

Portions of these slides were used at ACBS Conference, Session #76 (Child and Adolescent Adaptation to Context, based on a prior presentation to the Public Health Agency of Canada



PAXIS Institute™

passion into action science to practice promoting solutions

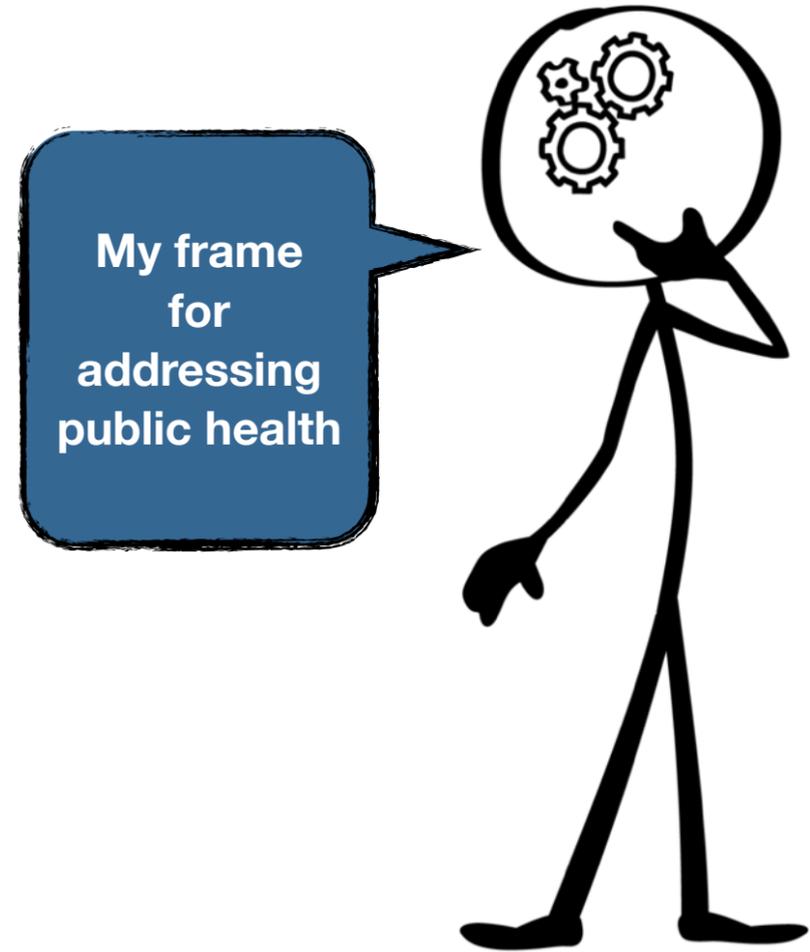
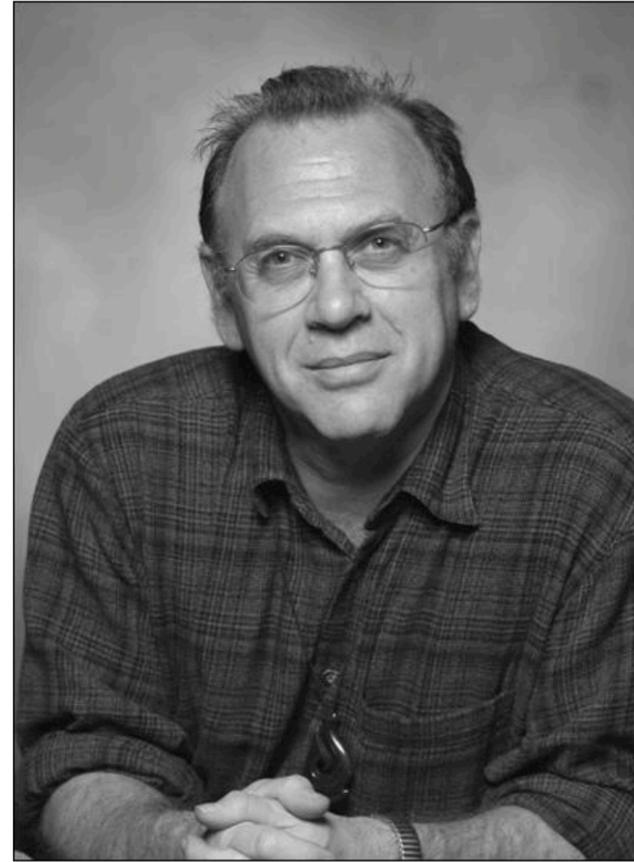
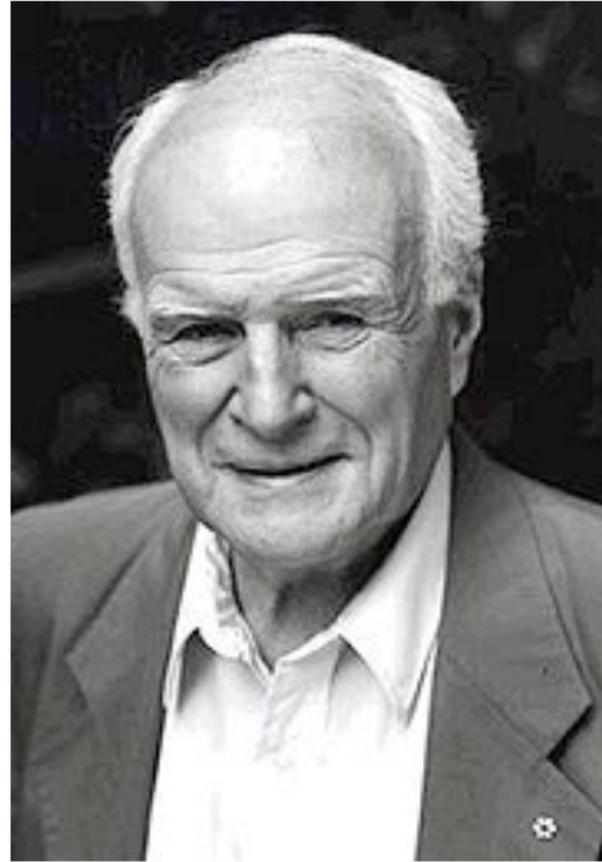
by Dennis D. Embry, Ph.D.

*Achieving Population
Prevention of Multiple
Mental, Emotional,
Behavioral and
Related Physical
Disorders Rapidly and
Cost Efficiently*

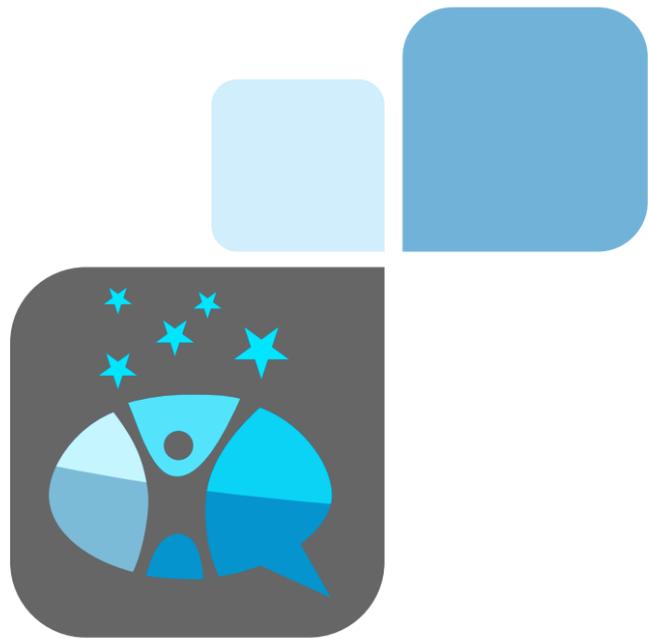


Dennis D. Embry, Ph.D. • Follow Up Think Tank to the Premiers' Mental Health Summit 2012 • Feb 13-14, 2013

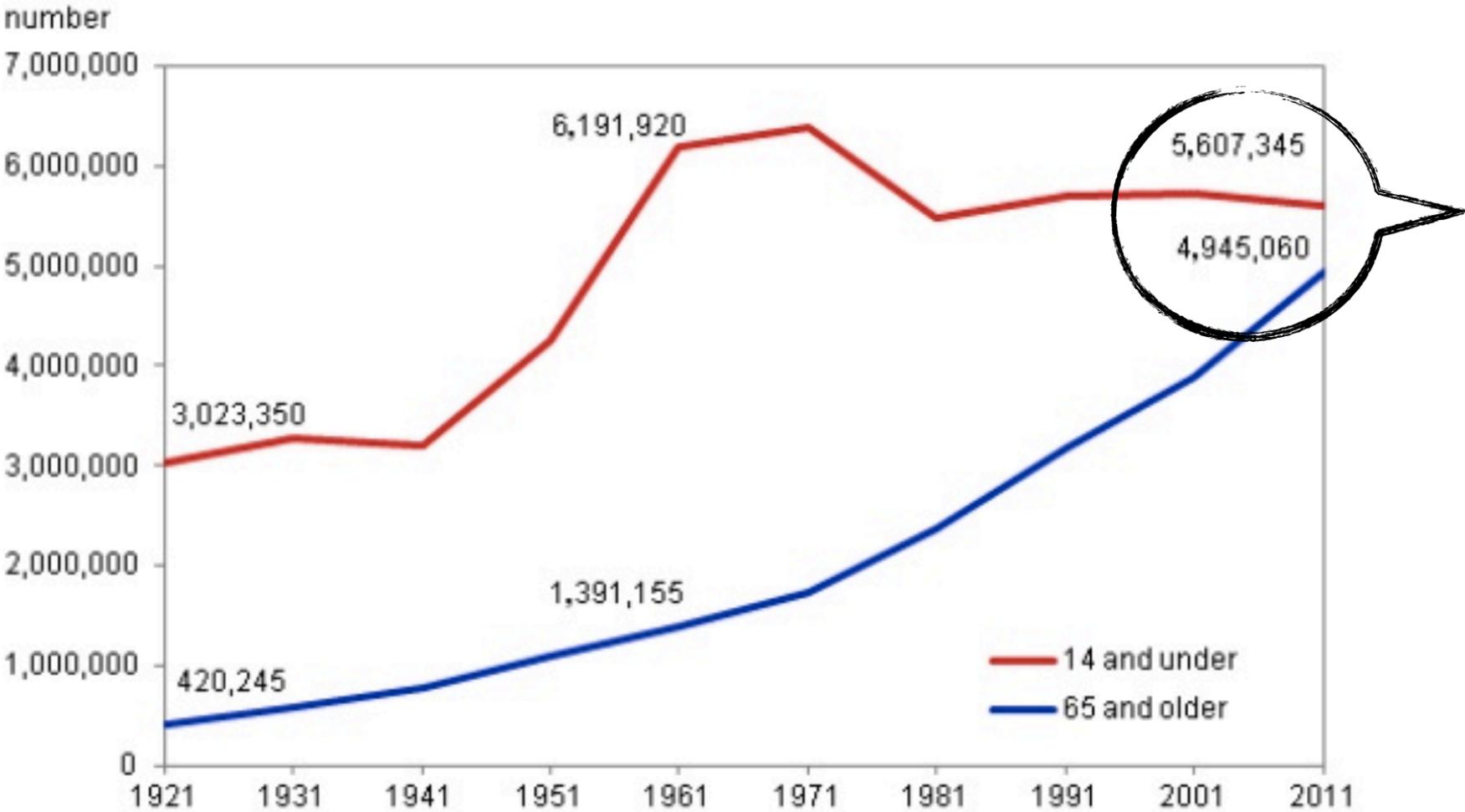
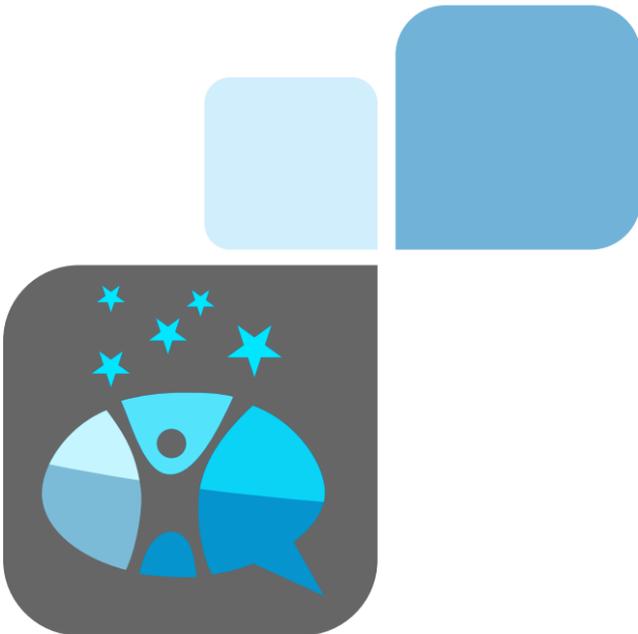




