It’s (all about the) People!

an example from the healthcare domain

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Computing: a Culture of Plenty

Culture of medical industrial complex is scarcity

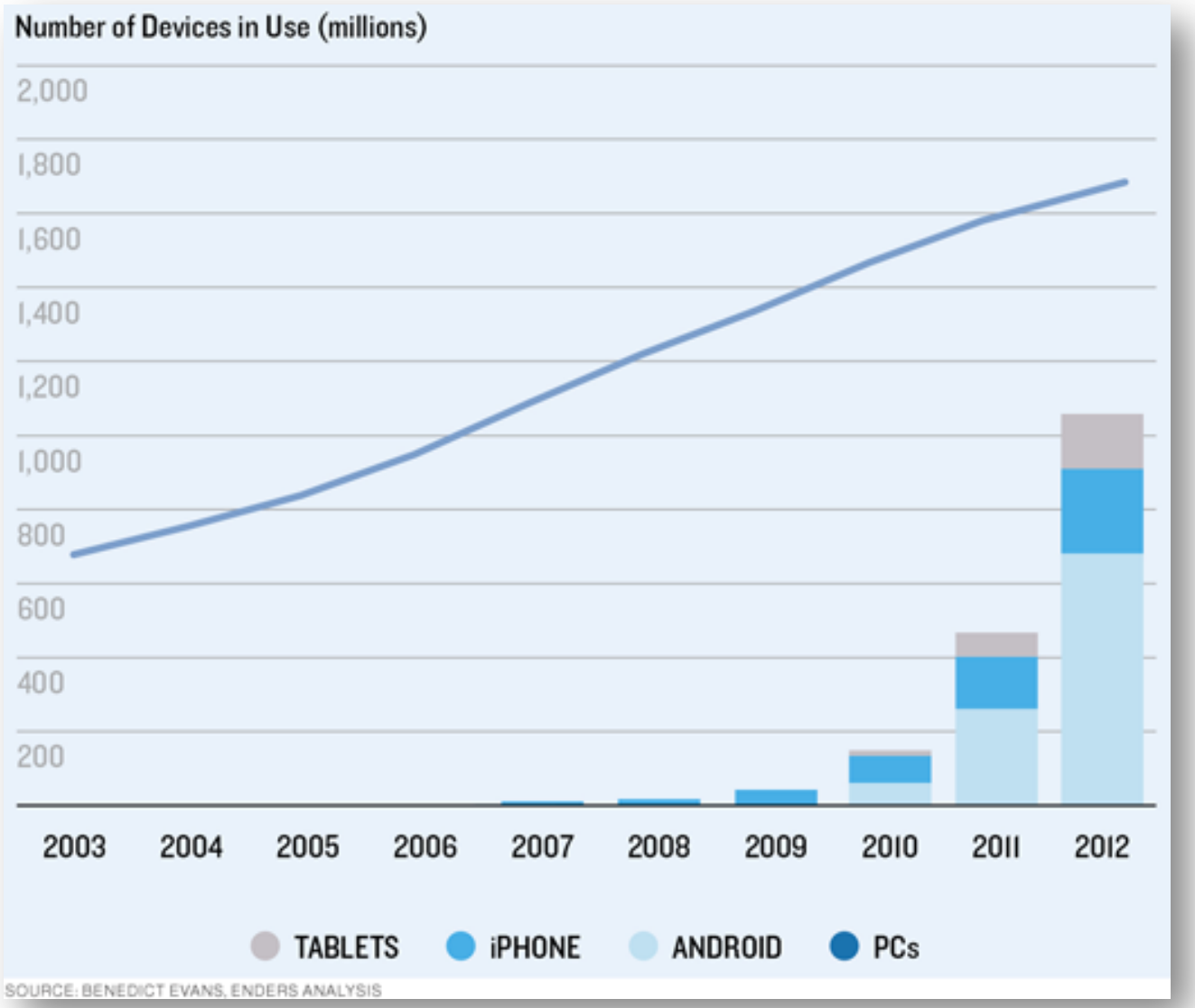
- Centralized, regulated, rationed, slow
- Unscientific: a single measurement in time tells us little
- (also seen in other domains, like environmental eng.)

