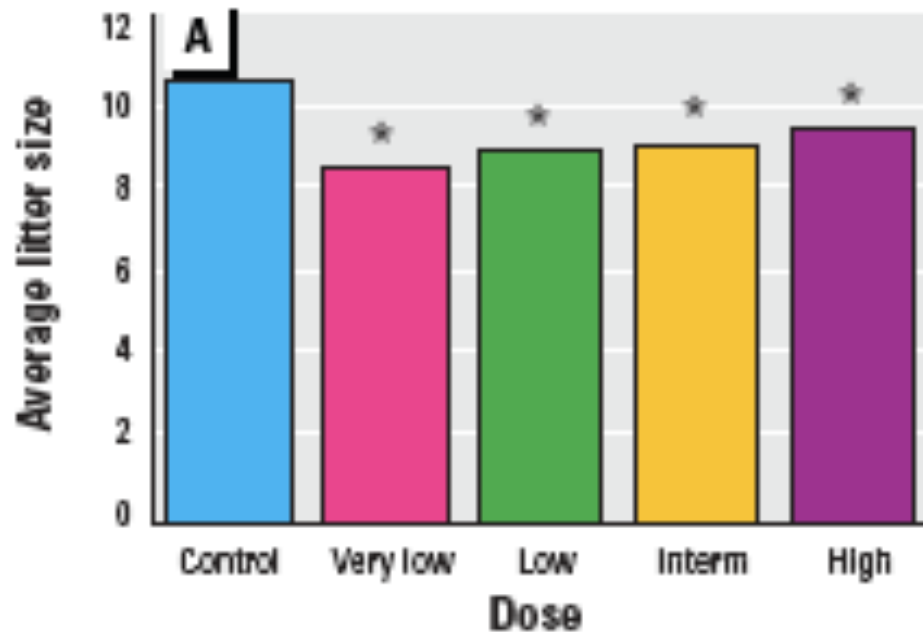
Figure 2.



The Collaborative on Health & the Environment (CHE)
Consensus Statement 2007

Status of Developmental Toxicity Testing for the 2,863 Chemicals Produced *Above 1 million pounds/year*



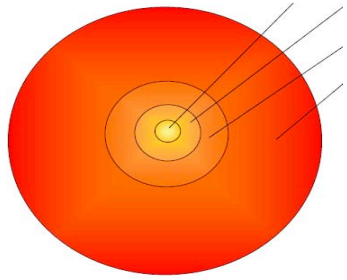


Low doses & Interactions

- Low doses can matter more (Cavieres, Jaeger, & Porter, 2002)

- 3-way interaction: aldicarb (insecticide), atrazine (herbicide), & nitrate (fertilizer)
 - Aggression
 - Thyroid
 - Immune

Porter, Jaeger, & Carlson (1999)



How many 2 & 3-way interactions from 80k chemicals?

- Over 85 trillion (85,303,200,000,000)
- 50,683 lifetimes just to count them
(at 2 per sec)

Let our children (& grandchildren) pay the price

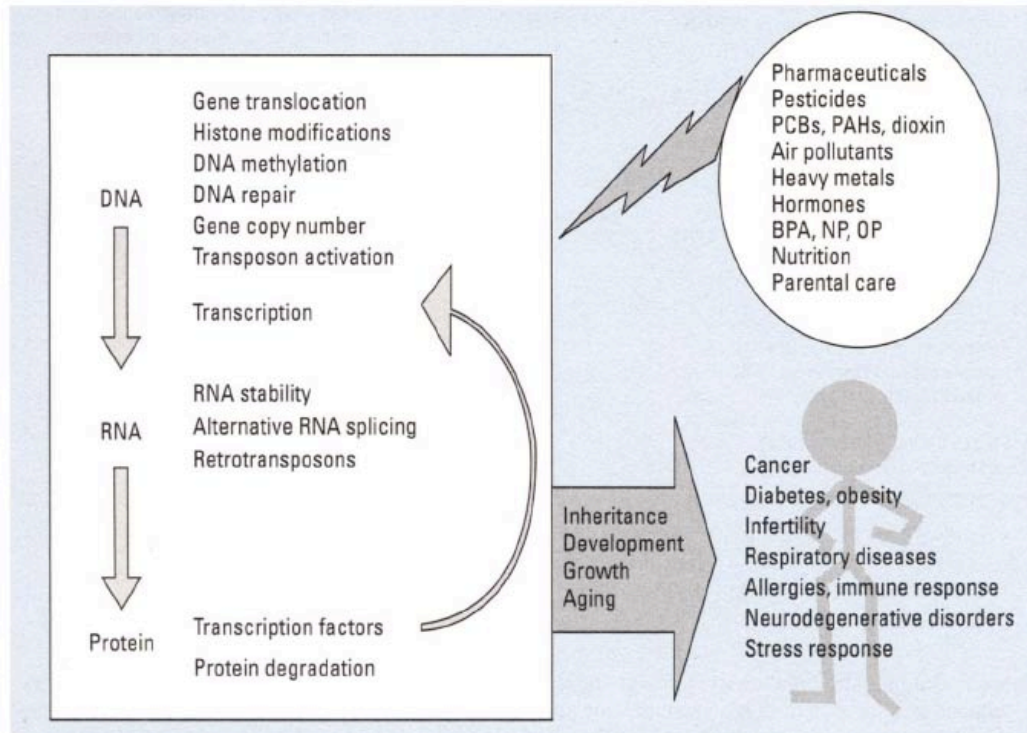


Figure 1. Summary of gene regulatory mechanisms affected by environmental exposures, with disease implications. Abbreviations: BPA, bisphenol A; NP, 4-nonylphenol; PAHs, polycyclic aromatic hydrocarbons, PCBs, polychlorinated biphenyls; OP, 4-*tert*-octylphenol.