My talk is dedicated to the these great scientists and advocates for the future of Canadian and the worlds' children — whom I am privileged to have known. May my words and deeds honor their vision today.

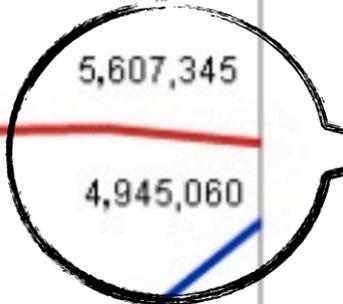
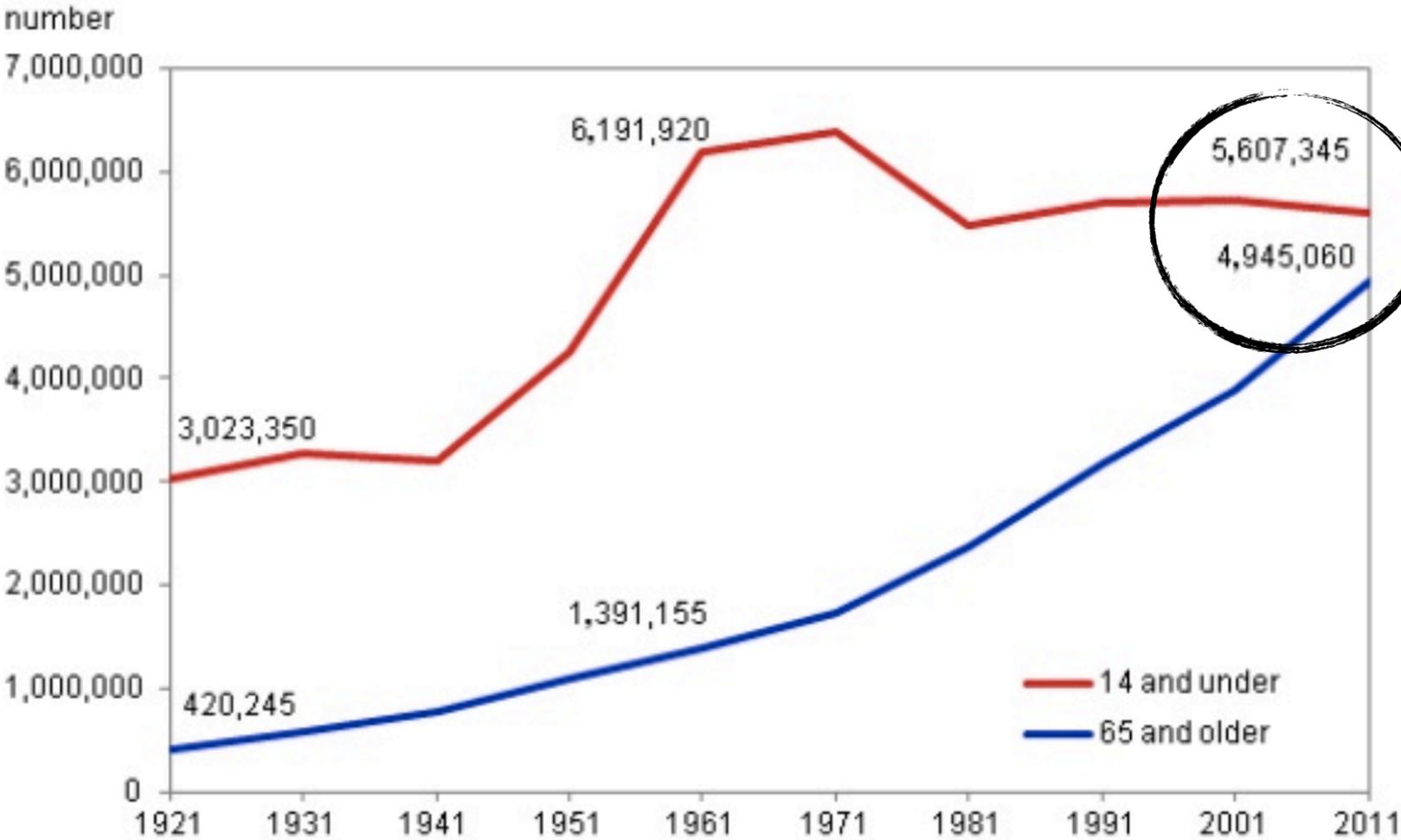


Canada's Generation Squeeze



Sources: Statistics Canada, censuses of population, 1921 to 2011.

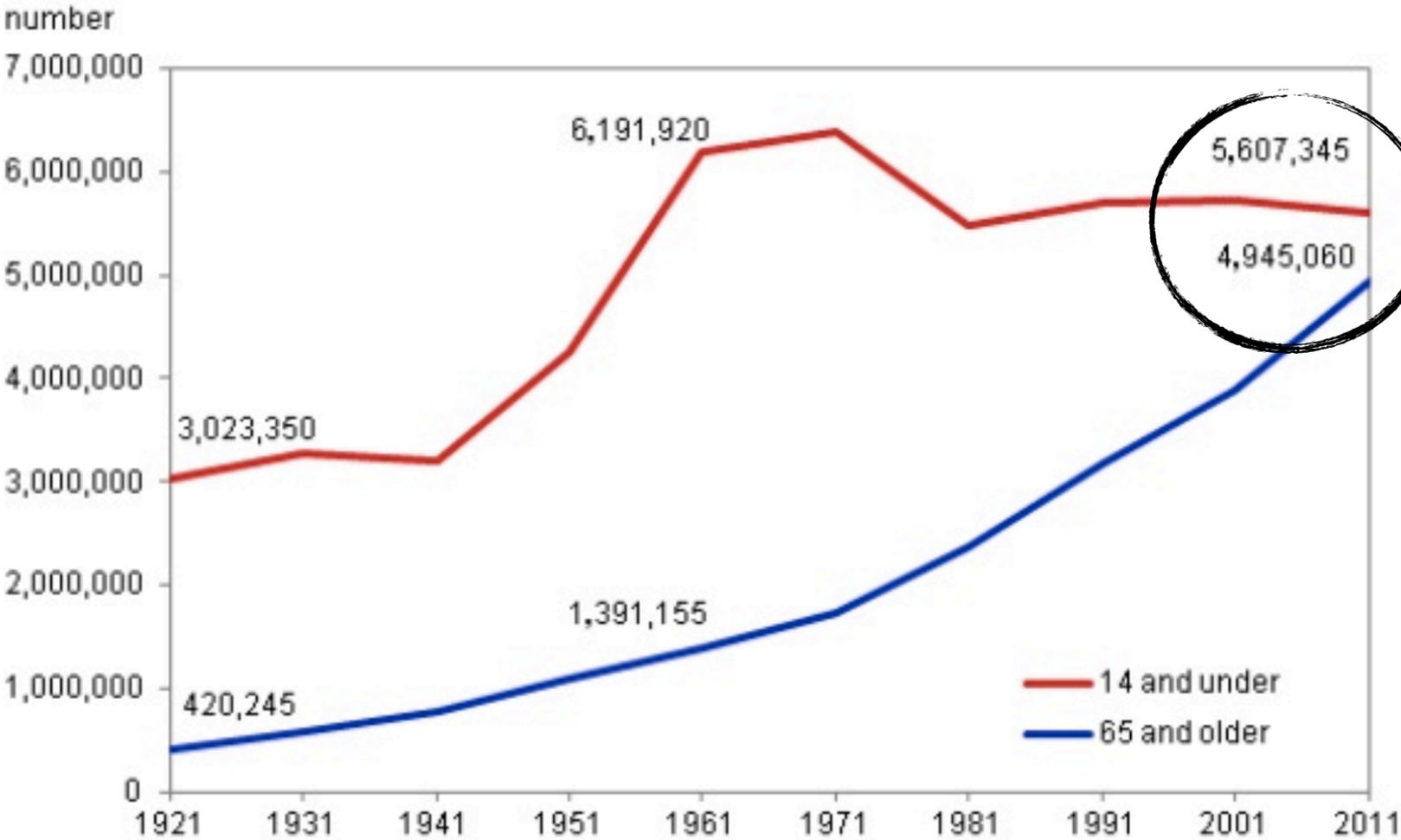
Canada's Generation Squeeze



What does this mean for Canada's future?

