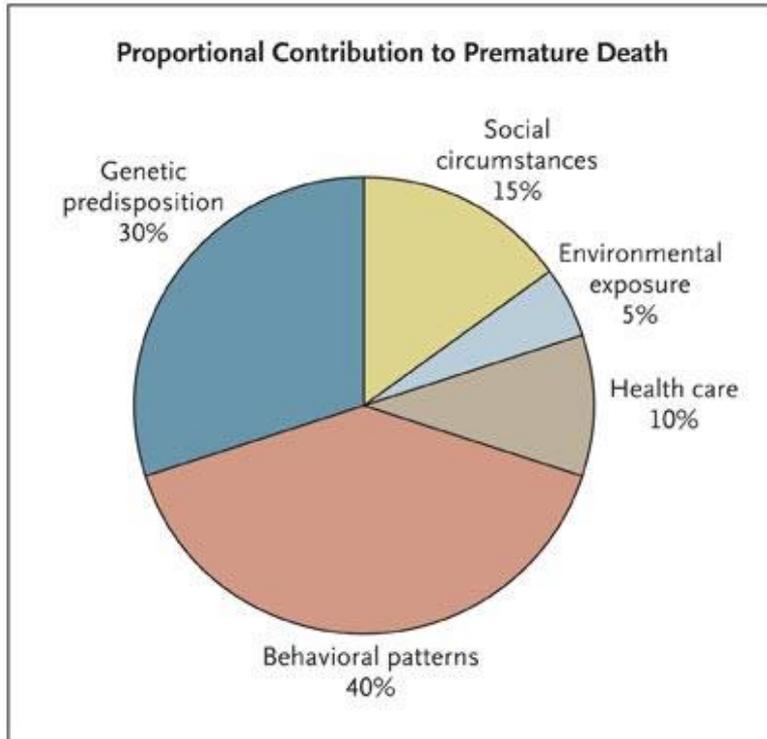


Science of Behavior Change (SOBC) Common Fund Program

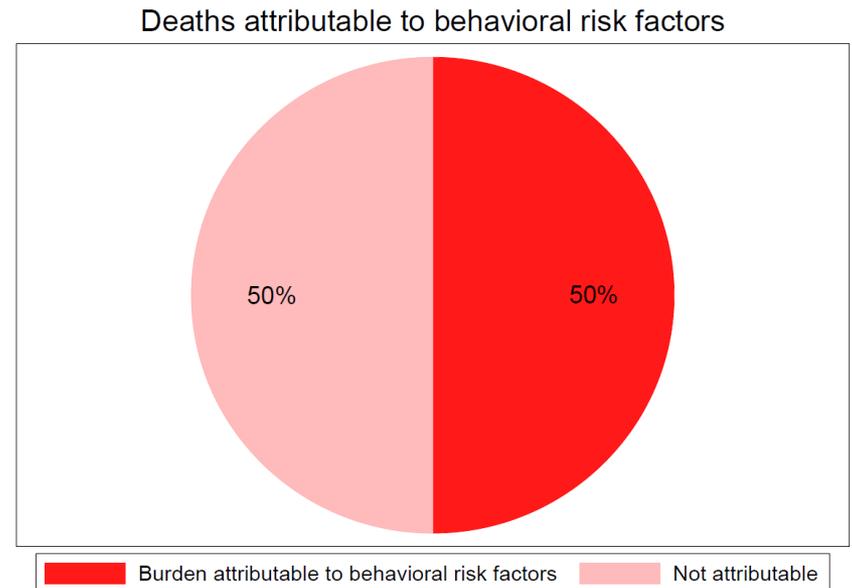
SOBC was originally developed through the cooperation and support of:

DPCPSI, FIC, NCCAM, NCI, NHGRI,
NHLBI, NIA, NIAAA, NIAID,
NIAMS, NICHD, NIDA, NIDCR,
NIDDK, NIGMS, NIMH, NINDS, NINR,
and OBSSR

