APPLYING THEORY TO PREVENTION OF DRUG USE AND MULTIPLE HEALTH RISK BEHAVIORS

Mary Ann Pentz, Ph.D.
Department of Preventive Medicine
University of Southern California

THS 8 – Oct 23-26, 2007 -- Biarritz, France

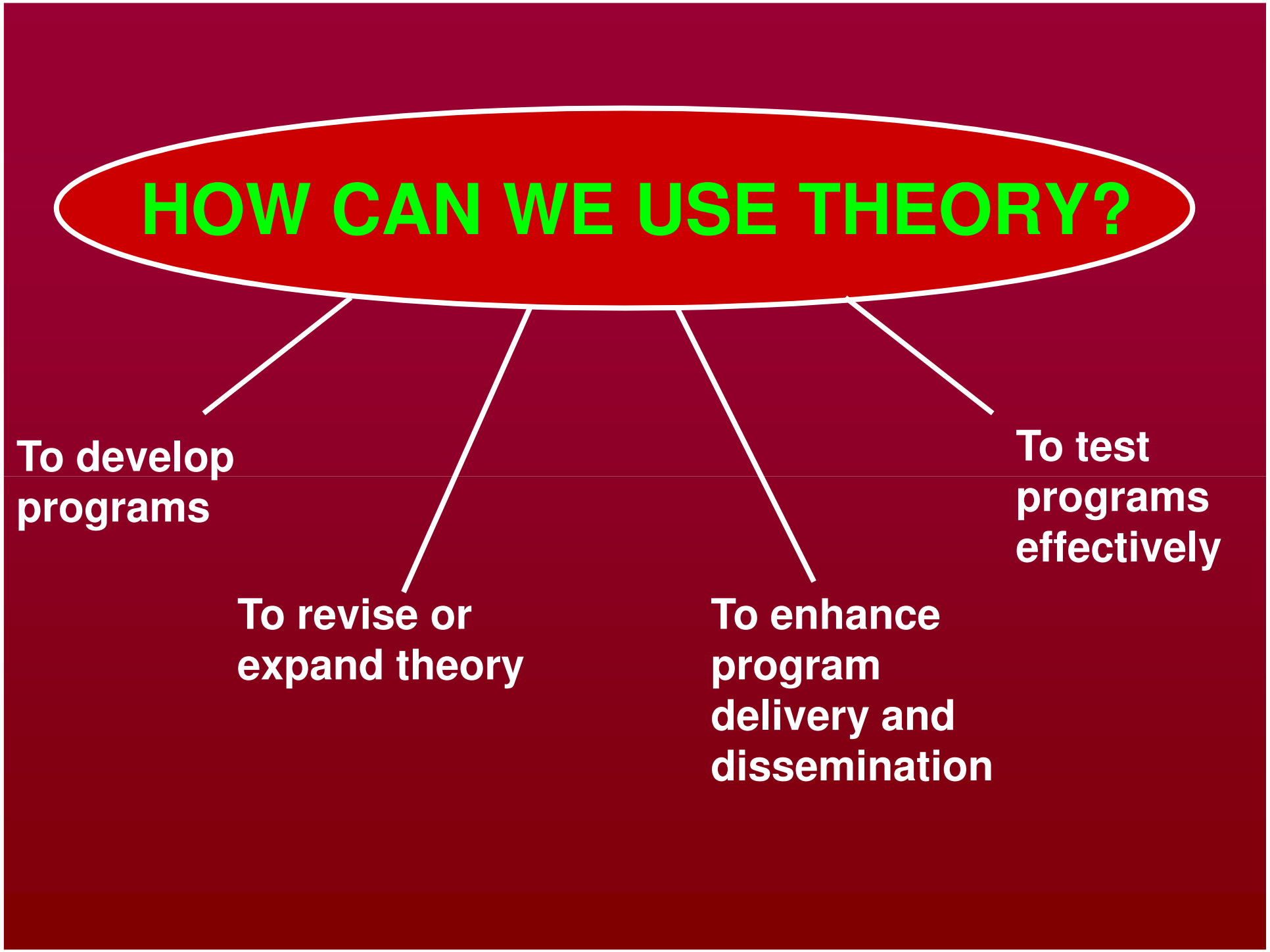
KECK
SCHOOL OF MEDICINE OF USC

WHY DO WE NEED THEORY?

THEORY EXPANDS OUR RESEARCH KNOWLEDGE

From "Does it work?"

To "What Works, how does it work, and why does it work?"


HOW CAN WE USE THEORY?
To develop programs
To revise or expand theory
To enhance program delivery and dissemination
To test programs effectively

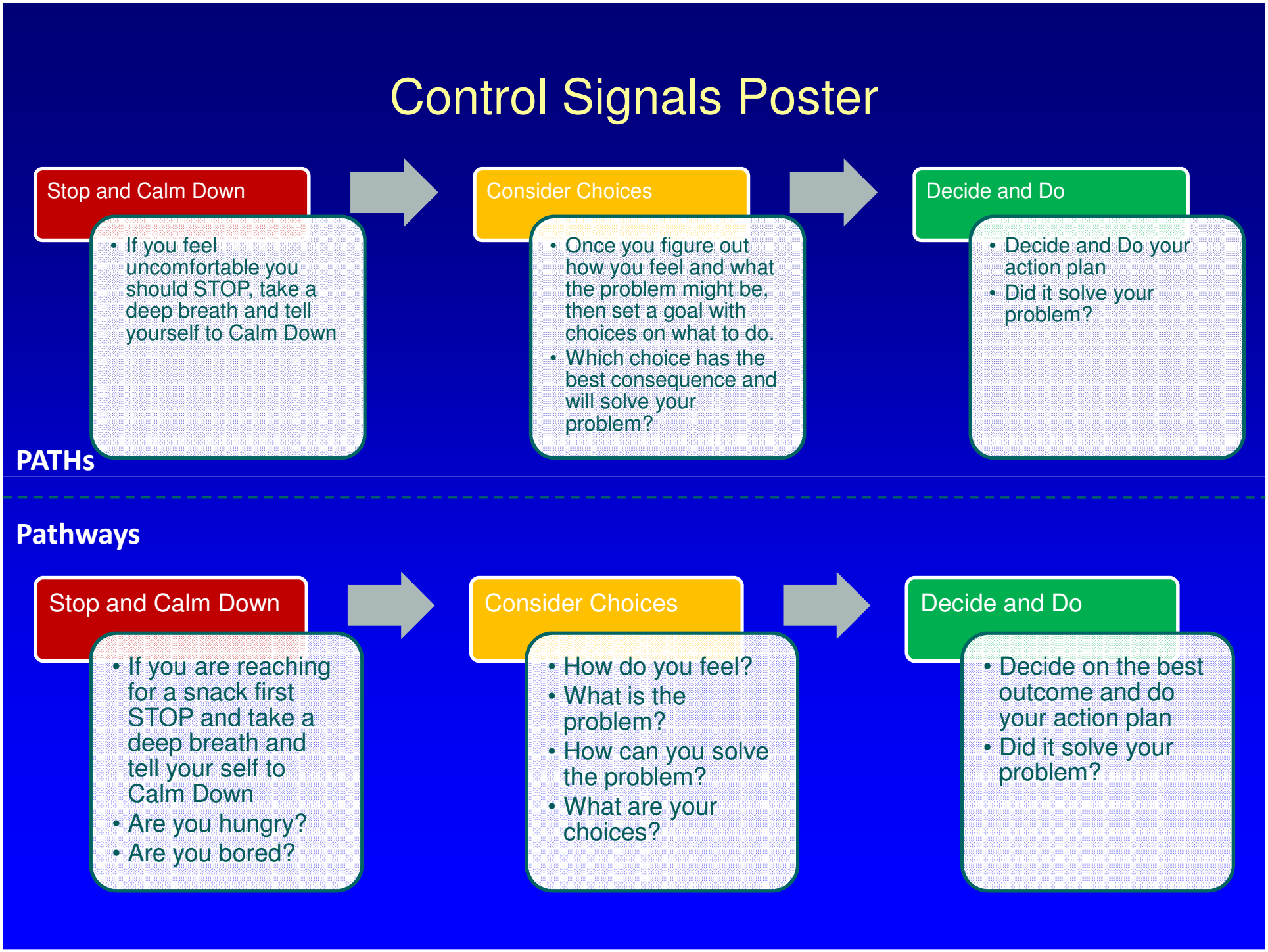
ILLUSTRATIVE STUDIES AND THEIR THEORETICAL MODELS

Study	Theory	Application
MPP (STAR) (NIDA 1985-present)	Integrative Translational Theory (PxSxE)	ATOD
STEP (NIDA 2000-present)	Prevention Diffusion Theory	ATOD
PATHWAYS (NICHHD 2007-2012)	CABD Regulation Model	Obesity, Tobacco

USING THEORY TO DEVELOP PREVENTION TRIALS

- Develop hypotheses
- Construct the program or intervention
- Correct or revise the program during piloting

Control Signals Poster



USING THEORY DURING PREVENTION TRIALS TO EXPLAIN:

- Mechanisms of change (program mediators)
- Baseline x treatment interactions
- Individual differences and different trajectories of change
- Transfer or generalizability effects
- *Translational effects across multiple health risk behaviors*