Sources: Statistics Canada, censuses of population, 1921 to 2011.

Canada's Generation Squeeze



What does this mean for Canada's future?

What happens when the kids AND the adults are getting mentally and physically sicker?

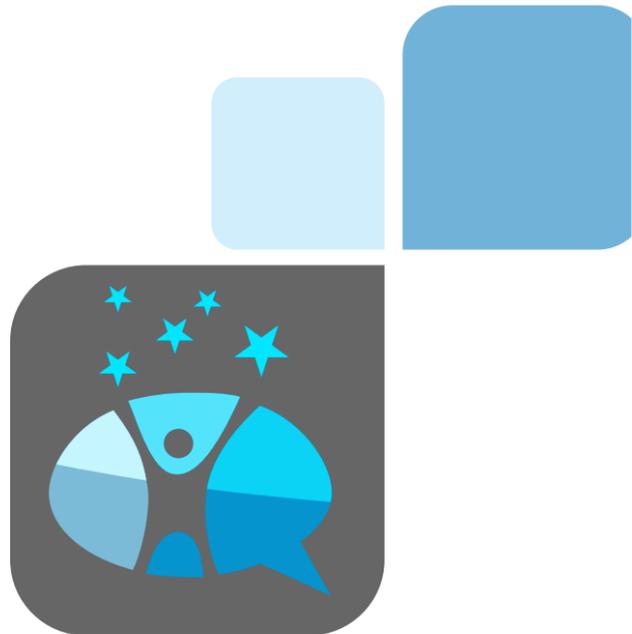
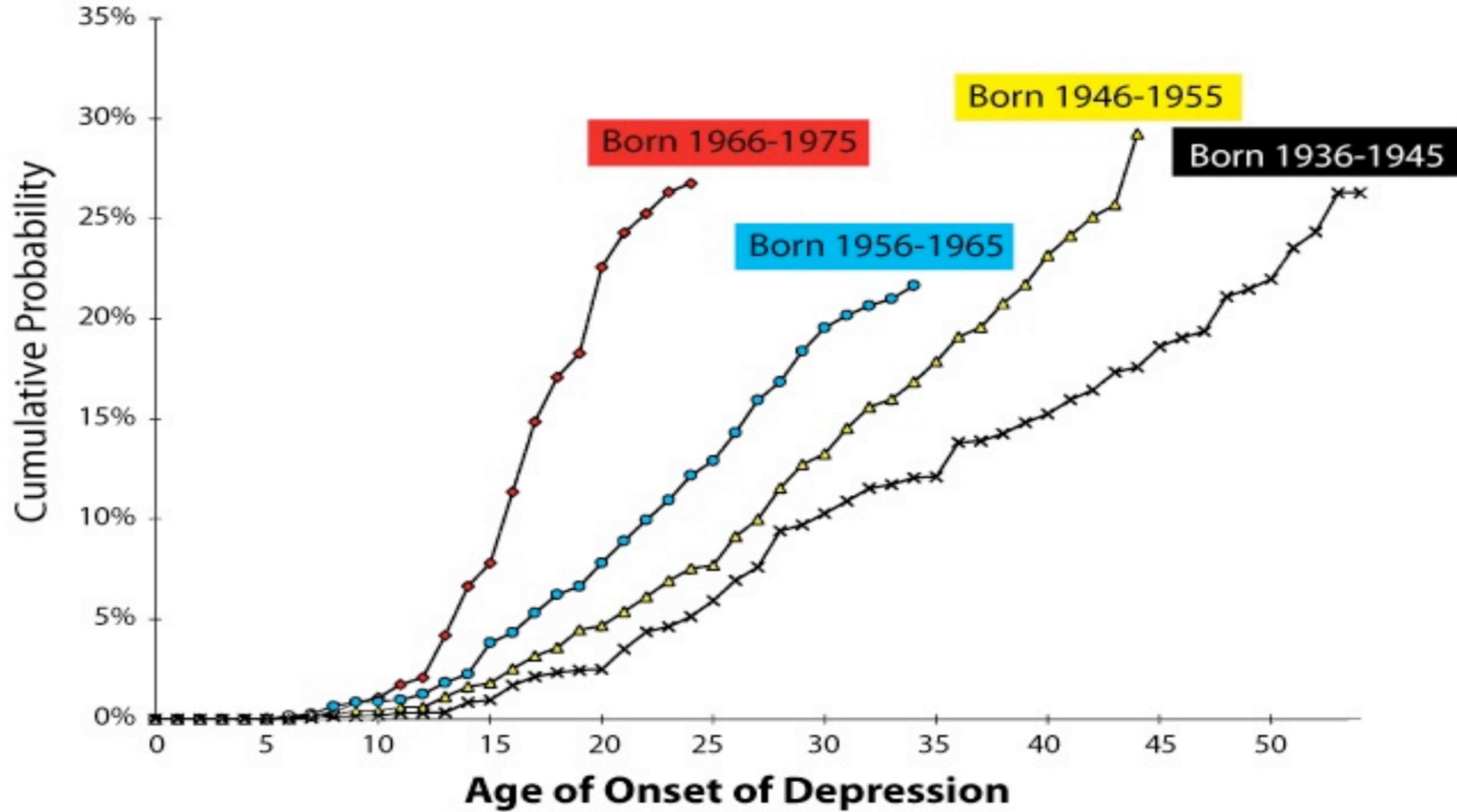
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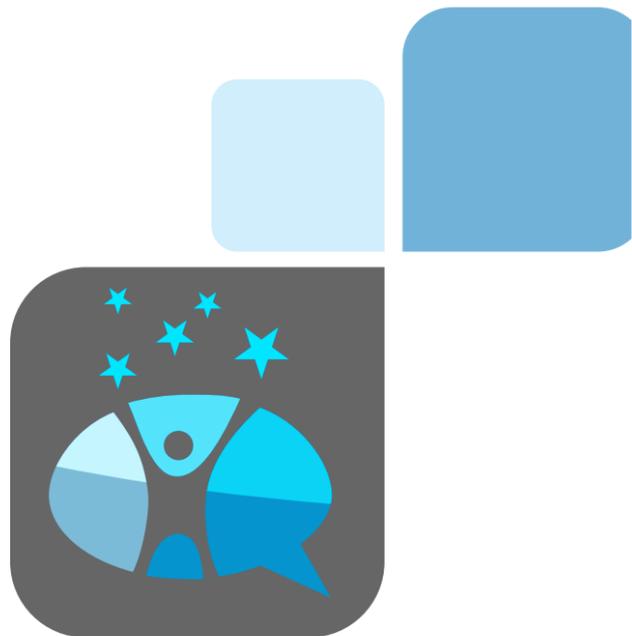
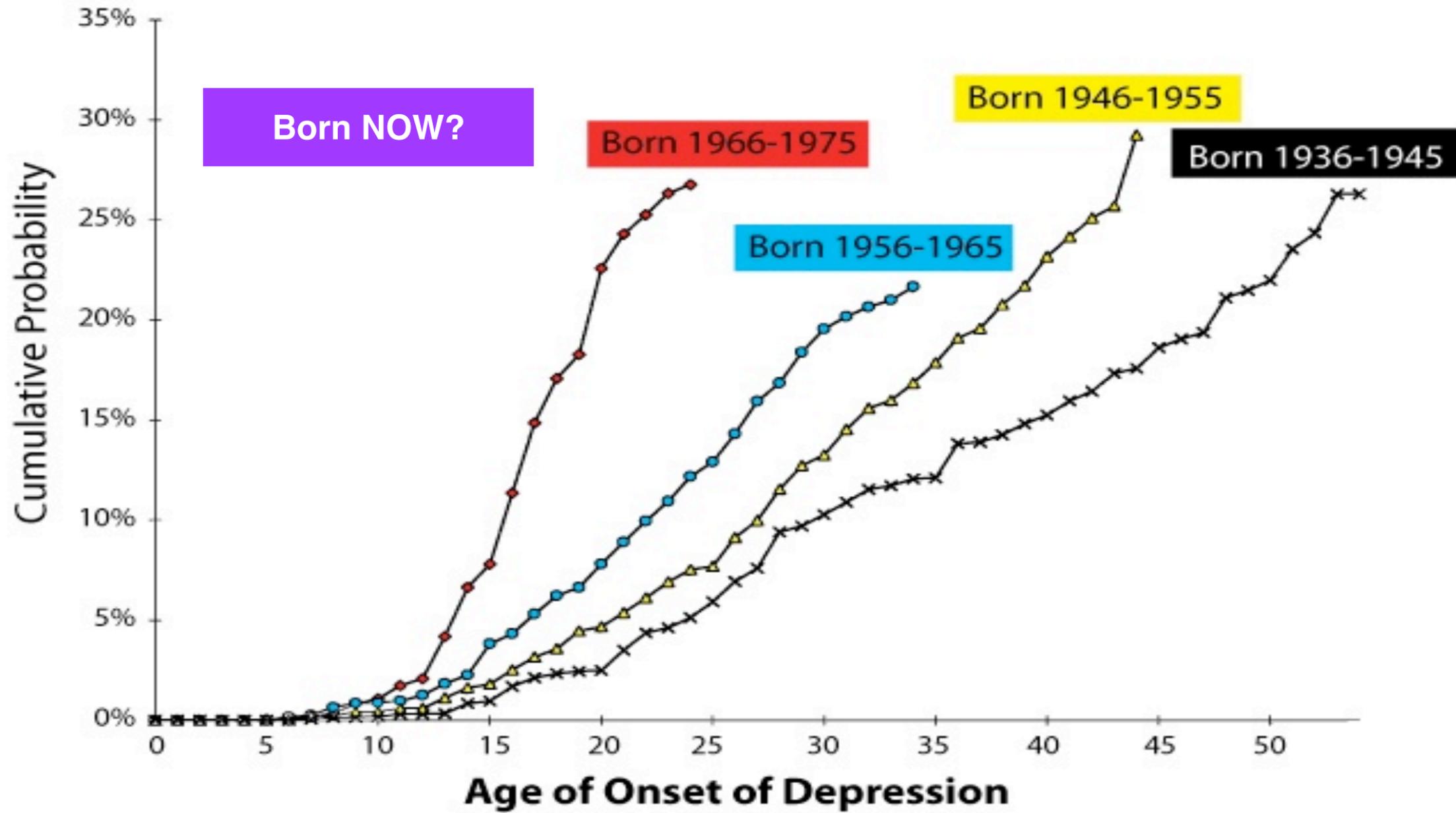
Consider the cohort trends...#1 mental health disorder