- Mice exposed to Chromium Chloride 2 weeks before conceived offspring with increased risk of tumors and developmental abnormalities relative to controls (Yu et al., 1999)
- Gestational exposure of male rats to vinclozolin (fungicide) or methoxychlor (insecticide) during gonadal sex determination --> decreased sperm count & viability and lower fertility for 4 generations (Anway et al., 2005)
- Genetic predisposition x Diet (vitamin D) x PCBs x Dose Level --> Prostate Cancer?
- Genetic predisposition x Pesticide (dieldrin) x 50 yr dose --> Parkinson's Disease? (Sun et al., 2005)

**“It is the mark of an educated mind to
entertain a thought without accepting it”**

-Aristotle

Arrogance vs. Confidence

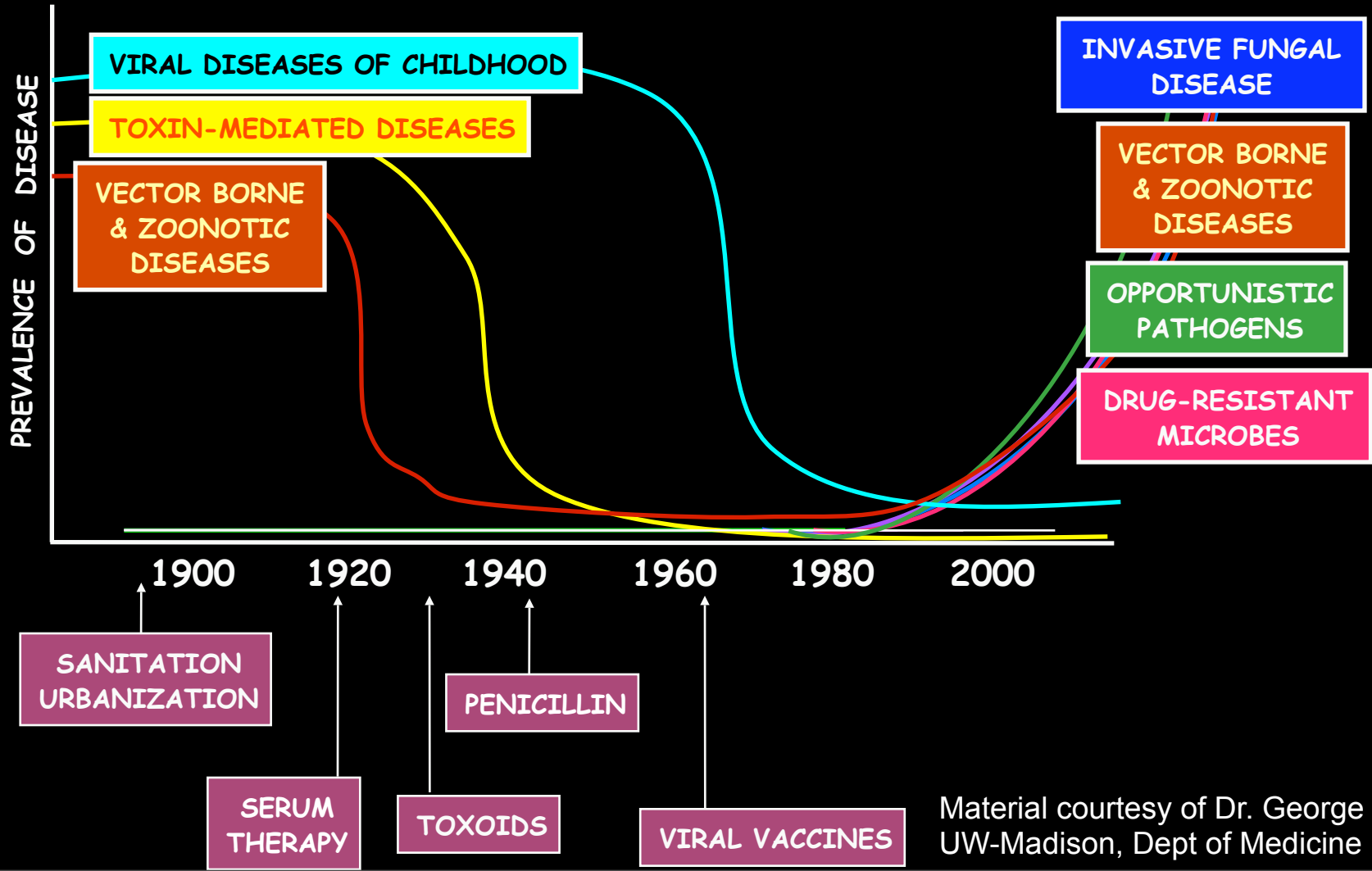
- Confidence in what we know
- Awareness of the ocean we do not
 - Humility
 - Identify opinion vs. knowledge
 - Listen to patients with an open mind
 - Listen with your full self (not just your healthcare mind)
 - Refer to others who do

Mercaptopurine (6-MP)

- Dedicated mortar, pestle, and spoon
- Don't breath the dust (some wear a mask when preparing)
- We wash the residue down the drain
- “Doc, any health effects?”
 - The dose is so low it won't matter
 - I'm not an environmental toxicologist



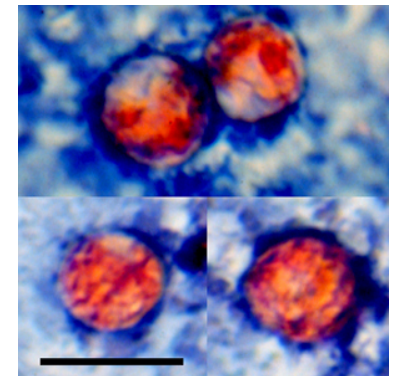
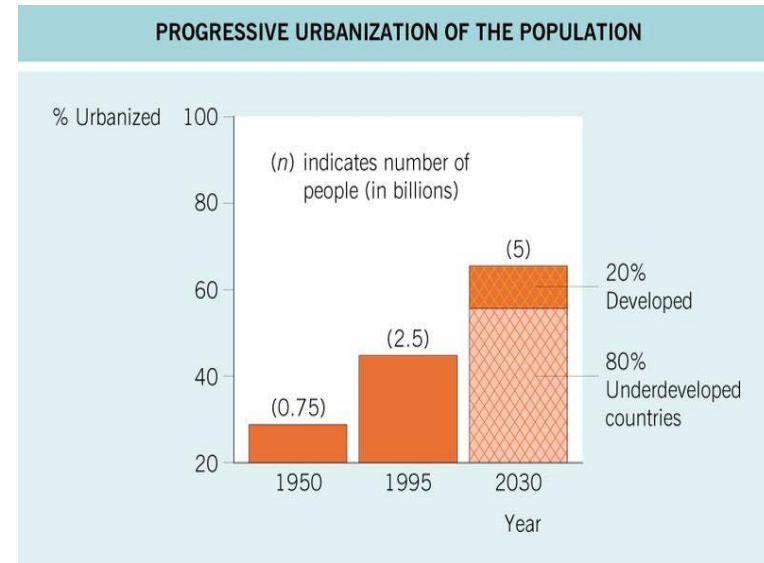
Emerging Infectious Diseases