Poor Health Behaviors Kill

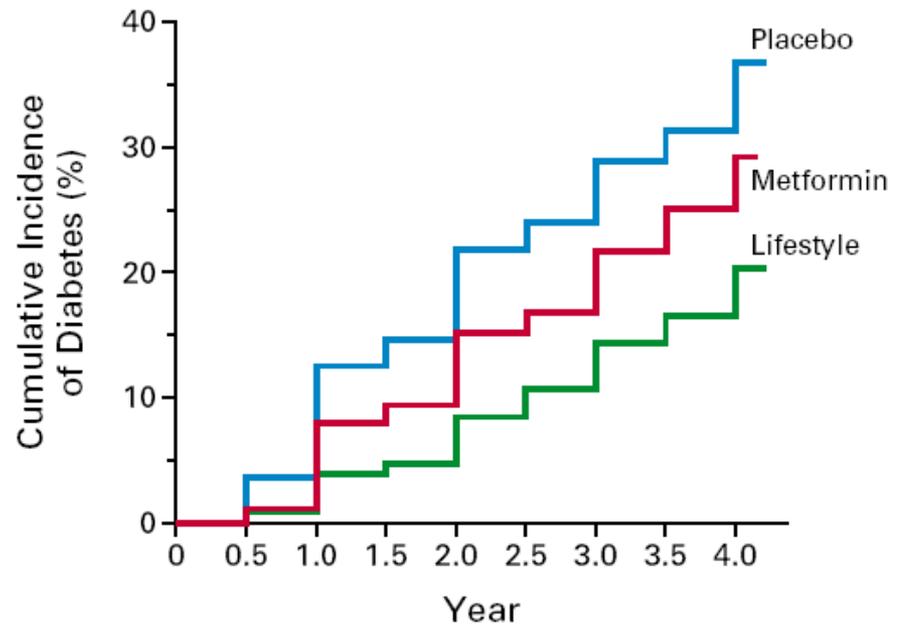
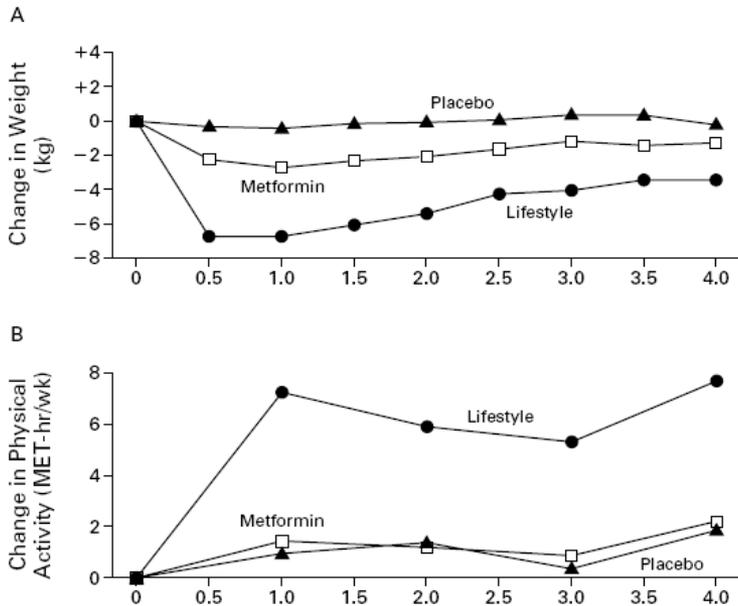


Schroeder et al. (2007, *NEJM*)
after McGinnis (1993, *JAMA*)



