

Simple Tools for Making our Environments More Nurturing

Anthony Biglan, Ph.D.

Senior Scientist

Oregon Research Institute

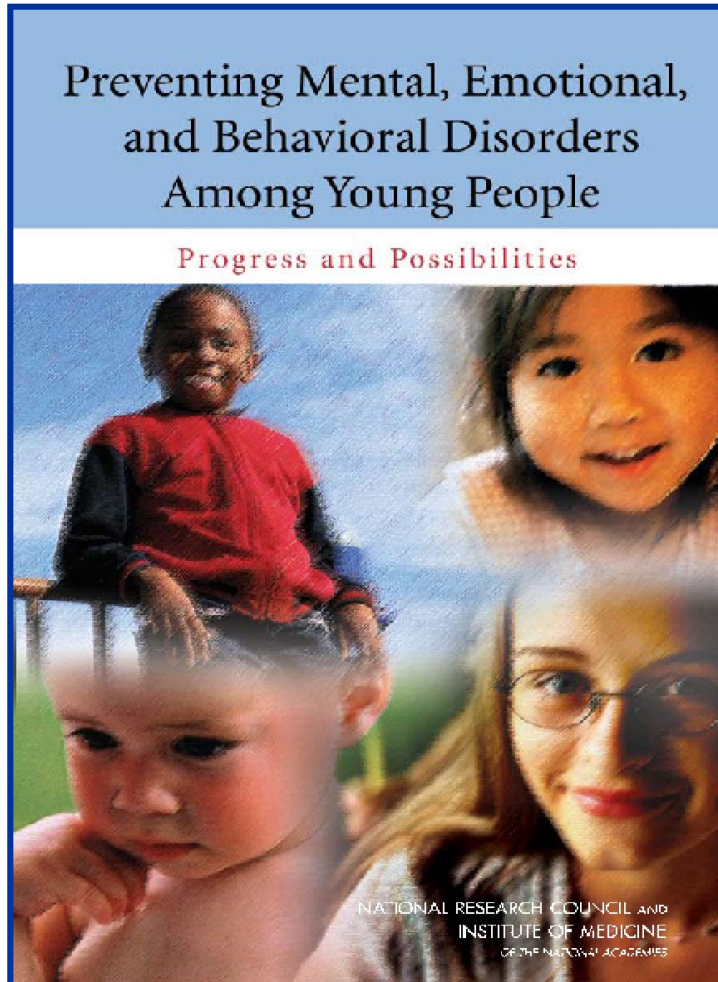


My Key Message

- We cannot prevent substance use simply by targeting that problem.
- To prevent substance use and substance use disorders, we have to prevent all of the psychological and behavioral problems that are risk factors for substance use.
- And to do that, we need to ensure that our young people live in environments that nurture the development of all of the psychological and behavioral skills that people need to thrive.



And the Good News is that we can do it!



“The scientific foundation has been created for the nation to begin to create a society in which young people arrive at adulthood with the skills, interests, assets, and health habits needed to live healthy, happy, and productive lives in caring relationships with others.”



The Nurture Consilience

- Diverse disciplines including behavior analysis, biology, medicine, public health, social work, and social, clinical, and developmental psychology converge in identifying the environmental conditions that promote vs. undermine wellbeing.
- I have found it useful to organize the evidence around the concept of nurturance.



Nurturing Environments

- Minimize toxic biological and social conditions
 - Limit opportunities and influences for problem behavior
 - Richly reinforce diverse forms of prosocial behavior*
 - Promote psychological flexibility: the mindful and pragmatic pursuit of one's values, even in the context of troubling thoughts and feelings.
-
- *The secret of behavior change is reinforcing alternative behavior, not trying to damp down or punish behavior we don't want.



Toxic Social Conditions



Adverse Childhood Experiences--ACES

- Physical abuse,
- Verbal abuse,
- Sexual abuse,
- Physical neglect,
- Emotional neglect.
- An alcoholic parent
- Abuse of one's mother
- Family member in jail,
- Mentally ill family member
- Loss of a parent through divorce, death or abandonment



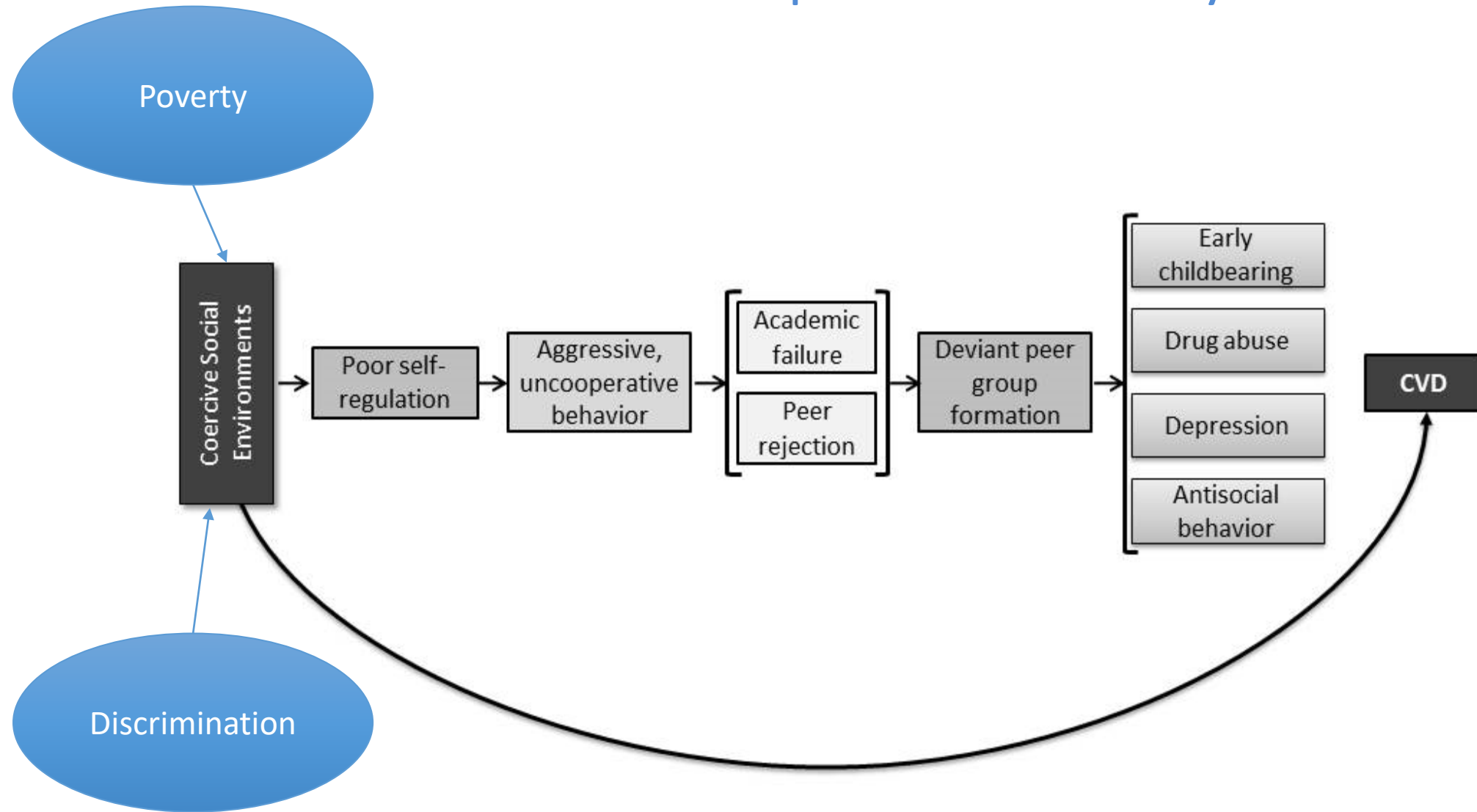
As the number of ACEs increases so does the risk for the following:

- Alcoholism
- Chronic obstructive pulmonary disease
- Depression
- Fetal death
- Health-related quality of life
- Illicit drug use
- Ischemic heart disease
- Liver disease
- Poor work performance
- Intimate partner violence
- Multiple sexual partners
- Sexually transmitted disease
- Smoking
- Suicide attempts
- Unintended pregnancies
- Early initiation of smoking
- Early initiation of sexual activity
- Adolescent pregnancy
- Risk for sexual violence
- Poor academic achievement

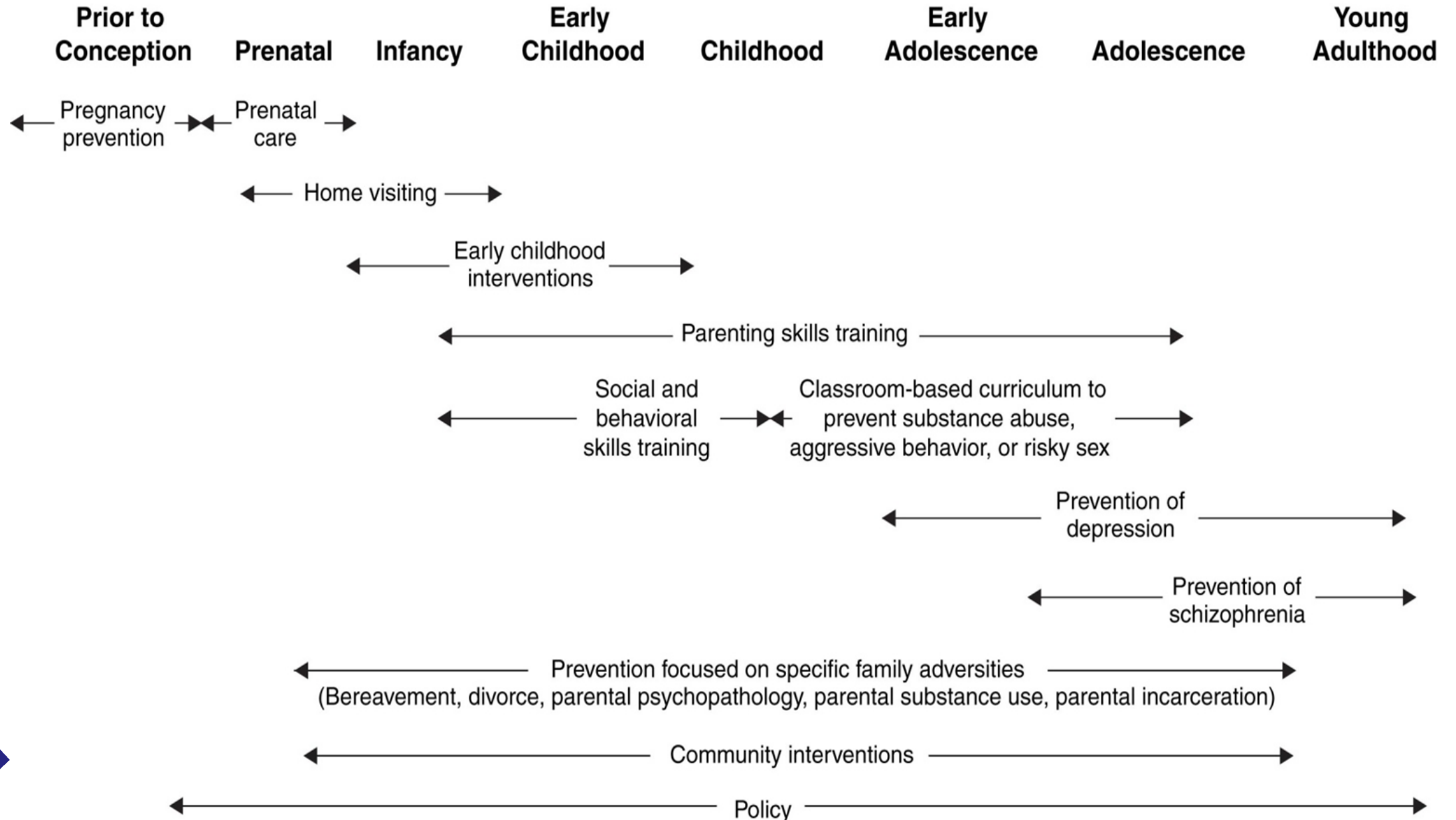
Source: [CDC](#)



“Fast” Developmental Pathway



Interventions by Developmental Phase



Evidence-Based Family Interventions through the Lifespan

Leslie et al., 2016

Program (Target age)	Impact
Family Foundations (0-2)	Antisocial-aggressive Behavior, Anxiety, Conduct Problems, Depression, Externalizing, Internalizing, Prosocial with Peers
Nurse-Family Partnership (0-2)	Child Maltreatment, Delinquency and Criminal Behavior, Early Cognitive Development, Internalizing, Mental Health - Other, Physical Health and Well-Being, Preschool Communication/Language Development, Reciprocal Parent-Child Warmth
Family Check-up (Toddler Version; 0-2)	Conduct Problems, Externalizing, Internalizing, Reciprocal Parent-Child Warmth
Triple P System (0-11)	Child Maltreatment, Mental Health – Other
Incredible Years – Parent (3-11)	Antisocial-aggressive Behavior, Close Relationships with Parents, Conduct Problems, Depression, Externalizing, Internalizing, Positive Social/Prosocial Behavior
Parent Management Training – Oregon Model (3-18)	Antisocial-aggressive Behavior, Conduct Problems, Delinquency and Criminal Behavior, Externalizing, Internalizing
Parent-Child Interaction Therapy (PCIT; 3-11)	Antisocial-aggressive Behavior, Child Maltreatment, Conduct Problems
New Beginnings (For children of divorce; 5-18)	Antisocial-aggressive Behavior, Close Relationships with Parents, Externalizing, Internalizing, Mental Health - Other, Reciprocal Parent-Child Warmth, Sexual Risk Behaviors



Evidence-Based Family Interventions through the Lifespan

Program (Target age)	Impact
Strong African American Families Program (5-11)	Alcohol, Close Relationships with Parents, Delinquency and Criminal Behavior, Truancy - School Attendance, Prevention of CVD Risk
Strengthening Families (10-14)	Alcohol, Antisocial-aggressive Behavior, Close Relationships with Parents, Illicit Drug Use, Internalizing, Tobacco
EFFEKT (12-14)	Alcohol, Delinquency and Criminal Behavior
Familias Unidas Preventive Intervention (12-18)	Externalizing, Illicit Drug Use, Sexual Risk Behaviors
Guiding Good Choices (12-14)	Alcohol, Delinquency and Criminal Behavior, Depression, Illicit Drug Use
Positive Family Support – Family Check-up (12-14)	Alcohol, Depression, Sexual Risk Behaviors, Tobacco, Delinquency
Functional Family Therapy (FFT; 12-18)	Delinquency and Criminal Behavior, Illicit Drug Use
Multisystemic Therapy – Problem Sexual Behavior (MST-PSB; 12-18)	Academic Performance, Adult Crime, Delinquency and Criminal Behavior, Illicit Drug Use, Mental Health - Other, Prosocial with Peers, Sexual Risk Behaviors, Sexual Violence



Schools

- E-Circle Professional Development for Preschool Providers
- Positive Behavioral Intervention and Support
- Promoting Alternative Thinking Strategies—PATHS
- Positive Action
- The Good Behavior Game
- Cooperative Learning
- Meaningful Roles



Kernels: Going Beyond Programs

- If you look inside programs, you will find that they contain a set of simple behavior-influence techniques.
- Family programs are expensive and often more than a family needs.
- School curricula on substance use are often resisted by schools because they take time away from academic subjects.
- Kernels are simple, proven behavior influences techniques.
- They are key ingredients in PAX GBG and Pax Tools
- As people become skilled at using them, you have a way to spread nurturance throughout a community.



