**Background**

- Despite great efforts over the previous five decades to stem the tide of problem behaviors among adolescents, the effect sizes produced by targeted prevention and treatment programs (based largely on behavioral parent training and cognitive behavioral therapy principles) have been modest (M = .45) [1].
- Increasingly, mental health researchers are calling for a ‘personalized’ approach to treat abuse and addiction and other problem behaviors [2,3].
- The fundamental building block of personalized care is the identification of moderators (i.e., individual difference characteristics), which are associated with differential response to various intervention options. Once identified, these moderators may be translated into empirically-derived decision rules that form the basis for assigning the appropriate dose or type of preventative to each person, based on the person’s values on the modifiers (i.e., tailoring variables).
- In our search for candidate moderators we were informed by the distinct concepts of differential susceptibility theory (DST) and vantage sensitivity [4,5]. Fundamentally, this collective framework describes individual differences in the degree of ‘sensitivity’ people have with regards to the effects of environmental influences on developmental outcomes.

**Differential Sensitivity to Preventive Interventions**

- For purposes of our prevention framework, we collectively refer to DST and vantage-sensitivity as differential sensitivity (DS) and related factors as DS factors.
- Individuals rated high on DS (possessing a number of DS factors and/or absence of vantage-resistant factors) may respond adequately to circumscribed and less intensive preventive interventions. However, individuals rated low on DS (lacking DS factors and/or presence of vantage-resistant factors) may require more comprehensively focused and/or intensive prevention efforts in order to show the same adequacy of response.

**Experimental Evidence of DS Cont.**

- Cicchetti et al. [10] found that variation in two putative DS genes, DRD4 and 5-HTT, failed to moderate outcomes for maltreated children assigned to either a child-parent psychotherapy intervention (CPP) or a psychoeducational parenting intervention (PPI). Children, on average, responded regardless of genetic variation. Nevertheless, both intervention modalities were quite intensive with sessions lasting throughout a 12-month period. This is in contrast to findings from studies using more circumscribed preventive interventions where differential sensitivity may be more informative with regards to dichotomous outcomes (responder vs nonresponder). In fact, the finding that DS factors seem to play a more revealing role in less intensive and more circumscribed interventions is at the heart of our personalization framework.

**Research Methodology for Inclusion of DS Factors into Personalized Prevention Trials**

- Conduct literature review and choose factors known to moderate the effects of similar environmental exposures on similar problem behaviors.
- Researchers need to consider the feasibility of using a given DS factor with their population of interest. Not all DS factors, published in the correlational and/or experimental literature, are feasible with high-risk prevention populations.
- A minimum of two interventions which vary in terms of dosage or comprehensiveness of environmental focus (youth vs. family vs. neighborhood) and a control condition are required, along with randomization.
- DS levels at pre-intervention are expected to moderate response outcomes. Specifically those most sensitive will respond to both intervention modalities, while those least sensitive will respond only to the more intensive or comprehensive version.

**Discussion**

- Differential sensitivity theories, including DST and vantage sensitivity, attempt to account for variability in developmental pathways given particular environmental exposures. Of interest to prevention scientists are factors that moderate positive environments.
- Given that individuals with lower levels of sensitivity/plasticity are less responsive to positive environments, they may require more dosage or comprehensiveness in their interventions to achieve optimal responses.
- Measuring sensitivity as a phenotype at pre-intervention may directly aid clinicians in deciding what type or dose of intervention youth should receive to optimize outcomes while saving untold costs and reducing burden and stigma.
- It’s unlikely that such an approach will be successful without the use of other highly predictive tailoring tools and strategies. Furthermore, DS theories are still in their infancy and there is much debate about their reliability. It’s crucial that, for any putative tailoring tool, strict clinical reliability and validity be ascertained before any practical use.

**References**