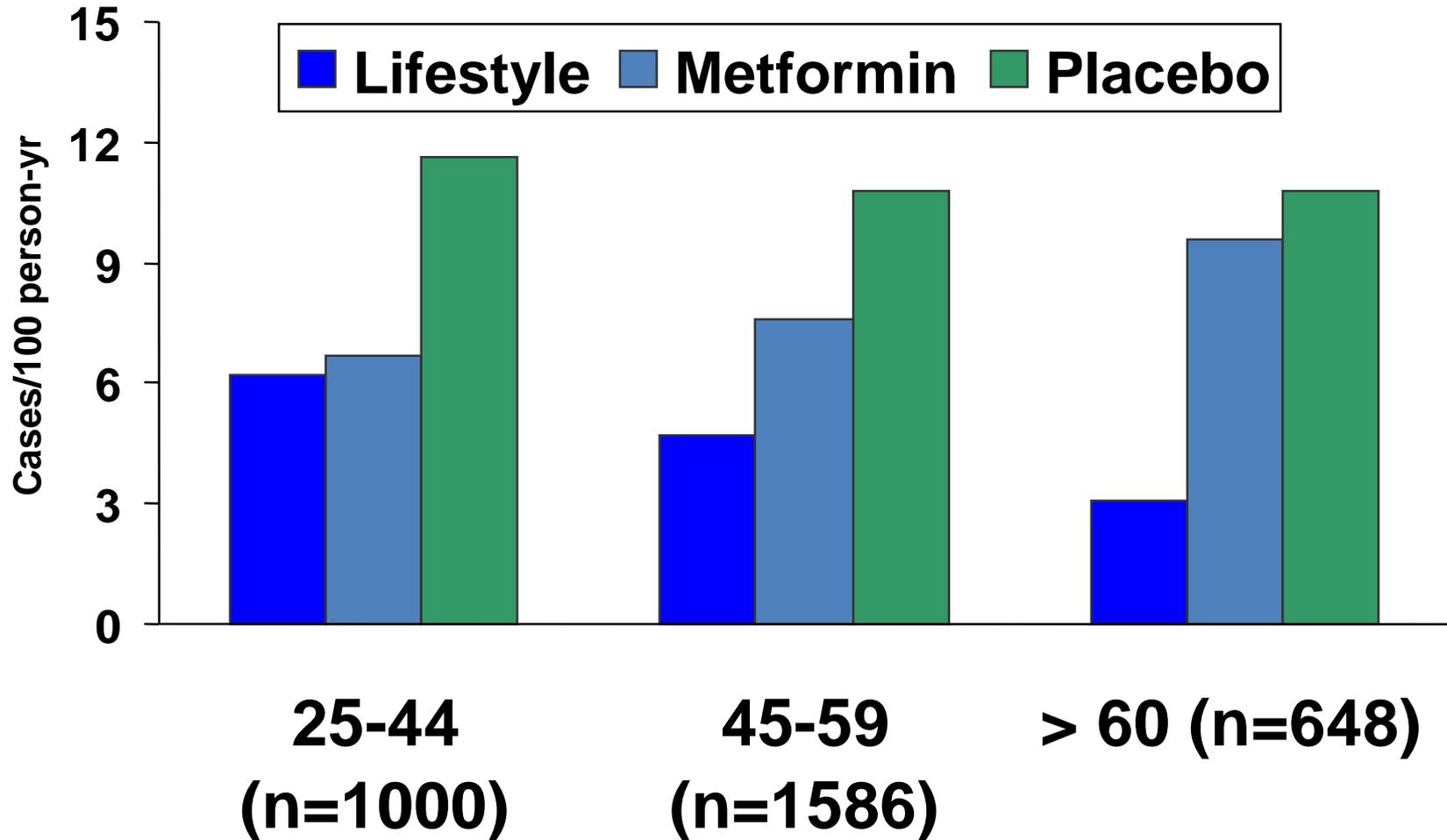
Murray (2013, Committee on
Population [NAS] Meeting on
Premature Death)

Behavior Change is Powerful



A 7% weight reduction and 2.5 hour per week activity increase led to a 58% reduction in the cumulative incidence of Type 2 diabetes in insulin-resistant individuals (Diabetes Prevention Program Research Group, 2002).

