June 6, 2012

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

Dear workshop participants,

We are looking forward to seeing you in October in Brussels!

As we mentioned in our original letter of invitation, the development of the workshop will take place in conversation with all of you. We thought that a good way to get the conversation started would be to ask you all to respond to a few questions, and then post your answers to our shared website where everyone could read and respond. The questions we thought might be useful are listed below. Please respond to one question from each of the three groups below, and then to the general question at the bottom. We think that about ½ page answer for each question would be great for starters. Thus, we are asking you for short responses to four questions in total, which amounts to about two pages of typed text. We hope you will find the questions thought provoking.

Please upload your answers (Word doc. or PDF file) to the workshop website **no later than Monday, June 25th**. To upload your responses, please go to http://www.behaviorchange.be/ and log in. Once you log in you will see a 'Documents' tab. Go to the documents page, and you will see a folder titled: 'First Idea Set'. Open the folder, and you will find a link to upload your responses. Once responses are uploaded, the entire group will be able to read them, so please check back in every so often to see what other members of the workshop are writing about. Under the document tab, the original workshop proposal is also available for you to download and read. If you have any trouble with the website, please don't hesitate to contact Javier Diaz at javierad@usc.edu.

Thanks in advance! Here are the questions:

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?

  In my view, the key 'necessary ingredients' for developing models of health-related behavior that can account for momentary, short-term and long-term behavior change are (a) a much more compelling labeling taxonomy/ontology of the components utilized to change behavior; (b) more efficient methods for sharing and "publishing" work, that would function more closely to a dynamic output like how source code can be seen in any website rather than more like this final "publication," which would be relatively static; (c) an emphasis in exploring a much wider range of hypothesis generation, quasi-experimental, and experimental designs; (d) higher emphasis on new measures of intervention component usage, mediators, and outcomes that rely less on self-report and instead emphasize mHealth optimized data capturing techniques that do not necessarily have to be validated based on previous work; and (e) ….

  A taxonomy/ontology for the "contender" components is critical for a better understanding across the field of the myriad ways that a concept can be operationalizated. For example, goal-setting is a very commonly used method for behavior change that can be accomplished in a wide variety of different ways. As highlighted in the CALO-RE Taxonomy (Susan Michie, et al. 2012, Psych & Health), which is an excellent starting point for this discussion by the way, goal-setting is broken up into goal-setting related to a behavior, goal-setting related to an outcome, and action planning (which is arguably distinct but still a very closely related construct that could often be confused for goal-setting). Although this is a good starting point, there are a variety of other subtle ways that goal-setting can be accomplished that is lost with this current taxonomy. For example, there is the well-known SMART framework for goal-setting. There is also research suggesting that, for some types of goal-setting (e.g., weight-loss goals), some have started to explore the use of more vague feedback including just ranges of goals; finally, Marc Adams has been pioneering the concept of adaptive goal-setting whereby the goals vary over time based on previous actions (which would be in contrast to a goal that may be grounded in something like the national guidelines for a behavior). All of these subtlies are largely missed in our meta-analyses and even to some extent our publications. This then leads to the fundamental problem with our current methods of "sharing"