Computing is cheap, plentiful, instantaneous, personal, customizable, connected, fast

Culture of computing wants same for healthcare

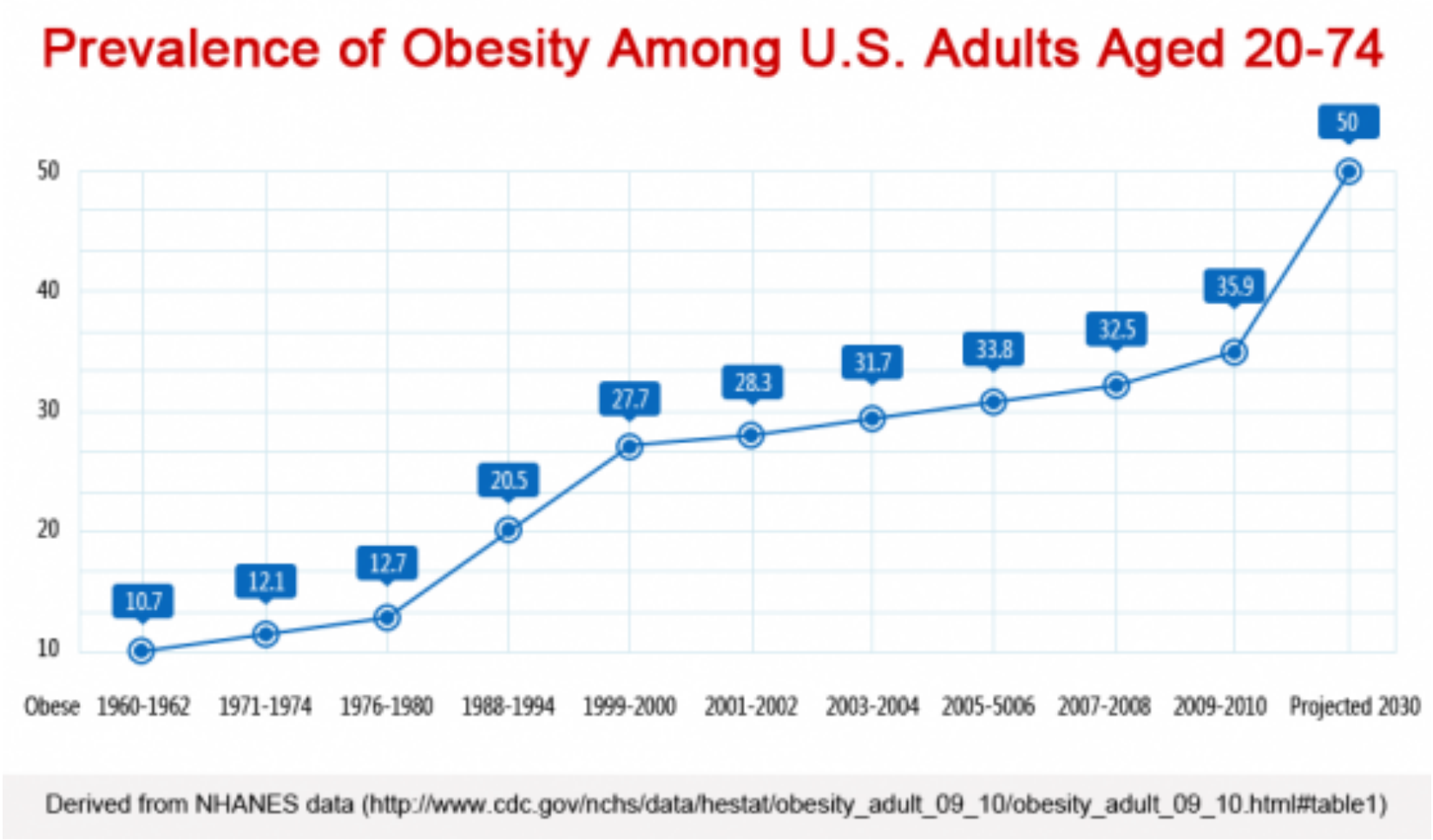
- *Why can't I take a blood test every day?*
- *Can't I self-diagnosis and self-treat?*
- Examples from my own research: CitiSense and DELPHI