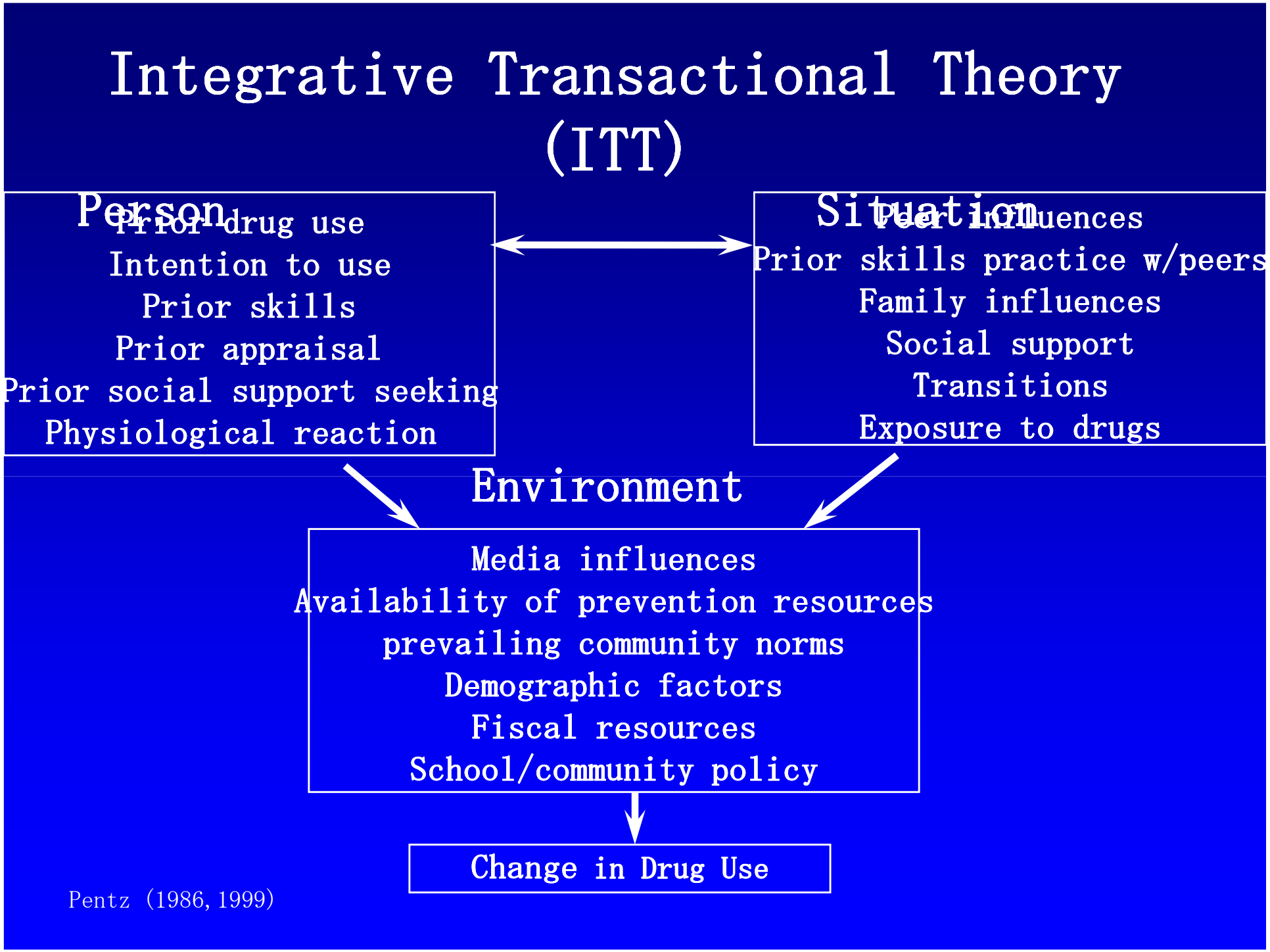
MIDWESTERN PREVENTION PROJECT (MPP)

A Multi-Component Community-Based Prevention Trial

What is STAR (Midwestern Prevention Project)?

- A multi-component, community-based trial for prevention of tobacco, alcohol, and other drug use in adolescents and their families.

Integrative Transactional Theory (ITT)



Pentz (1986, 1999)

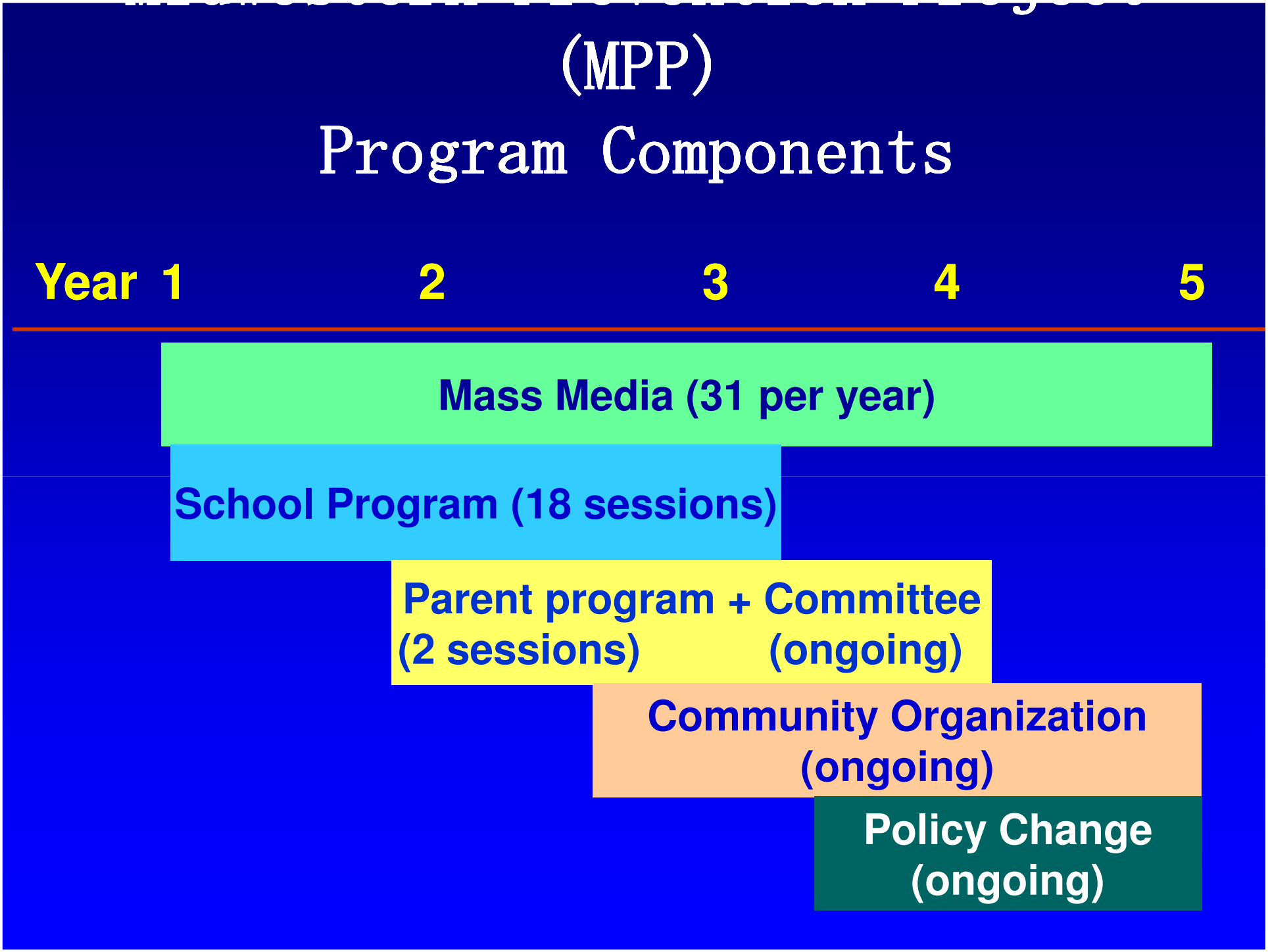
Research and Measurement Designs

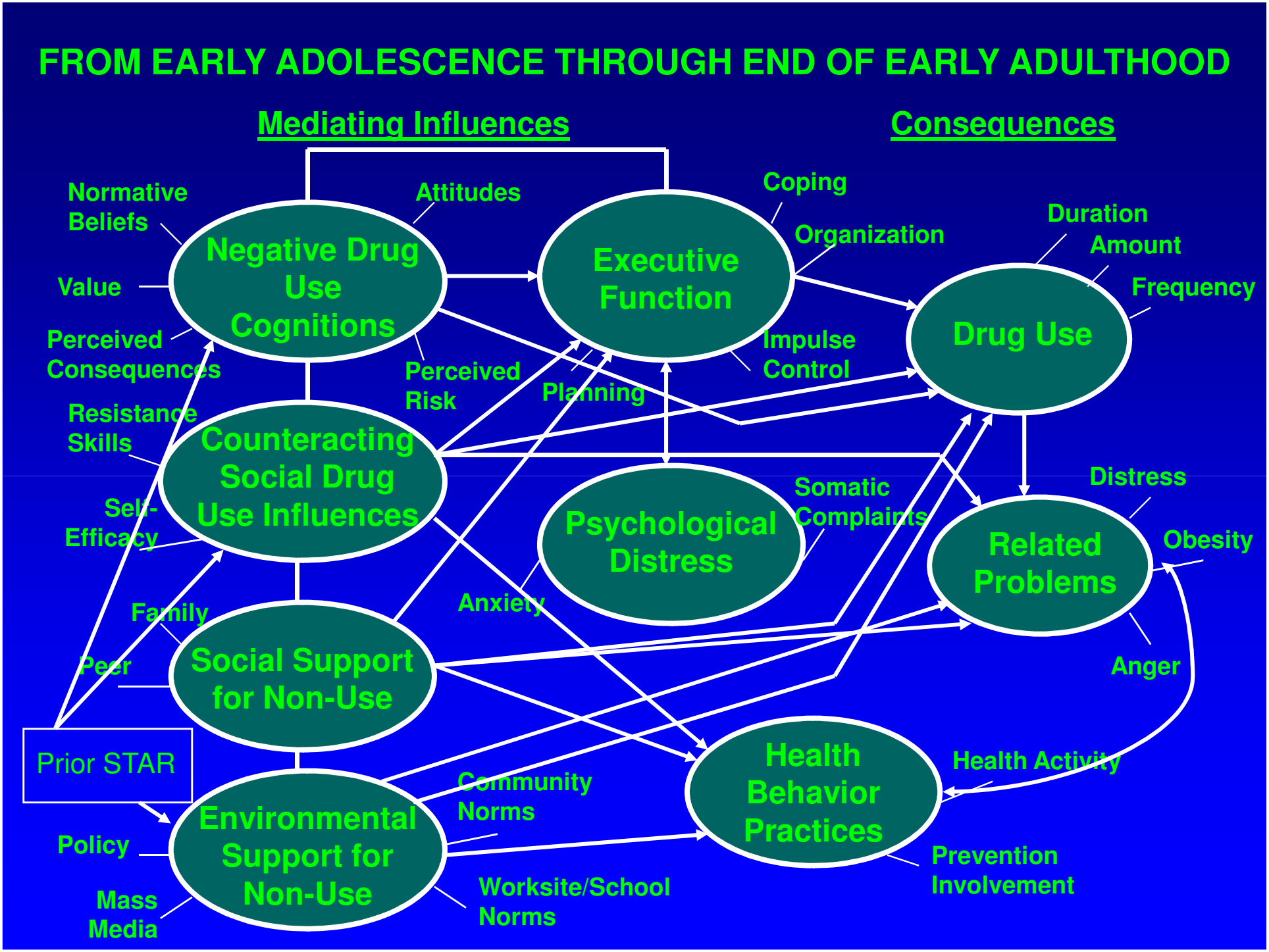
- Three-year lagged replication in two cities (1984 Kansas City, population N=1.7 million; 1987 Indianapolis, population N=1.4 million)
- Assignment of all middle schools within each school district to community intervention or control condition (N=26 communities, N=107 schools)