our results with one another. At present, academia only gives "credit" for peer-reviewed publications and grants (often times NIH-only grants based on indirects for the department) within tenure and the review process and within funding. Although there is and likely will always be a place for publications, publications implicitly presume, on some level, that there was some sort of "answer" found from the work. Unfortunately, much research currently being published is not really "answering" any major questions but instead just describing a process that occurred. Overall, there needs to be a thorough discussion and clear thinking about the strengths and limitations of current publication practices compared to what we are ultimately trying to accomplish with a strong emphasis on exploring alternative strategies for sharing (e.g., open-source pursuits such as the current practices for sharing source-code on websites) that can "count" as part of academic work. As has been discussed by many others, our over-reliance on randomized controlled trials greatly limits our ability to explore and understand a problem from multiple perspectives. Linda Collins and her team at Penn State have done a fabulous job highlighting this problem and emphasizing alternative study designs (e.g., MOST and SMART trials). We must push even farther however with our methods to explore an even wider range of methods from data mining and machine learning techniques for hypothesis generation, to quasi-experimental designs for large population-scale types of questions, to a within-person study designs (e.g., see Daniel Rivera's Wayne Velicer's work). Throughout this, our primary emphasis should be, not on what might be the most comfortable method for the researcher or the reviewers to understand, but the most efficient method for answering the question. Finally, there needs to be a higher emphasis placed on the wide variety of data that can be gathered passively through mHealth channels, such as accelerometry data, but also possible data points such as smartphone usage, geotagged data, and even possible methods for passively tracking mood (e.g., see Ginger I.O). Although self-report is valuable, at this point, our measures are somewhat beholden to them because the self-report work has a publication history that can be cited whereas newer methods may not be as easily "validated." In this vein, a clear discussion on reliability and validity testing of these new measures are needed.

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?

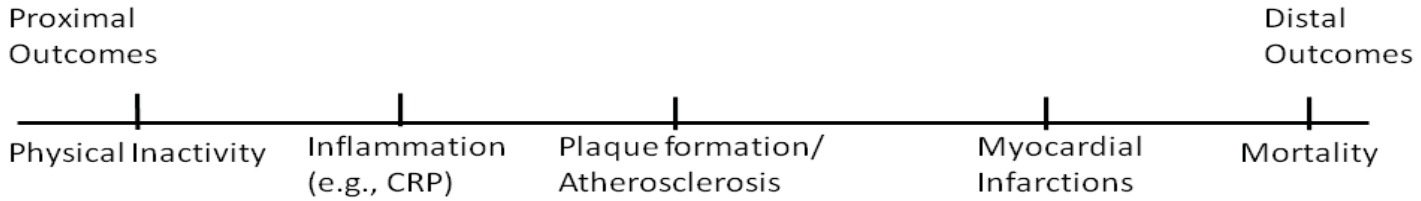
At this point, my gut reaction is that a greater emphasis needs to be placed on context, environments, and emotions and less on attitudes and cognitions. In my view, our field has a strong "rational/cognitive" bias that implicitly assumes a largely rational actor balancing the pros and cons for behavior change. As has been shown though from a wide variety of psychological and behavioral economic work, we have a wide variety of inherent "biases" that preclude us from potentially making the rational choice. Indeed, in many of our actions (both conscious, see Jonathan Haidt's work on morality and unconscious, see Wendy Wood's work on habits), are likely driven by more intuitive processes. These intuitive processes, in my view, are where most of the "wins" will come with promoting behavior change. Based on this, intuitions are likely more directly related to emotions/affect, context, and the environment.

Evaluation (please respond to one question in this category)

- What are the methodologies that should be used to evaluate behavior change systems using new BC&M models? Are there metrics the field should expect to see in publications that will enable incremental progress and major breakthroughs?