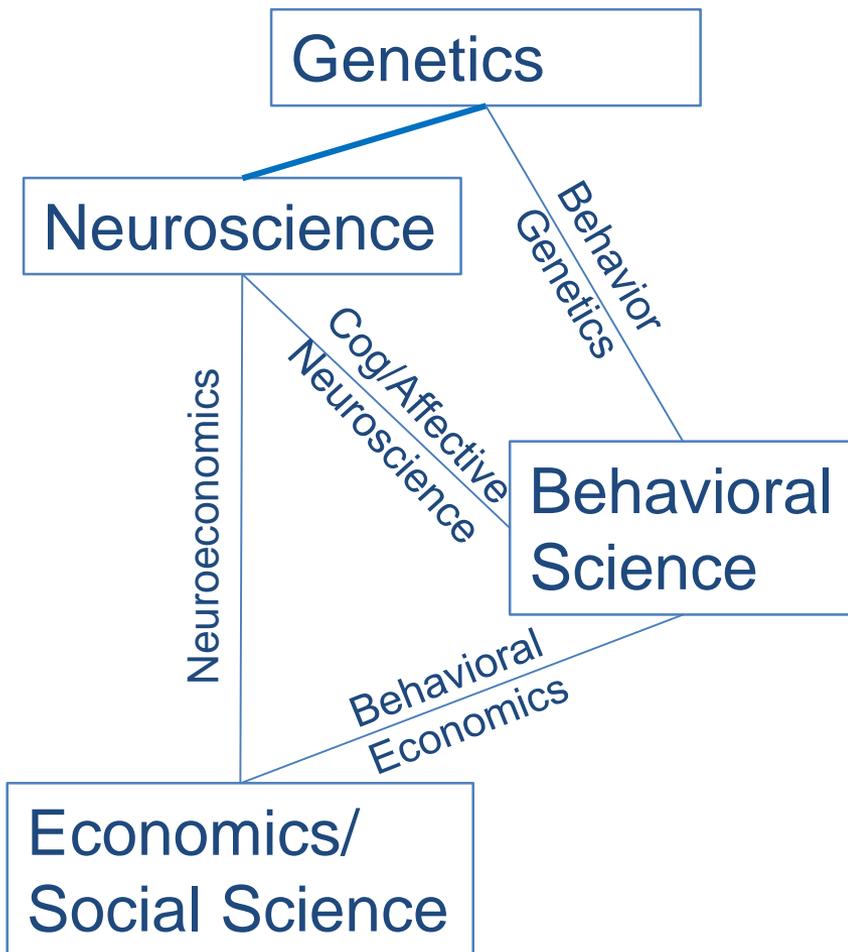
Age Effects on Behavior Change Intervention



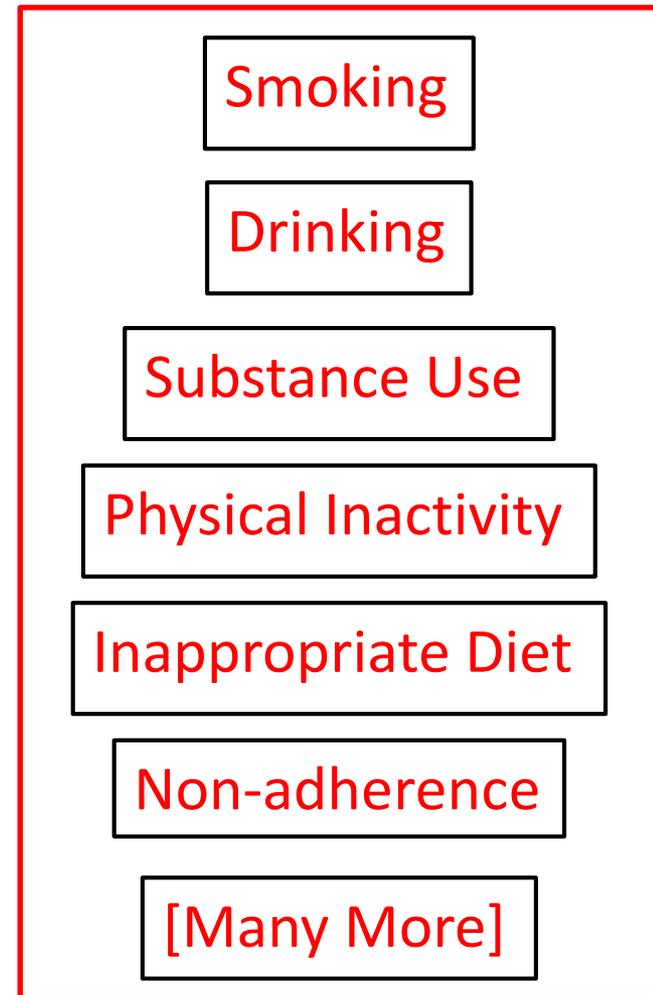
Source: Diabetes Prevention Program, 2001

Balkanization of Behavior Change

Basic Science



Clinical Endpoints



Goals and Milestones of SOBC

“SOBC will capitalize on emerging basic science to accelerate investigation of common mechanisms of behavior change.”

- Milestone 1 asks us (inter alia) to support studies in laboratory and field settings to delineate how mechanisms of behavior change respond in and outside the laboratory.
- Milestone 2 was to conduct a workshop on bridging laboratory and field work.
- Milestone 3 was to conduct a workshop on intervention targets and suggest new approaches.

Crucially, SOBC meetings have helped to bring down disciplinary boundaries, started collaborations, and expanded our perspectives on the mechanisms of behavior and behavior change.

