

Life course health science: understanding and improving health development

PAHO Webinar

Health and Development: The Absence of Disease is not Enough

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Objective

Develop an understanding of the emerging field of Life Course Health Science and its transdisciplinary principles

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Handbook of Life Course Health Development

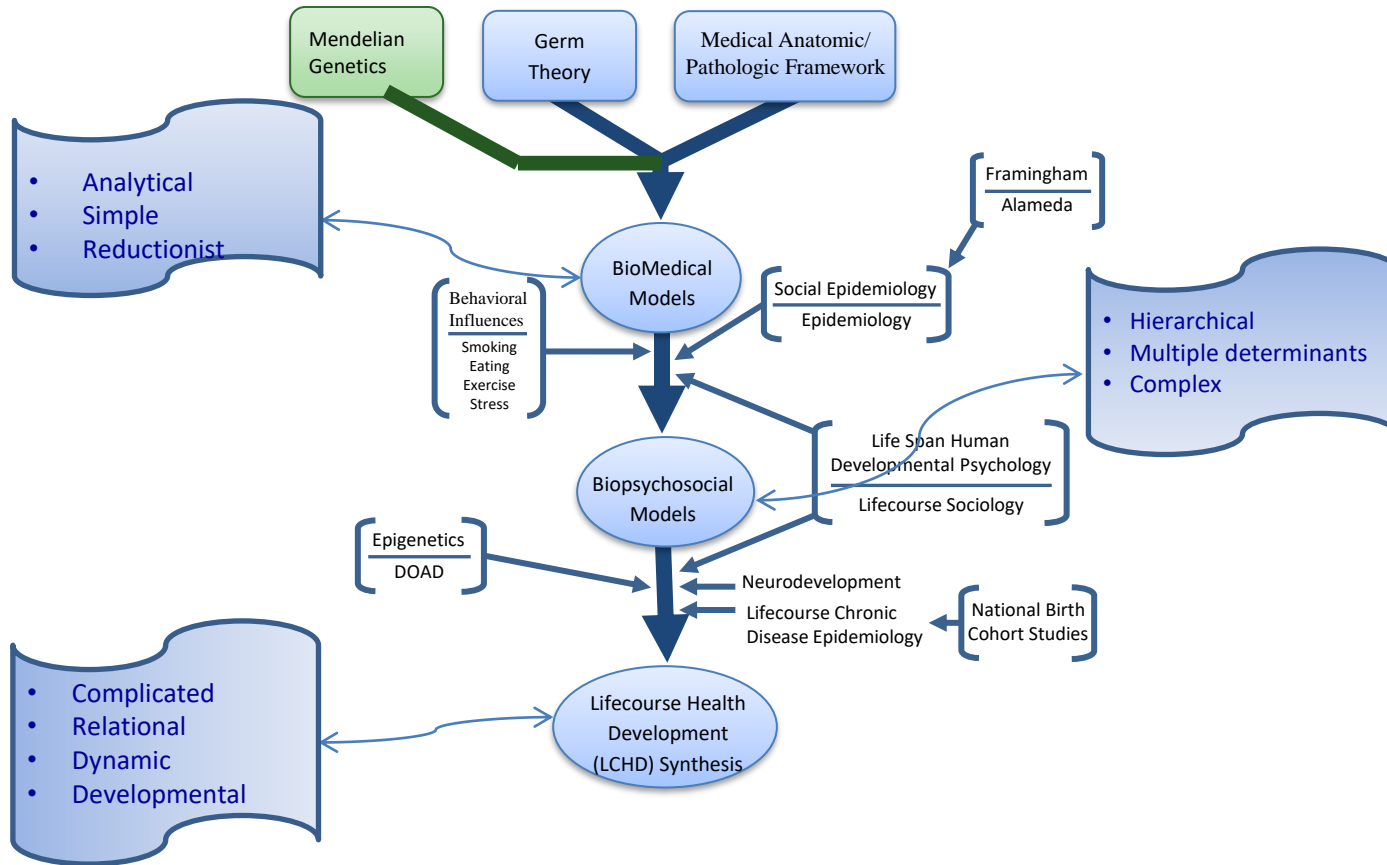
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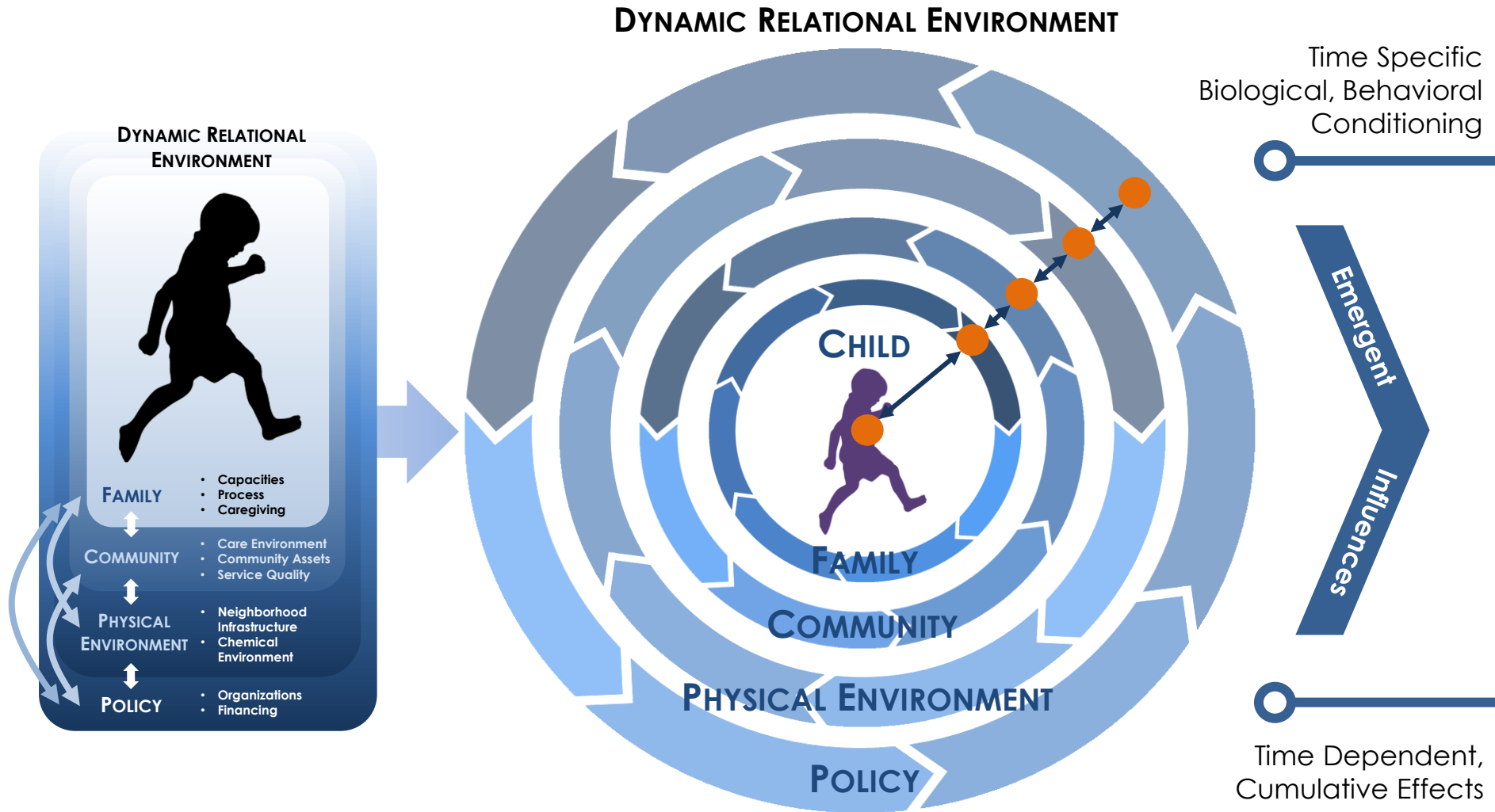
Evolving Conceptual Models of Health Development