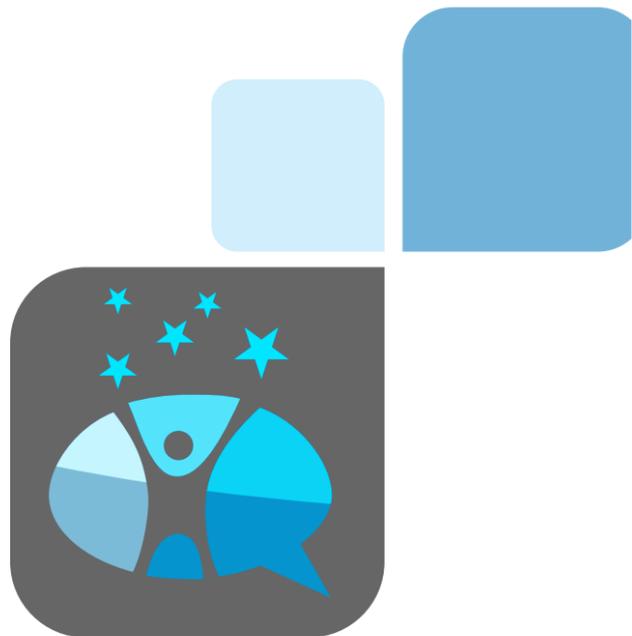
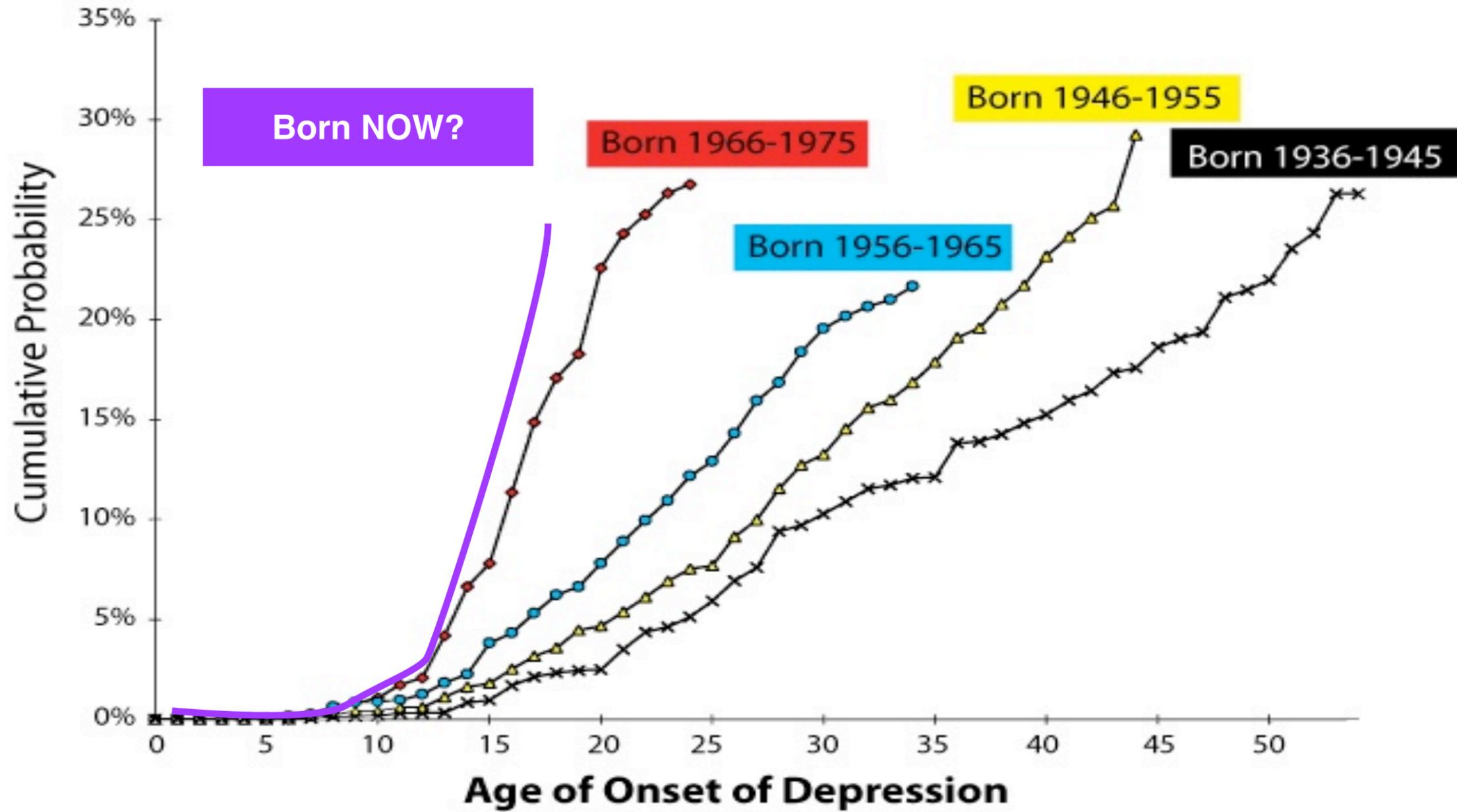
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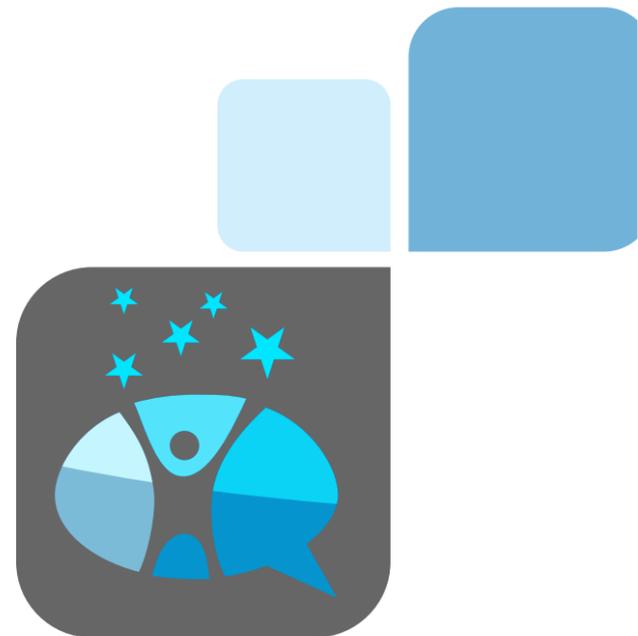
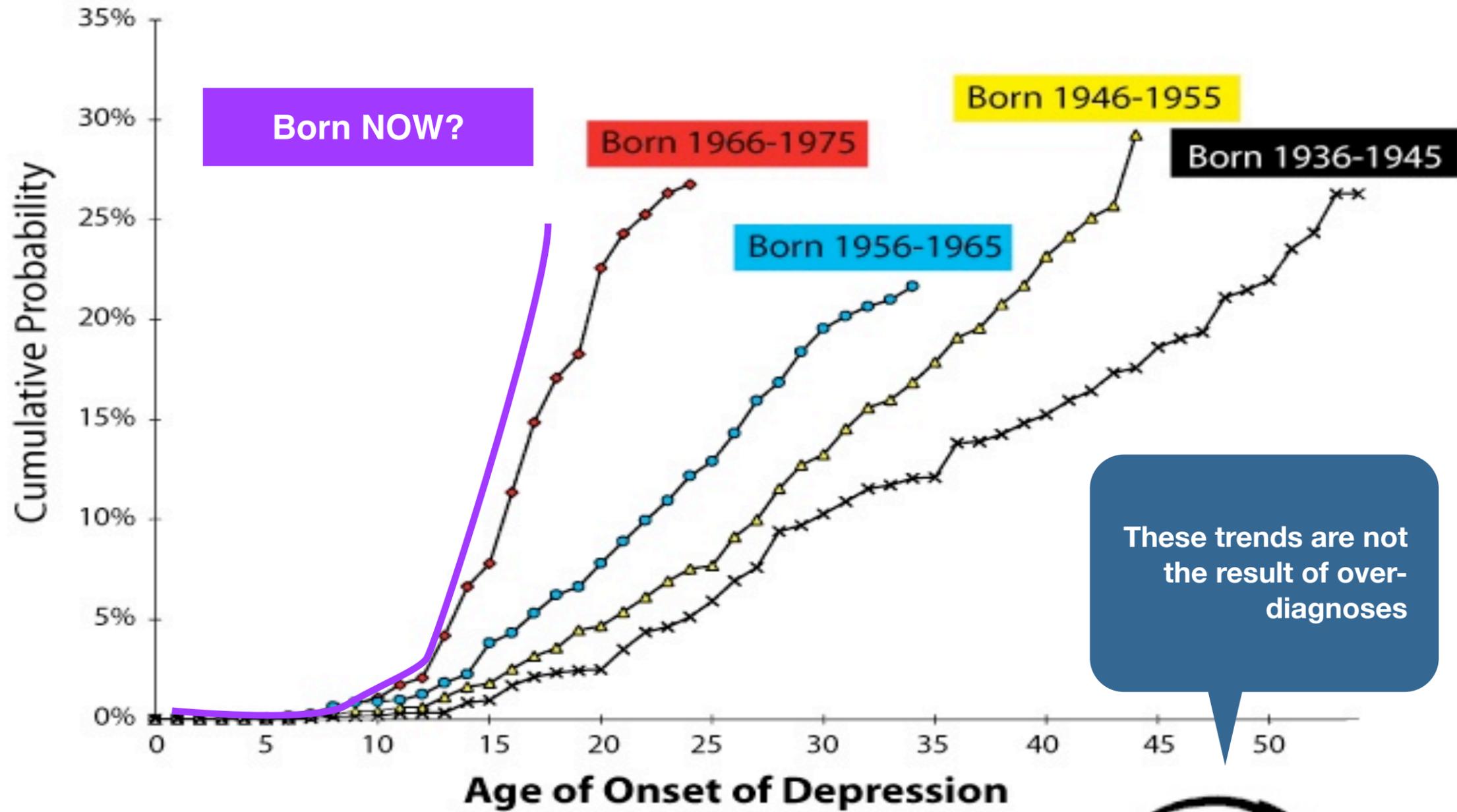
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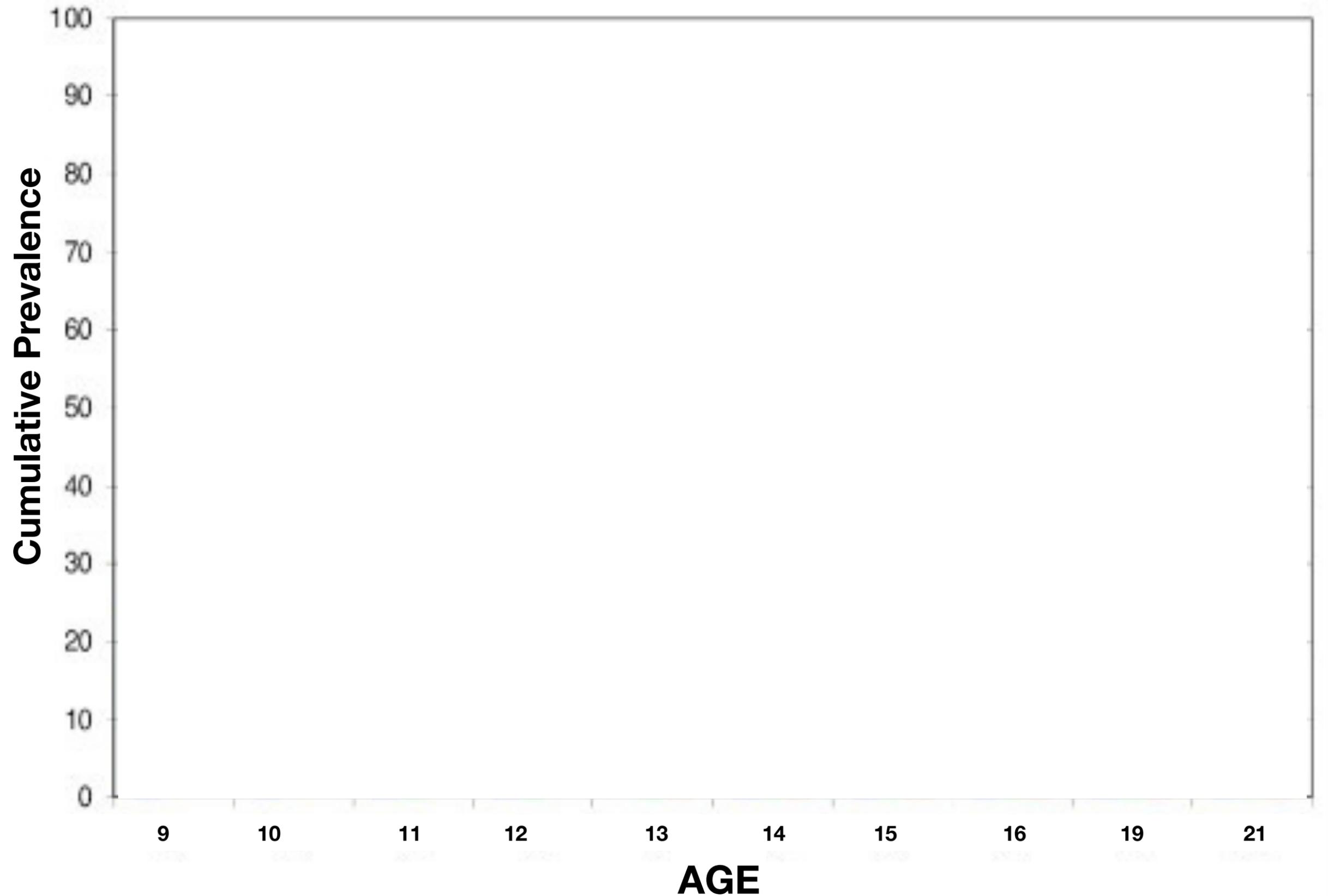
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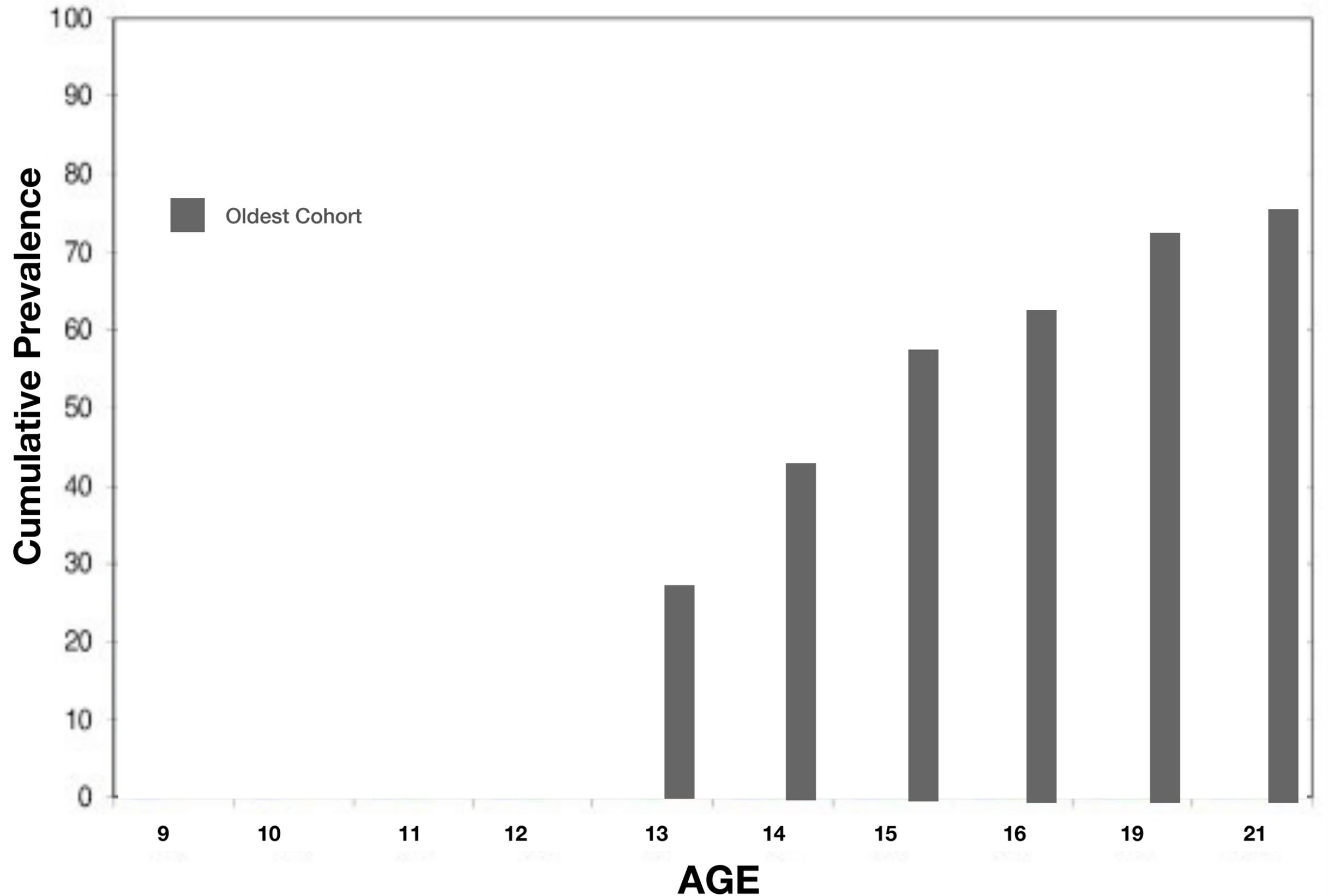