Major Factors Contributing to the Emergence of Infectious Diseases

- Human demographics and behavior
 - urbanization
- Industry and commerce
 - Over use of antibiotics in animals creates drug-resistant bacteria
 - Huge farms: animals close proximity
 - Non-local food: cyclospora parasite



Material courtesy of Dr. George Mejicano,
UW-Madison, Dept of Medicine



Major Factors Cont'd

- Economic development and land use
- International travel
- Microbial adaptation and change
- Breakdown of public health measures

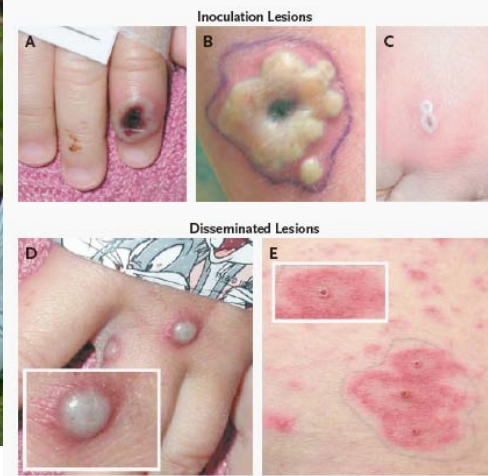




BodyBurden

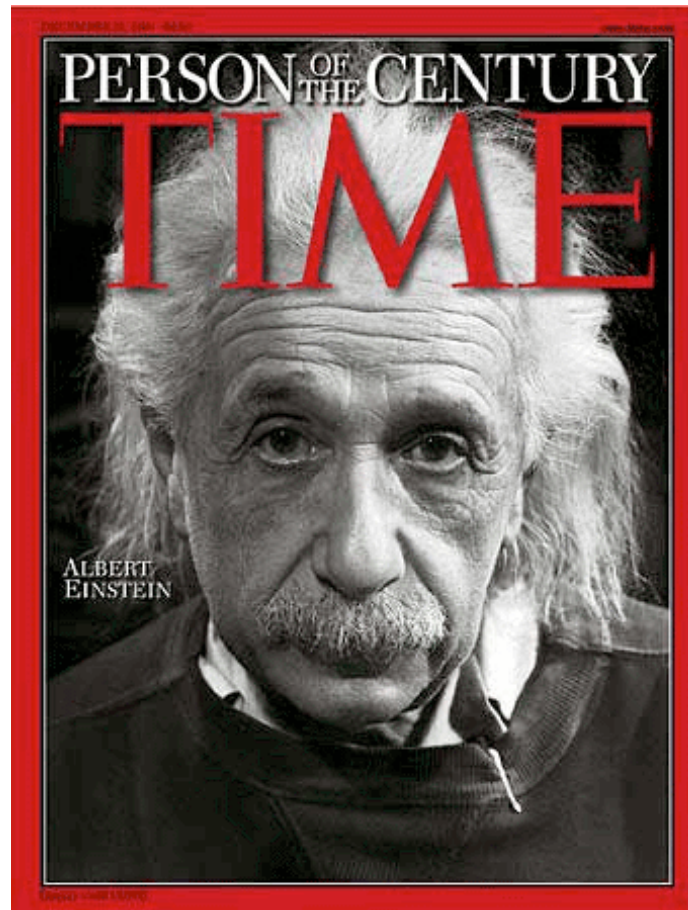
The Pollution in Newborns

A benchmark investigation of chemicals, pollutants, and pesticides in food



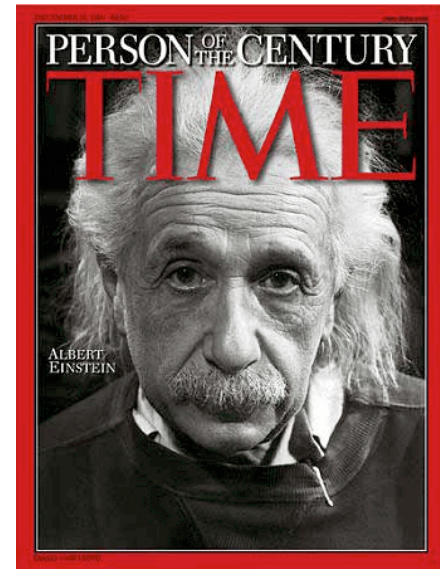
Modern life is toxic

and our grandchildren can inherit the
problems environmentally & genetically



“One cannot alter a condition with the same mind set that created it in the first place.”