Paper on Kernels by Embry and Biglan



Full Disclosure

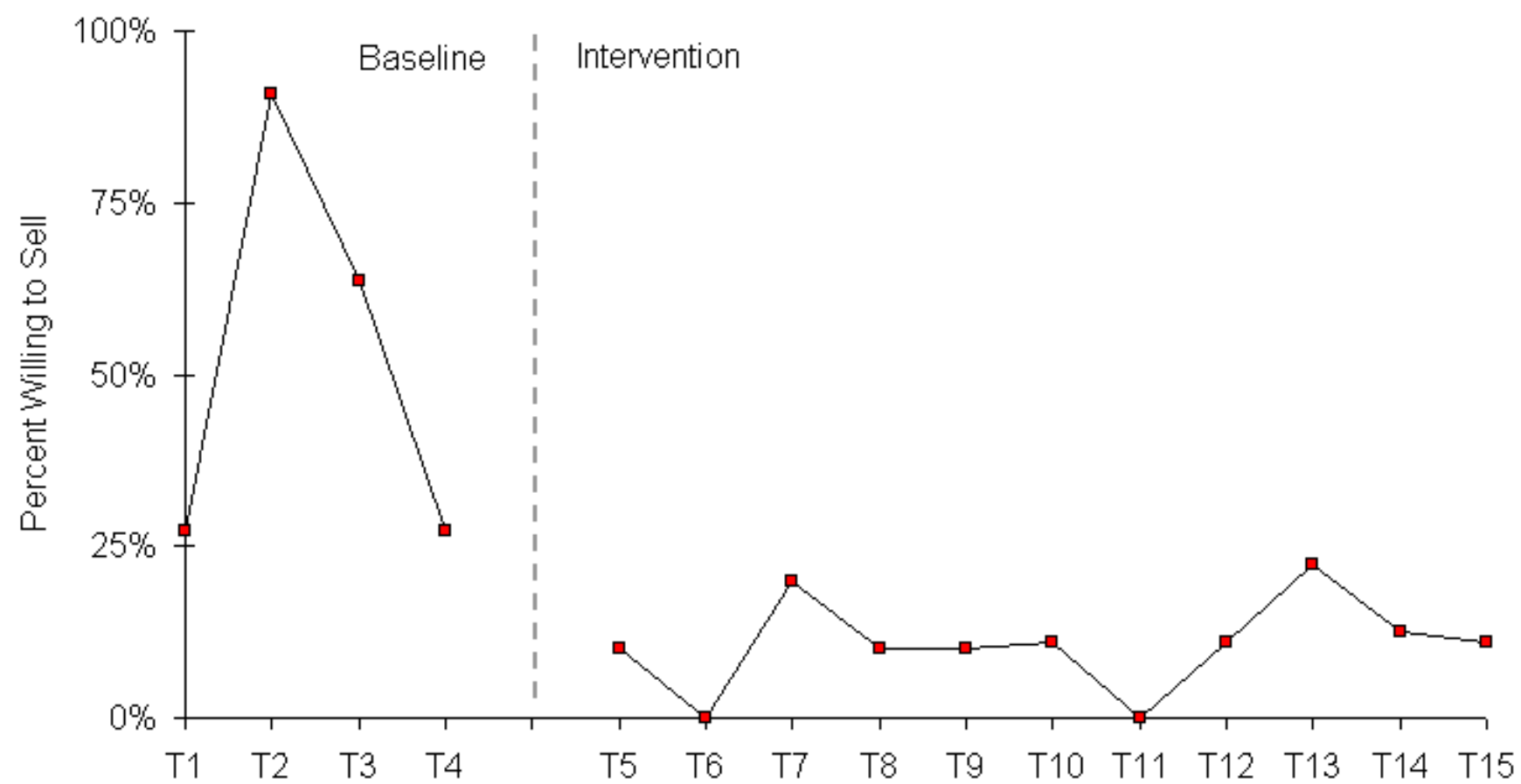
- Although kernels have been well tested in school settings—as key components of the PAX Good Behavior Game--PAX Tools have not been fully evaluated.
- My nonprofit, Values to Action has a contract with the PAXIS Institute to evaluate their impact, when delivered to parents.



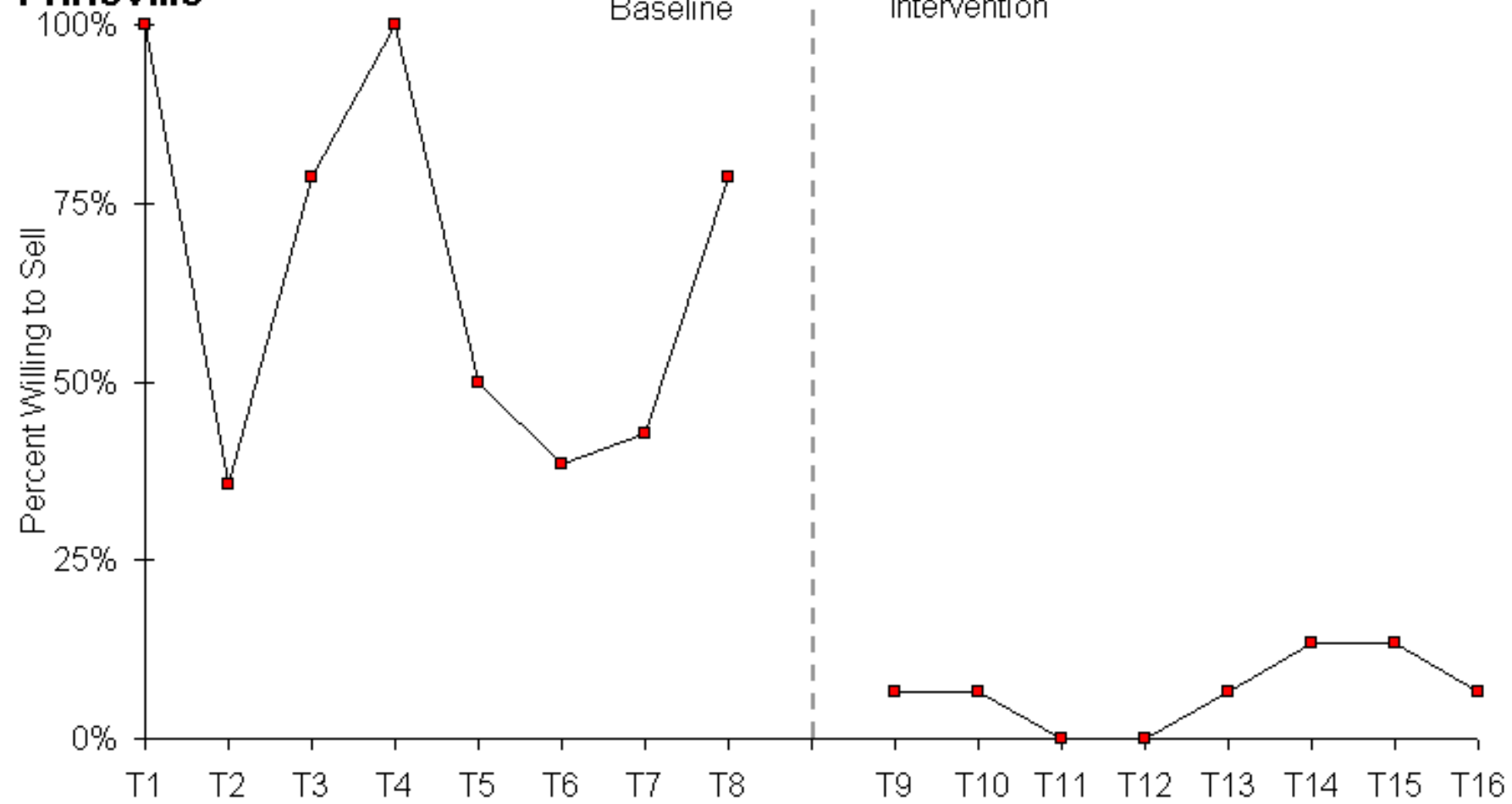
A kernel for Reducing Youth Access To Substances