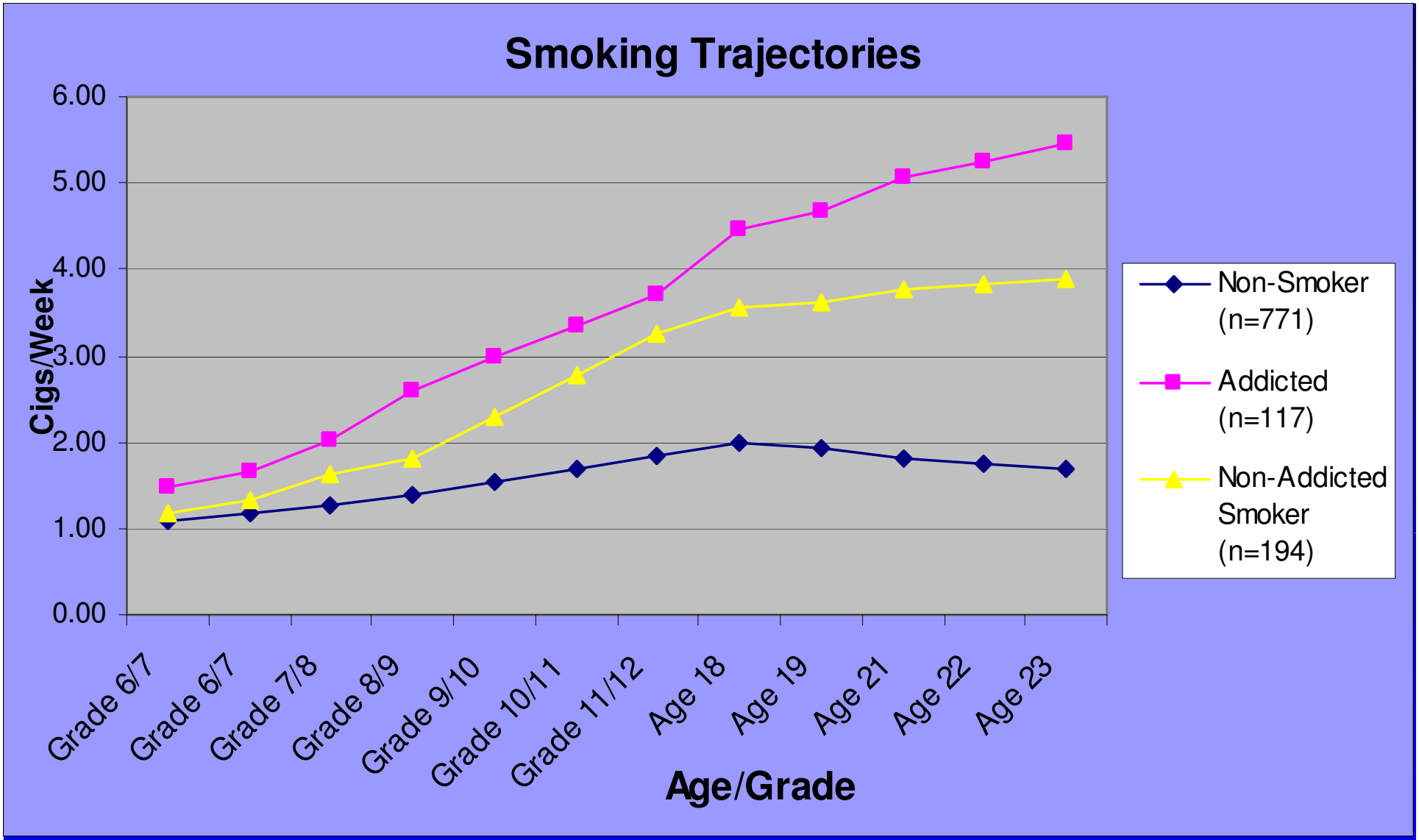
Kansas City - 1/3 randomized
2/3 demographically matched