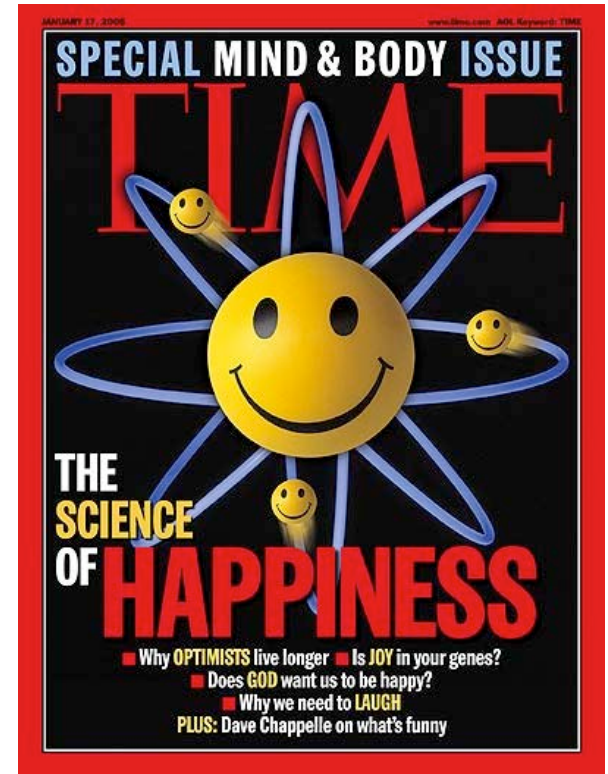
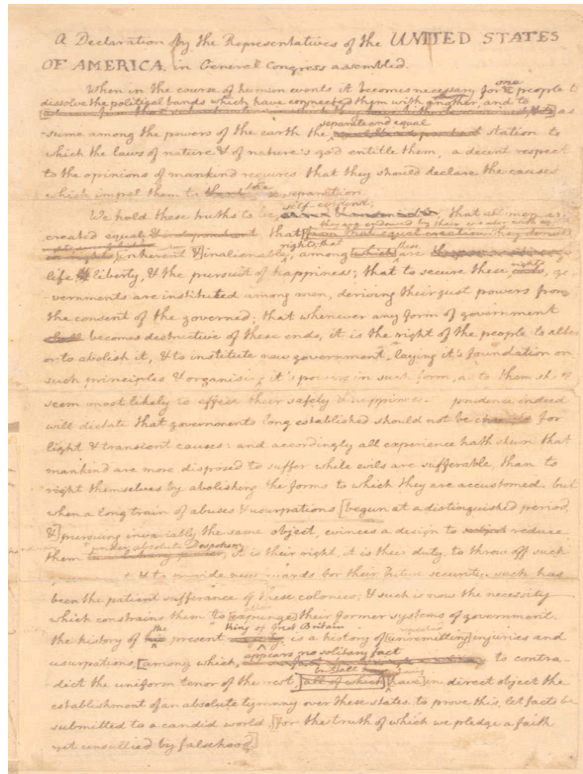
that mind-set is...



THEN

NOW

- One problem at a time --> solve by making it bigger
- Separate from nature --> part of
- Specialization --> integrating across fields
- Technology/reason/
knowledge will save us --> importance of integrating
emotion for wisdom
- Arrogance --> humility



“Salud, amor, y pesetas, y tiempo para gosarlos”

It goes 7.4 miles!



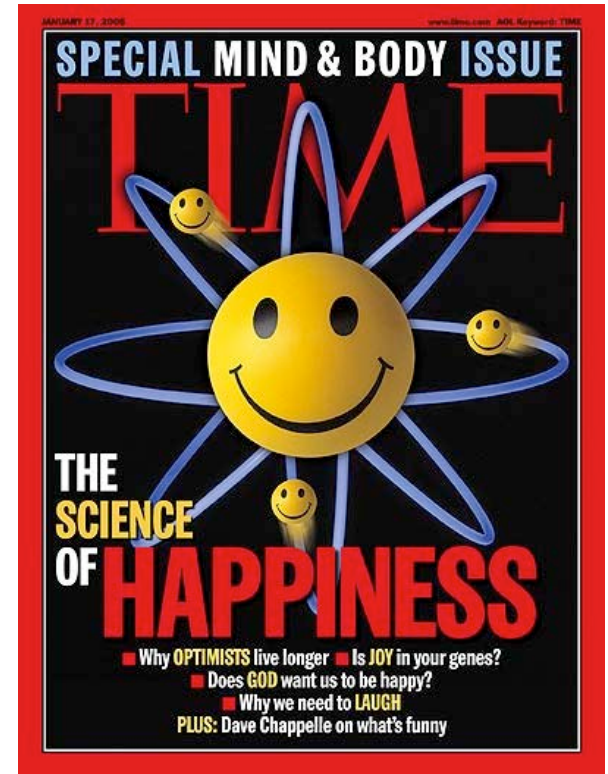
Denominator

- per hour?
- til it dies?
- per gallon?

A Declaration by the Representatives of the UNITED STATES OF AMERICA, in General Congress assembled.

When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the laws of nature and of nature's god entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to separate.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, & the pursuit of Happiness; That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed; That whenever any Form of Government becomes destructive of these ends, it is the right of the People to alter or to abolish it, & to institute new Government, laying its foundation on such principles & organizing it in such form, as to them shall seem most likely to effect their safety & happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light & transient causes; and accordingly all experience hath shewn that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses & usurpations, begun at a distinguished period, & pursuing invariably the same object, evinces a design to reduce them to absolute Tyranny, it is their right, it is their duty, to throw off such Government, & to provide new Guards for their future security. Such has been the patient sufferance of these Colonies; & such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let facts be submitted to a candid world, for the truth of which we pledge a faith not equalled by falsehood.



Denominator?