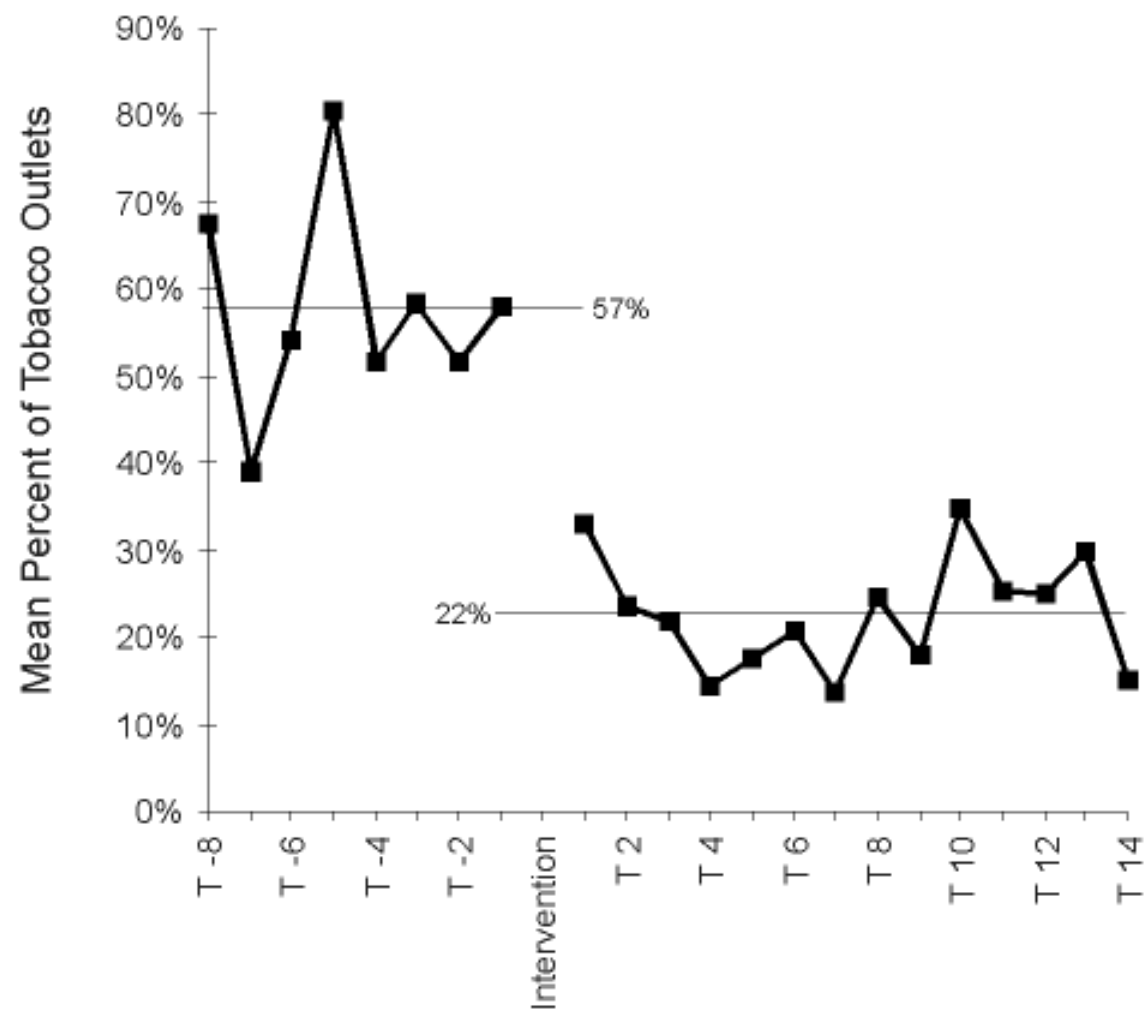


Willamina



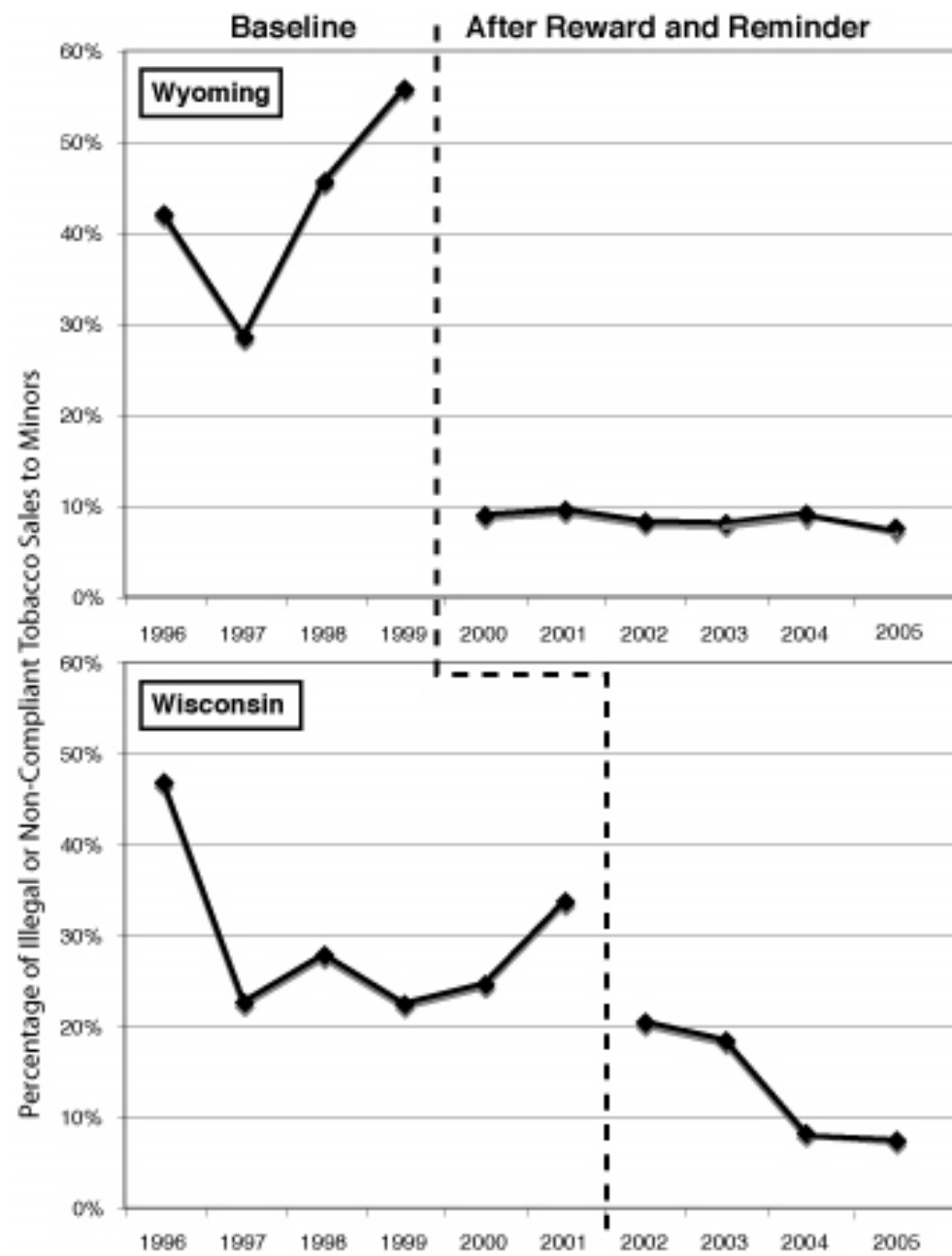
Prineville



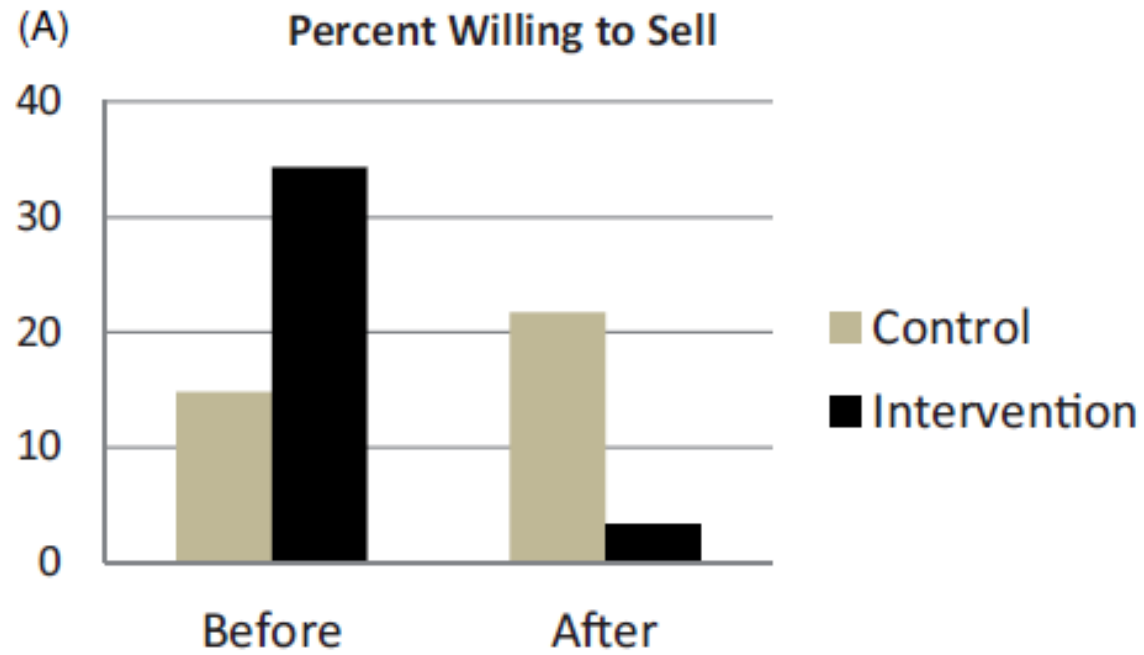


Mean percent of tobacco outlets in eight communities willing to sell tobacco to minors.





Reward and Reminder for Alcohol Sales



Action Circles

- Small groups of people who come together to work on one well-defined slice of a bigger problem.
 - Reading proficiency
 - Juvenile Justice Reform
 - Getting behaviorally skilled personnel in health care settings
 - Reducing Greenhouse Gas emissions.
- Values to Action can help your community address any of these problems.
- An action circle can help your community spread kernels.
- Go to <https://www.valuestoaction.org/> to learn more



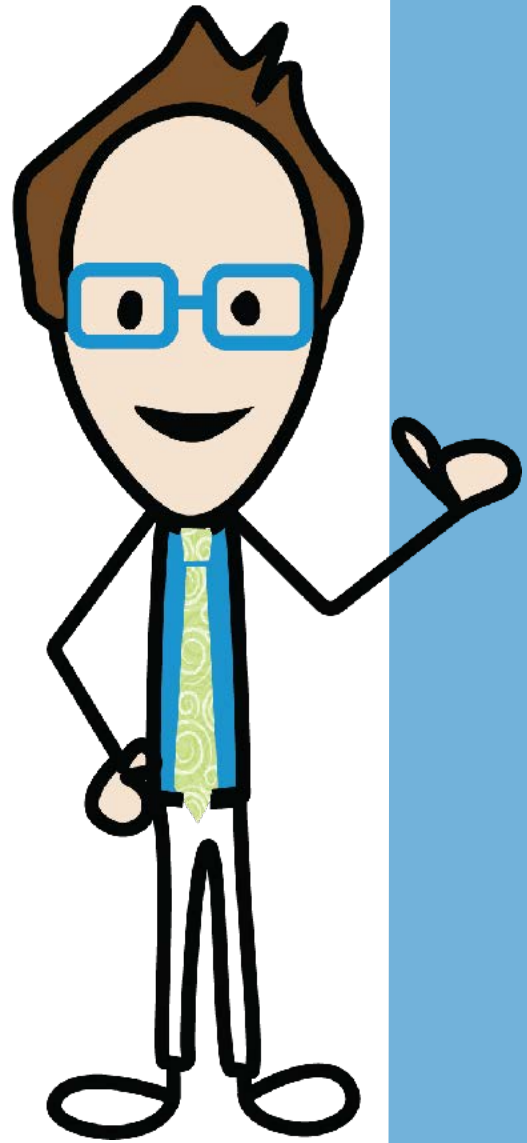
Summary

- You may have been told that your job is just to prevent substance use.
- But whether your funders know it or not, they will not get what they want, unless you help your communities come together around a clear goal of preventing the entire range of psychological and behavioral problems of young people.
- Focus on creating social environments in families, schools, and communities in which each person feels accepted and cared for.
- A community whose members become adept at using kernels can help to nurture the wellbeing of everyone.
- And hey, in the process, care for yourself!



You can Join Values to Action





Fundamental, practical units for behavior change: Using Evidence-Based Kernel to Better Our World

Dennis Embry, Ph.D., president & senior scientist • dde@paxis.org



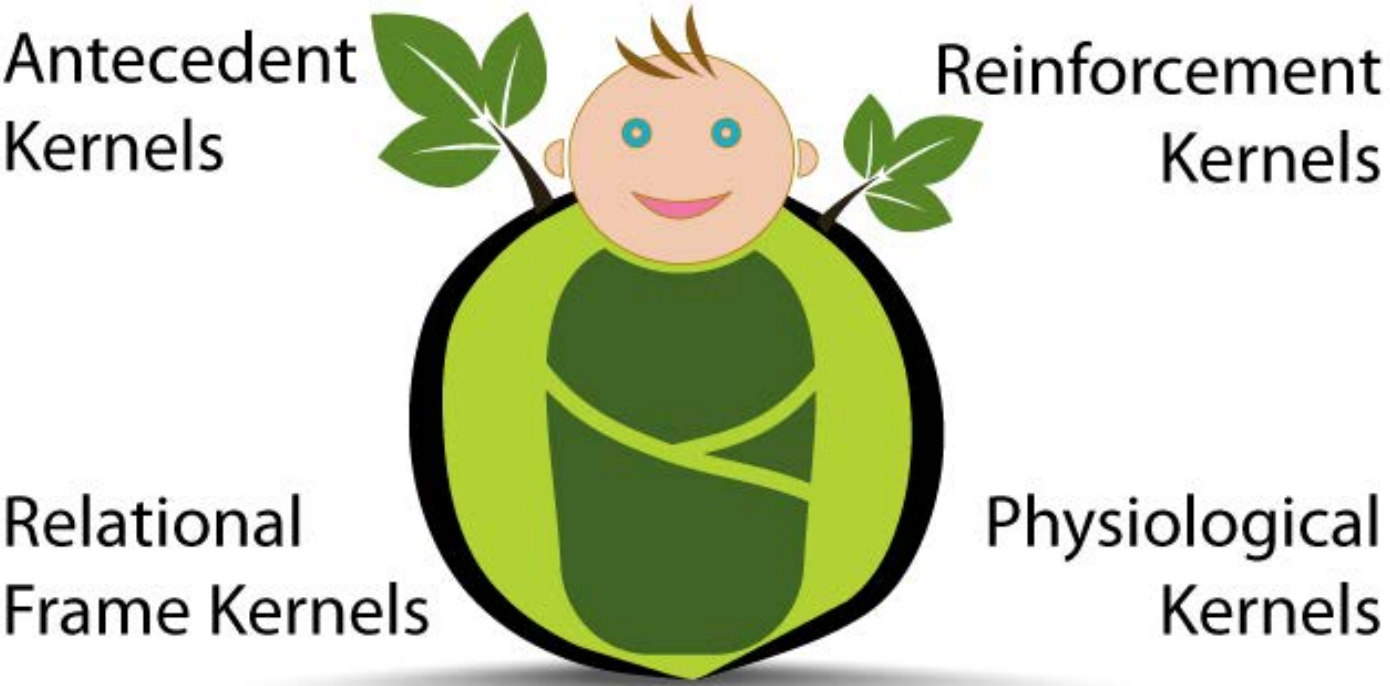
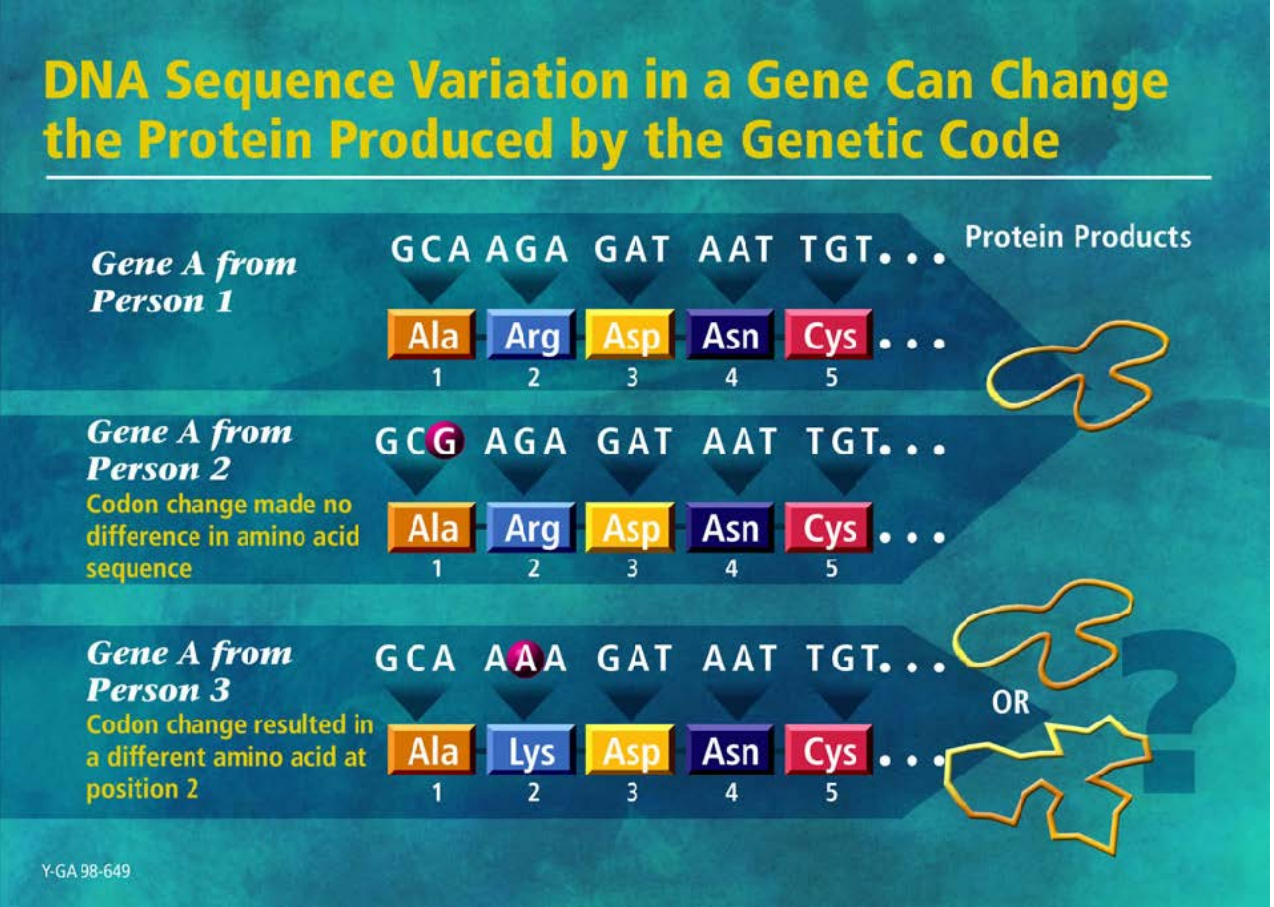
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May be shared in totality



This is the living building code for our biology – 4 amino acids: (A) adenine, (T) thymine, (G) guanine and (C) cytosine

What is the building code for human behavior? **Four** types of “kernels” of behavioral influence.



Embry & Biglan, Clinical Child & Family Psychology Review 11(3), 2008



Nature is always compact and consilient...

What makes an evidence-based kernel?



An evidence-base kernel must influence at least one of these outcomes...