Fields Synthesized in Life Course Health Science

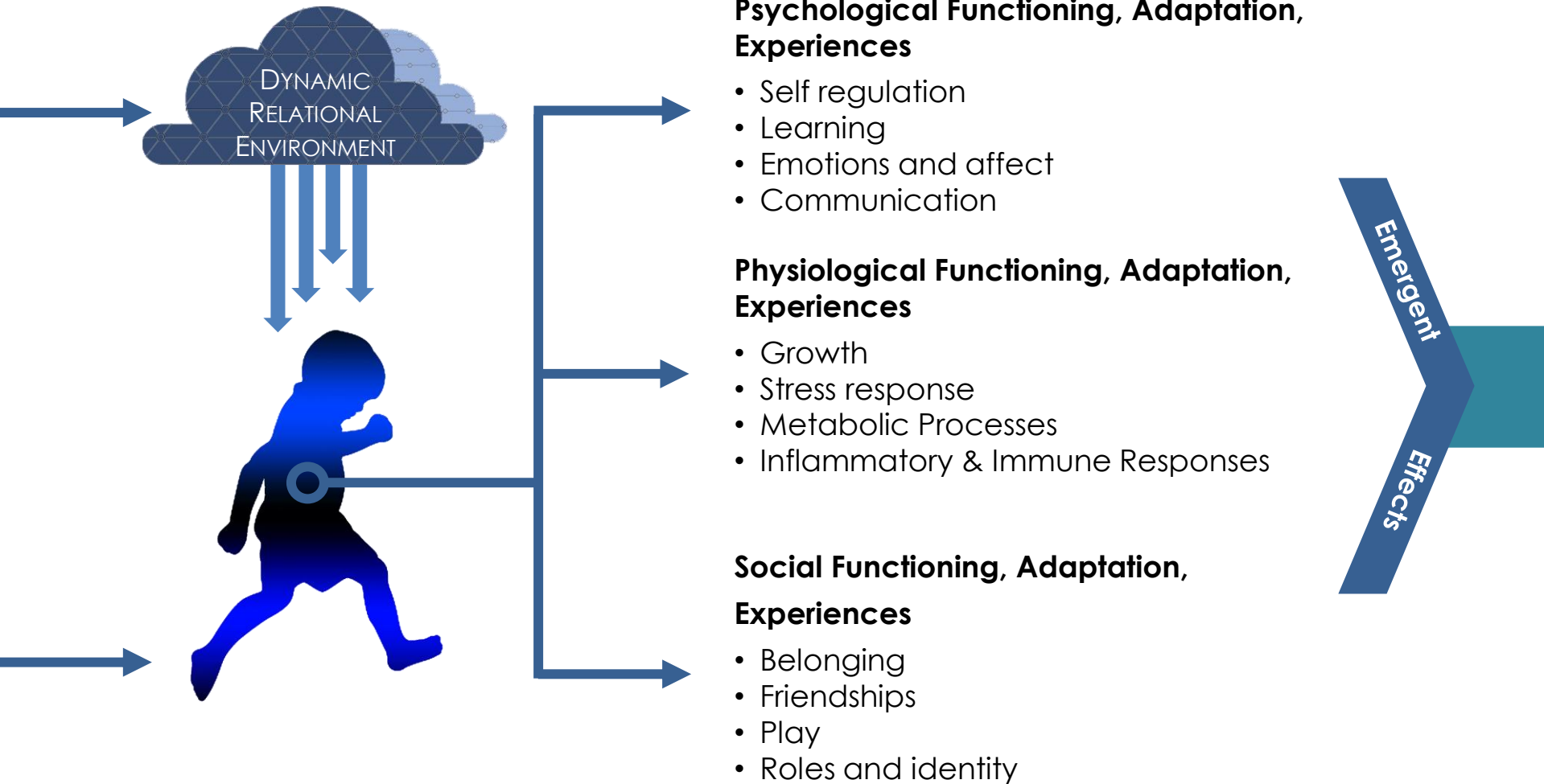
- Biomedicine
- Life course epidemiology
- DOHaD/Epigenetics
- Evolution/Evo-Devo
- Lifespan psychology
- Life course research
- Developmental systems theory
- Complexity

Changing Contexts of Health Development: Multiple Factors, Dimensions, & Levels Dynamically Transacting



Variable Adaptive Responses:

