

Invited Speakers

Building an Informatics for the Environment: Towards a More Complete Systems Medicine

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Both our genes and environment influence disease and health. While we have the ability to comprehensively study the genome and its relation to disease with tools such as the genome-wide association study (GWAS), we have yet to query the “exposome” — the totality of nongenetic factors such as nutrients and vitamins, physical activity, infectious agents, and pollutants — as it relates to disease. Furthermore, examination of genetic or environmental factors and how it relates to disease often comes without consideration of the other. We hypothesize that a more comprehensive and quantitative view of the environment is needed to discover the causes of complex disease. In the first part of this talk, we will describe one way of comprehensively associating a spectrum of personal environmental exposures with complex diseases such as diabetes, coronary artery disease, hypertension, and preterm birth. We will show how such a method allows one to uncover novel environmental factors associated with these diseases and prioritize them for further study. In the second part of the talk, we describe one way of integrating genetic and environmental information, investigating the role of “gene-by-environment” interactions in the context of disease. Specifically, we describe a way of systematically screening for multiple combinations of genetic and environmental factors that induce greater risk for disease than when considering either factor alone. We end by proposing future directions for integrative “exposome” and genomic research in an era of high-throughput biology.

VBT — Values and Behaviors Tracking

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Compassion is a part of life as a response to pain inherent in the human experience (Frost, 2003; Frost et al., 2006). Compassion is multidimensional, with three elements established: noticing another’s suffering, empathically feeling the person’s pain, and acting to ease the suffering (Dutton et al., 2006; Kanov et al., 2004; Miller, 2007, Neff, 2010) and can be directed towards the self, other individuals and groups. Compassion expresses itself behaviorally and affectively, from pro-social behavior (Brief and Motowildo, 1986) to organizational citizenship behavior (OCB) (Smith, Organ, and Near, 1983). While emotional social support has been defined as “talking, listening, and expressing concern or empathy” (Zellars and Perrewew, 2001, p. 459), compassion moves beyond empathy, entailing allocations of material resources directed toward

those in pain (Dutton et al., 2006) passing empathy through action, whether it ameliorates suffering or not (Kanov et al., 2004; Reich, 1989).

Steele's Self-Affirmation theory (1988) has been described as a "psychology of self defense" (Sherman and Cohen, 2006). Studies of self-affirmation (SA) support tangible health benefits, buffering psycho-physiological stress, maintaining perceived self-worth/integrity, and reducing ruminative thinking (Keough, 1998; Keough et al., 1998; Koole et al. 1999; Taylor et. al. 2003a; Creswell et al., 2007). SA leads to positive social interactions such as reductions in defensiveness and positive expression of love/connection (Crocker, Niiya and Mischkowski, 2008). Physiological evidence supporting SA shows buffering of stress levels (measured by salivary cortisol and urinary catecholamine excretion) when confronting hostile audiences and stressful examinations (Creswell et al., 2005; Sherman, Bunyan, Jaremka and Creswell, 2009). SA entails ranking personal values by importance, considering value meaning, and writing brief narratives.

Behavioral activation (BA) is another powerful intervention originating in behavior therapy for depression (Ferster, 1973; Lewinsohn, 1974) that has long become a first line evidence based depression treatment (Jacobson, Martell, and Dimidjian, 2001; Martell, Addis, and Jacobson, 2001; Mazzucchelli, Kane, and Rees, 2009). BA consists of engaging in enjoyable, self-care activities and tracking their impact. BA has a positive impact on subjective well-being, happiness and life satisfaction equating to the effects of positive psychology interventions, with proven applications for non-clinical populations (Mazzucchelli, Kane and Rees, 2009). Values awareness has been shown to be an effective supplement to BA's effectiveness (Hopko, Magidson and Lejuez, 2011).

Environmental pressures in university campuses can often lead to stress, depression, anxiety and lower general student wellbeing (Murphy, Denis, Ward and Tartar, 2010; Rawson, Bloomer and Kendall, 1994). Accordingly, the integration of SA/BA offers an excellent opportunity to address Hopko et. al.'s (2011) efficacy suggestions.

As our research focuses on multidimensional aspects of compassion, the impact of altruism should be considered. In an extensive meta-analysis, altruistic helping behaviors positively impact depression, experience of greater personal happiness, life satisfaction and self-esteem (Weinstein and Ryan, 2010). Hence, altruistic and caring behaviors will be added to the BA framework to augment its existing scope, integrated with self-tracking feedback. Previous research justifies the integrations of SA/BA to improve personal/collective wellbeing with applications for other stressful environments (for example, military, workplace).

This web based intervention can stand-alone, as well as supplement a broad range of programs to increase participant connection to personal values, caring behaviors and wellbeing. Importantly, graphs presented enable participants to view levels of subjective wellbeing in six life domains and the relative contribution of specific behaviors on their wellbeing longitudinally. Cumulative graphs are sent to participants every 2 weeks summarizing the top five behaviors related to each domain.