Indianapolis - Randomized

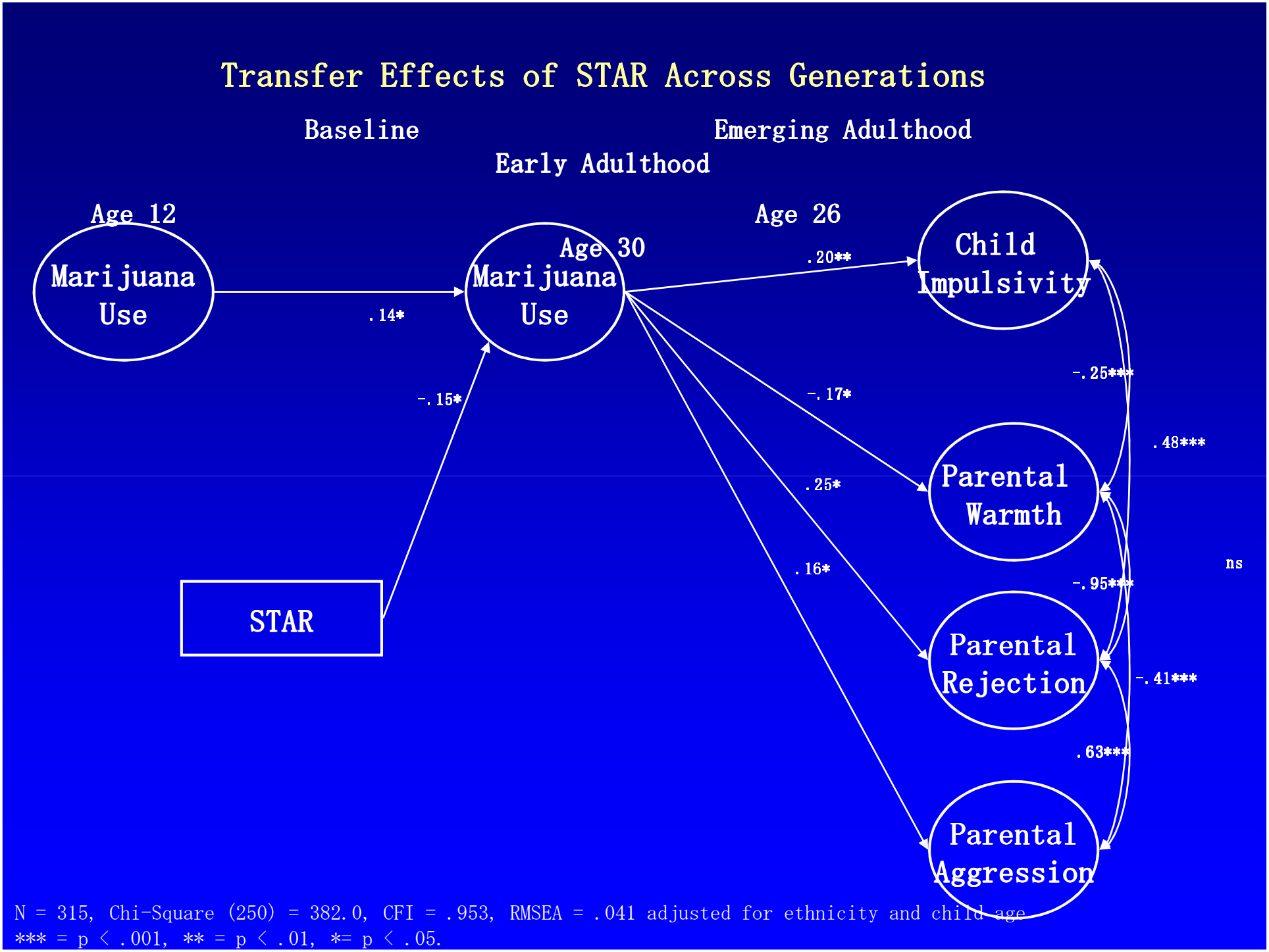
(MPP)
Program Components



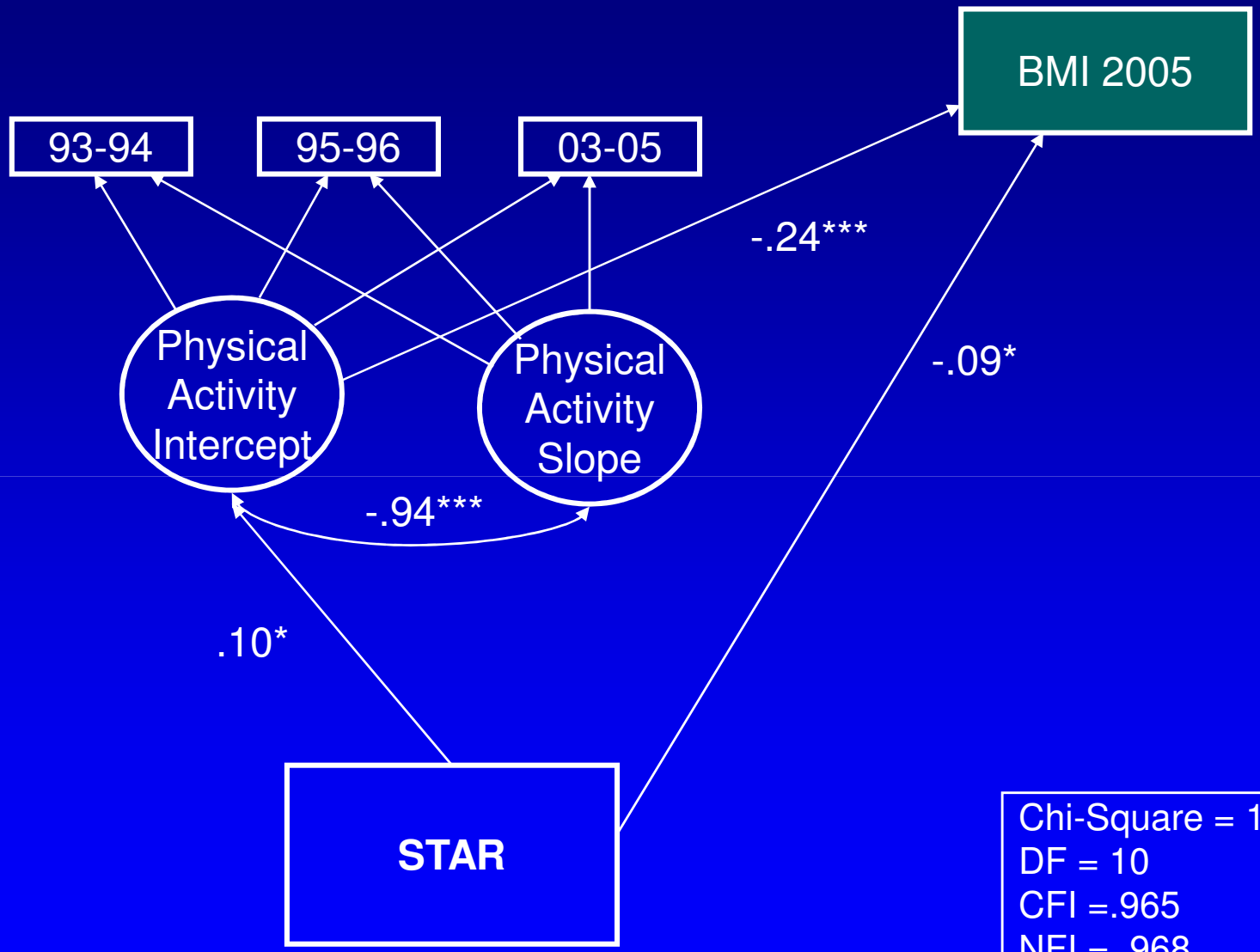

FROM EARLY ADOLESCENCE THROUGH END OF EARLY ADULTHOOD
Mediating Influences
Consequences
Normative Beliefs
Attitudes
Coping
Organization
Duration
Amount
Frequency
Value
Perceived Consequences
Perceived Risk
Planning
Impulse Control
Resistance Skills
Self-Efficacy
Somatic Complaints
Distress
Obesity
Anxiety
Family
Peer
Anger
Prior STAR
Health Activity
Community Norms
Policy
Mass Media
Worksite/School Norms
Prevention Involvement
Negative Drug Use Cognitions
Executive Function
Drug Use
Counteracting Social Drug Use Influences
Psychological Distress
Related Problems
Social Support for Non-Use
Health Behavior Practices
Environmental Support for Non-Use



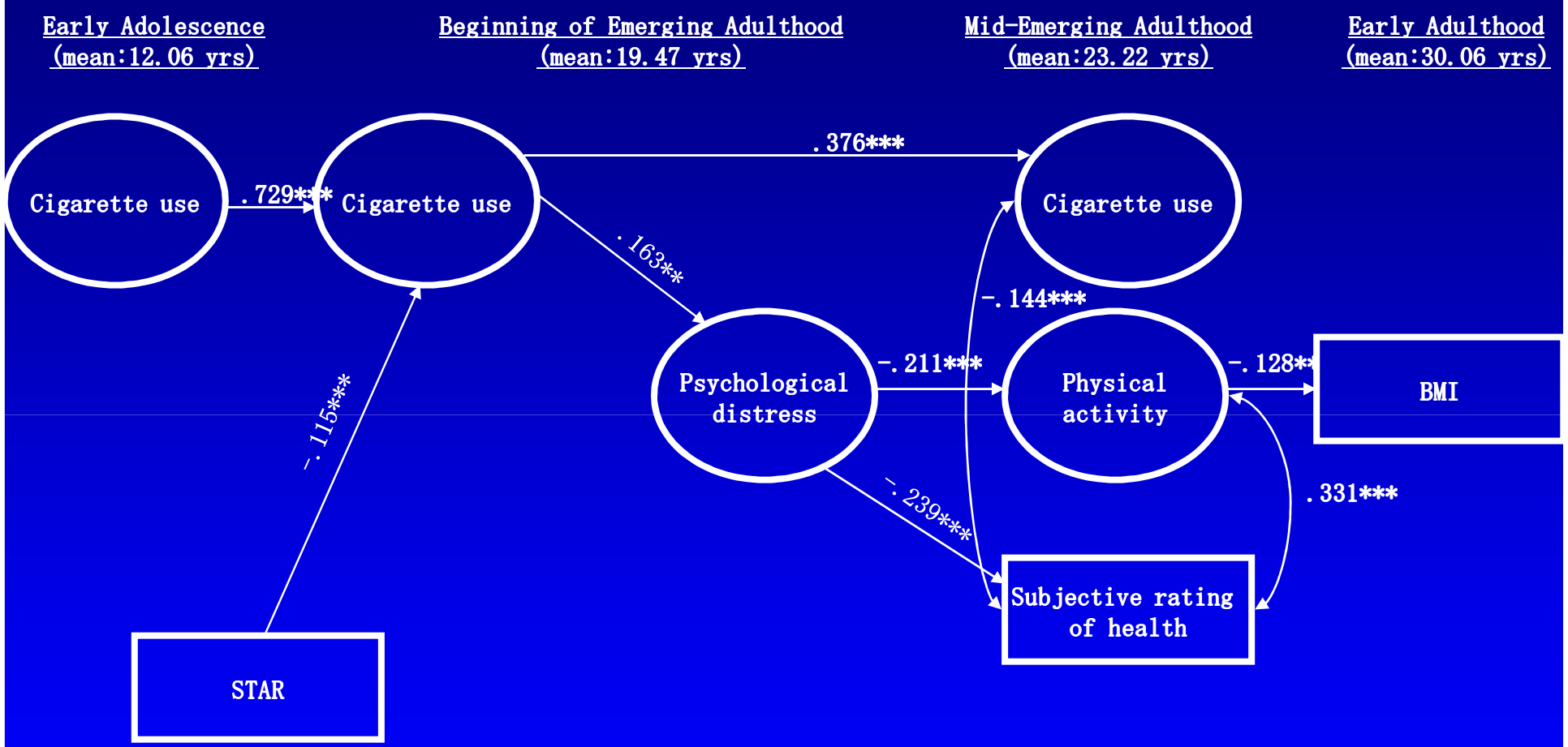
Group [OR = .78 (.65-.94) p < .01].


Transfer Effects of STAR Across Generations
Baseline
Early Adulthood
Emerging Adulthood
Age 12
Marijuana Use
.14*
Age 30
Marijuana Use
Age 26
.20**
Child Impulsivity
-.15*
-.17*
.25*
.16*
STAR
Parental Warmth
Parental Rejection
Parental Aggression
-.25***
.48***
ns
-.95***
-.41***
.63***
N = 315, Chi-Square (250) = 382.0, CFI = .953, RMSEA = .041 adjusted for ethnicity and child age
*** = p < .001, ** = p < .01, *= p < .05.

Translational Effects



COLLATERAL BENEFITS



Model fit:
NFI=.949
CFI=.957
$\chi 2$ =827.049

(150)
RMSEA=.046
N=2127

*p<.05; **p<.01;***p<.001 (one-tailed test)

USING THEORY AFTER TRIALS TO DISSEMINATE AND TRANSLATE EVIDENCE-BASED PREVENTION

- Disseminate evidence-based prevention
- Adapt prevention programs
- Translate prevention from one health risk behavior to another