Sustainable Well-Being

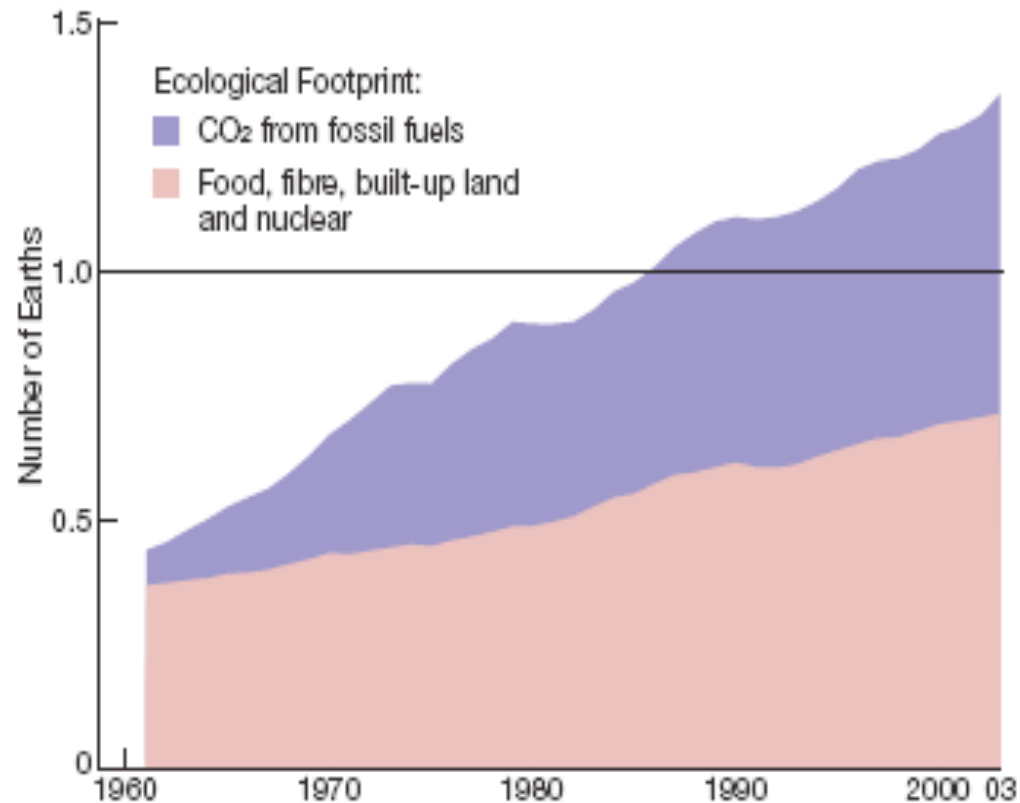
(Mental & Physical Health) * Longevity

Ecological Footprint



How much of the Earth's resources does your lifestyle require?


Fig. 1: **HUMAN DEMAND ON THE BIOSPHERE, 1961–2003**



Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

How are we doing?

	Life Sat	Life Exp	EF	HPI	Rank
Vanuata	7.4	68.6	1.1	68.2	1
Costa Rica	7.5	78.2	2.1	66	3
Cuba	6.3	77.3	1.4	61.9	6
Switzerland	8.2	80.5	5.3	48.3	65
UK	7.1	78.4	5.4	40.3	108
Sweden	7.7	80.2	7	38.2	119
France	6.6	79.5	5.8	36.4	129
Lithuania	4.7	72.3	3.9	29.3	149
USA	7.4	77.4	9.5	28.8	150
UAE	7.4	78	9.9	28.2	154
Ukraine	3.6	66.1	3.3	22.2	174
Zimbabwe	3.3	36.9	1	16.6	178



Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

Well-being: Physical Health

24th in world for disability adjusted life expectancy

"Basically, you die earlier and spend more time disabled if you're an American rather than a member of most other advanced countries"

Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

Q: Why?

- Some groups (e.g., Native Americans, inner city poor) have extremely poor health, more characteristic of a poor developing country rather than a rich industrialized one
- HIV kills or disables more in U.S. than in most other advanced countries
- U.S. a leader for cancers relating to tobacco
- A high coronary heart disease rate
- High levels of violence, especially of homicides, when compared to other industrial countries (Crime is up 300% from 1950-1980 & still above 1950 levels; Layard, 2005)

A: Social Justice & Lifestyle



Well-being: Mental Health

Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

Table 2. Twelve-Month Prevalence of World Mental Health Composite International Diagnostic Interview/*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition**

Country	% (95% Confidence Interval)				
	Anxiety	Mood	Impulse-Control	Substance	Any
Americas					
Colombia	10.0 (8.4-11.7)	6.8 (6.0-7.7)	3.9 (3.2-4.7)	2.8 (2.0-3.7)	17.8 (16.1-19.5)
Mexico	6.8 (5.6-7.9)†	4.8 (4.0-5.6)	1.3 (0.9-1.8)‖	2.5 (1.8-3.3)	12.2 (10.5-13.8)‡
United States	18.2 (16.9-19.5)	9.6 (8.8-10.4)	6.8 (5.9-7.8)	3.8 (3.2-4.5)	28.4 (24.7-28.0)
Europe					
Belgium	6.9 (4.5-9.4)	6.2 (4.8-7.6)§	1.0 (0.3-1.8)‖	1.2 (0.6-1.9)‡‡	12.0 (9.6-14.3)
France	12.0 (9.8-14.2)	8.5 (6.4-10.6)§	1.4 (0.7-2.0)‖	0.7 (0.3-1.2)‡‡	18.4 (15.3-21.5)
Germany	6.2 (4.7-7.6)	3.6 (2.8-4.3)§	0.3 (0.1-0.6)‖	1.1 (0.4-1.7)‡‡	9.1 (7.3-10.8)
Italy	5.8 (4.5-7.1)	3.8 (3.1-4.5)§	0.3 (0.1-0.5)‖	0.1 (0.0-0.2)‡‡	8.2 (6.7-9.7)
Netherlands	8.8 (6.6-11.0)	6.9 (4.1-9.7)§	1.3 (0.4-2.2)‖	3.0 (0.7-5.2)‡‡	14.9 (12.2-17.6)
Spain	5.9 (4.5-7.3)	4.9 (4.0-5.8)§	0.5 (0.2-0.8)‖	0.3 (0.0-0.5)‡‡	9.2 (7.8-10.6)
Ukraine	7.1 (5.6-8.6)†‡	9.1 (7.3-10.9)§	3.2 (2.4-4.0)‖#**	6.4 (4.8-8.1)‡‡	20.5 (17.7-23.2)
Middle East and Africa					
Lebanon	11.2 (8.9-13.5)	6.6 (4.9-8.2)	1.7 (0.8-2.6)‖#**	1.3 (0.0-2.8)	16.9 (13.6-20.2)
Nigeria	3.3 (2.4-4.2)	0.8 (0.5-1.0)	0.0 (0.0-0.1)‖#**	0.8 (0.3-1.2)	4.7 (3.6-5.8)
Asia					
Japan	5.3 (3.5-7.0)†	3.1 (2.2-4.1)	1.0 (0.4-1.5)‖#**††	1.7 (0.3-3.0)	8.8 (6.4-11.2)
People's Republic of China					
Beijing	3.2 (1.8-4.6)†				
Shanghai	2.4 (0.9-3.9)†				

Source: WHO World Mental Health Survey Consortium (2004), *JAMA*

Q: Why?