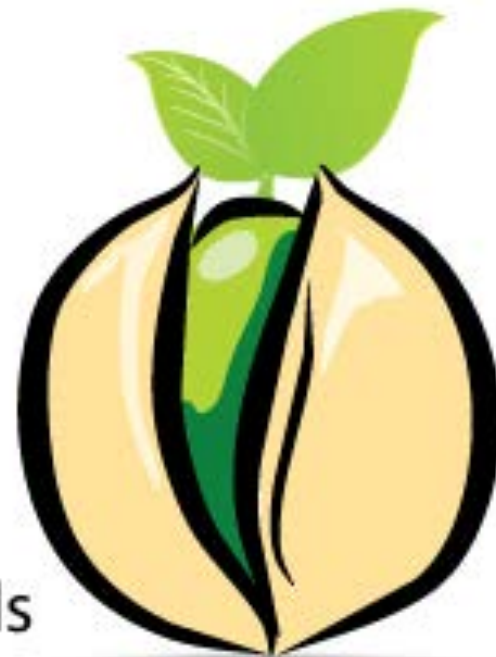
- The frequency of behavior,
- The intensity of behavior,
- The duration of behavior, and/or
- Biological brain functions including gene expression.

Antecedent
Kernels

Reinforcement
Kernels

Relational
Frame Kernels

Physiological
Kernels



A kernel is the smallest unit of proven behavioral *influence* procedure shown in experimental analysis to affect specific behaviors.

A kernel is indivisible in the sense that removing *any* of its components would render it inert or ineffective.



What is the science behind PAX Tools?

Evidence-based kernels.....

COMMUNITY-BASED PREVENTION USING SIMPLE, LOW-COST, EVIDENCE-BASED KERNELS AND BEHAVIOR VACCINES

Dennis D. Embry
PAXIS Institute

A paradox exists in community prevention of violence and drugs. Good research now exists on evidence-based programs, yet extensive expenditures on prevention have not produced community-level results. Various multiproblems are quite prevalent in the United States, such as violence, Attention Deficit Hyperactivity Disorder (ADHD), conduct problems, learning disabilities, depression, and other mood problems. Various studies have observed that intuitively appealing community-based coalitions and best practice requirements have not produced prevention gains as hoped for by many. Calls for more money, fidelity, or dose seem unlikely to succeed. Other alternatives may be possible. Most of the best practices aimed at preventing these community problems are composed of evidence-based kernels, which act on core principles of prevention (risk and protective factors). What is not widely known is that the evidence-based kernels are powerful in their own right. Evidence-based kernels are irreducible units of behavior-change technology, and they can be put together into behavioral vaccines (daily practices) with powerful longitudinal prevention results. Kernels and behavioral vaccines are simple, and they are not programs or curriculum in the conventional sense. This article presents examples of evidence-based kernels and behavioral vaccines that can be promoted easily across whole communities or states using social marketing principles. Widespread propagation of evidence-based kernels and behavioral vaccines could have a significant impact on communities and their prevention norms, providing low-cost alternatives and practical models for community psychology, public health, and policy makers. Behavioral kernels and vaccines can add needed precision to prevention science and community psychology. © 2004 Wiley Periodicals, Inc.

Correspondence to: Dennis D. Embry, Ph.D., PAXIS Institute, P.O. Box 68494, Tucson, AZ 85737. E-mail: dde@paxis.org

JOURNAL OF COMMUNITY PSYCHOLOGY, Vol. 32, No. 5, 575–591 (2004) © 2004 Wiley Periodicals, Inc.
Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/jcop.20020

Clin Child Fam Psychol Rev (2008) 11:75–113
DOI 10.1007/s10567-008-0036-x

Evidence-based Kernels: Fundamental Units of Behavioral Influence

Dennis D. Embry · Anthony Biglan

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© The Author(s) 2008. This article is published with open access at Springerlink.com

Abstract This paper describes evidence-based kernels, fundamental units of behavioral influence that appear to underlie effective prevention and treatment for children, adults, and families. A kernel is a behavior–influence procedure shown through experimental analysis to affect a specific behavior and that is indivisible in the sense that removing any of its components would render it inert. Existing evidence shows that a variety of kernels can influence behavior in context, and some evidence suggests that frequent use or sufficient use of some kernels may produce longer lasting behavioral shifts. The analysis of kernels could contribute to an empirically based theory of behavioral influence, augment existing prevention or treatment efforts, facilitate the dissemination of effective prevention and treatment practices, clarify the active ingredients in existing interventions, and contribute to efficiently developing interventions that are more effective. Kernels involve one or more of the following mechanisms of behavior influence: reinforcement, altering antecedents, changing verbal relational responding, or changing physiological states directly. The paper describes 52 of these kernels, and details practical, theoretical, and research implications, including calling for a national database of kernels that influence human behavior.

Keywords Evidence-based kernels · Public-health benefits · Prevention · Treatment

D. D. Embry (✉)
PAXIS Institute, P.O. 31205, Tucson, AZ 85751, USA
e-mail: dde@paxis.org

A. Biglan
Oregon Research Institute, Eugene, OR, USA
e-mail: tony@ori.org

This paper presents an analysis of fundamental units of behavioral influence that underlie effective prevention and treatment. We call these units *kernels*. They have two defining features. First, in experimental analysis, researchers have found them to have a reliable effect on one or more specific behaviors. Second, they are fundamental units of behavior influence in the sense that deleting any component of a kernel would render it inert. Understanding kernels could contribute to an empirically based theory of behavioral influence, facilitate dissemination of effective prevention and treatment practices, clarify the active ingredients in existing interventions, and contribute to developing interventions that are more efficient and effective. Subsequent sections of this paper expand on the two essential features of evidence-based kernels, as well as the origins of the idea and terminology.

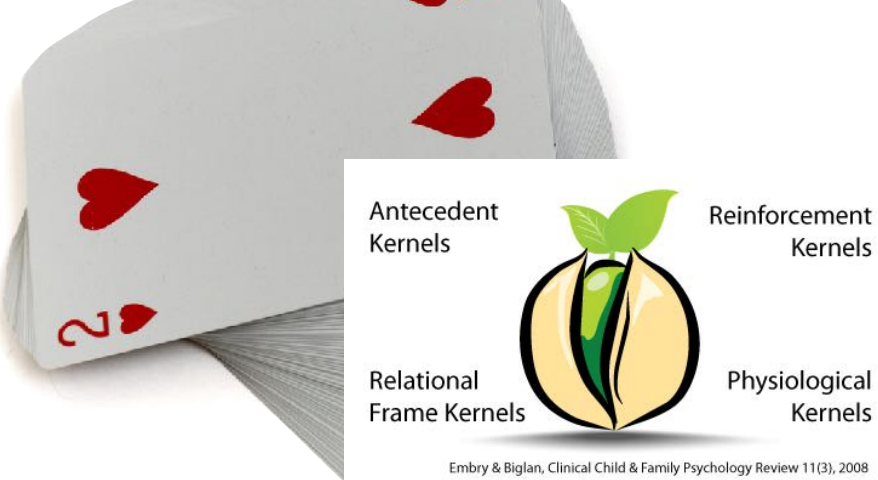
The ultimate goals of treatment and prevention research are a reduction of the prevalence of the most common and costly problems of behavior and an increase in the prevalence of wellbeing. Current thinking about how to accomplish this assumes that we will identify empirically supported programs and, to a lesser extent, policies, and will disseminate them widely and effectively. Although substantial progress is occurring through this strategy, there are at least four limitations to it that point to the value of kernels as a complementary strategy.

First, it is difficult to implement a program’s efficacy widely with fidelity or effectiveness. Ringwalt et al. (2003) surveyed a sample of 1,795 school staff members who were in charge of teaching substance-use prevention programs. Nearly two-thirds reported teaching content that meta-analyses showed was effective. However, only 17% used effective delivery and only 14% used both effective delivery and content. In a second study, Ringwalt et al. (2003) found that about one-fifth of teachers of substance-



Please read these articles, which have been included. And sign up for free webinars at www.paxis.org

Examples of some of the 52 evidence-based kernels in four “suites”

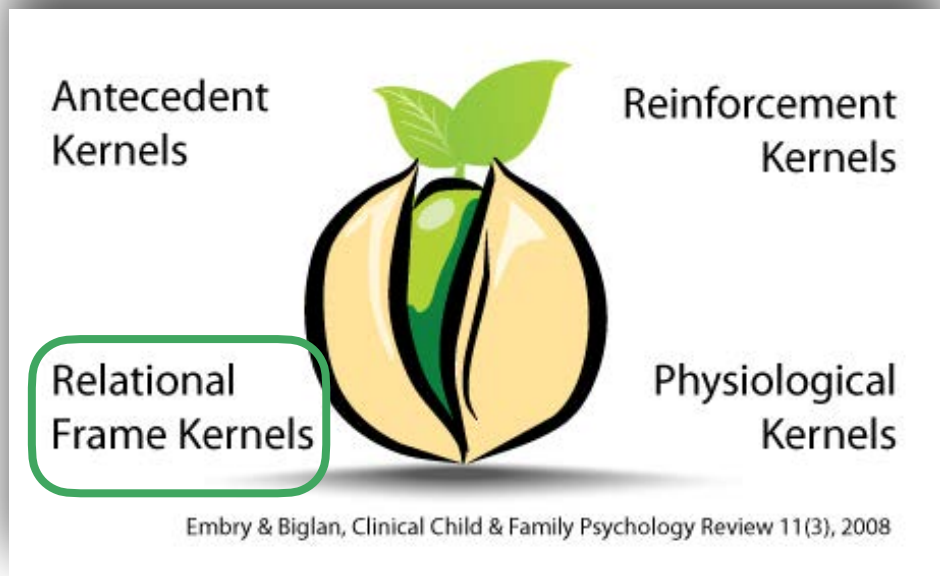


Note: We always cite the first clear cases of first published, experimental studies that are easily found and referenced online. We are aware these kernels are often found among indigenous cultures.



Kernel	Description	Citations
Beat the timer	Use small timers to reduce allocated time for task. Powerful effects for reducing negative behaviors. Available at most discount stores.	Adams & Drabman, 1995 Drabman & Creedon, 1979 Wolfe, Kelly, & Drabman, 1981
Response cost	<u>Removal</u> of token, money, or privilege for misbehavior and emotional displays. Works as well as stimulant medication for children with Attention Deficit Hyperactivity Disorder. Easily adapted at home.	Forman, 1980 Kendall & Finch, 1976 Little & Kelley, 1989 Reynolds & Kelley, 1997
Mystery motivators	Random rewards using a simple, lottery-like system for behaviors. Very powerful in changing child behaviors at home & school, parent behavior, and work-related behaviors.	Brown & Redmon, 1989 Foxy & Schaeffer, 1981 Moore et al., 1994
Nonverbal (relational) transition cues	Nonverbal visual, kinesthetic, and auditory! cues for transitions stopping one task & starting another! (STOP & GO), changing voice registers, getting quiet to hear instruction that are used school wide.	Abbott et al., 1998 Embry et al., 1996 Krantz & Risley, 1977 Rosenkoetter & Fowler, 1986
Meaningful roles (jobs)	Providing responsible roles to all children in the classroom, school, or home increases prosocial behaviors, instructional time, and achievement, and provides positive adult and peer reinforcement & recognition.	Kahne & Bailey, 1999 Rutter, 1983

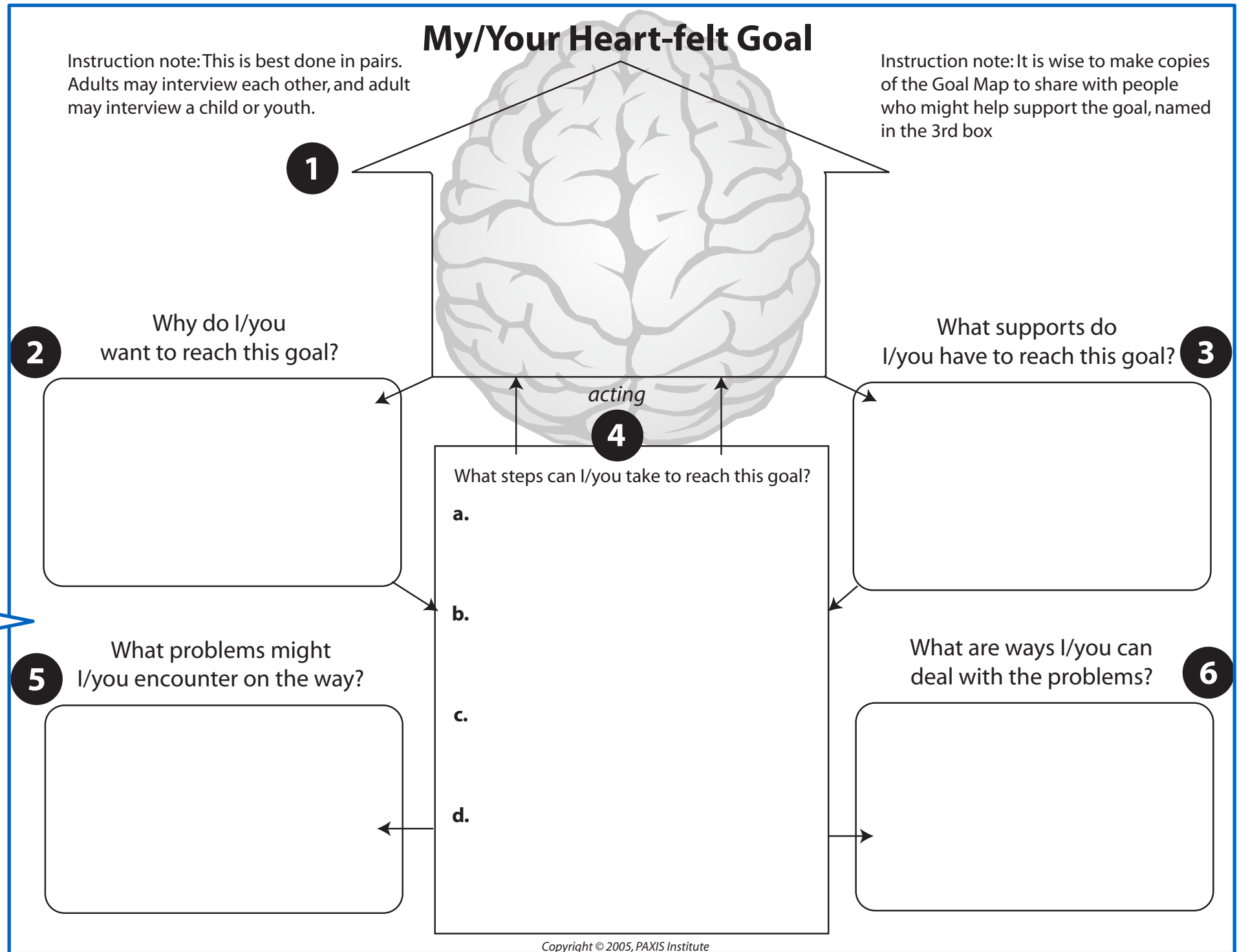
Example Relational Frame, a Proven Evidence-based Kernel