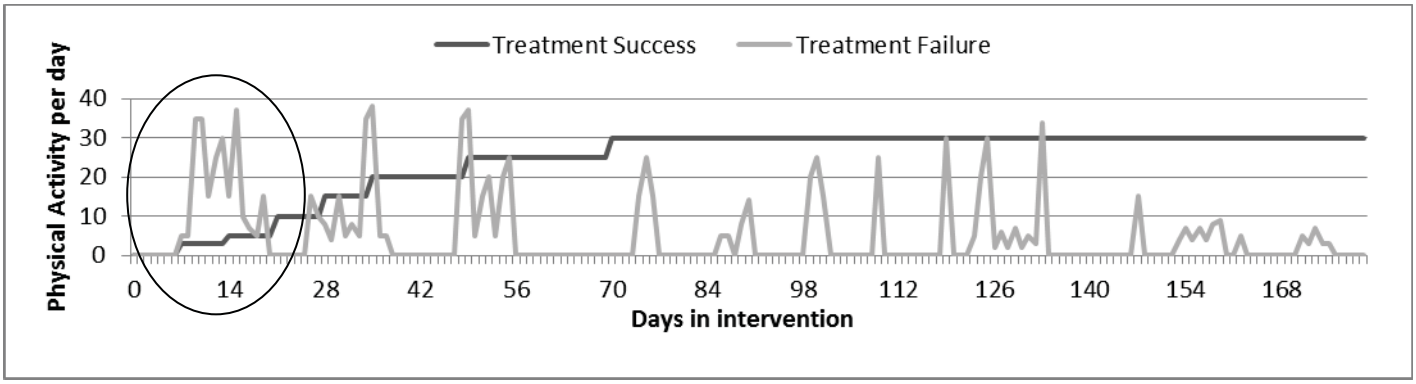
This is a very difficult question to fully answer but also a very important one to explore. The technology industry is well known for rapid development and innovation. A popular software development model, Agile, promotes creation of viable products as quickly as possible via user-centered, iterative design (i.e., constant improvements based on user feedback). A key part of this process is the identification of short-term objectives. For example, when game developers create a new game the most important initial threshold is inspiring a user to play a second time. This short-term but tangible goal allows for rapid refinement. In addition, "beta testing" of design features (e.g., the user interface) with real users promotes optimization of the system to those who use it. This method of beta testing (i.e., rapid deployment and constant iteration) could be a valuable method for developing targeted and tailored preventive medicine/health promotion interventions. These methods do not incorporate medical science and, therefore, do not promote evidence-based practices, as the short-term goals (e.g., second play) have not been linked with health outcome. *New methods are required that take advantage of stringent scientific practices AND iterative design.*

Figure 1. Epidemiologic Markers of Mortality from Cardiovascular Disease



Like game designers, epidemiologists have identified short-term predictors of health outcomes (see Figure 1). For example, mortality may be the key health outcome of interest, but waiting for this event can literally take decades. More proximal markers (e.g., physical inactivity, inflammation) have been identified and used as outcomes for more proximal research (e.g., intervention development). Even when developing physical activity interventions, it can take several months to years before any "clinically meaningful" changes in behavior can be detected, greatly limiting the speed of iteration. It is plausible to hypothesize, however, that there may be preliminary patterns in responses to interventions that may be used as a predictors of later outcomes. For example, imagine an intervention focused on promoting 30 minutes of moderate-intensity physical activity per day. An ideal hypothetical graphic representation of daily amounts of physical activity, divided between those who achieved the goal by 6 months vs. those who did not achieve the goal, is summarized in Figure 2. As this hypothetical visual demonstrates, there may be certain behavioral patterns in responses to the intervention during the first few weeks of the trial (e.g., steady increase for those who succeeded vs. erratic change among those who failed) that may predict outcomes at the end of the intervention. If these early patterns could be identified, they could be used as a "proxy outcome" for intervention development and refinement.

Figure 2. Hypothetical Physical Activity Responses to an Intervention by Those Who Succeed vs. Fail



This hypothetical example is simplistic but highlights the potential for using not just single snapshots

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.

In my view, like the Agile Manifesto, http://agilemanifesto.org/, we need to be discussing, before, during, and after, a similar type of "Manifesto" that can be used as a guiding point for future research. In particular, I think a key emphasis needs to be placed more on the values and ideals we would like to pursue and how these values may be counter, but potentially more valuable than current best practices. I have attempted to start this in a Google Doc related to Aspirational Values and Guiding Principles for "Agile Science." These values and principles can be found here: http://bit.ly/agilescience. I welcome others to comment and critique. My hope would be that this document, even if radically changed by the time of our meeting, could function is a starting point for a potential position statement that could reside as the entrance into a Wiki space for better sharing and aggregation of resources.