1. Glorification of the individual [1]
2. Degradation of the commons [1]
 - Decreased civic involvement (esp. U.S.), 1/2 of which attributed to urban sprawl, T.V. viewing, & time limitations [2, p. 18]
 - Time poverty [3]
 - U.S. works more than any other industrialized country
 - We work nearly 9 full weeks (350 hours) longer per year than our peers in Western Europe

Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

A: Lifestyle

Sustainable Well-Being

Well-being

Resources to get WB



Resources Used

Life Sat	Life Exp	EF	HPI	Rank
7.4	77.4	9.5	28.8	150

- U.S. uses 6.8 planets worth of resources
- We use more energy/person than any other country (except UAE)
- U.S. & allies outspend all non-allies militarily
- “Providing adequate food, clean water, and basic education for the world’s poorest could all be achieved for less than people spend annually on...

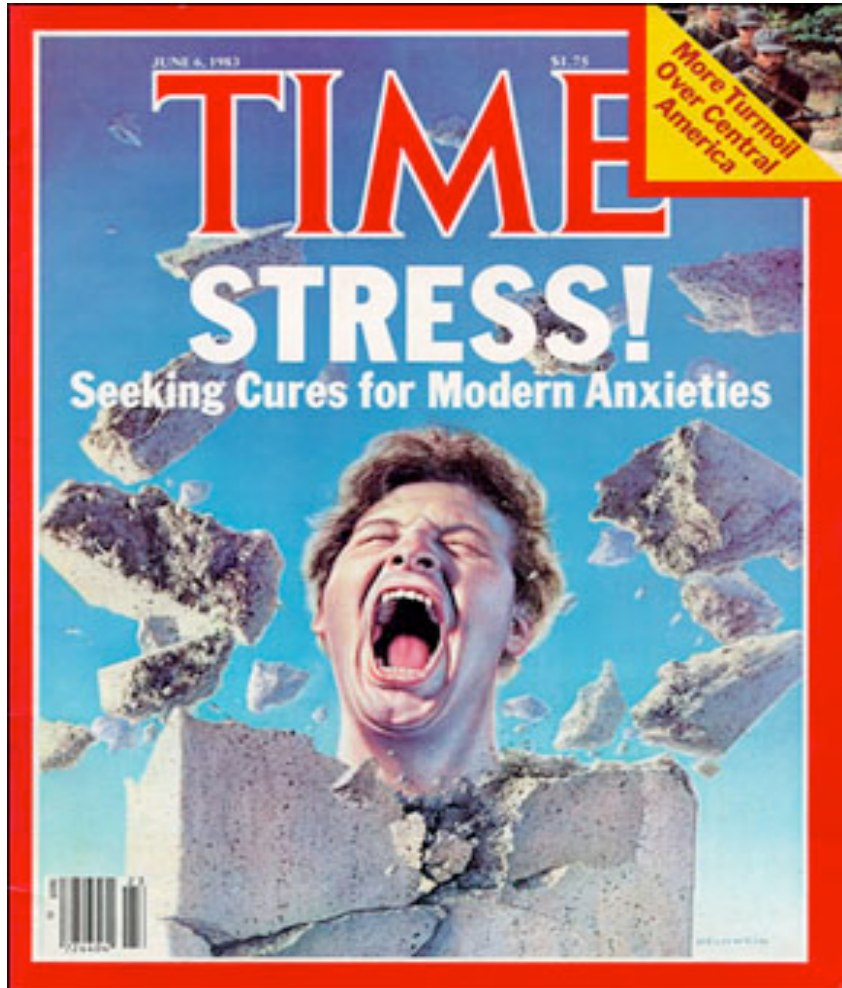
makeup, ice cream, and pet food” (p.10, State of the World, 2004)



Sustainable Well-Being

(Mental & Physical Health) * Longevity

Ecological Footprint



Work more, achieve less, &
destroy the planet in the bargain

Mindfulness effective for...

- **Anxiety, depression, stress, burnout** (e.g., Cohen-Katz, Wiley, et al., 2005; Ma & Teasdale, 2004; Teasdale, Segal, Williams, et al., 2000)
- **Chronic pain** (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985)
- **Substance abuse** (Bowen, Witkiewitz, Dillworth, et al., 2006)
- **Arthritis** (Pradhan et al., 2007)
- **Diabetes** (Gregg, Callaghan, et al., 2007)
- **Fibromyalgia** (Sephton et al., 2007; Grossman, et al., 2007)
- **Psoriasis** (Kabat-Zinn et al., 1998)



Mindfulness effective for...

- Positive resting frontal alpha-asymmetry (Davidson, et al., 2003; Barnhofer et al., 2007)
- **Immune Function** (Davidson, Kabat-Zinn et al, 2003)



...and different types of people

- **Cancer patients** (Specia, Carlson, et al., 2000; Monti, Peterson, et al., 2005; Carlson, Specia, et al., 2007)
- **Health care professionals** (Shapiro, et al, 2005)
 - **Medical Students** (Shapiro, et al., 1998)
 - **Nurses** (Cohen-Katz, Wiley, et al ., 2005)
- **Women with heart disease** (Tacon, McComb, Caldera, Randolph, 2003)
- **Prisoners** (Bowen, Witkiewitz, Dillworth, et al., 2006)
- **Borderline Personality Disorder** (DBT, Linehan, 1993)





- Al: “I feel like I want to be healthier.”
- Dr.: “Maybe you should quit smoking”
- Al: “Really, Doctor, how would that help?”
- Dr.: “Well, smoking is slowly killing you”
- Al: “Wow! I didn’t realize that. I’ll quit straight-away!”



- Al: “I feel like I want to be healthier.”
- Dr.: “Maybe you should quit smoking”
- Al: “Really, Doctor, maybe I should stick these cigarettes up your &%^\$!”
- Dr.: “Maybe you should leave the office”
- Al: “Yeah, that’s obviously the only way to find a competent Doctor.”
- Suppose Al has BPD

Smoking Cessation Pilot

- 8-week MBSR
- Treatment
 - (1) This is not about quitting
 - (2) Be aware of thoughts, emotions, sensations
 - (3) Bring this awareness to smoking
- Results
 - 56% stayed quit at 6 weeks vs. 11-30% rates in other therapies (Fiore, Bailey, & Cohen, 2000)





Mechanisms of Change?

