

*Brainstorming scientific opportunities:
Synthesis on topics
Development over the lifecourse*

<http://oppnet.nih.gov>



What is in development?

- Development = Process
 - Change over time
 - Dynamic
 - Non-linearities?
- Dimensions
 - Social
 - Psychological
 - Behavioral
 - Physiological
 - Extra-individual factors (environments – family, friends, school, work, etc)



The Challenge: Updating Theories

- Theory building in lifecourse developmental science
 - **Gap:** Disciplinary fragmentation, life stage fragmentation
 - Appreciate nonlinear dynamics and multilevel processes in lifecourse development
 - To explain/model trajectories across multiple levels
 - What produces trajectories, what alters them, e.g. fetal programming
 - **Common mechanisms** of lifecourse developmental change across multiple systems?
 - Are there critical periods? Is there early embedding?
 - How do we understand cumulative effects?



The Challenge: Plasticity

- **Understanding mechanisms underlying trajectories of change**
 - How is *plasticity* manifest at different life stages?
 - How are later stages conditional on early stages?
 - Examples: Gene-environment correlation; epigenetic effects; fetal programming
 - How do changes at one level impact other levels?
 - Extending concepts related to “neural plasticity” to other levels of analysis – social, behavioral, psychological
 - How large scale environmental changes – like rapid technological advances, economic policy – impact plasticity in systems of cognition, behavior, etc.?



The Challenge: Tools

• Analytic Tools and Data Resources

- Need for large complex databases to model plasticity and multiple trajectories over time
- Need to integrate and standardize/harmonize data and methods to span the stages of the lifecourse
- Need new models and analytic methods (or adapting models from other areas of science) to evaluate complex interaction processes underlying various developmental trajectories within the population
 - Over levels, over time and space, interactions
 - Capturing dynamic intra-individual change over time, beyond average exposure



The Challenge: People

• Capacity building

- Interdisciplinary Networks
- Training – Interdisciplinary T32s
- Leverage CTSA's to incorporate bBSSR



The Opportunity: Why Now?

- Better conceptual and substantive appreciation of these complexities
- Newly available methods to examine these (imaging, ambulatory monitoring, temporal modeling at multiple timescales)
- Bridging of laboratory and survey science providing foundations for multilevel analysis in commonly used data resources
- Willingness to engage in interdisciplinary research



What does this concept provide that is lacking or needed to advance the field?

- Leveraging this emerging understanding of non-linear trajectories of development over the lifecourse in a wide range of behavioral, psychological, neurobiological and social domains
- Understanding plasticity in these systems
 - Entry points and mechanisms of change
- **Essential for identifying effective targets and subgroups for intervention!**