RFA-RM-10-002

Title: Science of Behavior Change: Finding Mechanisms of Change in the Laboratory and the Field (R01)

PA-12-119

Title: Use-Oriented Basic Research: Change Mechanisms of Behavioral and Social Interventions

	FY 2010	FY 2011	FY 2012	FY2013	FY2014
SOBC WG, Meetings	\$43,050	\$93,350	\$243,716	\$175,662	\$112,474
RFA-RM-10-002	\$4,599,603	\$4,630,000	\$4,553,671	\$3,967,448	\$3,662,190
PA-12-119			\$660,447	\$90,338	
SOBC TOTAL	\$4,642,653	\$4,723,350	\$5,457,834	\$4,233,448	\$3,774,664

Workshop: How can we incorporate mechanistic approaches into ongoing clinical research?

- Studies of mechanisms of change should be a standard feature of all phases of clinical trials.
- Mechanistic studies in clinical trials require innovative measures and methods.
- Understanding mechanisms of behavior change advances basic science and accelerates translation of basic science to clinic settings.

SOBC Common Fund

OCTOBER 9–10, 2012



**Revisiting Pasteur's Quadrant:
Use-Inspired Basic Research**



Workshop: Finding Neurobiological Targets for Behavior Change Interventions

- Research across diverse behavioral conditions demonstrates:
 - Neurobiological variables offer potential as signatures for successful behavior change.
 - They also serve as indicators or predictors for ‘who’ will respond to interventions.
 - And they can be potential targets for behavioral interventions, when the substrates and circuits are known.



NIH
National Institutes
of Health

September 23-24, 2013

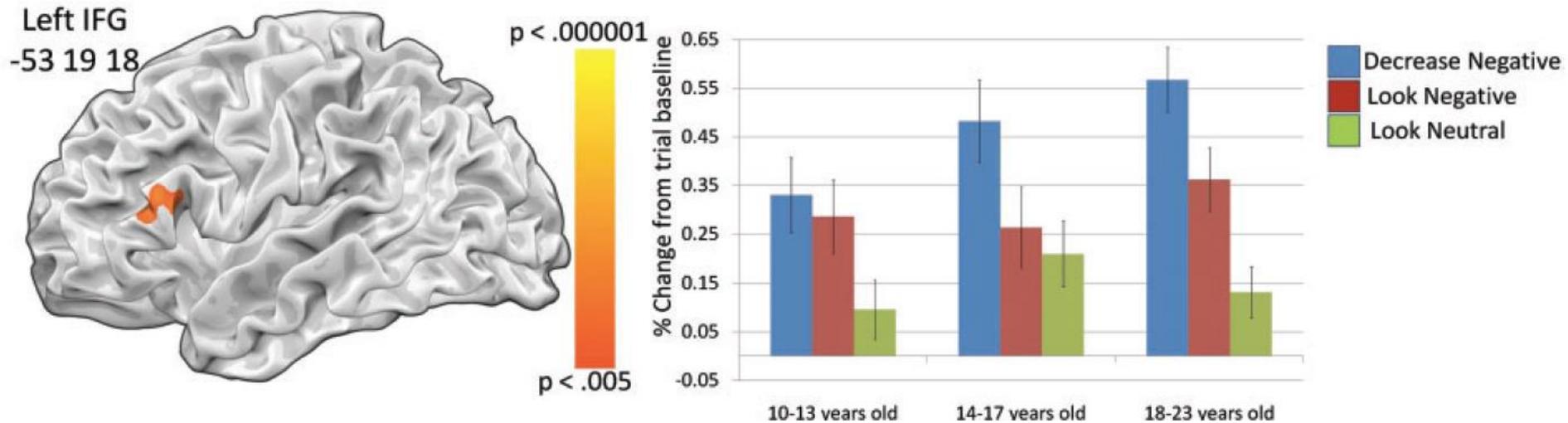
SOBC Common Fund
**HARNESSING NEUROPLASTICITY
FOR BEHAVIOR CHANGE**

The banner features a grid of six icons: a beaker, a DNA double helix, an apple, a hand holding a pen, a microscope, and a brain.