Prevention Works: The Next STEP

A Multi-State Prevention Teleconference Project

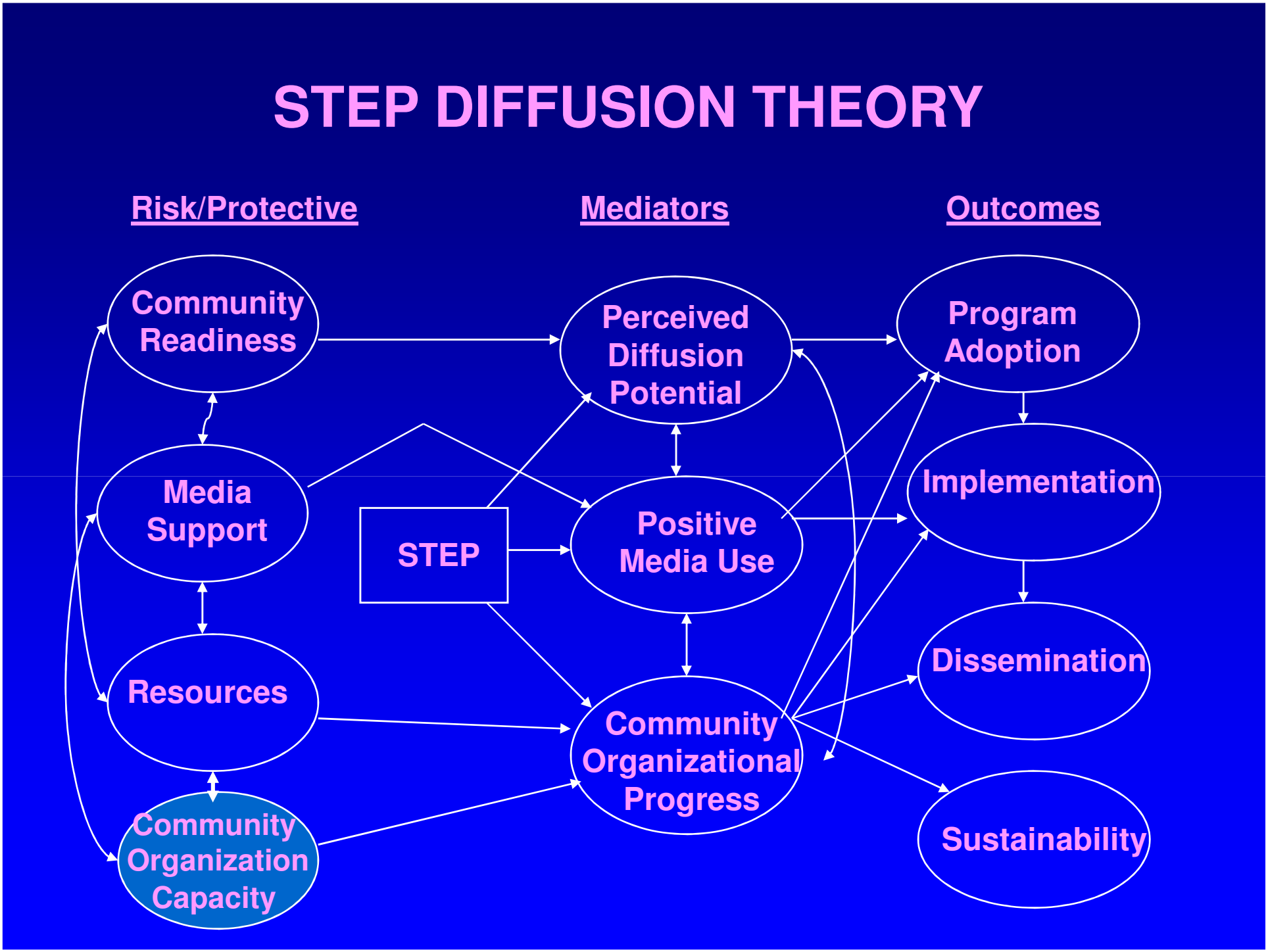
What Is STEP?

- A randomized trial to evaluate the adoption, implementation, and diffusion of evidence-based drug use prevention to underserved small to medium size cities using relatively low cost, abbreviated televised training and limited technical assistance.

Research and Measurement Designs

- Randomized 3 group design, cities within 5 states randomized to television training + technical assistance, television training alone, or control (N=24 cities)
- Sub-design: Within each city, schools randomly assigned to a drug prevention media literacy program or control (N=48)
- Longitudinal measurement (baseline + 3 follow-ups)

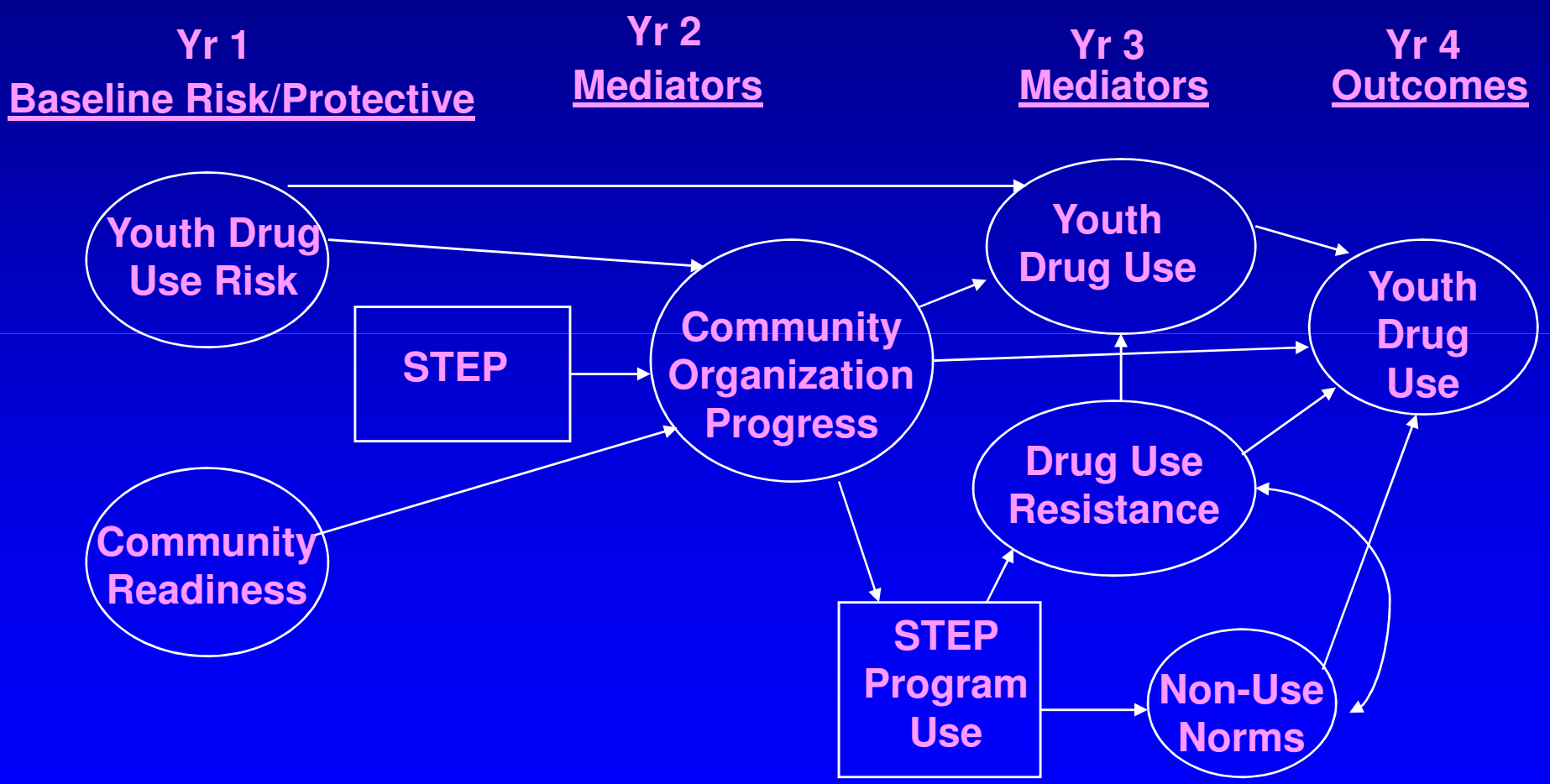
STEP DIFFUSION THEORY

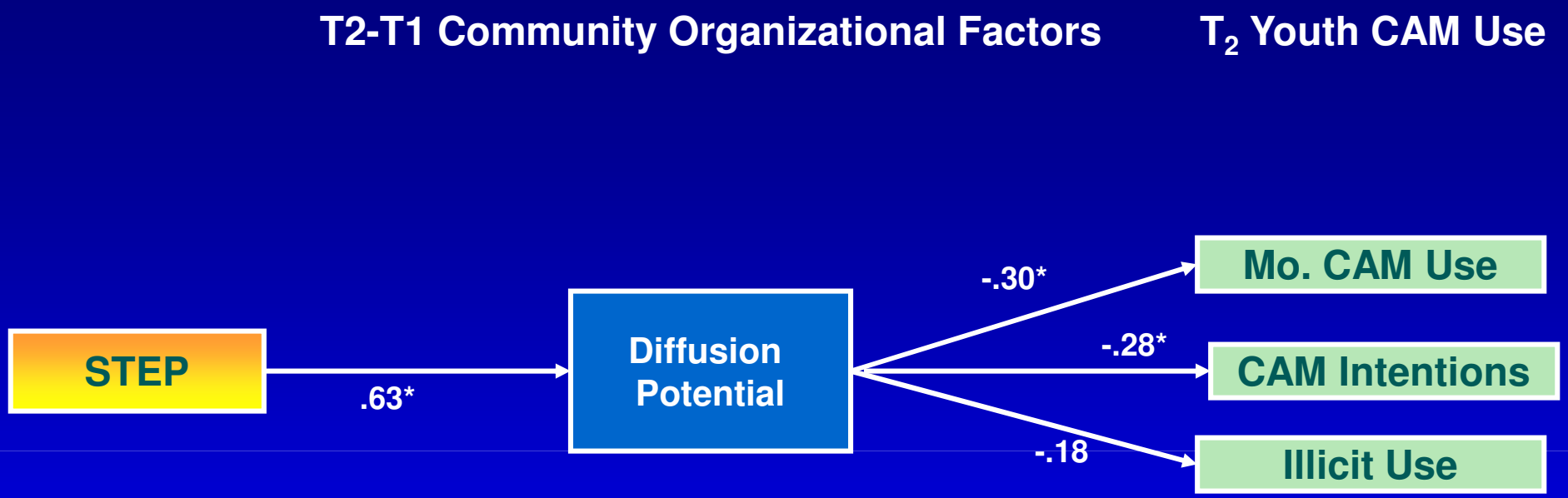


Using diffusion theory to adapt programs:

- STAR advertising influences lessons adapted to STEP Media Buzz media literacy program for youth
- STAR media programming adapted to STEP media advocacy for community leaders