- Attention is needed even for awareness of amygdala-mediated stimuli (Pessoa, Padmala, & Morland, 2005, NeuroImage)
- Increased control of habitual responding (Wenk-Sormaz, 2005)
- Better reality sampling (Slagter, Lutz, Greischar, et al. (2007; PLOS Biology)
- Meta-cognitive awareness (Teasdale, et al. 2002)
 - CT & MBST --> increased meta-cog awareness --> decreased depression
 - MBCT reduces overgeneral memory bias (Williams, Teasdale, Segal, & Soulsby, 2000)



Mindfulness

- Being aware is the act of integrating (re-mem-ber-ing) all parts of ourselves
- Welcoming them into awareness without judgment
- Beyond self:
Interdependence





Integrating parts of ourselves

- Authenticity associated with less depression & anxiety, lower stress, greater subjective vitality, & lower physical Sxs (Ryan, LaGuardia, & Rawsthorne, 2005)
- More distinct one is across different roles, less well-being (Sheldon, Ryan, et al. JPSP, 1997)

- You are more than health care providers.
You are...
 - Parents & siblings
 - Neighbors & Citizens
 - Human Beings

Beyond Self



The Big Us

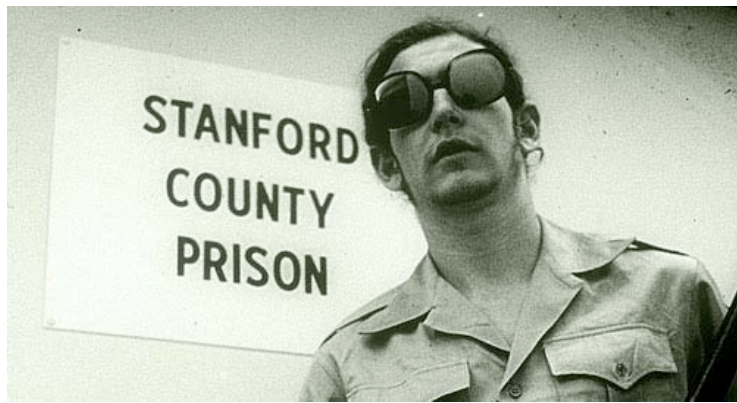
Fundamental Attribution Error

Attributing to person what should
be attributed to the context

Coined by Lee Ross. Experiments by Jones & Harris (1967)

Is context important?

- Patient is depressed
- She was sexually abused as a child
- She is physically & mentally abused by her husband
- They have no money & 2 children
- Husband was fired & COBRA is gone
- Is it appropriate to locate the disease within the individual?
 - Give her a pill?
 - A new life?



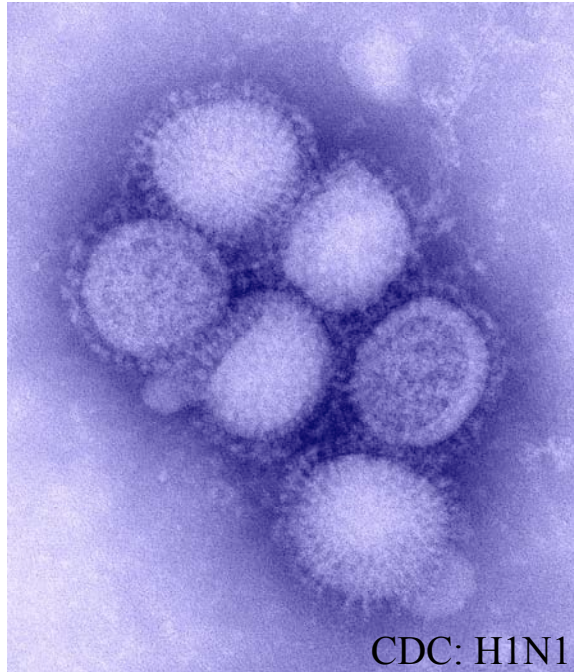
Stanford Prison Experiment

- Participants randomly assigned to “prisoner” or “guard” roles in mock prison setting
- Study prematurely terminated “when it became apparent that many of the ‘prisoners’ were in serious distress and many of the ‘guards’ were behaving in ways which brutalized and degraded their fellow subjects”
- “Volunteer prisoners suffered physical and psychological abuse...while volunteer guards were exposed to the new self-knowledge that they enjoyed being powerful and had abused this power to make human beings suffer.”

Wisdom of Crowds

- Jelly Beans (Treynor, 1987)
 - Jar with 850 beans, group estimate 871
 - 1 out of 56 people made better guess
- Estimate of room temp (Knight, 1921)
 - Ave estimates of class at Columbia U.
 - Guess = 72.4 degrees, actual = 72 degrees
- Rank items by weight (Gordon, 1924)
 - Asked 200 students to rank items by weight
 - Groups estimate 94% accurate, better than all but 5 indiv guesses





CDC: H1N1

Google better
than CDC at
predicting flu
(2007-8)

Beyond Self



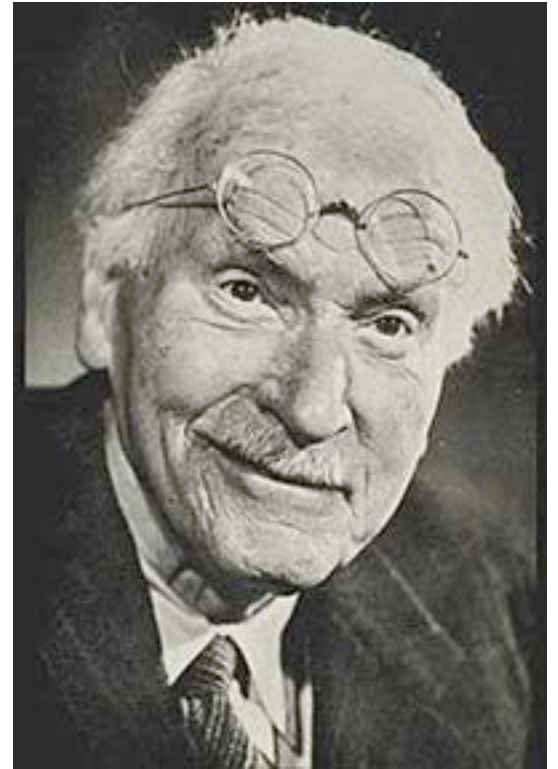
The Big Us

Listening to our patients IS
listening to ourselves

Showing up for ourselves is
the only way to show up for our
patients

“The most terrifying thing is
to accept oneself completely”