Computing Trend (Global)



via: Technology Review

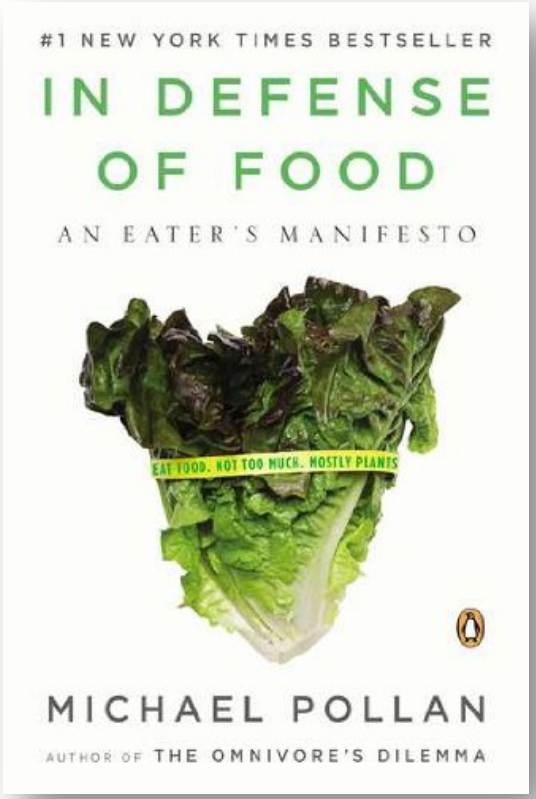
Correlation: we're getting sicker



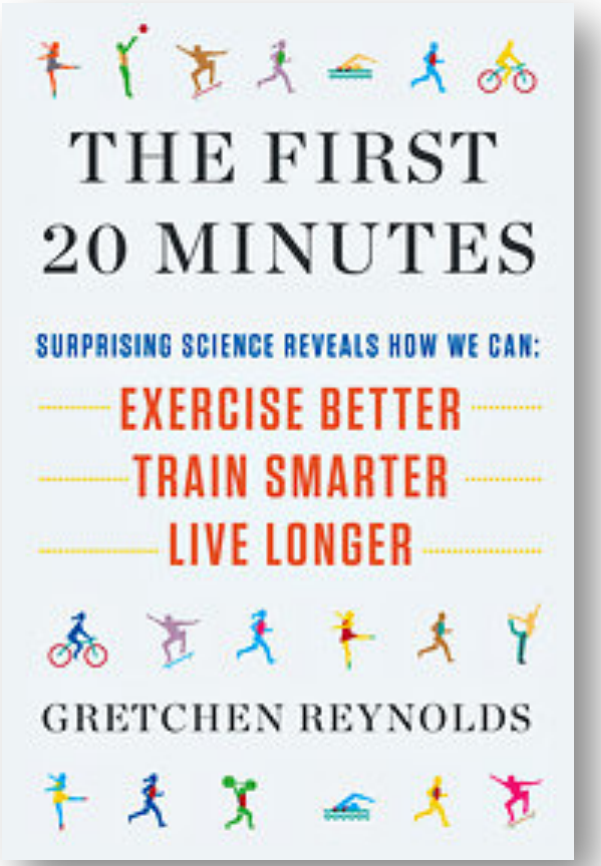
via: RWJF and thinkprogress.org

We know what to do, but we don't

"Eat food. Not so much. Mostly Plants."



"Humans are born to stroll."