Plasticity & Optimization of Regulatory Processes

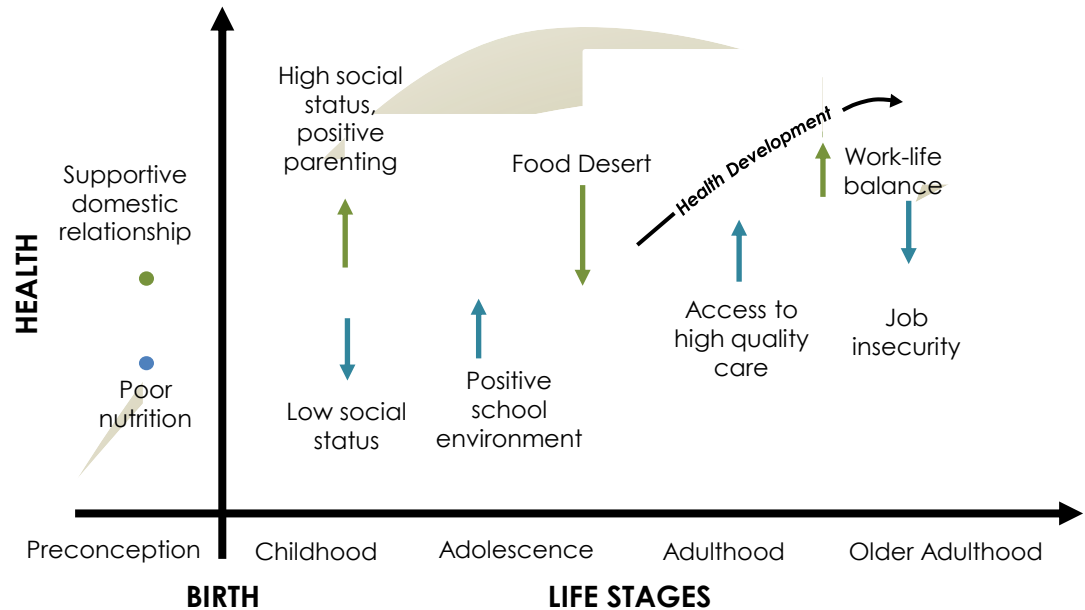


Dynamics of Health Development: Phases, Trajectories and Outcomes

HEALTH DEVELOPMENT TRAJECTORIES

Patterns of changes in health assets over time, affected by environmental and intrinsic factors.

- 1 LATENT EFFECTS**
 Resulting from experiences, particularly during sensitive periods, that influence health later in life.
- 2 CUMULATIVE EFFECTS**
 Resulting from experiences that accumulate over time & manifest in health.
- 3 PATHWAY EFFECTS**
 Resulting from multiple, converging environmental and genetic influences, regulated by an array of specific developmental switches that set people on certain health development trajectories. (Combination of latent & cumulative effects)