Key Targets for Behavior Change Identified by SOBC Grantees

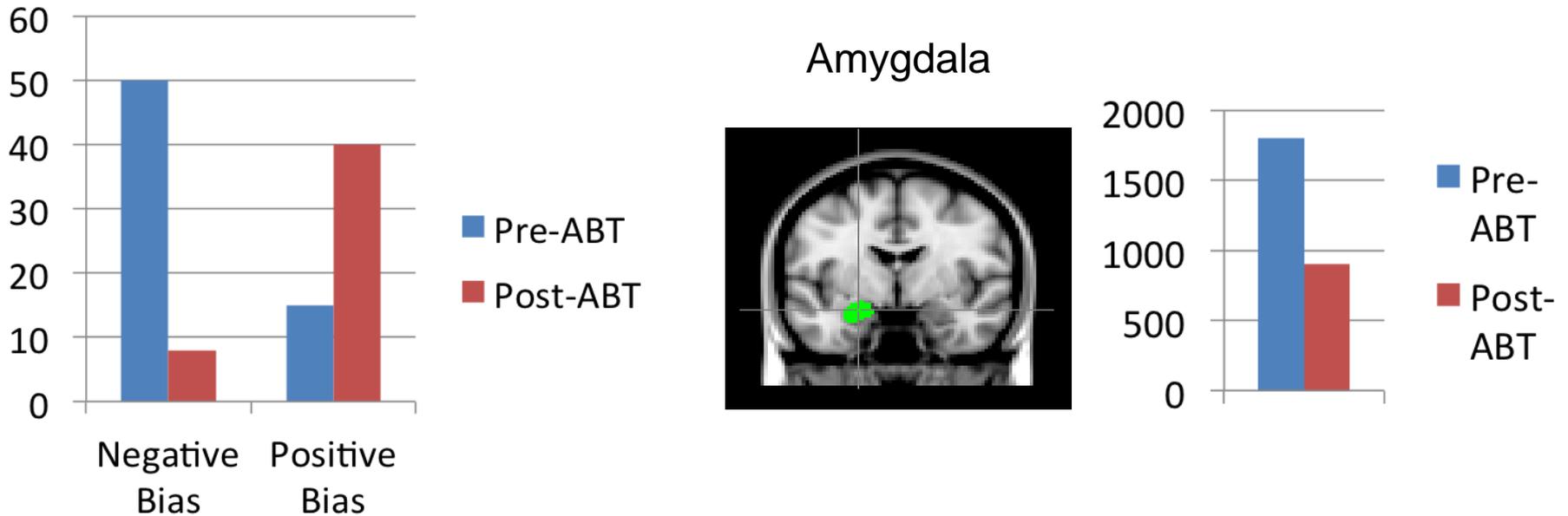
- **Environmental and Social Factors**
 - These can induce or suppress behavior (so the target can be the environment).
- **Stress and Stress Reactivity**
 - Decision-making under stress ignores long-term consequences.
- **Cognitive Processes**
 - Manipulating attention (in place of exerting effortful control) can lead to behavior change.
- **Emotional Processes**
 - Emotional aspects of behavioral contexts and emotional reactions profoundly change behavior.