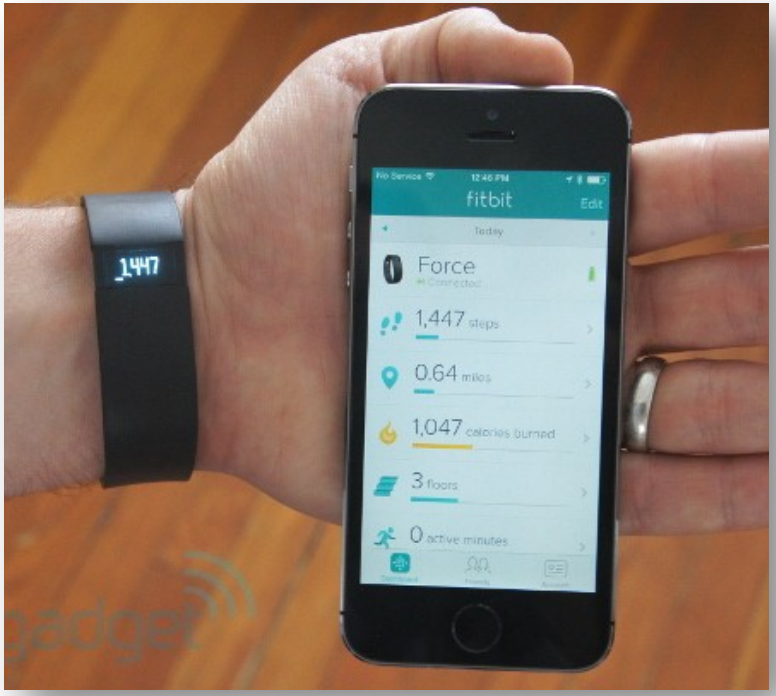
Take 1: Doctor's Intervention*

1. Nurse weighs you
2. Doctor tells you to eat less and exercise more
3. You eat less and exercise more
4. You lose weight

*Annually

Take 200: Personal Informatics*

1. Gather lots of data about yourself (sensors help)
2. Graph it and study it
3. Gain insight & inspiration
4. Change your behavior
5. (Track data to see the results)
6. (Push to Twitter if the results are flattering)



source: blogcdn.com

*Daily, until you lose inspiration and leave your fitbit in the drawer

What's wrong? Bad Psychology

Humans are <u>not</u> information-processing machines

We have **cravings**
- *"Bet you can't eat just one!"*
- e.g., eating carbs causes blood sugar to yo-yo

We're **forgetful**; **rationalize** to defeat analysis

These are **not bugs**, it's the essence of who we are

Culture
- if your friend's friend's friend gains weight, you gain weight (Christakis & Fowler, *Connected*)
- mass media marketing, fads, etc.

Infrastructure as culture: suburbia, air conditioning, etc.
- e.g., we live far from work, so we drive; eats up walking time

Not just patients: doctors, too

Doctors have resisted the introduction of checklists

Seen as taking away decision-making authority (Gawande, *The Checklist Manifesto, 2009*)

Add **ego** to the list of human "failings"

Surgical Safety Checklist

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

Before induction of anaesthesia
(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?
- ☐ Yes

Is the site marked?
- ☐ Yes
- ☐ Not applicable

Is the anaesthesia machine and medication check complete?
- ☐ Yes

Is the pulse oximeter on the patient and functioning?
- ☐ Yes

Does the patient have a:

Known allergy?
- ☐ No
- ☐ Yes

Difficult airway or aspiration risk?
- ☐ No
- ☐ Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

Before skin incision
(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

Has antibiotic prophylaxis been given within the last 60 minutes?
- ☐ Yes
- ☐ Not applicable

Anticipated Critical Events

To Surgeon:
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

To Anaesthetist:
- ☐ Are there any patient-specific concerns?

To Nursing Team:
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

Is essential imaging displayed?
- ☐ Yes
- ☐ Not applicable

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:
- ☐ What are the key concerns for recovery and management of this patient?

