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Psychology Should Emulate Physics

ON MAY 14–17, 2009, the Presidential Task Force on the Future of Psychology Practice convened the Presidential Summit on the Future of Psychology Practice: Collaborating for Change. American Psychological Association (APA) goals and objectives drafted in June 2009 included the following:

3. Increase recognition of psychology as a science
   a. Enhance psychology's prominence as a core STEM (Science, Technology, Engineering and Mathematics) discipline;
   b. Improve public understanding of the scientific basis for psychology;
   c. Expand the translation of psychological science to evidence-based practice;
   d. Promote the applications of psychological science to daily living;
   e. Expand educational resources and opportunities in psychological science.

The portion of U.S. gross domestic product spent on health care has increased from 7% in 1970 to 17% today. However, the amount spent on mental health care has increased from 0.84% to only 0.91%, with much of this growth being spent on psychotropic medications, not psychological services. Expanding our role in this new era of health care will mean providing cost-effective services, which will depend on moving toward: (a) providing evidence-based treatments, and (b) giving our mental health care workers the skills and training to deliver those treatments. In their report, the APA goals and objectives also speak of training psychologists to integrate new technologies into their existing practices to provide more quality services (APA Strategic Goal #2, 3). This will help us to create a way of extending services, providing access to more individuals, and disseminating best practices more effectively. By putting in place appropriate training and education mechanisms to give psychologists the new skills they need, we allow the profession to remain a positive player in the new health care regimen.

These recommendations must be implemented if psychology is to be recognized as a "hard science" similar to physics—in a time when, as Carl Jung predicted, quantum physics and psychology are actually coming together.

How did we get to the point where evidence-based practice seems to be "do or die" for the psychology profession? One often-heard criticism of psychology is its lack of hard science in deciding whether to include or exclude disorders in the *Diagnostic and Statistical Manual of Mental Disorders*, giving itself over more to political or public opinion at times rather than hard scientific evidence. Other barriers to recognition of psychology as a science include the tendency for theoreticians to reject evidence contrary to their theories, and to perpetuate their theories through training institutes and referrals. Replication of previous theory-based studies under the exact same conditions as the original study is not research that is encouraged in graduate school. Studies that honor the null hypothesis are rare. Most APA internships include less than 15 hours of training in empirically supported therapies. Instead of evidence-based practice, we have "practice-based evidence."

It has been posited that psychology's disciplinary matrix is "testing a theory quantitatively" and physics is "developing a model without empirical data." We propose that developing a model for therapy is the path to the future viability of the psychology profession. As physics has told us, the purpose of a model is not to choose an absolute and hold to that truth, but rather to develop a framework within which to do testing—a construct that allows one to apply questions, interrogatories, where you can do rigid and organized testing, and where change of truths may be recognized as further testing evolves.

With technology, we may very well have the perfect opportunity to bring psychology into the realm of hard science. To illustrate: In my psychology research, I have created a model regarding a patient's arousal and distress that informs my work with people with anxiety disorders.[1] Based on this model, we can predict which patients with phobias, panic, or posttraumatic stress disorder (PTSD), for example, will respond to treatment with virtual-reality-assisted therapy. We use subjective measures (asking the patient how anxious/stressed do you feel?), as well as clinical observations. And we utilize more objective measurements of anxiety or stress (standardized paper and pencil tests, physiological measures, brain imaging). What we have found is that by mapping an individual's progress through therapy, we can help determine the length of therapy, as well as who might respond to therapy. We continue to conduct further tests to refine the model, and plan to conduct dismantling studies to determine which components of this empirically supported treatment for PTSD are most useful. But by using virtual worlds and knowing exactly what stimuli are being presented to patients, as well as by measuring their objective response to those stimuli, we are given the opportunity for a perfect setting with which to test models and make predictions.

We subscribe to the mathematical psychology approach, creating algorithms of cognitive processes. We describe a function of the brain as the features of a program in the high-level programming language of thought, a program that it executes. Different physical properties will correspond to the same data structures, and the same mind will execute its program in different ways on different occasions.

In a recent article, Townsend (2008)[2] noted that:

> Practitioners of the new fields of brain imaging are hungry for tools and training pertaining to methodology and data analysis of their data. This is one of a number of areas where statistics and substantive process modeling could synthesize with the neuroscience to offer vigorous instruments for progress. Especially rich opportunities lie in the

relative scarcity of means of comparing and provisionally linking two or more types of data, for instance, behavior, fMRI, EEG, PET, single unit recordings, and so on.

Psychology can make a unique contribution to the exploration of the link between cognition and the physical world. While proponents of the neural basis of behavior hold that brain mechanisms will explain all psychologically defined phenomena, quantum mechanics introduces choices made by human agents into the equation. Changing this approach may be as important to progress in psychology as it was to progress in atomic physics.

References

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