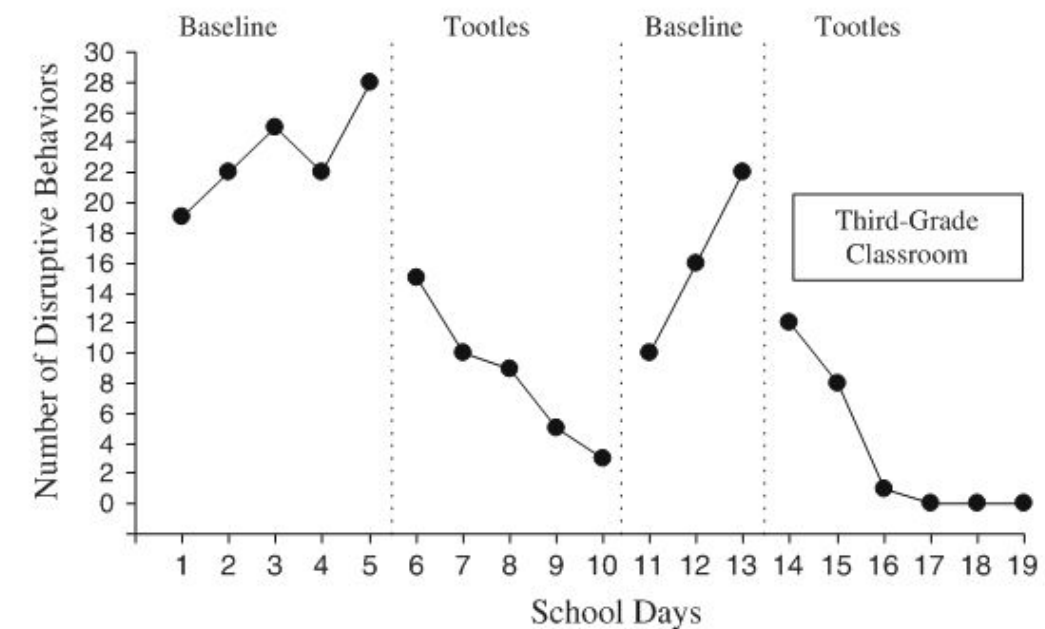
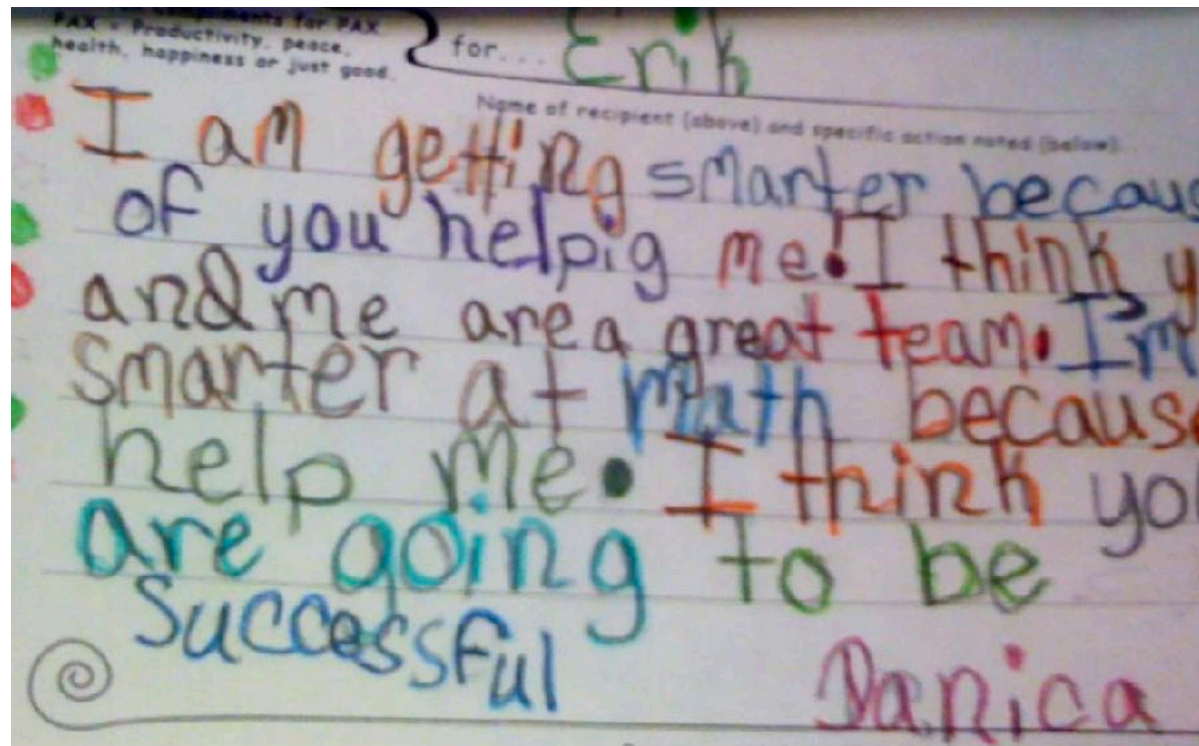
NOTE: This process is embedded in the PAX Good Behavior Game and drug treatment.



This works for prevention, intervention, and treatment.



Positive Reinforcement Peer-to-Peer Notes (aka "Tootles")



Number of disruptive behaviors in a third-grade classroom with and without the use of tootling



Such positive peer-to-peer notes also work for prevention, intervention, and treatment.

Did You Know

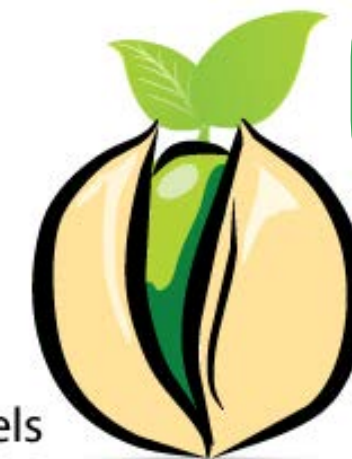
Peer-to-peer reinforcement is the active ingredient in reducing the risk of teen & early adult suicide. Necomer et al, 2015

Antecedent
Kernels

Reinforcement
Kernels

Relational
Frame Kernels

Physiological
Kernels



Embry & Biglan, Clinical Child & Family Psychology Review 11(3), 2008



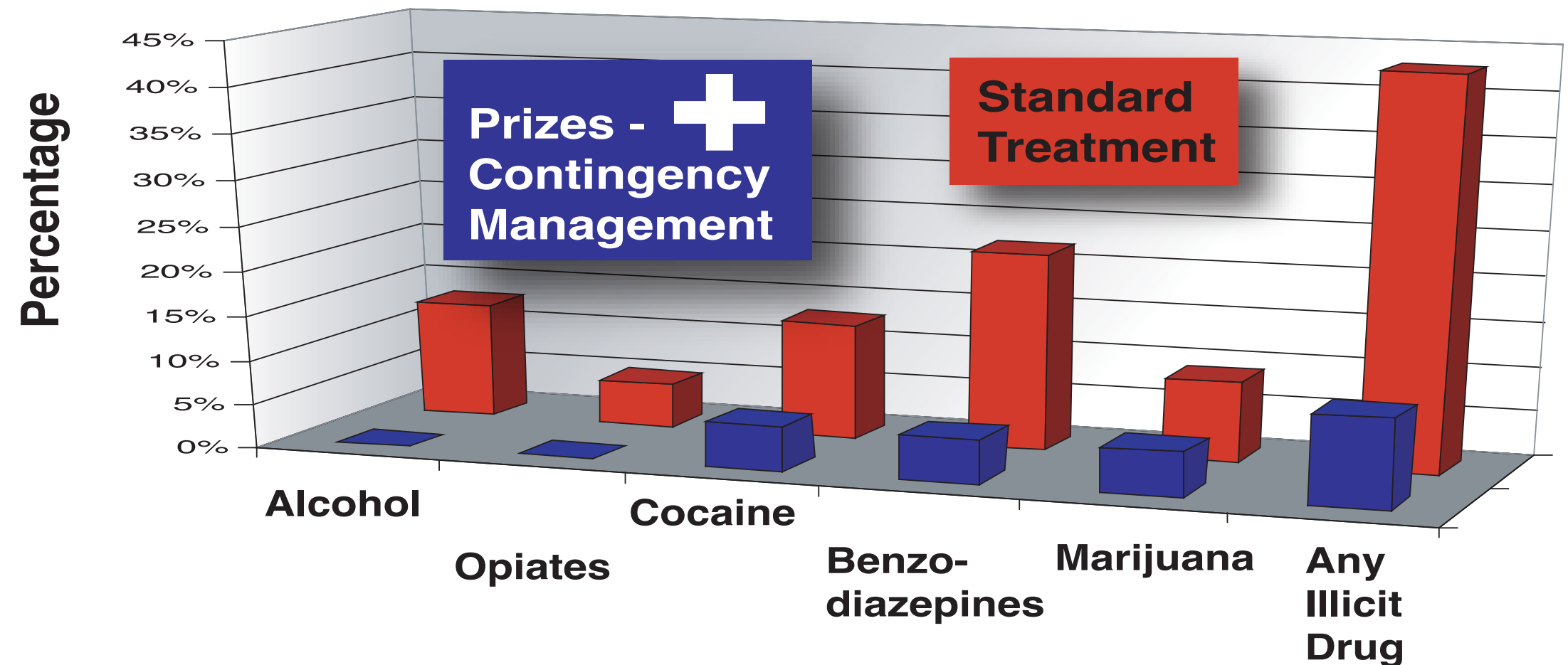
Available at
[amazon.com](https://www.amazon.com)



The Prize Bowl is a
 reinforcement kernel.



Positive Drug Tests a Week 8



Source: Petry et al., Journal of Consulting and Clinical Psychology, 2000, 68, 250-257

+ = A proven tool for addiction treatment

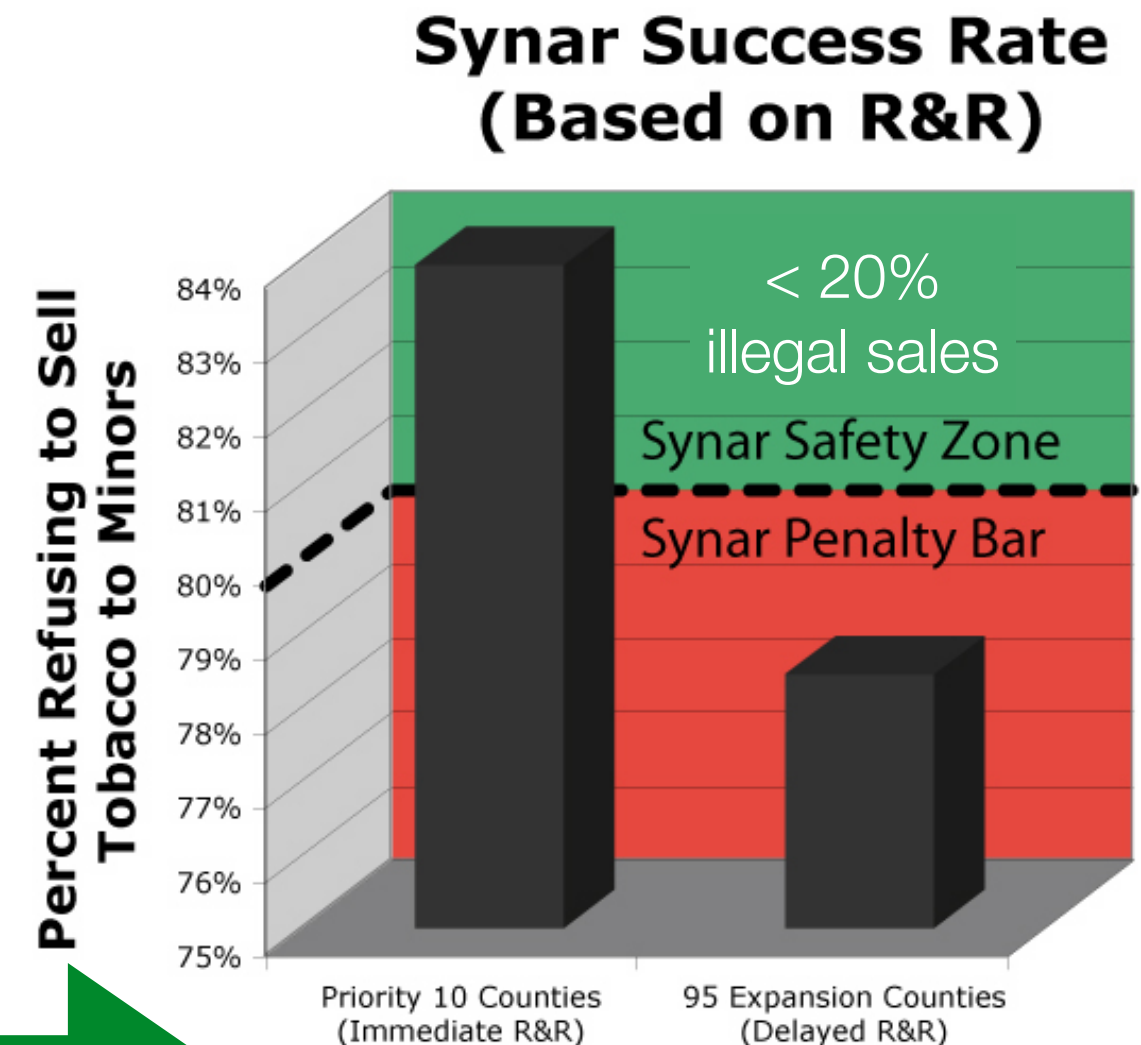
And the single most proven, and cost effective strategy
 NIDA has ever funded for early intervention and
 treatment of series addictions.



Don't bank on punishment to get to the promised land...
A state did that and lost \$\$ from the Title 4 Block Grant



Reward & Reminder Visits for Tobacco Control work.



If the state had used R&R for the whole state they would not have had a \$\$ penalty

Evidence-Based Kernels Can Be Delivered in the Context of Public Health and Wellbeing

State Medicaid, state block grants, county agencies, private care, and care systems are using kernels.



