

Re: International Workshop on New Computationally-Enabled Theoretical Models to Support Health Behavior Change and Maintenance, October 16-17, 2012, Brussels, Belgium.

First Idea Set Author: Brigitte Piniewski, MD

Extending behavior theory (please respond to one question in this category)

- What do you think are the 'necessary ingredients' to develop models of health-related behavior that can account for momentary, short-term and long-term behavior change?

A key necessary ingredient is access to a data structure that aligns high yield co-occurrence data such that gradations of optimal can be defined effectively. Today we still work in silo's of behavior change...trying to increase activity or improve nutritional choices and so on. Our assumptions or conventional wisdom in terms of pro-active prevention of avoidable health outcomes is fraught with mis-information and until we link the co-occurrences of the older generation effectively we will continue to mis-guide the younger generation.

The younger generation is no longer accidentally well and they need access to the health journey intelligence of the older generation. This can best be accomplished through a cross-generational monetization alliance that populates a community data commons and follows the principles of the National Oceanic Atmospheric Administration (NOAA) model.

Measurement of behavior (please respond to one question in this category)

- What type of behaviors, emotions, cognitions, context, environments and systems need to be measured to enable modeling behavior change? At what level of detail must the measurement take place?

The measure must be a universal surrogate that is a good predictor of future health outcomes. Thus measuring insulin resistance (a common metabolic portal to Diabetes II, heart disease, stroke, many cancers, cognitive decline and so on) is a good choice. Tracy McLaughlin at Stanford suggested that Triglycerides over High density Lipoproteins (TG/HDL) was a decent surrogate for insulin resistance.

With this I would recommend an accelerometer to measure activity or the inverse (sedentary burden) as well as a wireless weight scale to capture the cumulative weight loss per person over the decades of their lives. This is likely to separate out those folks who have shifted their gene expression towards hyper efficient storage of calories such that further attempts at weight loss are plagued by rebound weight gain.

Evaluation (please respond to one question in this category)

- How should systems designed to work for years be evaluated if they depend on technology that may change at a much more rapid pace?

This is expressly why you need a community data commons such as mentioned in the cross-generational collaboration model. The issues that plague society today (sedentary behavior and high intake of refined carbohydrates) are not likely to persist indefinitely. Eventually these will be largely taken care of and society will be battling a new demon. Thus I recommend this model of high yield co-occurrence data with a rules light (assumptions light) processing such that the relationship between the co-occurrences continuously refreshes and the system is therefore future-proofed effectively.

The data commons also solves the problem for solution providers, they no longer have to worry if their patient goes out and buys a new blood pressure cuff...the solution provider always gets his data from the commons and thus replacing sensors with new models will not interfere.

General question (*please respond to this question*)

- What could participants in the meeting collectively do before, during, and after the meeting to significantly impact the field of health behavior change and maintenance? Be as concrete as you can, and think boldly.
- We could define the cross-generational approach and outline the standard technical framework to support this model. We could identify target universities and begin to outline a means of international collaboration across the data commons similar to the NOAA model. This will enable cross continent learnings to occur at the pace of change. We have a number of universities in the US interested in supporting this approach as well as few international ones as well; Applied Sciences University of Vienna, the University of Wales in Newport, and Manchester School of Business.