PHASES OF HEALTH DEVELOPMENT

Generativity

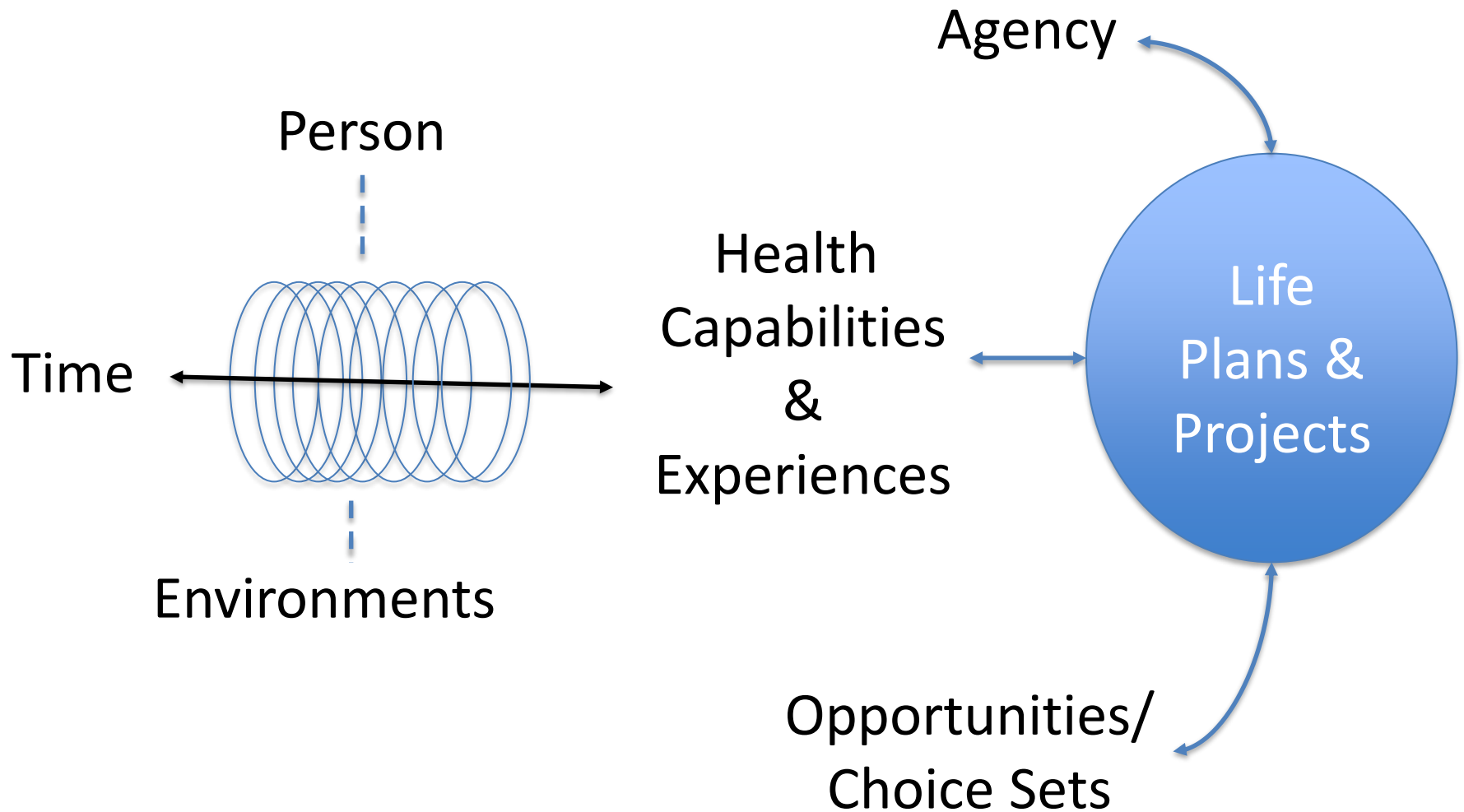
Acquisition

Maintenance