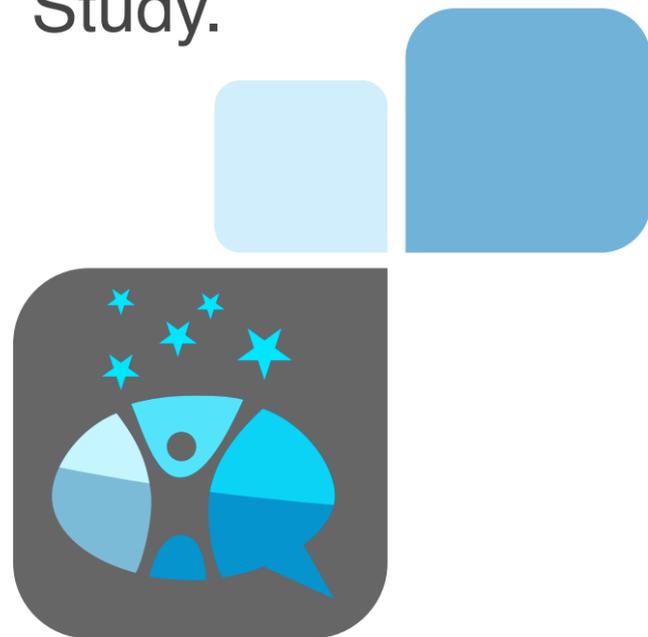
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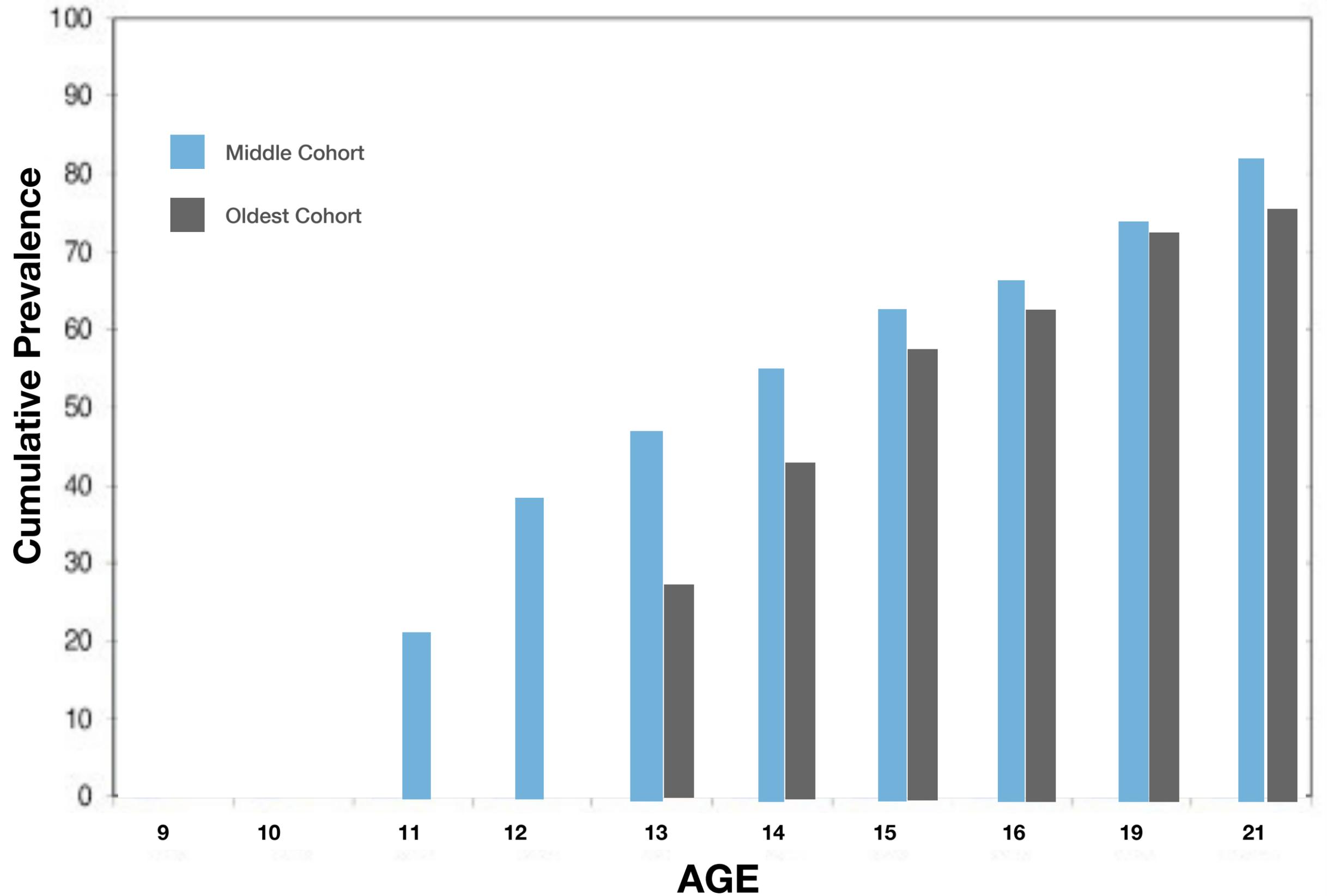
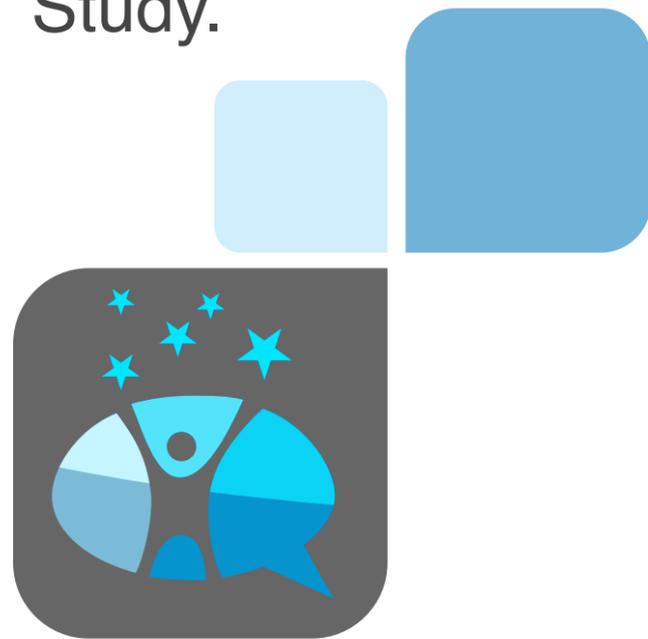
Cumulative prevalence of psychiatric disorders by young adulthood: a prospective cohort analysis from the Great Smoky Mountains Study.