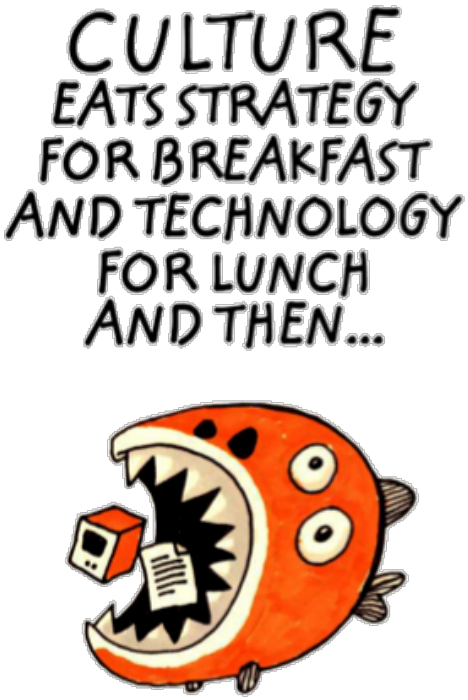
This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

The computing problem

Psychology eats computing for lunch

The learning health system is a socio-technical system in which *computing needs to* ***influence*** *the humans in the system**

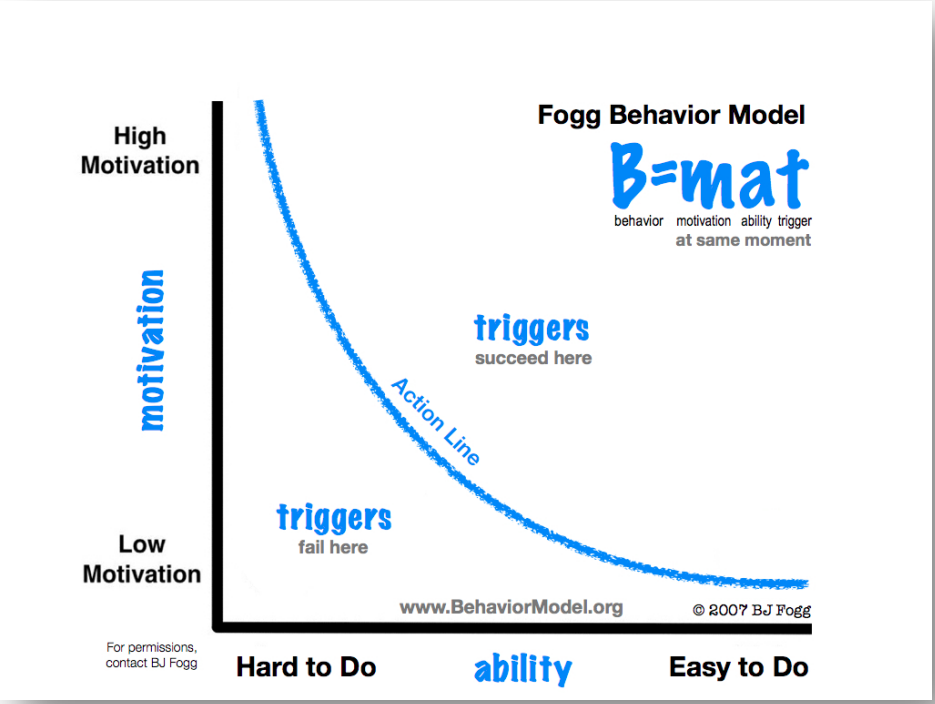


*and otherwise **accommodate** and **tolerate** their intrinsic nature

source: Tech Crunch

State of the Art: Persuasive Technology

Technology for changing user attitudes or behaviors through persuasion and social influence (Wikipedia)



Motivates Ecological Momentary Intervention (EMI)

Hasn't fully confronted challenge of forming habits

Computing needs more psychology, and then learn how to automate it

Influence: The Psychology of Persuasion (Cialdini, 1984)

- 6 principles of persuasion: *reciprocity, commitment, social proof, liking, authority, scarcity*
- not specifically about stable behavior change (habits)

Trans-Theoretical Model (Prochaska *et al.*, 1983+)

- unaware → aware→ plan → act → maintain
- behavior change is a *process*, not a *moment*

*Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives (*Christakis and Fowler, 2009)

Take Aways

Computing's "culture of plenty" is poised to transform our scarcity-oriented cyber-social systems

People are not information processing machines

- craven, forgetful, rationalizing, ego-centric, self-defeating…

We'll need to accommodate via persuasive tech, etc.

- patients, doctors, and many other stakeholders

HCI will need more psychology

- learn to "automate" it to achieve habit-forming influence
- leverage on-going scientific advances