STEP COMMUNITY TO YOUTH MEDIATIONAL EFFECTS





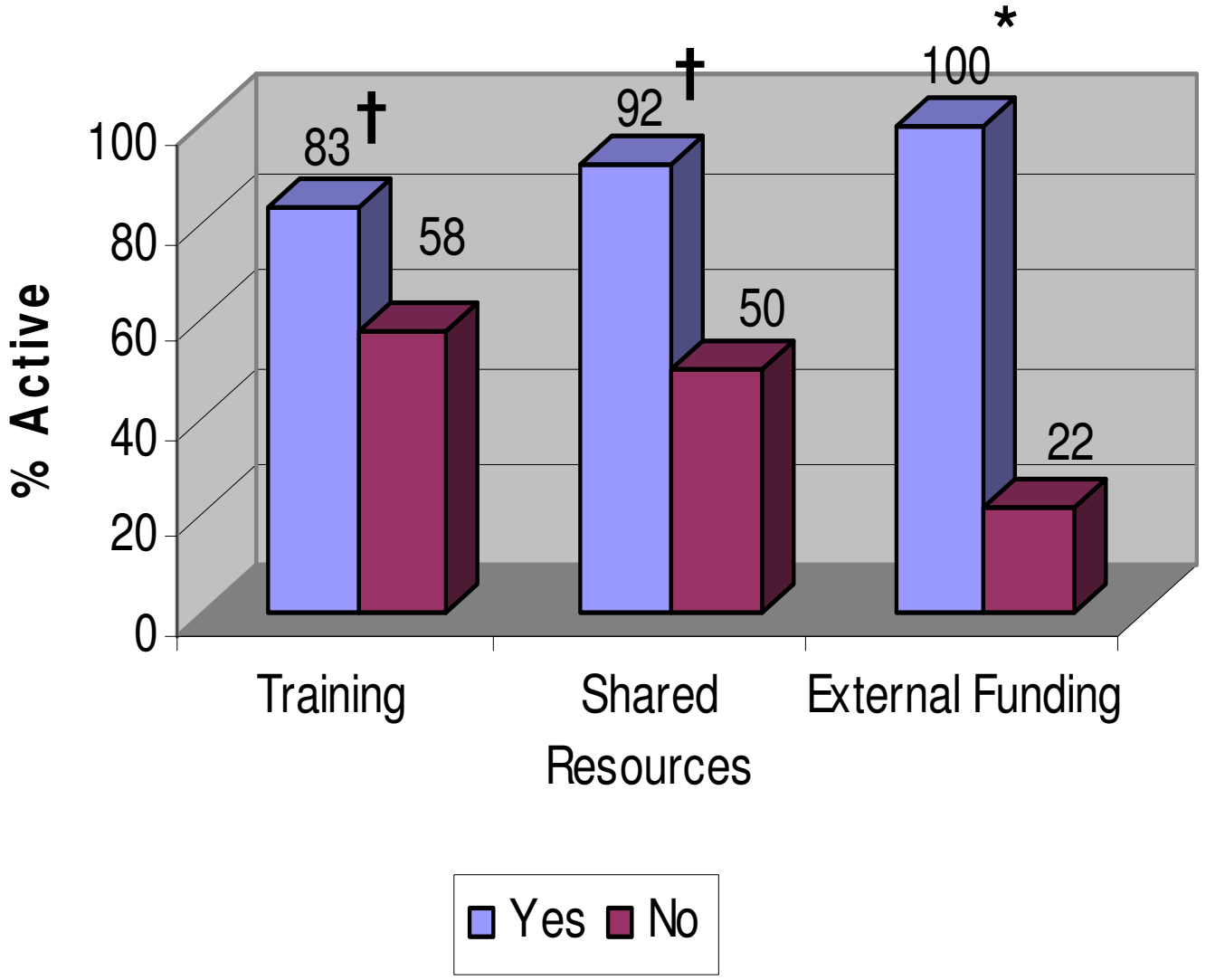
*=p < .10, **=p<.05, 1-tail

NOTE: Community (n=19) is level of analyses controlling for T_1 community organizational values or student drug use values (depending on the model). Mediation was tested one variable at a time

USING PROGRAM RESULTS TO REVISE THEORY

- Collateral benefits
- Reactive effects
- Translation across health behaviors (drug use to obesity).

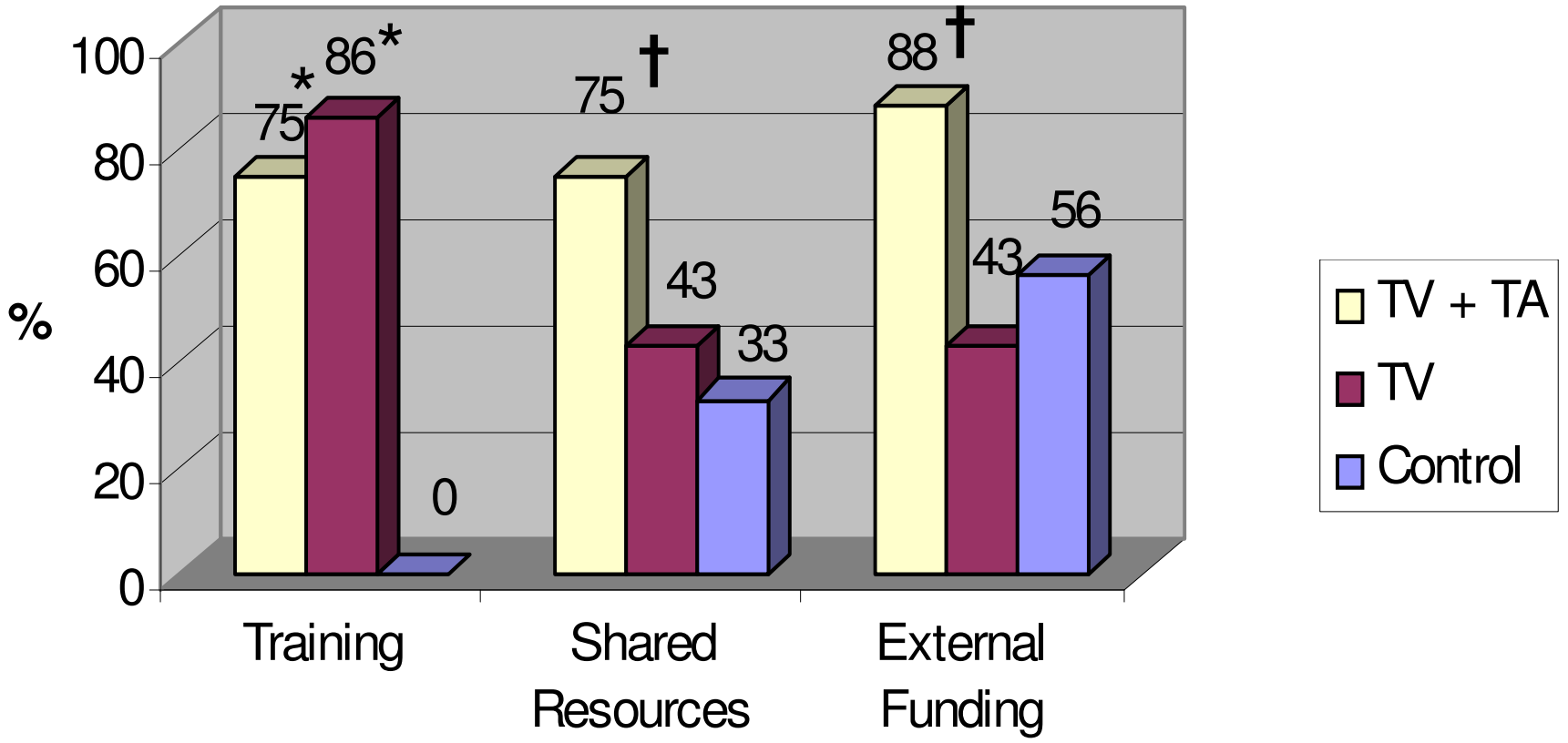
Percent Active at Year 5 by Training and Resources