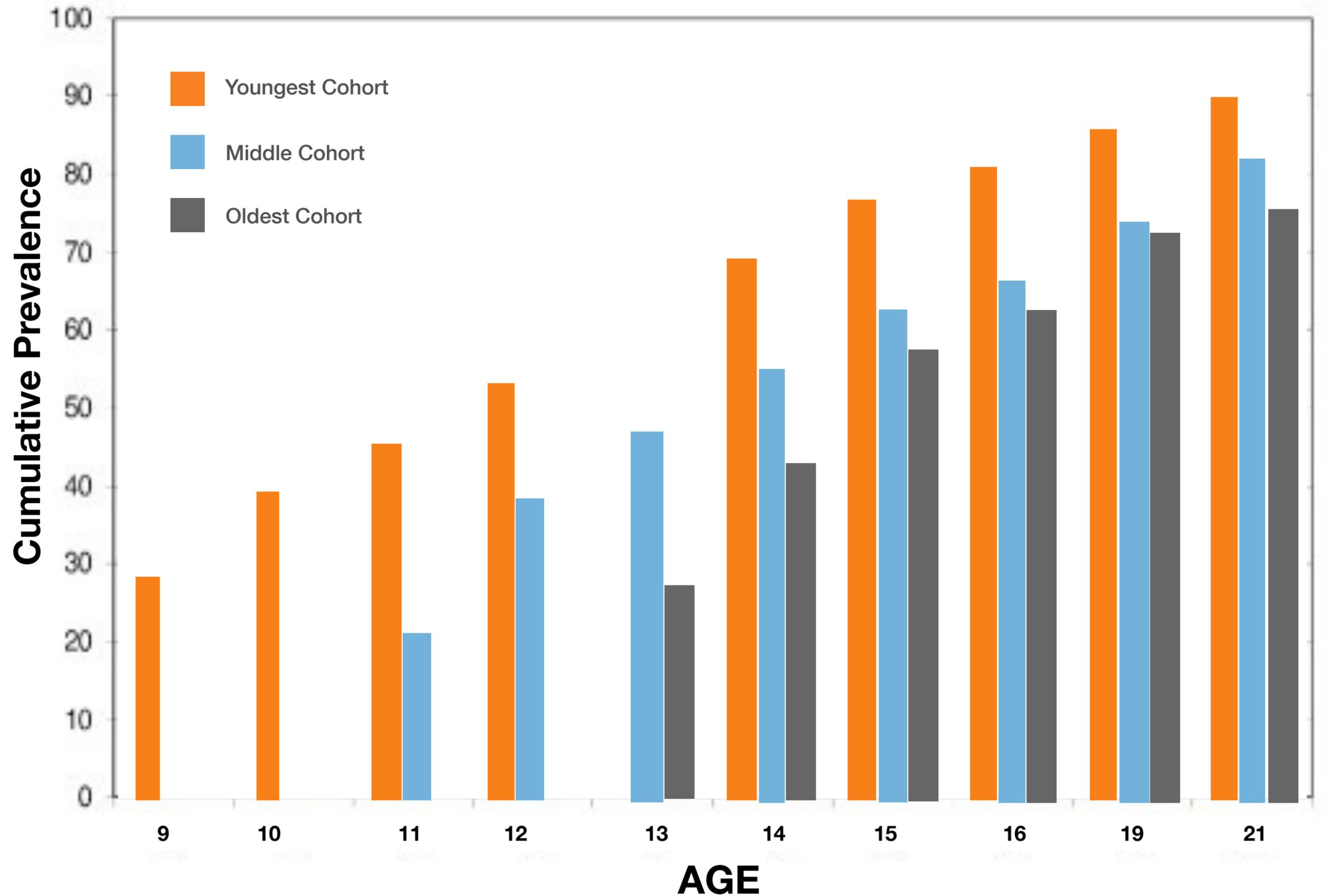
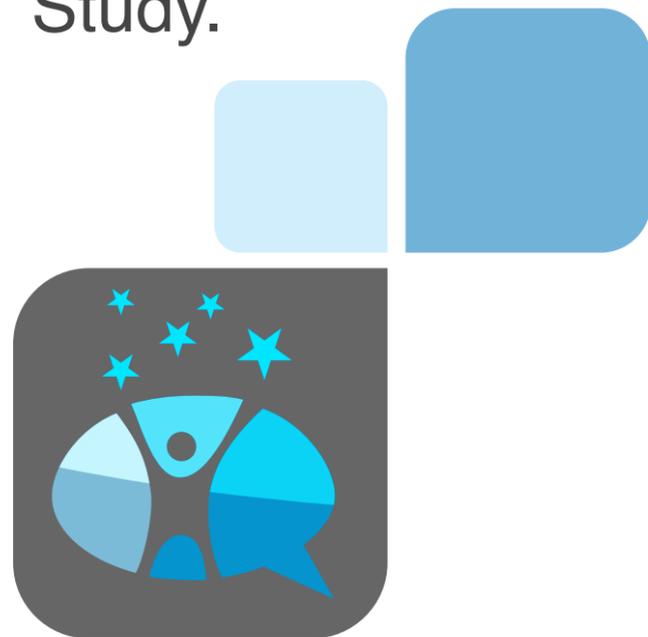
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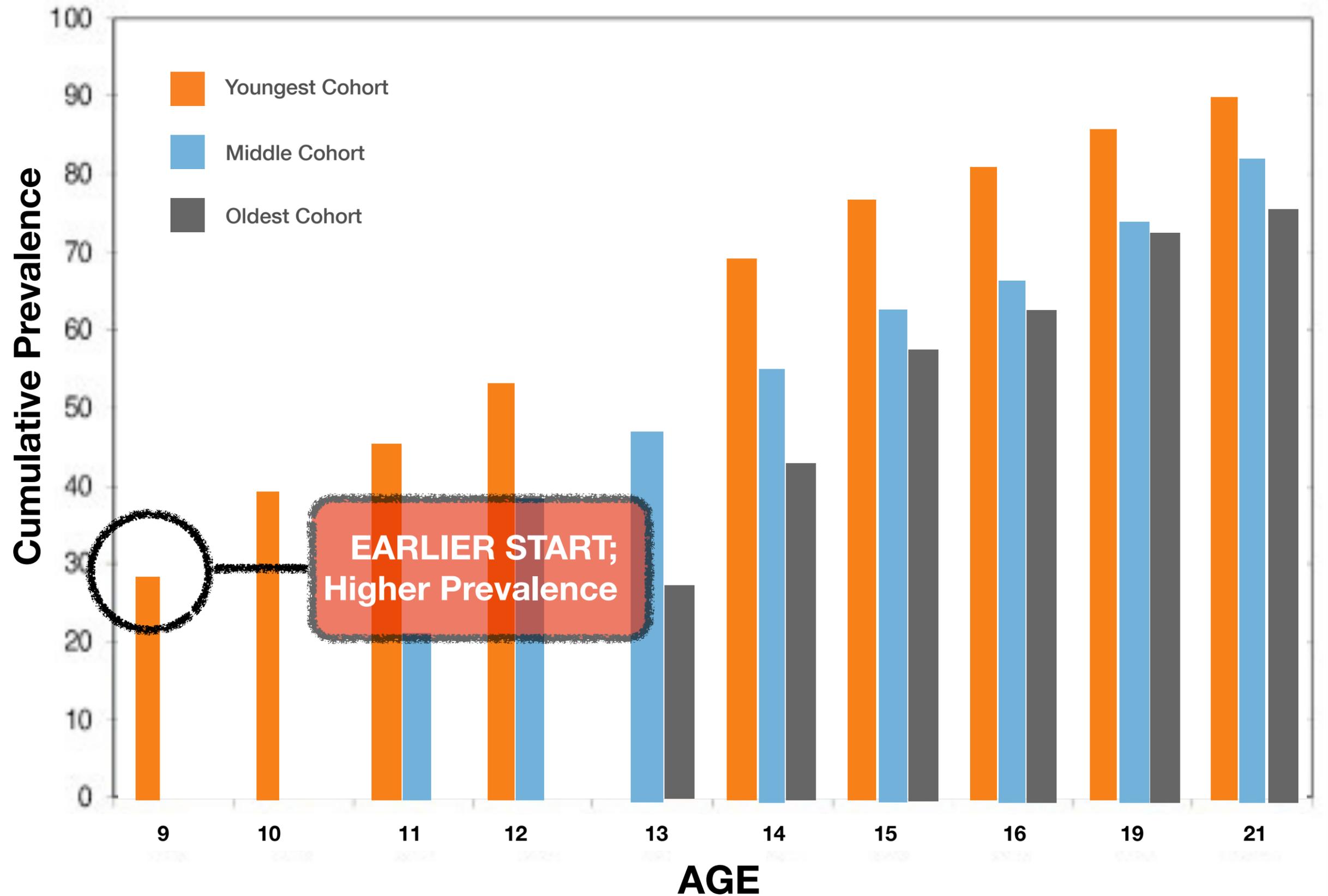
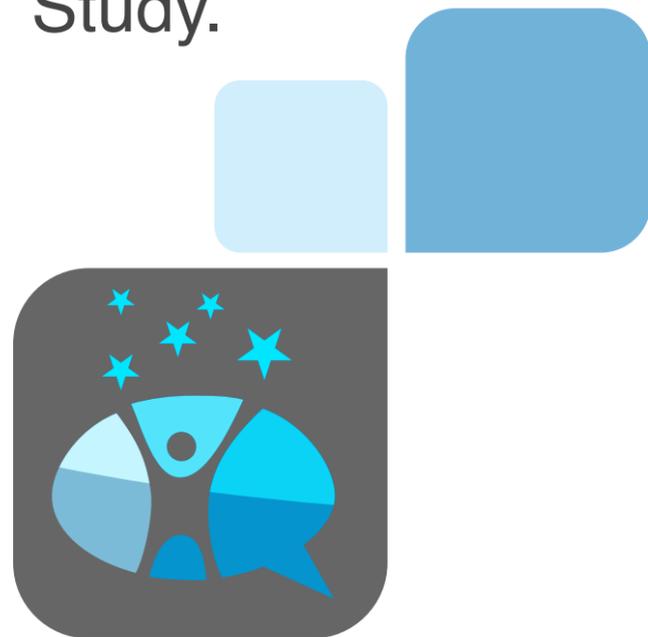
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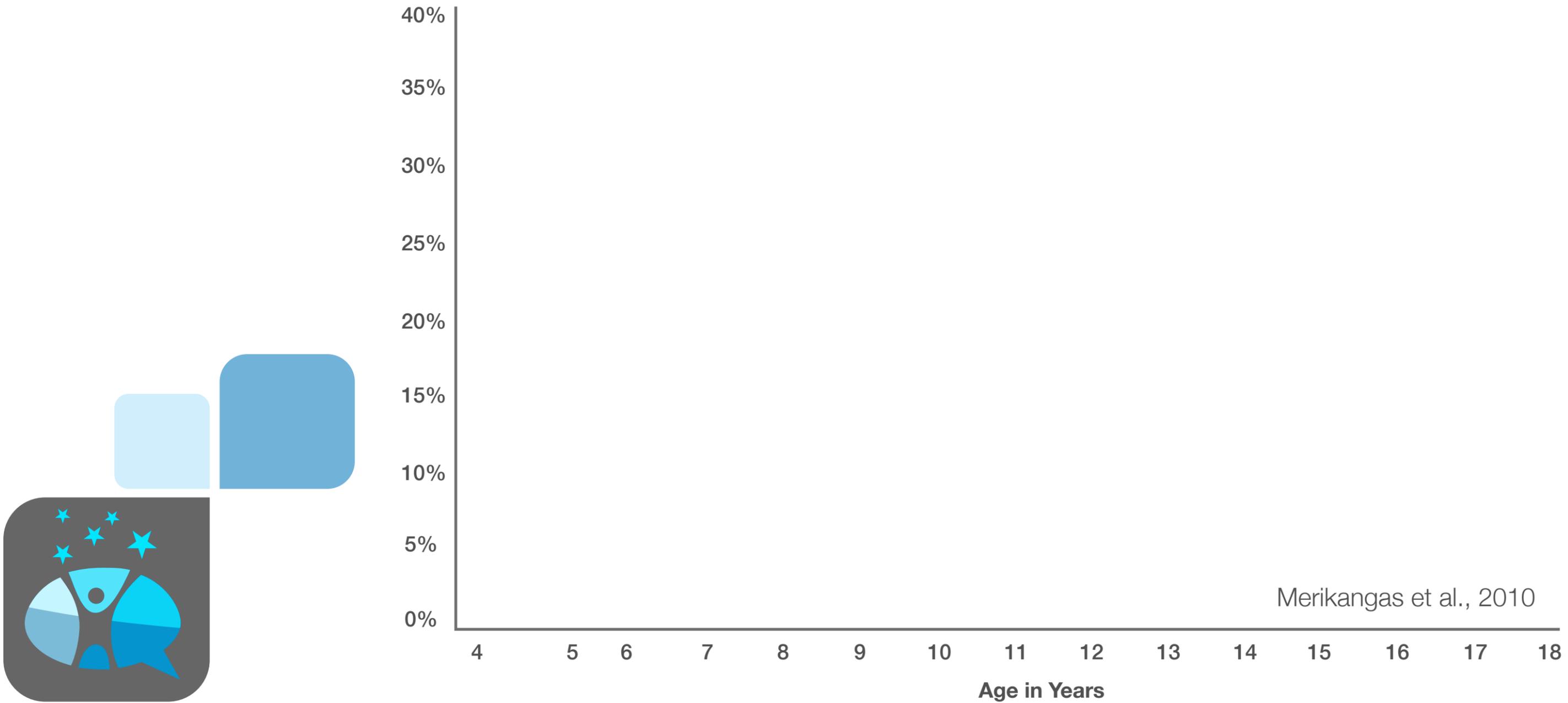