- Carl Jung





True neurally. Mirror Neuron System

- Observing an action = Doing that action
- Experiencing disgust & observing someone's disgust both activate anterior insula (Wicker, Keysers, et al., 2003, Neuron)
- Empathy: to put oneself in the place of others

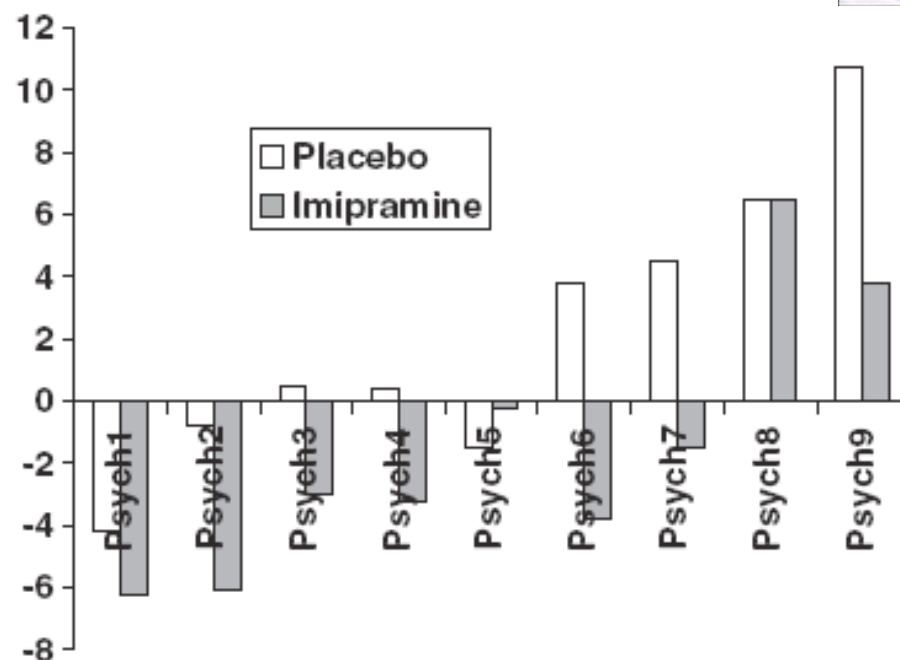
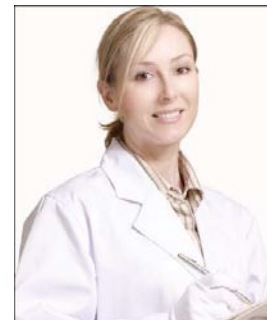


Empathy, Compassion, & Fairness

- Empathy: High functioning autistic individuals have less activation in MNS areas than controls when imitating emotional facial expressions (Depretto, et al, 2006, Nat Neurosci)
- Compassion: AC & Anterior insula activate when partner feeling pain (Singer, et al., 2004, Science)
- Fairness: AC & Anterior insula activated when neuroeconomic games are played fairly or not (Singer, et al., 2006, Nature)



Your Choice: Pills or Person



- Variance in BDI due to medication = 3.4% vs. 9.1% d/t psychiatrist
- HAM-D = 5.9% & 6.7%

An even larger system




- Mows the lawn



- Mows the lawn...quietly
- While feeding itself
- While fertilizing its food
- While being smart enough to avoid said fertilizer
- Gives milk & meat & clothing
- Reproduces itself

Power

- MDs have a lock on healthcare
- Can have powerful influence on helping people by using that power to incorporate new ideas
- Obstacles? Debt, Time, Training, Lack of compassion resulting from not knowing yourself

An aerial photograph showing a diverse landscape. In the upper left, there's a large, open field with some trees. To its right is a rectangular field divided into sections, some green and some brown. Below the top-left field is a dense line of trees. In the bottom left, a large area is divided into many small, rectangular plots, some of which appear to be gardens or small fields. To the right of this is a residential area with several houses, some with solar panels on their roofs, and a parking lot. The overall scene is a mix of natural, agricultural, and residential land use.

5-acre prairie
restoration

5-acre organic CSA farm

Community Gardens
5 acres (320 plots)

Troy Co-housing
30 units, mixed income

Troy Co-housing

- Lifespan design
- Universal design
- Green space
- Promote community
- Green built & energy star
- Low operating costs
- Affordable: 20 (of 30) units permanently at affordable housing rates
- 2007 Livable Community Award from AARP & NAHB



Ecovillage at Ithaca, NY



Song (30 houses)

Frog Common House

Frog (30 houses)



- 800, 1000, 1200, 1500 sq ft
- Resources = ~14 acres/person (EF 1.0)
- 25 acres = avg (EF 1.0; 56% of avg American)

Sharing...

- Meals
- Childcare
- Cars?
- Financing to increase renewables?
- Homes to increase density?
- Largest obstacles?
 - Intending to change
 - Getting along

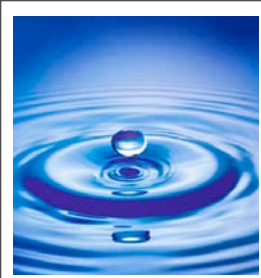
Mindfulness



- Tool for awareness & integration of...
 - Self: our own parts
 - Community: how we effect others and how others effect us
 - Planet: How our lifestyle effects the planet & how the planet effects our lifestyle
- Emotion regulation (important for change)
- Skillful communication

Skillful Communication

- Be fully present & listen
 - to yourself: e.g., notice anger
 - & to them
- Make sure they know you've heard them
- Empathize with them (Yes...)
- Speak your truth skillfully (...and)



Maximize sustainable well-being

- Be fully human (Ts, Es, all your roles)
- Requires being fully present
 - It's about you & the community & the planet
 - Take a deep breath when you enter the room
 - Pay attention to the full catastrophe
 - Compassion to self & other
- Lean in to a more sustainable lifestyle
- Work with others for lifestyle change



sustainable**wellbeing**.org

- music
- pdf
- video

Thank you

- Greg Reeb
- Rizwan Ahmad