Cognitive and Emotional Processes



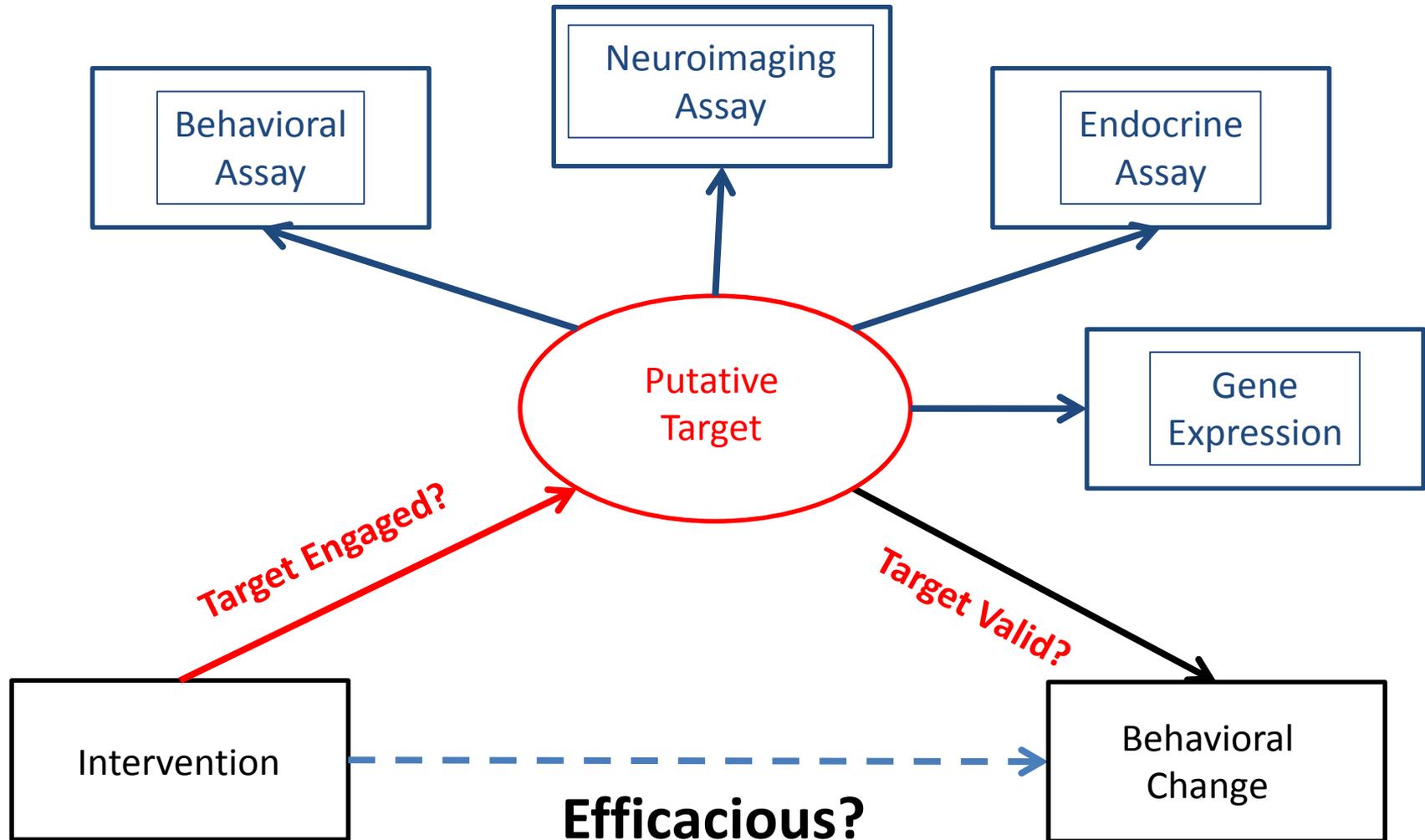
McRae et al. (2012) compared the ability of 10-13 year olds, 14-17 year olds, and 18-23 year olds to regulate emotions elicited by negative emotional stimuli (vs. neutral stimuli). Older participants performed better and attention-related activation in left inferior frontal cortex indexed this improvement.

Use-inspired Research on Cognitive/Emotional Processes



Ian Gotlib is employing an Attentional Bias Training (ABT) technique to decrease attention to negative and increase attention to positive affective stimuli in the not depressed (but at risk) daughters of women with recurrent Major Depressive Disorder. Successful training (left) is associated with decreased reactivity in the amygdala (right) and increased activity in the prefrontal cortex (not shown) during an Emotional Interference Task.

Causal Mechanisms & Behavior Change



Experimental Medicine Approach to Behavior Change

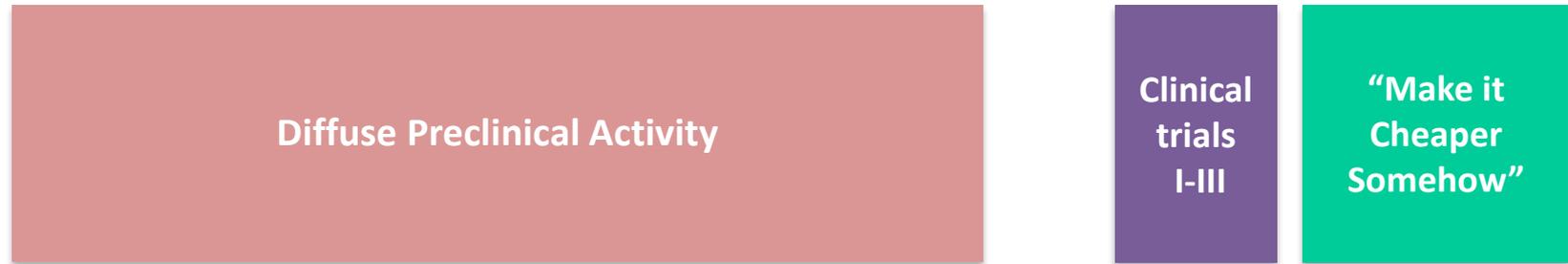
- ***Identify and isolate the most promising intervention targets*** whose change drives behavior change.
- ***Develop assays*** to measure target engagement at the appropriate level.
- ***Identify individual differences in treatment response*** via *a priori* validated assays.
- ***Improve behavioral trial designs*** to incorporate verification of target engagement and strategies for re-randomization/treatment for non-responders.