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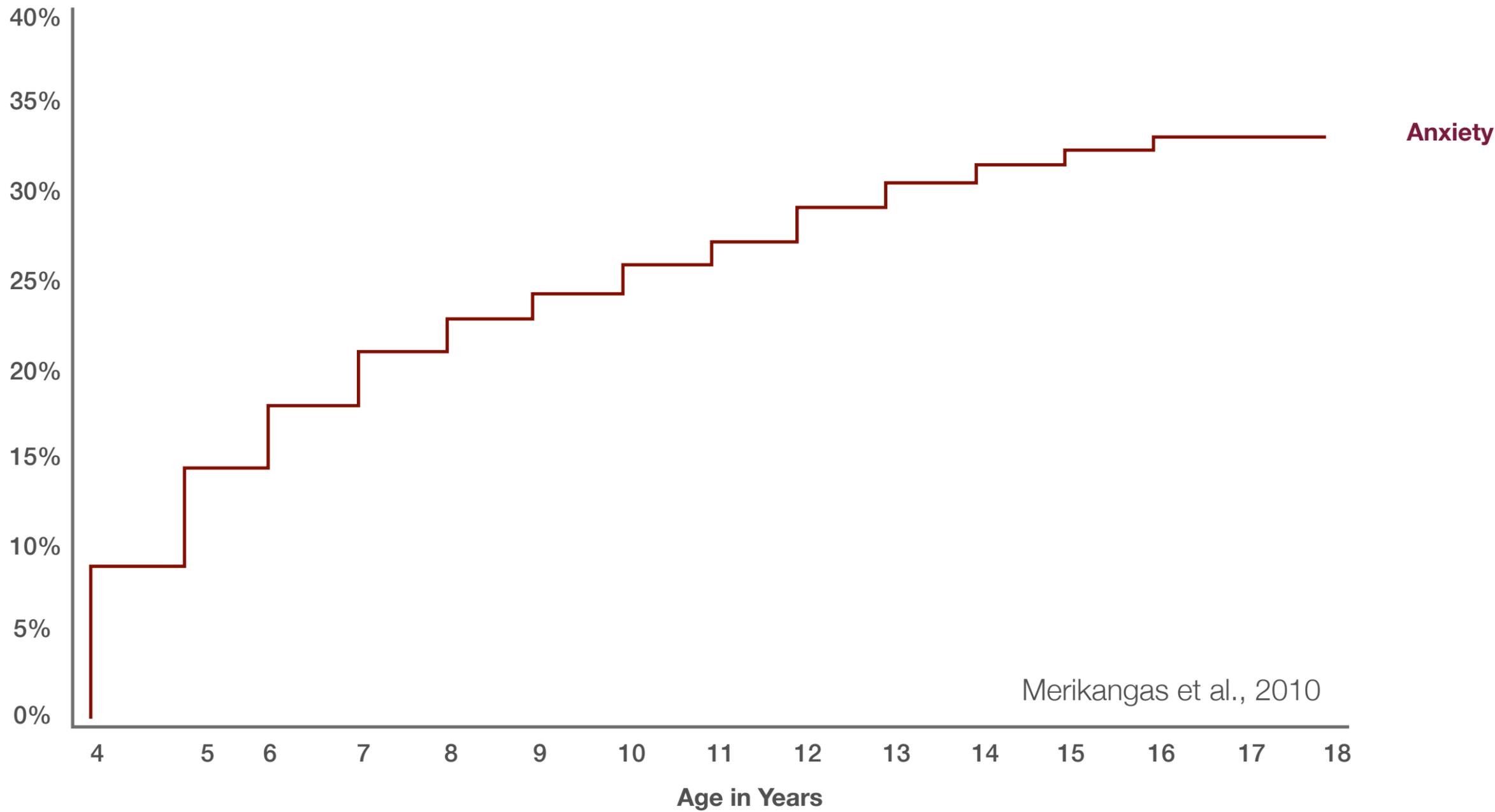
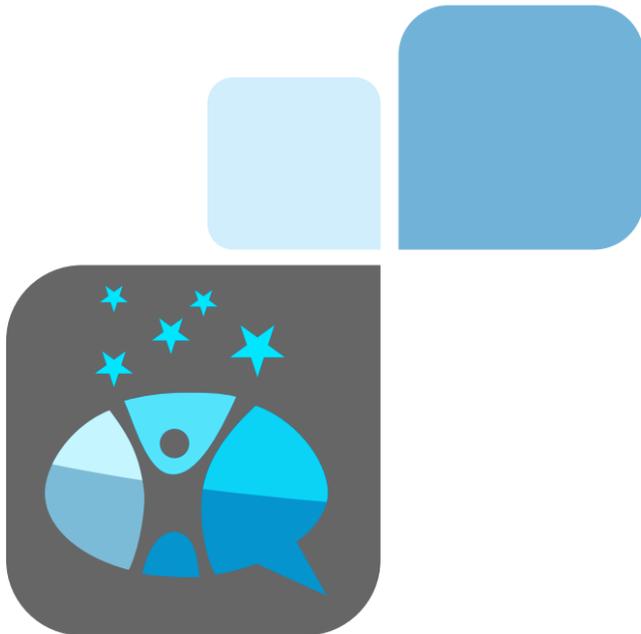
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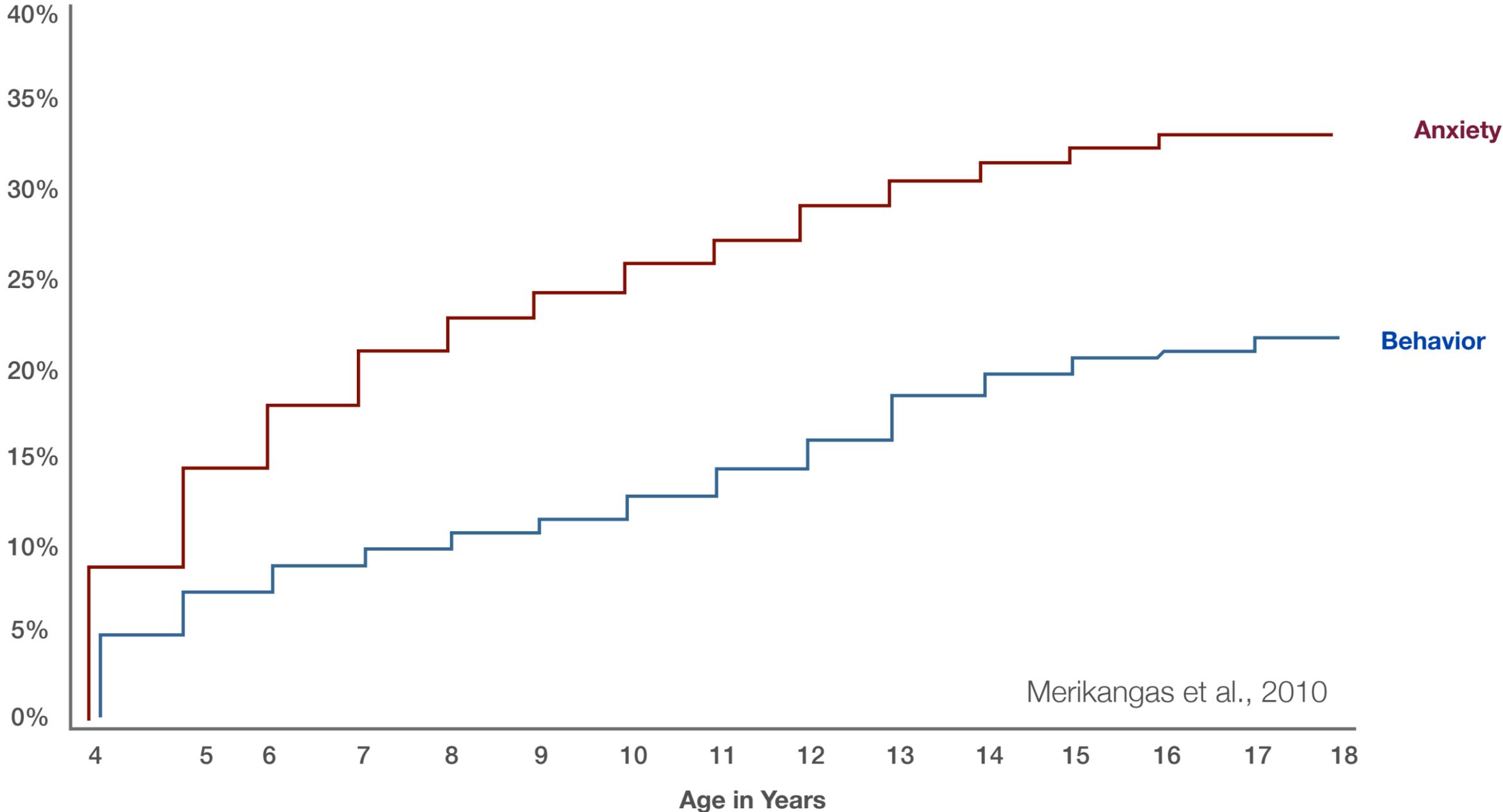
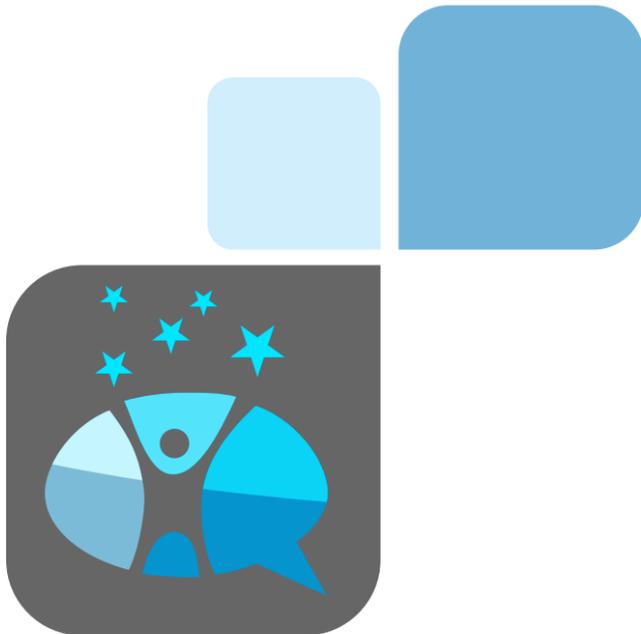
Lifetime Prevalence of Disorders in US Adolescents (N=10,123)