Find A Doctor Conditions We Treat Specialties Locations Your Visit Family Resources & Support

700 Children's® – A Blog by Pediatric Experts

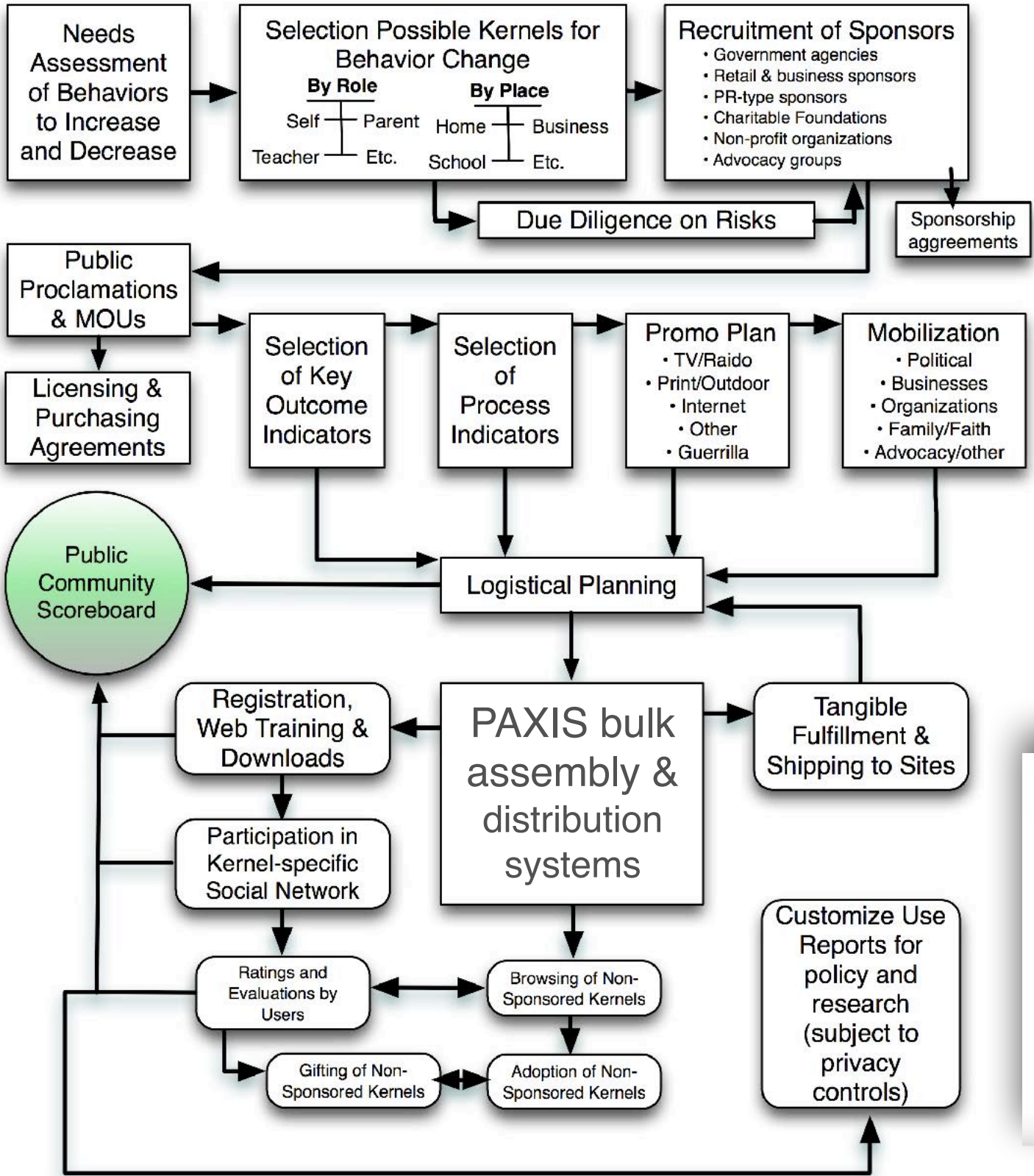
PAX Tools® for Families and Caregivers

Oct 26, 2020

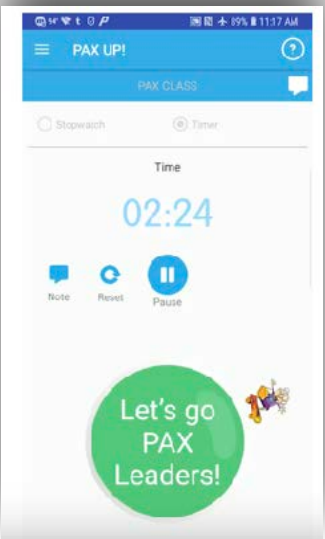
With the uncertainty surrounding the school year and pandemic, many families are left wondering how to best structure and balance schoolwork, avoid conflicts about new routines, or may be looking to improve efficiency of routines within the home. One resource that offers concrete suggestions for families are PAX Tools workshops.

PAX Tools rests on decades of behavioral research, such as:

Flow Chart for State/Community Level Promotion of Specific Kernels

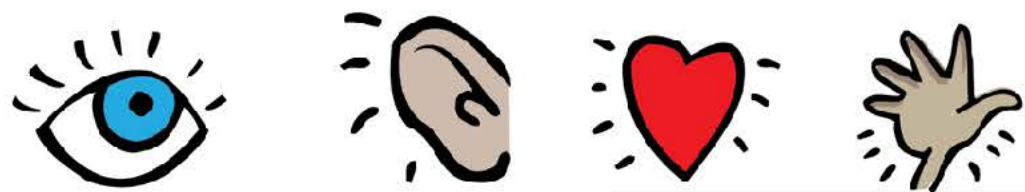


Free PAX App



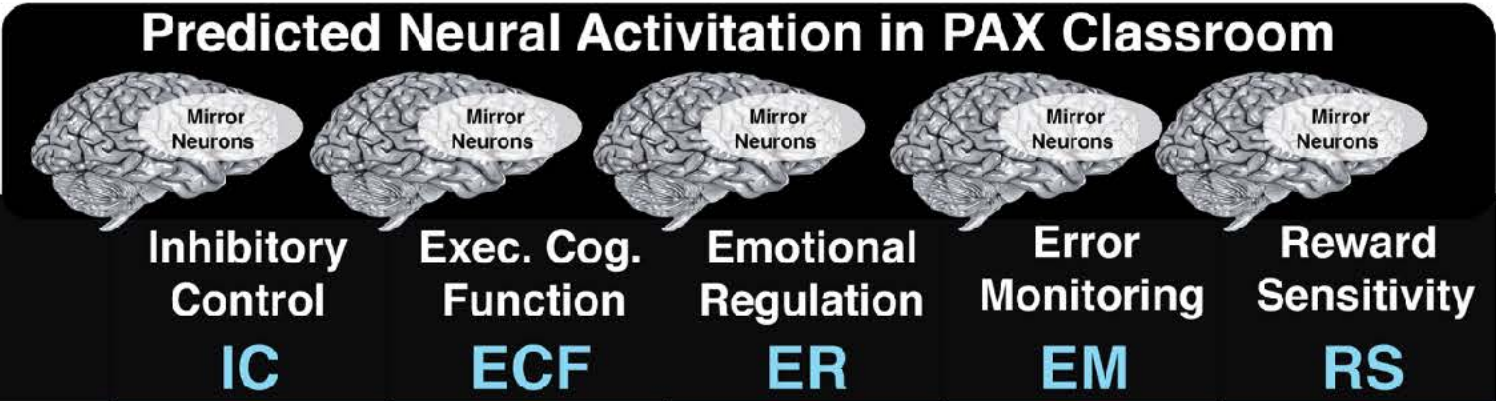
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Evidence-based kernels are the active ingredients of gold-standard prevention SEL or prevention strategies like the PAX Good Behavior Game...even brain functions and even brain gene expression (i.e., BDNF)*



PAX Kernels

1. PAX Vision	Relational Frame
2. PAX Leader	Relational Frame
3. PAX Quiet	Antecedent / Physiological
4. Granny's Wacky Prizes	Group Social Reinforcement
5. Beat the Timer	Antecedent
6. PAX Sticks	Antecedent
7. Tootle Notes	Peer Social Reinforcement
8. PAX Voices	Antecedent
9. PAX Hands & Feet	Antecedent
10. OK/NOT OK	Relational Frame
PAX Game Recipe	Played 3-5 Times daily



Each of these and *other* evidence-based kernels for behavioral influence can be used at home, in the community or school with similar and addition benefits on behavior, emotional regulation, academics and the brain health.



*Musci RJ, Bradshaw CP, Maher B, Uhl GR, Kellam SG, Ialongo NS: Reducing aggression and impulsivity through school-based prevention programs: a gene by intervention interaction. Prev Sci 2014, 15(6):831-840.

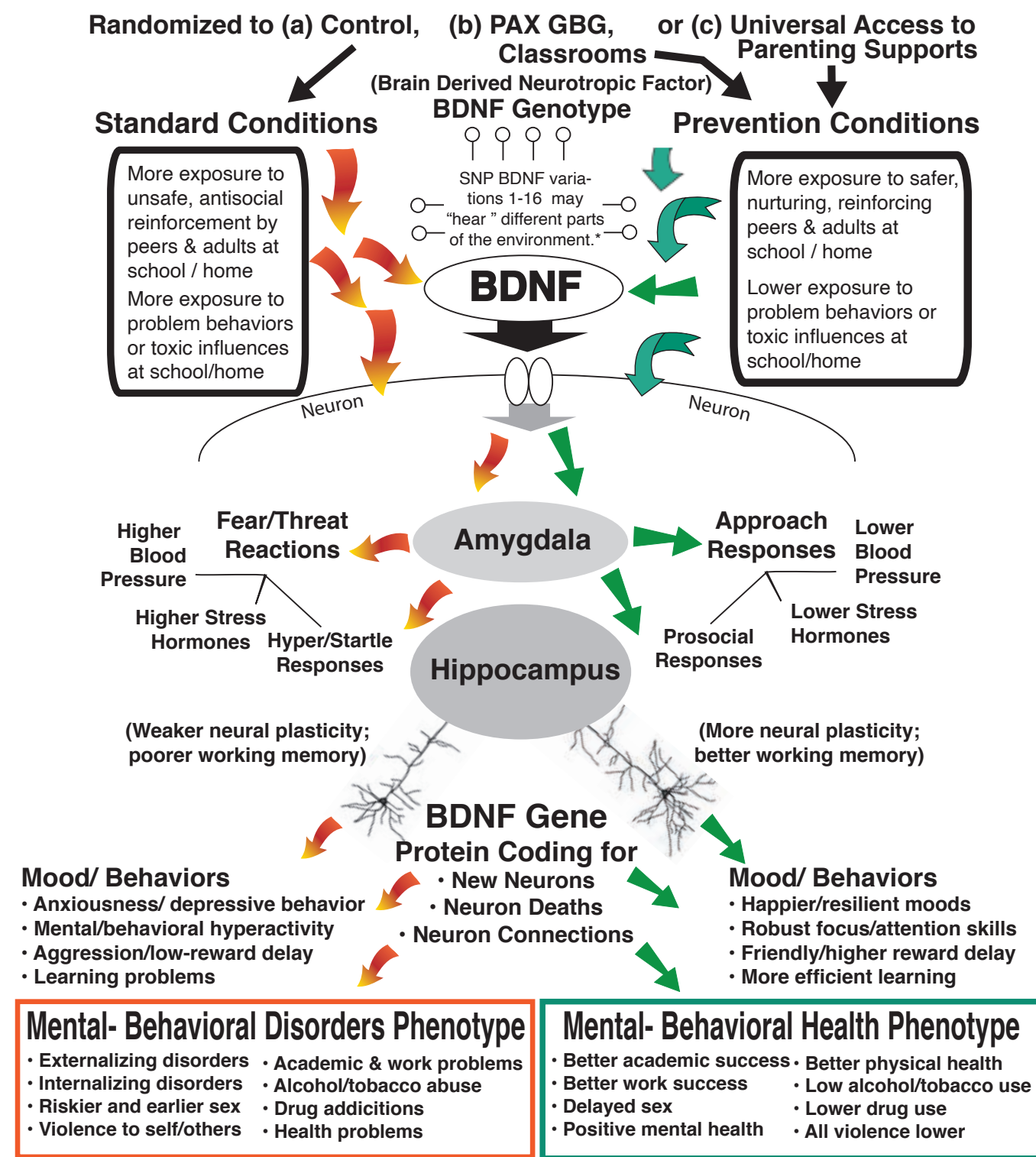
Hold on to your hats!

The use of ALL ten kernels in elementary school actually causes positive, protective brain gene expression well into adulthood (age 35)—based on our studies at Hopkins.



This is not good news for folks making PSYCH meds—but good news for USA’s future health & wealth.

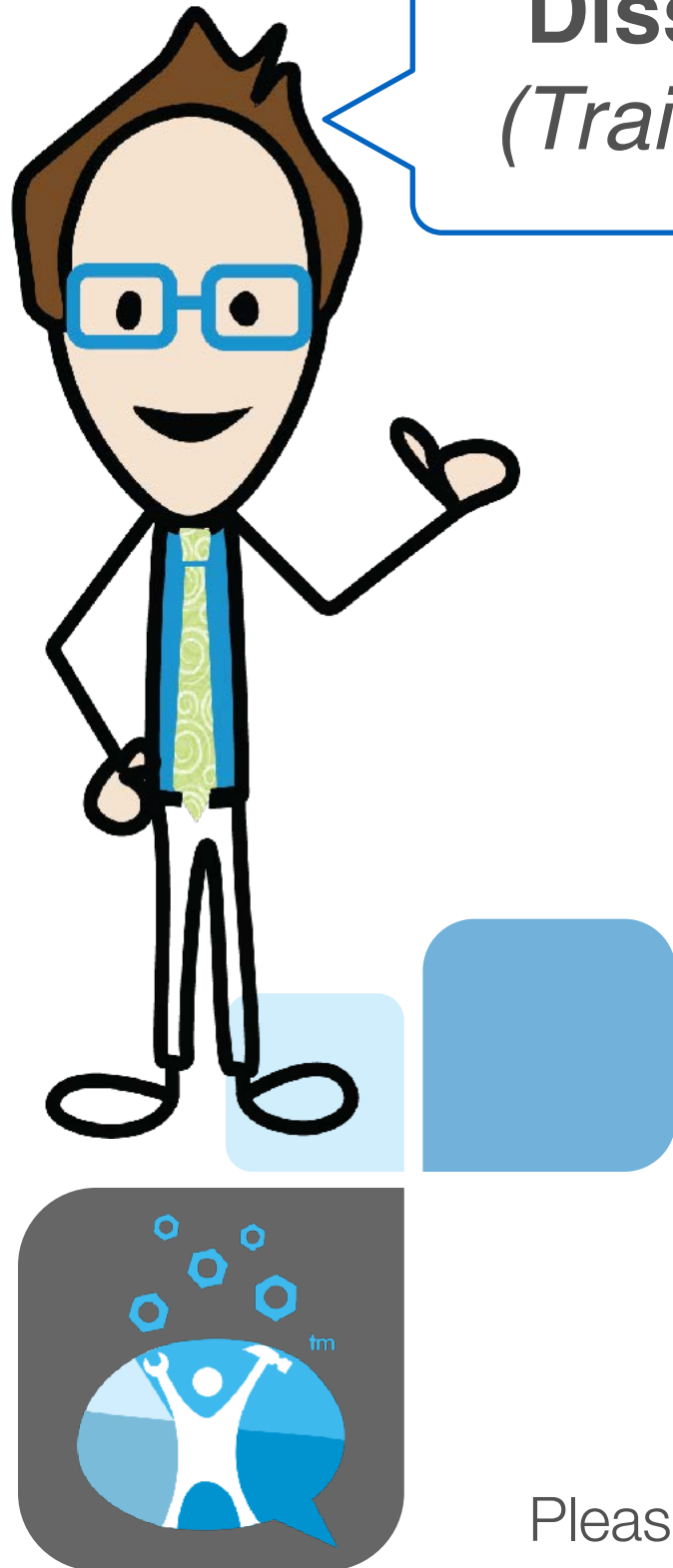
Visualizing Nurturing Environment Impact on Expression of Some Genes Associated with Mental and Behavioral Disorders from Experimental Results, Following Children for Two Decades*



