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Transdisciplinary Methodological Innovation: Connecting Natural and Social Sciences Research through a Training Toolbox

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Abstract : Although much of natural and social science research aims to enhance human flourishing and address social problems, the training within the two fields is significantly different across theory, methodology, and implementation of results. Social scientists are trained in social, psychological, and to the extent that it is relevant to their discipline, spiritual development, theory, and accompanying methodologies. They tend not to receive training or learn about accompanying methodology related to interrogating human development and social problems from a biological perspective. On the other hand, those in the natural sciences, and for the purpose of this work, human biological sciences specifically – biology, neuroscience, genetics, epigenetics, and physiology – are often trained first to consider cellular development and related methodologies, and may not have opportunity to receive formal training in many of the foundational principles that guide human development, such as systems theory or person-in-environment framework, methodology related to tapping both proximal and distal psycho-social-spiritual influences on human development, and foundational principles of equity, justice and inclusion in research design. There is a need for disciplines heretofore siloed to know one another, to receive streamlined, easy to access training in theory and methods from one another and to learn how to build interdisciplinary teams that can speak and act upon a shared research language. Team science is more essential than ever, as are transdisciplinary approaches to training and research design. This study explores the use of a methodological toolbox that natural and social scientists can use by employing a decision-making tree regarding project aims, costs, and participants, among other important study variables. The decision tree begins with a decision about whether the researcher wants to learn more about social sciences approaches or biological approaches to study design. The toolbox and platform are flexible, such that users could also choose among modules, for instance, reviewing epigenetics or community-based participatory research even if those are aspects already a part of their home field. To start, both natural and social scientists would receive training on systems science, team science, transdisciplinary approaches, and translational science. Next, social scientists would receive training on grounding biological theory and the following methodological approaches and tools: physiology, (epi)genetics, non-invasive neuroimaging, invasive neuroimaging, endocrinology, and the gut-brain connection. Natural scientists would receive training on grounding social science theory, and measurement including variables, assessment and surveys on human development as related to the developing person (e.g., temperament and identity), microsystems (e.g., systems that directly interact with the person such as family and peers), mesosystems (e.g., systems that interact with one another but do not directly interact with the individual person, such as parent and teacher relationships with one another), exosystems (e.g., spaces and settings that may come back to affect the individual person, such as a parent's work environment, but within which the individual does not directly interact, macrosystems (e.g., wider culture and policy), and the chronosystem (e.g., historical time, such as the generational impact of trauma). Participants will be able to engage with the toolbox and one another to foster increased transdisciplinary work

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