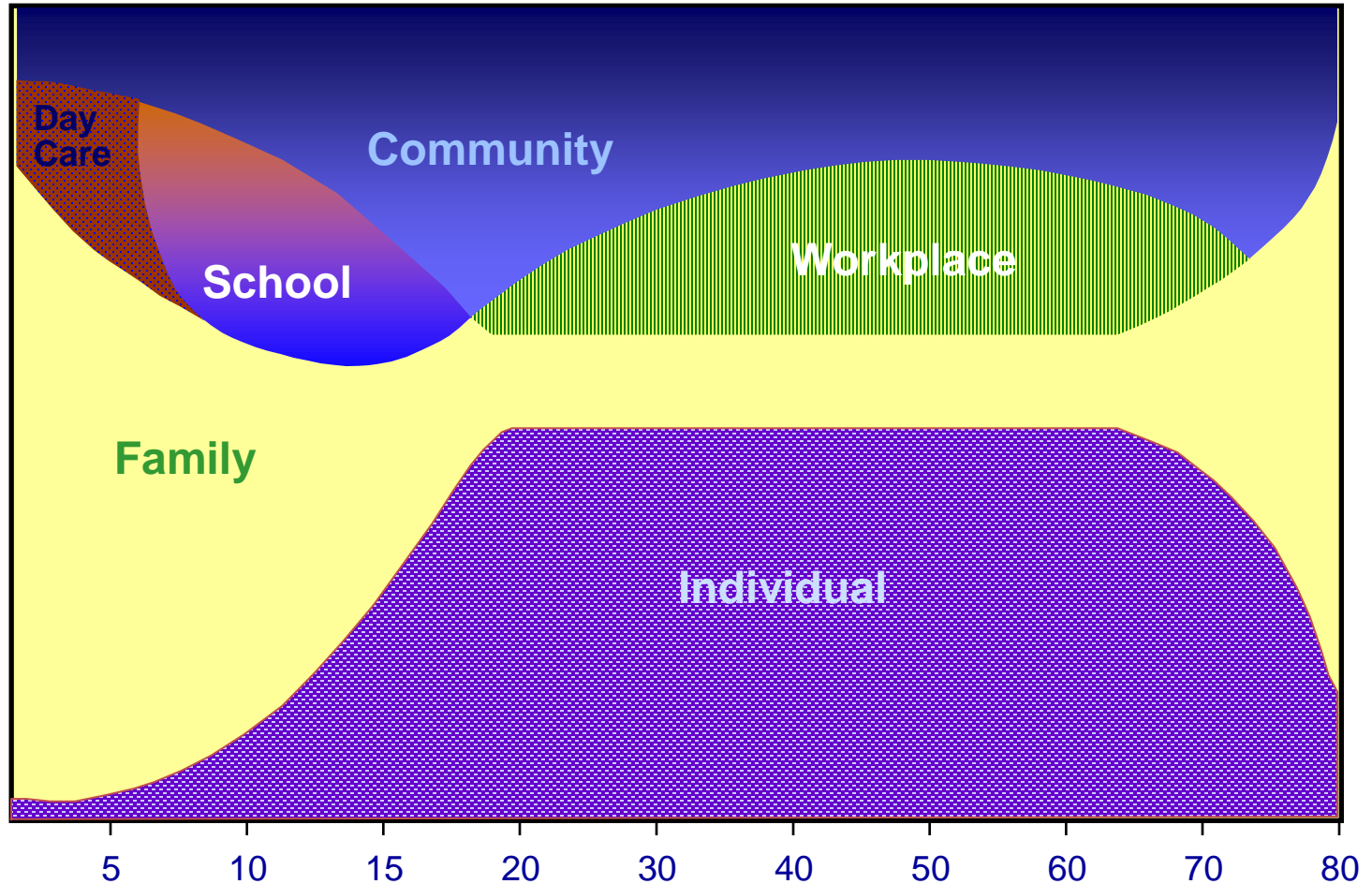
Decline



LCHS Model



Relative
Magnitude
of Influence



5 10 15 20 30 40 50 60 70 80

Age (years)