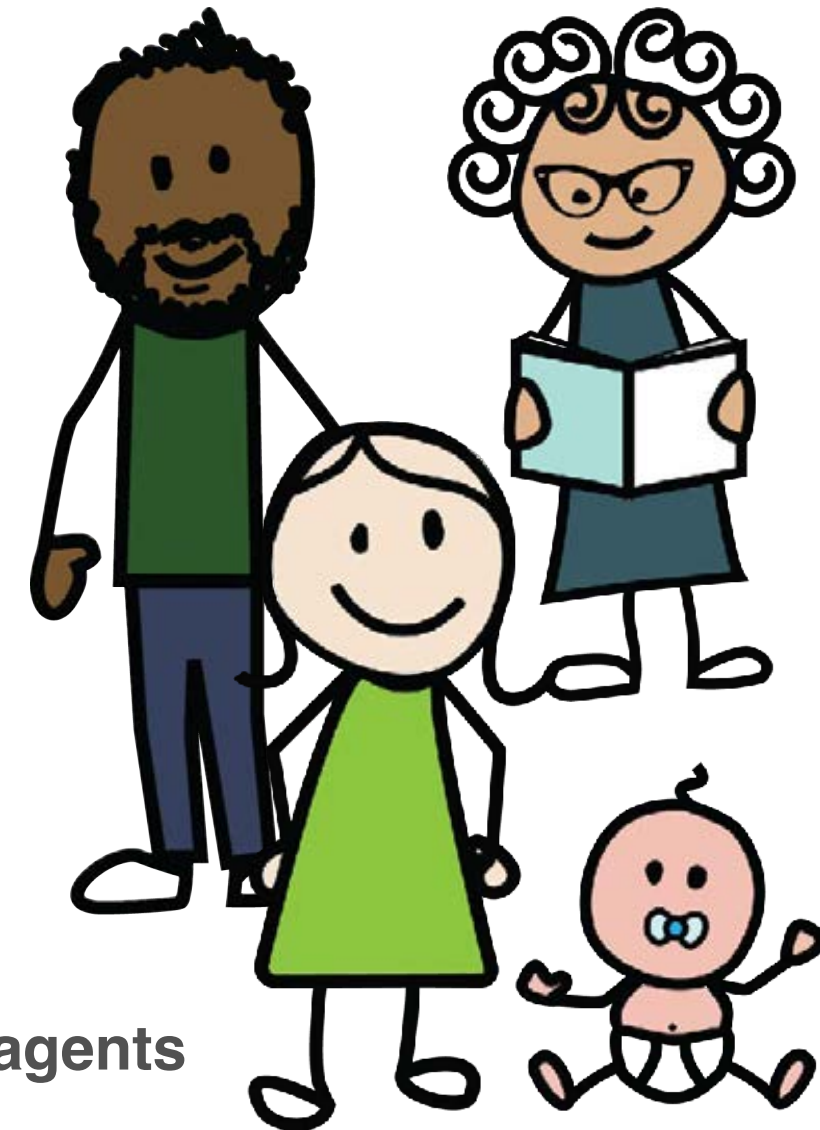
*Graphic visualization by Dennis D. Embry of the findings from: Musci, R. J., Bradshaw, C. P., Maher, B., Uhl, G. R., Kellam, S. G., & Ialongo, N. S. (2013). Reducing aggression and impulsivity through school-based prevention programs: A gene by intervention interaction. Prevention Science, No Pagination Specified. doi: 10.1007/s11121-013-0441-3. File:BDNF Brain and PAX GBGv5-2021.ai

Evidence-Based Kernels Can Be Widely Disseminated and Used in the Real World.

(Training & materials are needed for efficiency)



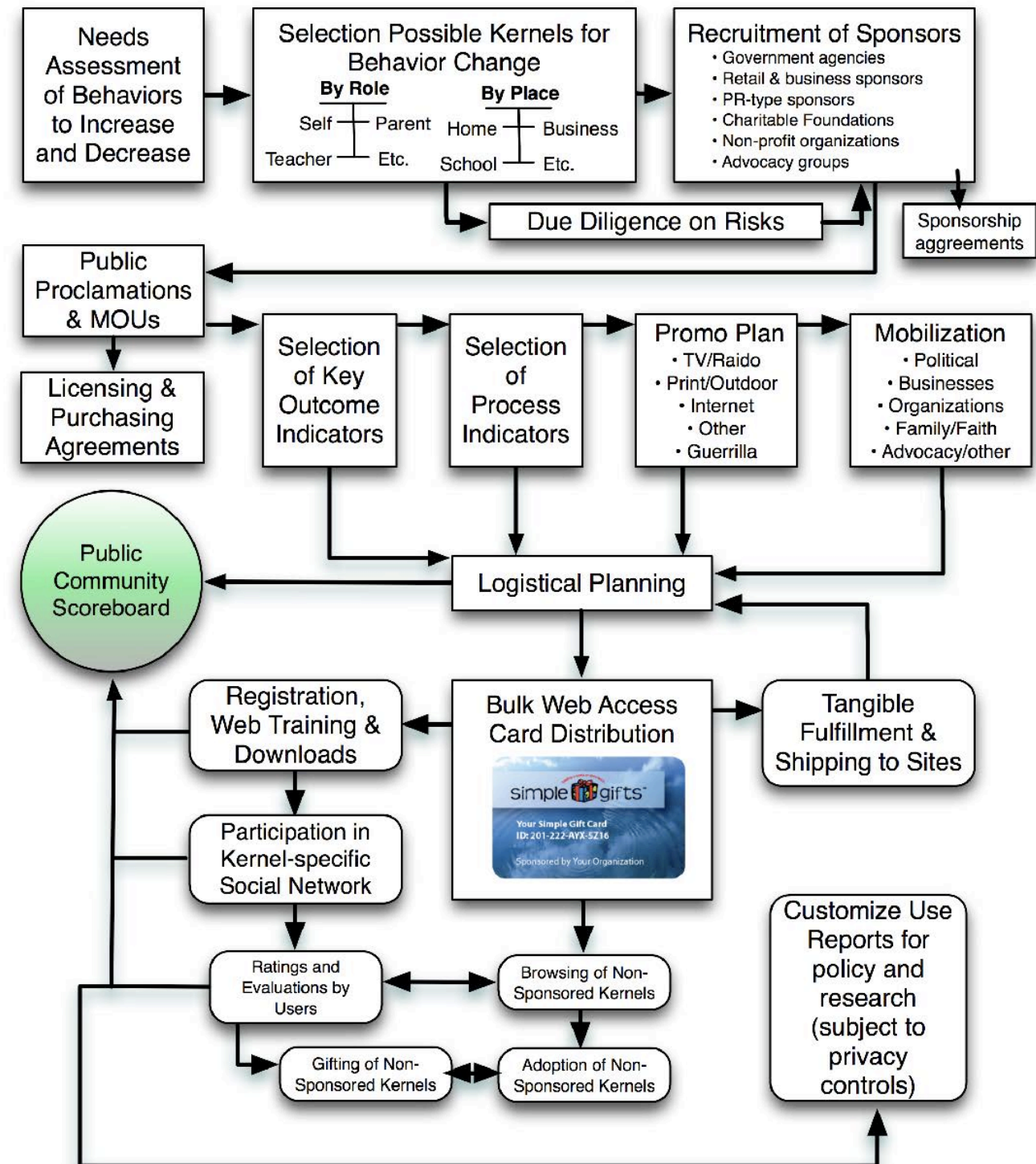
- Parents / Grandparents / Caregivers / Foster Parents
- Childcare Providers
- Preschool Staff
- After-School Staff
- Coaches
- Faith Based Staff / Volunteers
- Prevention Professionals
- Mental Health Professionals
- Addictions and Recovery staff & volunteers
- Juvenile and Adult Court Personnel
- **And young people as active prevention agents**



Please Check with www.paxis.org for training events.



Yes, and is happening
across multiple states...





Do you have to read every book and journal article to learn about each kernel to make use of evidence-based kernels?

NO!

Thanks for extensive federal and other funding, states and communities can learn HOW TO USE evidence-based kernels quickly and efficiently.



Training & Dissemination Model for PAX GBG and PAX Tools (kernels) can work for Whole Communities...



Teaches



Who Collaborate with



Who Implement & benefit



PAXIS
Trainer

Who teach
community
members to
mentor others

Many Caring
Adults in
Communities

Many Children,
Teens, and adults in
Communities





Yes, we can!



Multiple states and countries have shown it is possible to reduce mental, emotional & behavior disorders with GBG and/or kernel “recipes”



Why does every community need simple, practical tools (kernels) to help children, youth, families, schools, businesses, & health services?