Intervention Development Pipelines

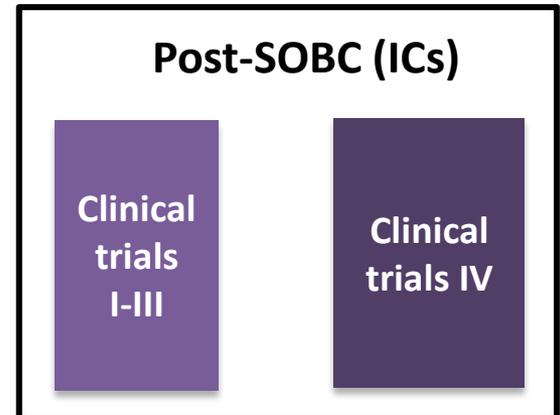
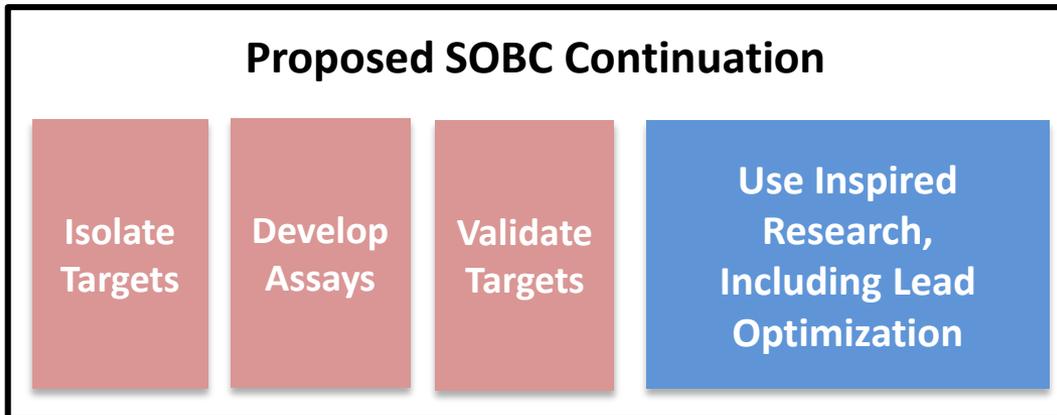
Drugs and Devices



Behavior Change Pre-SOBC



SOBC 2 (2015-)



SOBC: Next Steps

- **Goal 1:** Implement the **Experimental Medicine Approach** to Behavior Change.
 - Deliverable: Isolated key targets for interventions
 - Deliverable: Assays to measure engagement of key targets.
 - Deliverable: Targets validated in the laboratory and in clinical studies through use-inspired research.
- **Goal 2:** Strengthen the dialogue between clinical and basic scientists and promote use-inspired research.
 - Deliverable: Publications from meetings, training on the use of instruments, findings from use-inspired research.
- **Long-term Goal:** Reshape NIH's approach to behavior change interventions by building a unified science.

Tentative Continuation Budget

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
SOBC WG, Training	\$200,000	\$200,000	\$400,000	\$400,000	\$400,000
Target Isolation	\$1,200,000	\$800,000	\$400,000		
Assay Development	\$800,000	\$1,600,000	\$1,600,000	\$1,600,000	\$1,200,000
Target Validation		\$2,600,000	\$4,200,000	\$4,200,000	\$1,600,000
Use-Inspired Research			\$1,600,000	\$3,200,000	\$3,200,000
INITIATIVE TOTAL	\$2,200,000	\$5,200,000	\$8,200,000	\$9,400,000	\$6,400,000