*= p < .05. †= < .10

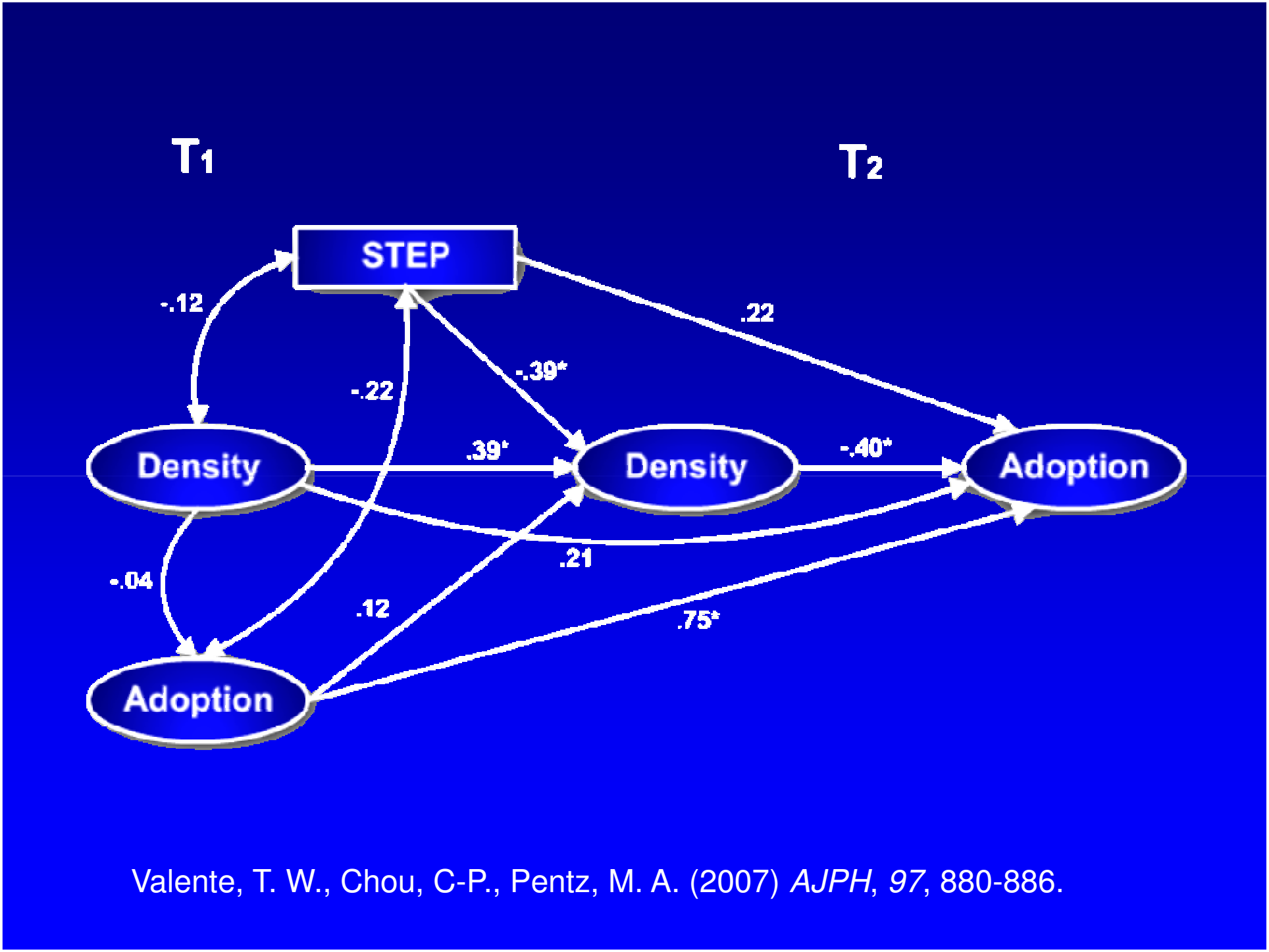
Covariates: Baseline coalition status, intervention condition

Percent Training and Resources by Condition (n=24)



*= p < .05. †= < .10

Covariate = Baseline coalition status

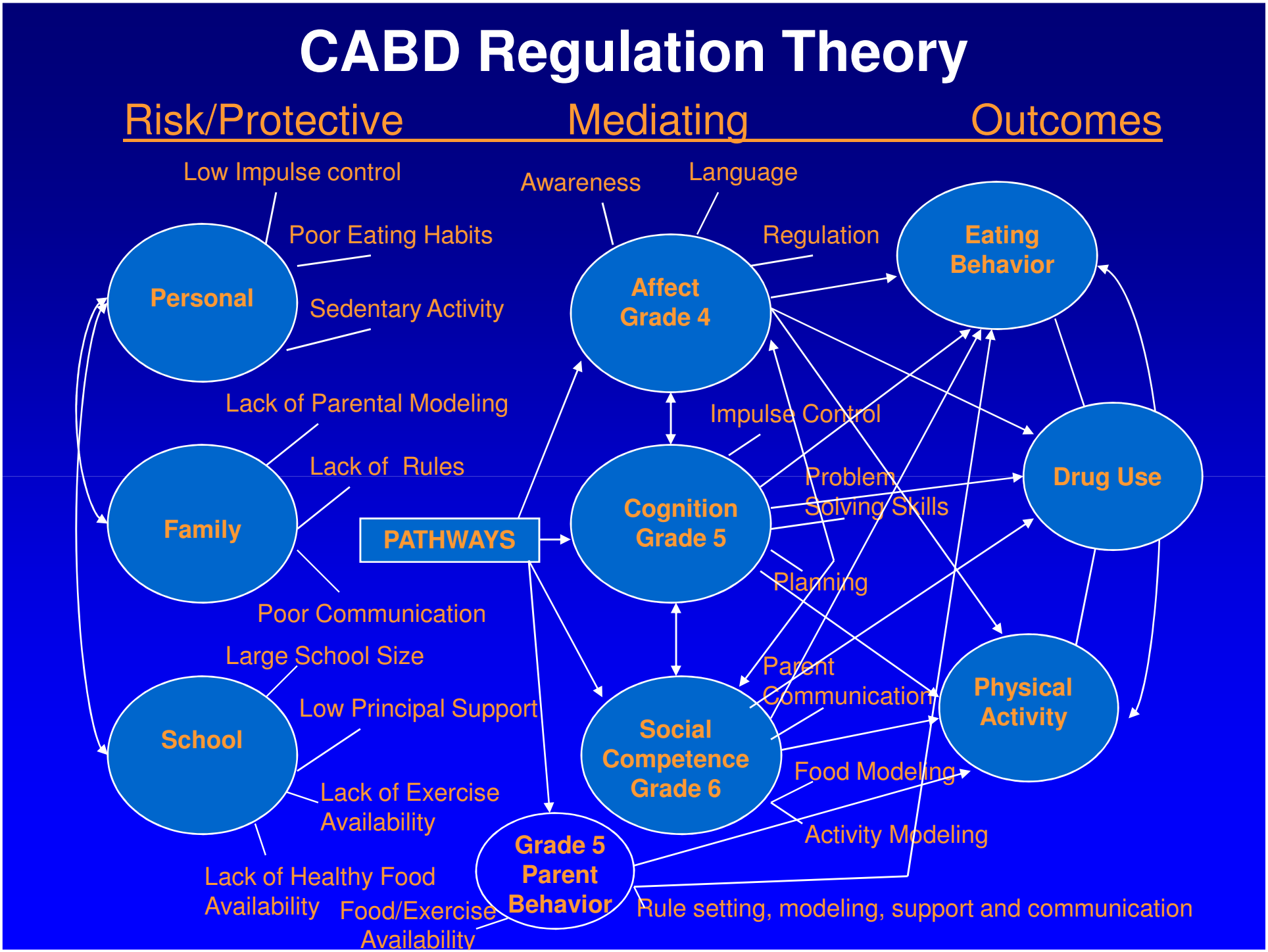


Valente, T. W., Chou, C-P., Pentz, M. A. (2007) *AJPH*, *97*, 880-886.

PATHWAYS

- A randomized school-based prevention trial to translate two evidence-based drug and violence prevention programs (PATHS, STAR) to obesity prevention.

CABD Regulation Theory



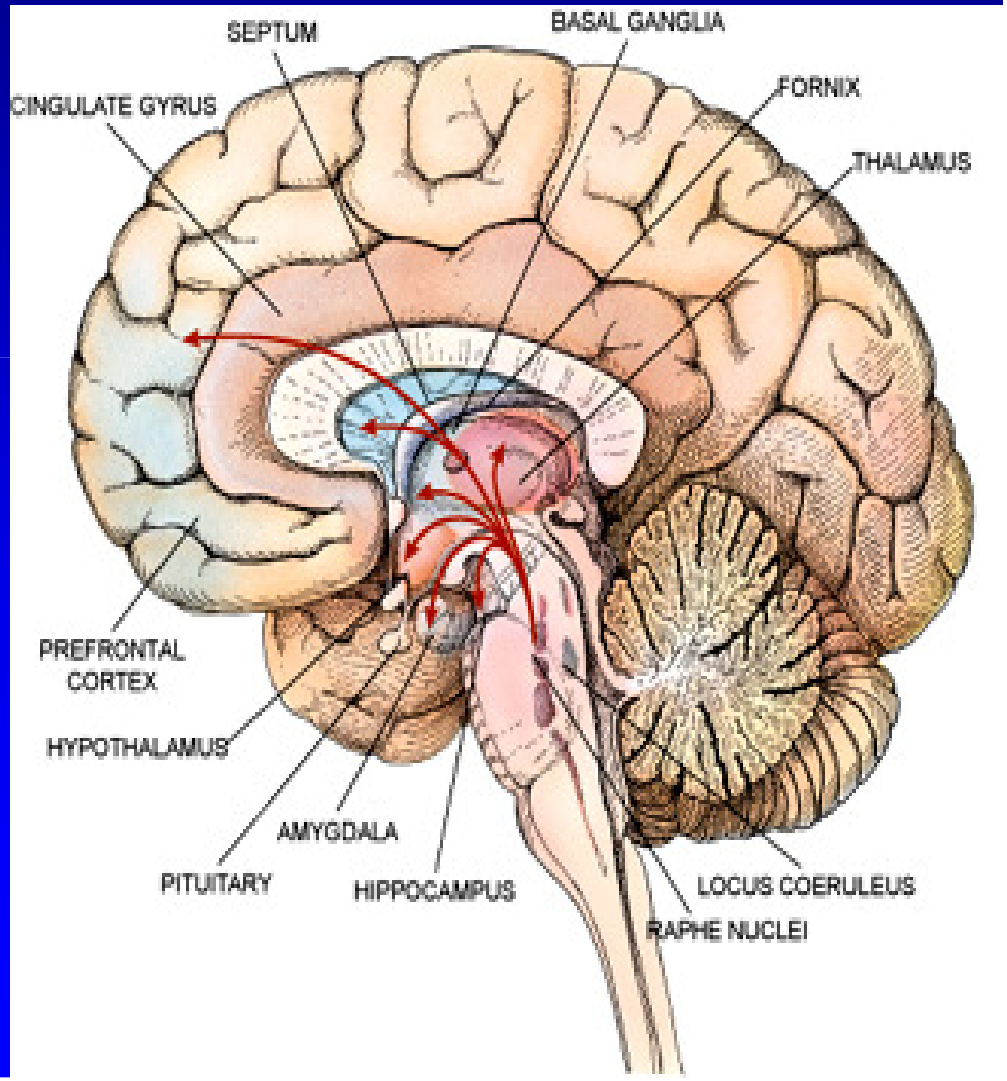
Using theory to revise, integrate, and translate programs

PATHS emotional regulation	**+**	**STAR decision-making and parent support**	**=**	**PATHWAYS for control of impulsive eating and drug use experimentation**

Neurocognitive Systems Related to Social-Emotional Development

- Two structures of the brain related to self-regulation of emotion and behavior.
  - Limbic System
  - Frontal Cortex

- These systems related to school readiness, substance use, risk for obesity, and behavior problems.