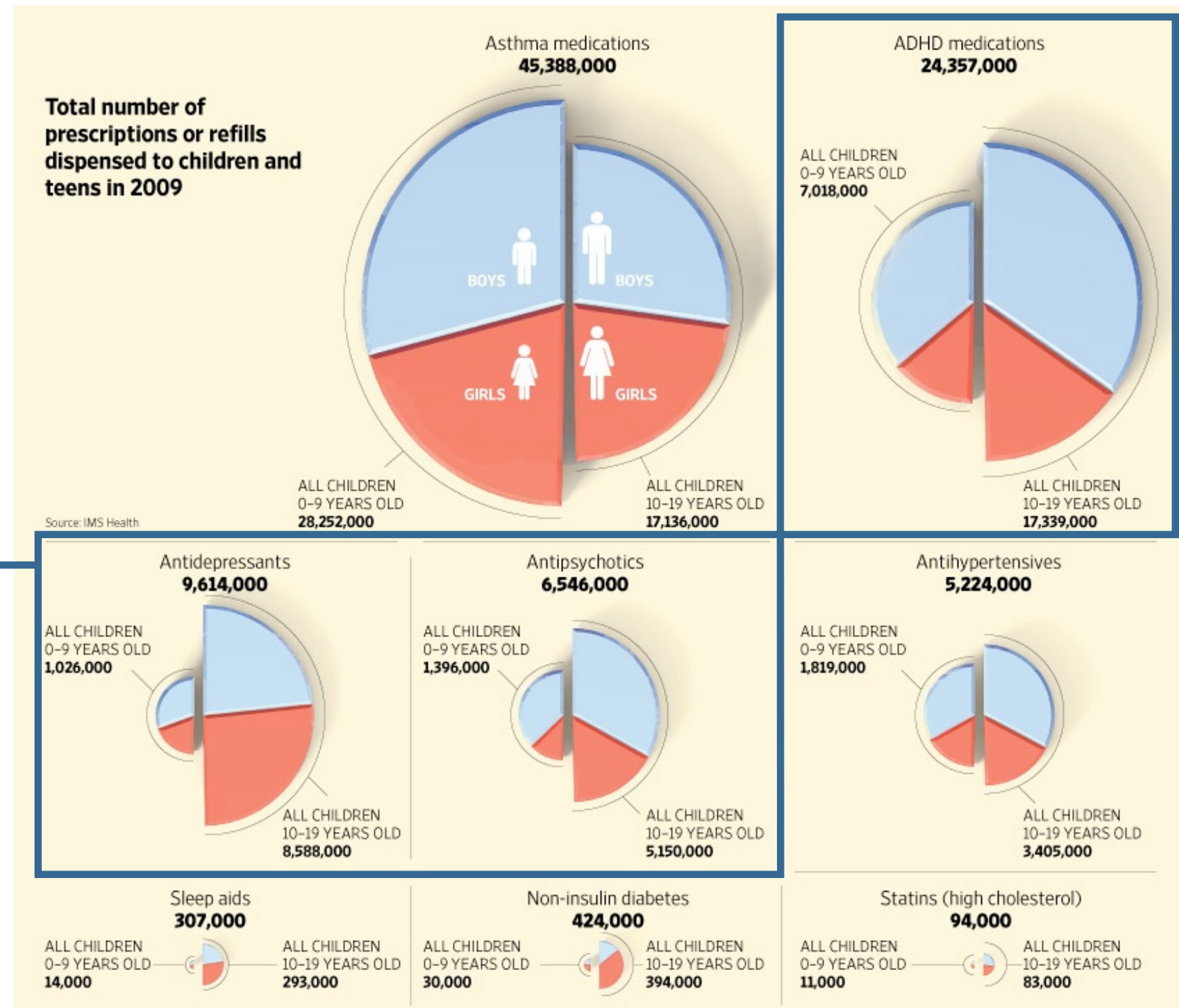


...to reduce and flatten a rising epidemic

The US had 75 million children and teens 2009

40.4 million kids had one psychotropic med in 2009

And it keeps rising



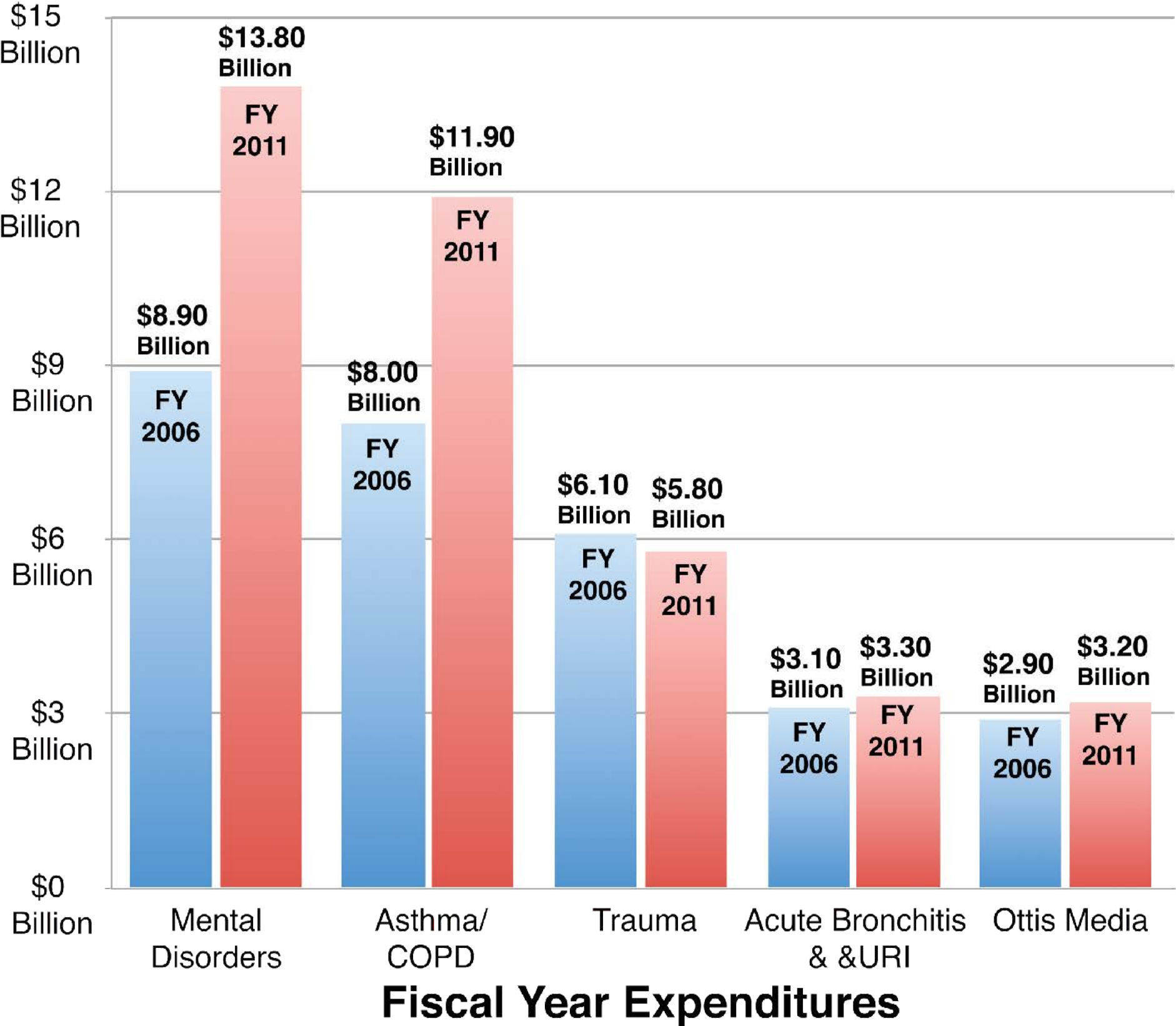
Wall Street Journal, 12-28-2010

Medicaid Expenditures for the Five Most Costly Conditions in Children

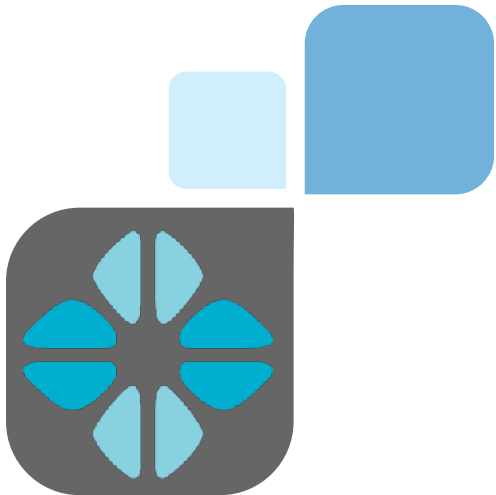


The cost of Mental Disorders is increasing \$1 billion per year

Medicaid Expenditures (In US\$, Billions)



Source: Center for Financing, Access, and Cost Trends, Agency for HealthCare Research and Quality, 2006, 2011



What Can We Do to Change Direction?

Provide children with ***explicit teaching*** of social-emotional and behavioral skills - just like learning tying shoes and math problems.

Behavior is adopted when it is ***useful*** and ***reinforced by adults and peers.***

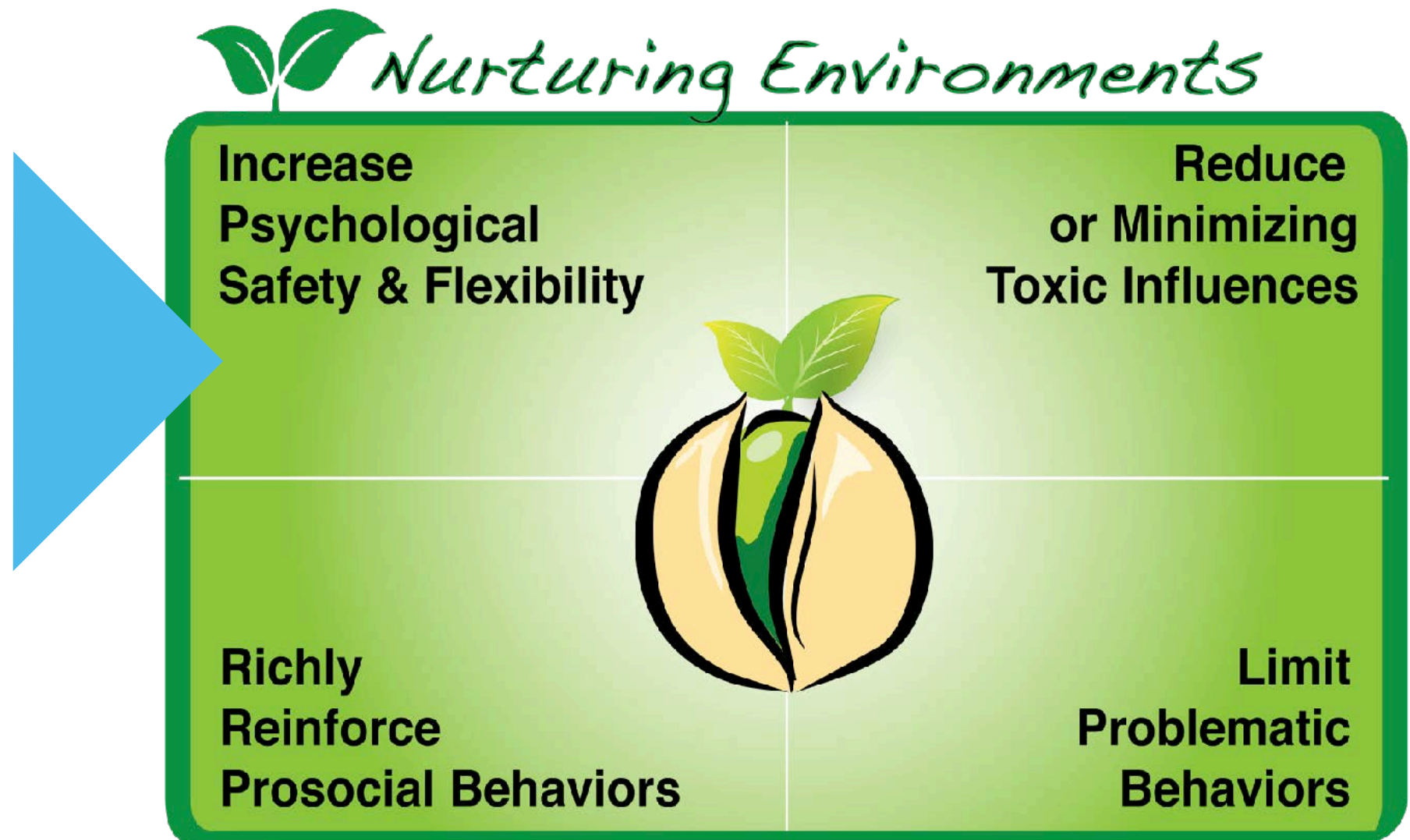
When teaching new skills, you

- use methods shown to work
- have a backup plan
- exercise patience
- don't get emotional about mistakes



Proven Tools Can Create Nurturing Environments

Nurturing Environments are surroundings and conditions that promote resilience, self-regulation, and positive behaviors.



When adults and children co-create Nurturing Environments, adults help offset the predatory environments children may experience elsewhere.





www.paxis.org



PAX GBG is used by educators in classrooms, schools & after school settings.



PAX Tools are strategies for parents, caregivers, youth workers, & clinicians, with a free app.

All this is happening at a population-level in Ohio, Texas, Arizona, other states as well as other countries with public-health benefits.



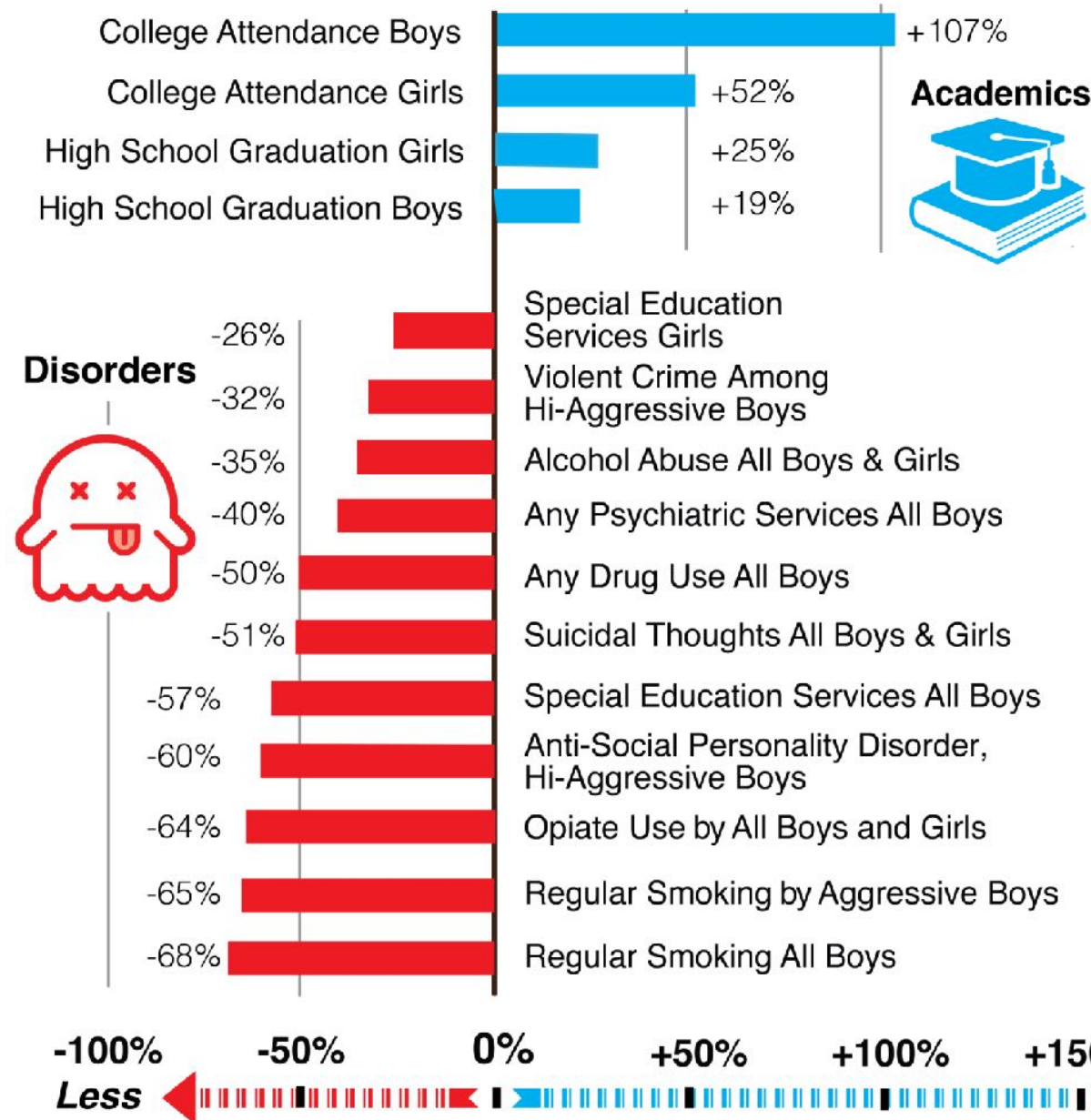
PAX GBG both PAX Tools teach self-regulation & wellbeing, using proven evidence-base kernels!

Why use the evidence-based recipe for kernels at school, at home, and in the community as a public health approach? Here is **why**.....



Snapshot of PAX Good Behavior Game® Benefits

Computation of Relative Difference = (GBG/Control)-1



THE COST OF PAX

The cost of protecting a child's lifetime with PAX GBG is the price of taking a child to a movie, buying popcorn, a soda, and getting a pizza and dessert after the movie. For the price of a nice time with a child, that same child can have a *good and better life*.

THE VALUE OF PAX

The net-economic benefit for the child and society is \$10,850 at age 19, with a return on investment (ROI) of more than 70-to-1. The change in quality of lives and communities is priceless.

Visit: www.wsipp.wa.gov
Search: "Good Behavior Game"

Note: These calculations are based on two prior studies of 1,500 students by Johns Hopkins with long-term follow up. Please visit www.goodbehaviorgame.org for study results and publications. PAXIS Institute is the official provider of Good Behavior Game® based on Johns Hopkins' studies and current replications at Hopkins. Relative difference calculation takes into account that some groups may have higher or lower "risk" changing the absolute numbers of students who may benefit from a preventive strategy. The graph illustrates the potential widespread benefits of the strategy. Two new longitudinal studies, involving 10,000 students, have significant positive initial outcomes. Another randomized study shows positive benefits in afterschool settings. Also note that the "recipe" used in the past and current replications at Hopkins are much more sophisticated than the simple descriptions in journals or in the early applied behavior analysis studies. Further, some entities construed the Hopkins recipe as rigid rules (e.g. sit in your seat, only speak with permission from teacher) with tokens, stickers, and tangible rewards. That conception is wrong and yields no positive or lasting results. Copyright © 2018, PAXIS Institute. May be reproduced in total with notice.

Cross cultural replications?

What is the goal for these simple PAX efforts?



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**To better our
world, and better
ourselves.**

PAXIS Institute • an International prevention science company
• PO Box 31205, Tucson, AZ • 85751 • 520-299-6770
info@paxis.org • www.paxis.org

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families and
communities for
increased peace,
productivity, health
& happiness now
and for the future.