

ENVIRONMENTAL AND POLICY SOLUTIONS TO OBESITY: EXTENDING THE BOUNDARIES OF BIOMEDICAL RESEARCH

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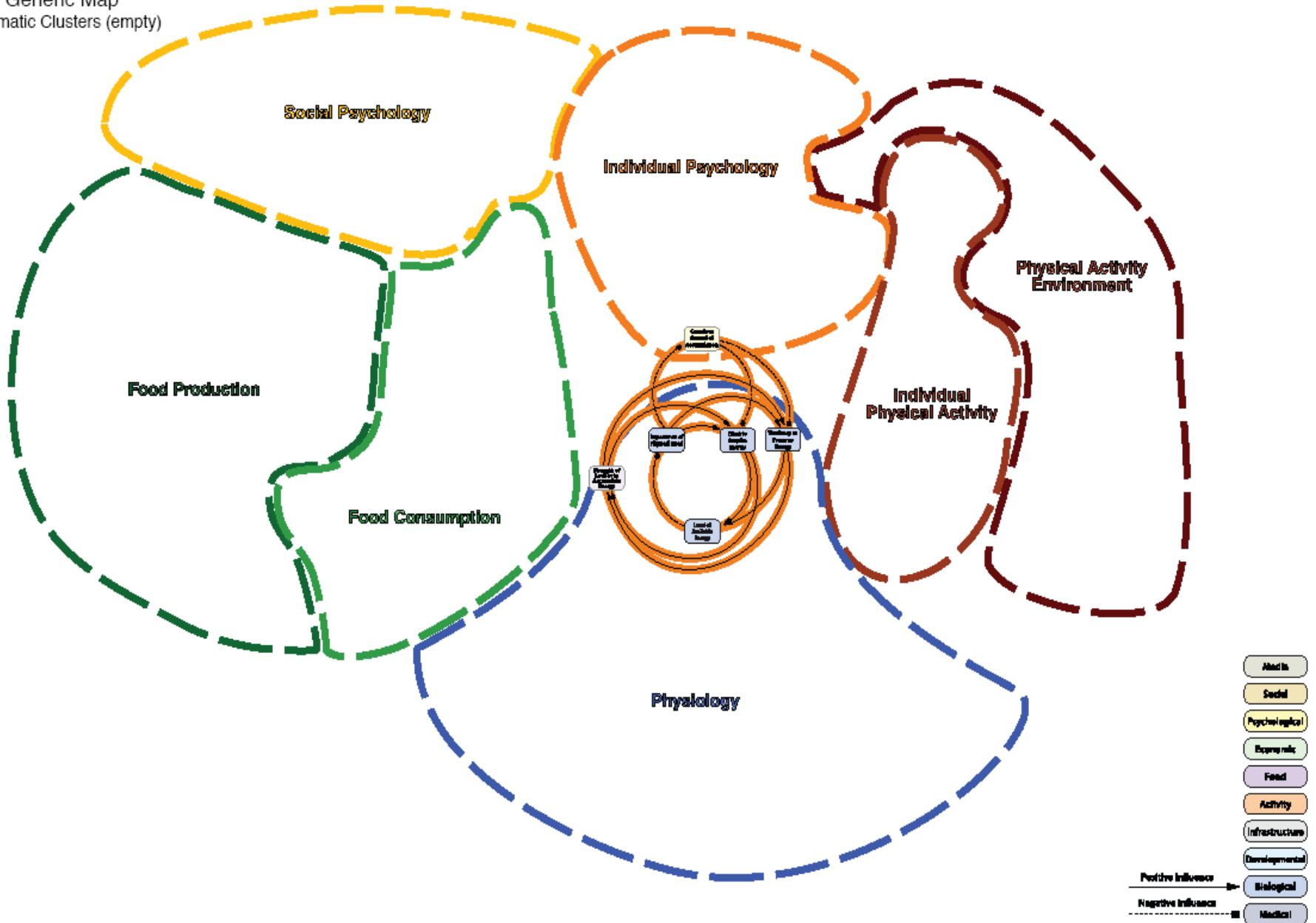
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Obesity is a global problem...and

**“Global obesity is not only a function of nutrition transition in terms of changes in dietary patterns, but also the management of and human interface with the physical environment, as well as culture.”
(Lang 2007)**



**COMPLEX PROBLEMS NEED
COMPLEX SOLUTIONS – OR AT
LEAST AN UNDERSTANDING OF THE
COMPLEXITY OF THE PROBLEM TO
ARRIVE AT SIMPLE SOLUTIONS**



Environment and Policy Matter to Biology

- ❑ **Strong biological defense against low body fat but not excess adiposity**
- ❑ **Upward re-setting of metabolic rate when gaining weight**
- ❑ **Decrease in resting energy expenditure during weight loss, but no compensatory decrease in energy intake**
- ❑ **Brain has automatic responses to food vs. non-food**

Environment and Policy Matter to Biology

- **Biological mechanisms can be affected by environmental manipulations prenatally and postnatally**
- **Epigenetic changes food behavior per environmental exposure**
- **Brain responses to food altered by marketing**
- **Chronic stress repeated stimulates brain reward pathway & can enhance the reward value of food**

A Testable Hypothesis Linking Macroeconomics to Obesity

- **Given higher cost of healthy foods & unequal distribution of healthy vs. non-healthy foods**
- **Increased financial and time stress**
- **Increased brain-mediated propensity to purchase and consume energy-dense, nutrient poor foods**
- **Increased obesity**
- **Mothers affected by obesity in this environmental condition transmit obesity to offspring via epigenetic programming**

Research Needs

- **Cross-disciplinary hypotheses and questions**
- **Statistical and computational capability to quantify complex systems**
- **Creation of big science within which modular studies can be embedded**
- **Solution-oriented research: clear idea how research fits on the larger complex systems map**