PATHWAYS Research and Measurement Designs

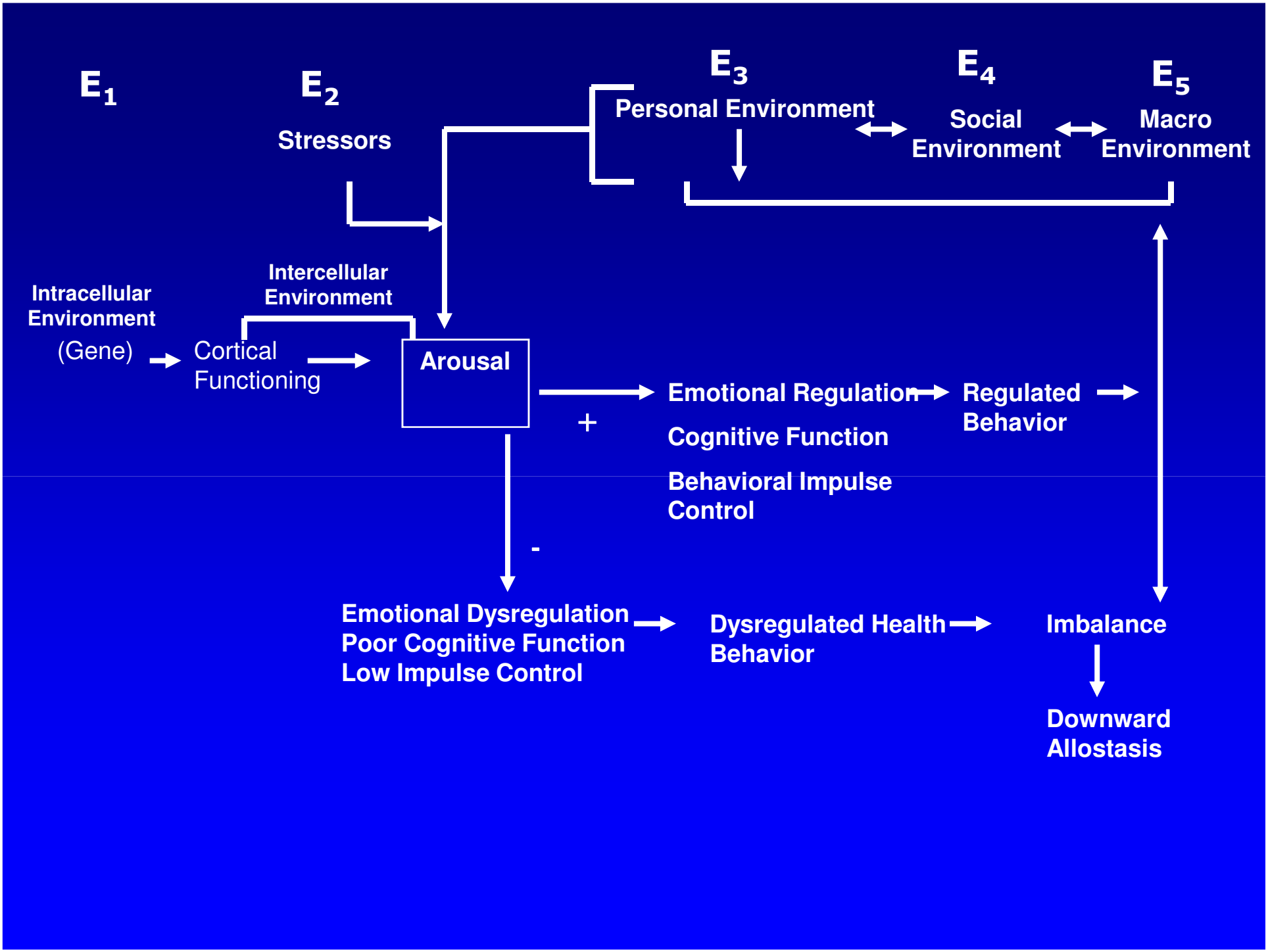
Program	Control	Grade 4	Grade 5	Grade 6
n = 12 schools	n = 12 schools			
n = 1700 4th grade students	n = 1700 4th grade students	O X O	X O	X O
n = 1700 Parents	n = 1700 Parents	O	X O	
N = 3400 4th graders (77% Hispanic), N = 3400 Parents, N = 120 teachers				

NEXT STEPS

- Expand theory and programs to integrate environmental influences
- Develop new theoretical models that explain brain-behavior relationships across multiple health risk behaviors

Translational Theory -- Ecostasis

- Homeostasis + Ecology + Stress Arousal
- Prevention of allostatic load build-up


E1
E2
Stressors
E3
Personal Environment
E4
Social Environment
E5
Macro Environment
Intracellular Environment
(Gene)
Intercellular Environment
Cortical Functioning
Arousal
+
Emotional Regulation
Cognitive Function
Behavioral Impulse Control
Regulated Behavior
-
Emotional Dysregulation
Poor Cognitive Function
Low Impulse Control
Dysregulated Health Behavior
Imbalance
Downward Allostasis

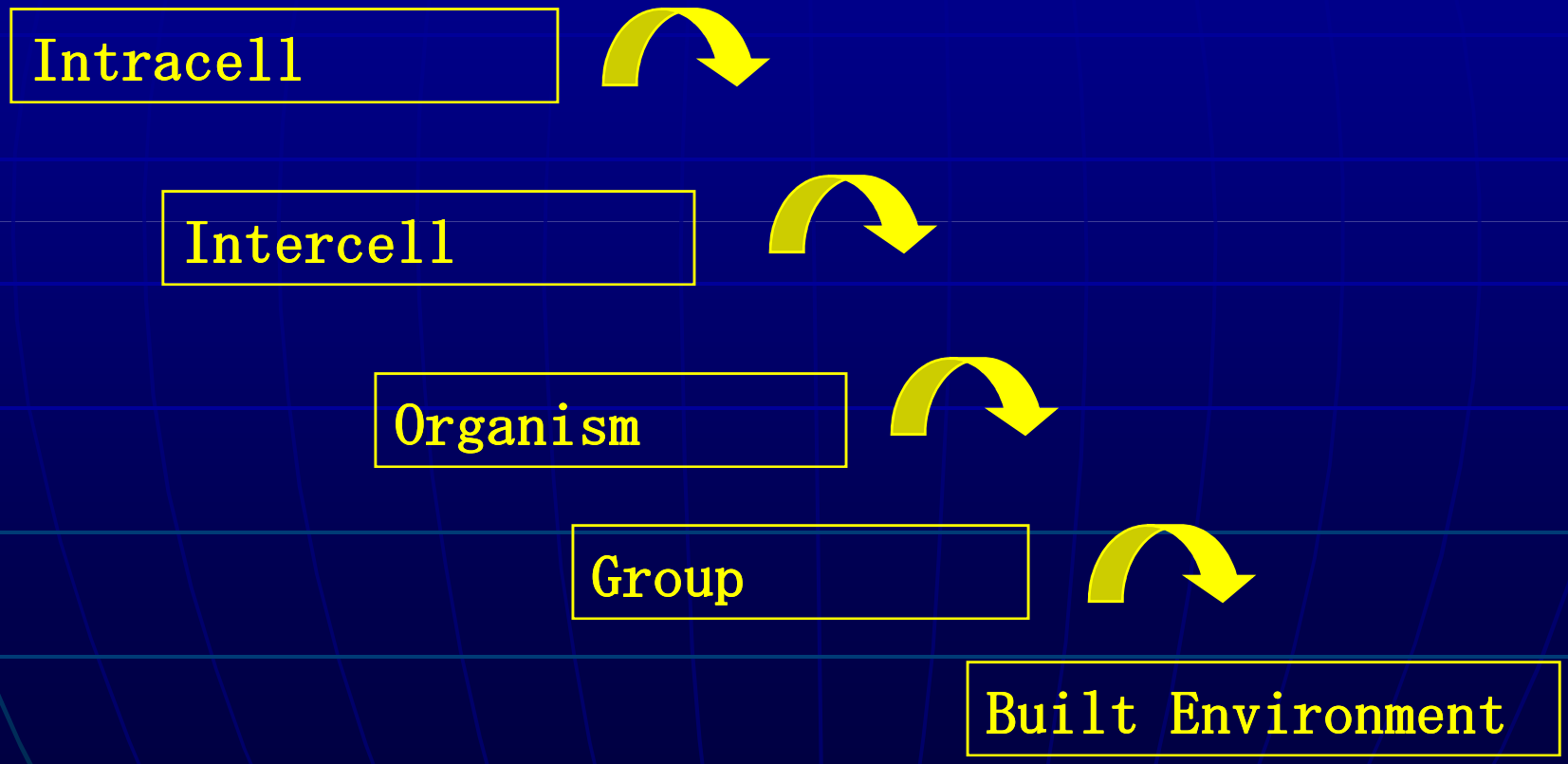
Primary Health Applications for Prevention of:

- Obesity
- Alcohol use
- Drug use
- Tobacco use in adolescents

FOCUS: Environment (E)

Micro-Level E

Macro-Level E



ACKNOWLEDGMENTS

**Keck School of Medicine,
University of Southern California**

Chih-Ping Chou, Ph.D., Nathaniel Riggs, Ph.D., Donna Spruijt-Metz, Ph.D., Kim Reynolds, Ph.D., Tom Valente, Ph.D.

Supported by grants from the National Institute on Drug Abuse and the National Institute for Child Health and Human Development.

Special thanks to:

**Andrew Zaw M.P.H., USC,
Liz Robertson, Ph.D., NIDA,
Terry Huang, Ph.D., NICHD**

pentz@usc.edu

KECK SCHOOL OF MEDICINE OF USC