**Functional
Phase of
Lifespan**

Generativity

Acquisition
of Capacity

Maintenance
of Capacity

Managing
Decline

Unfolding and Growth

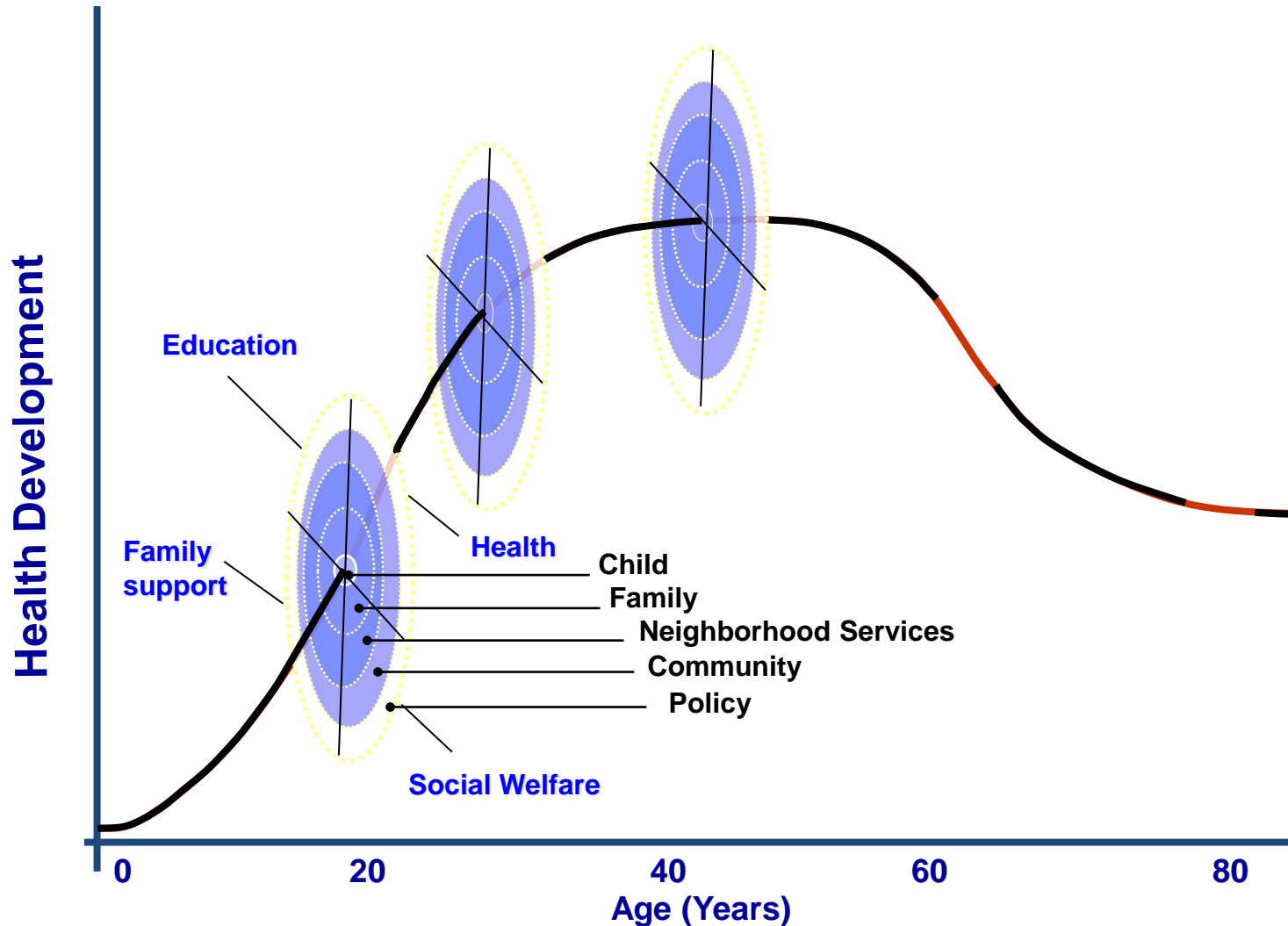
- “As a record of individual health experiences . . . growth unfolds as a complex adaptive system.”
- Sensitive to changing environmental conditions
- Variability in growth is an “evolutionary robust strategy”

- Human body “unfolds” as a result of growth (increases in size) and maturation (acquisition of adult features) as an result of $p \leftrightarrow e$ and developmental time

Health results from interactions in complex adaptive systems

- Nonlinear change
- Change influenced by feedback loops
- Hierarchies: systems within systems
 - Multilevel
- Emergent

HD Trajectories and Their Influence



Timing and HD non-linear effects

- Time-specific effects
 - Biological conditioning that occurs during sensitive periods, when systems are most adaptable and plastic
 - Same exposures can lead to different outcomes if they occur at different time periods of the lifespan
- Most common in fetal and early life

Down Stream Health Problems Related to Time-Specific and –Dependent Adversity

2nd
Decade

3rd/4th
Decade

5th/6th
Decade

Old Age



- School Failure
- Teen Pregnancy
- Criminality
- Substance abuse
- Anxiety Disorders

- Obesity
- Elevated Blood Pressure
- Depression

- Coronary Heart Disease
- Diabetes
- Renal Disease
- Arthritis

- Premature Aging
- Memory Loss

Summary of LCHD Principles

Health and development are unified into a single construct (***Health-Development*** principle) that adaptively unfolds over the life course (***Unfolding*** principle) according to the principles of complex adaptive systems (***Complexity*** principle). Change in health results from time-based processes (***Timing*** principle) that influence biobehavioral systems during sensitive periods when they are most susceptible (***Plasticity*** principle). Health-development provides instrumental assets that enable individuals and populations to pursue desired life projects (***Thriving*** principle).

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to share our work