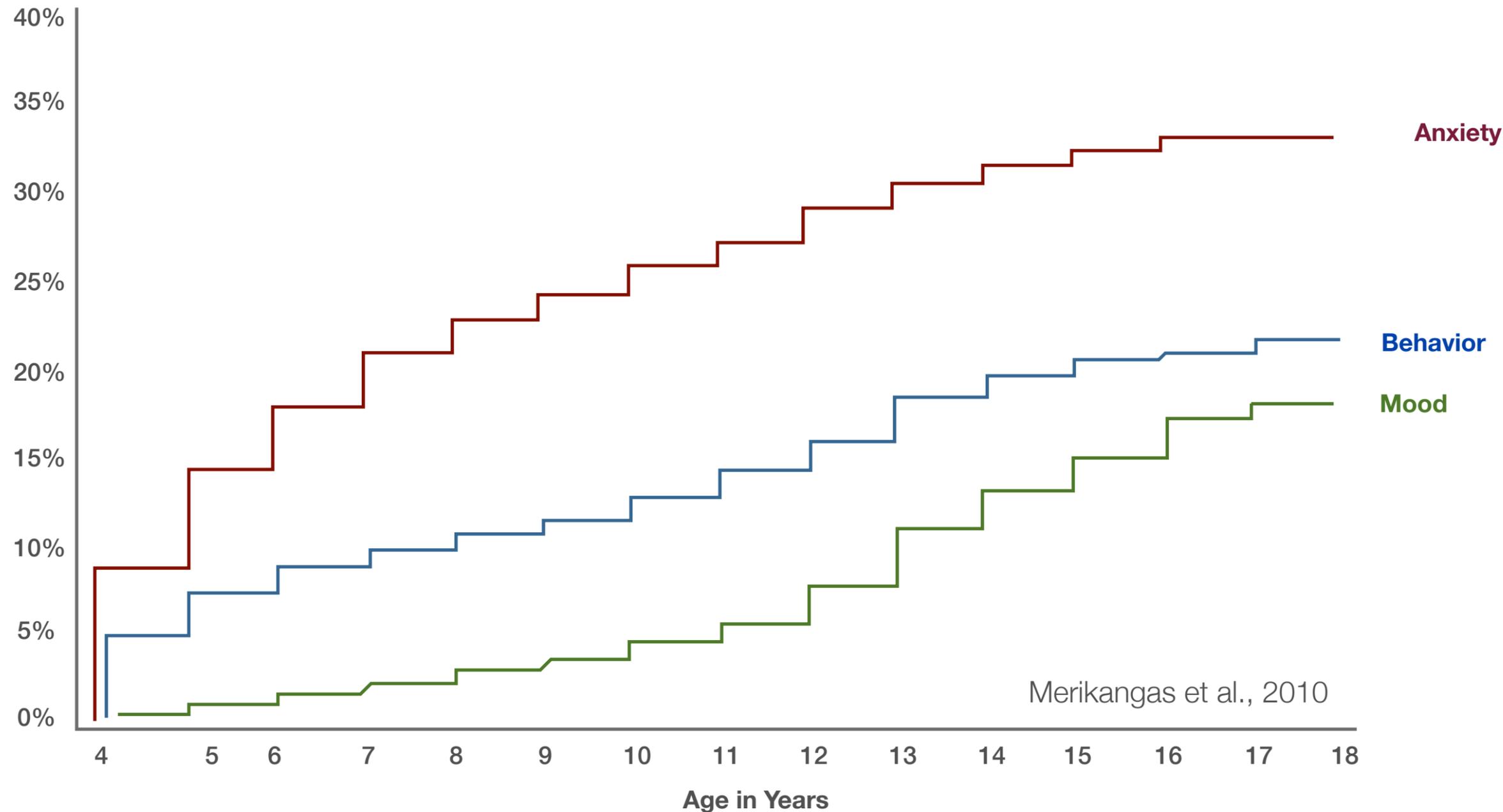
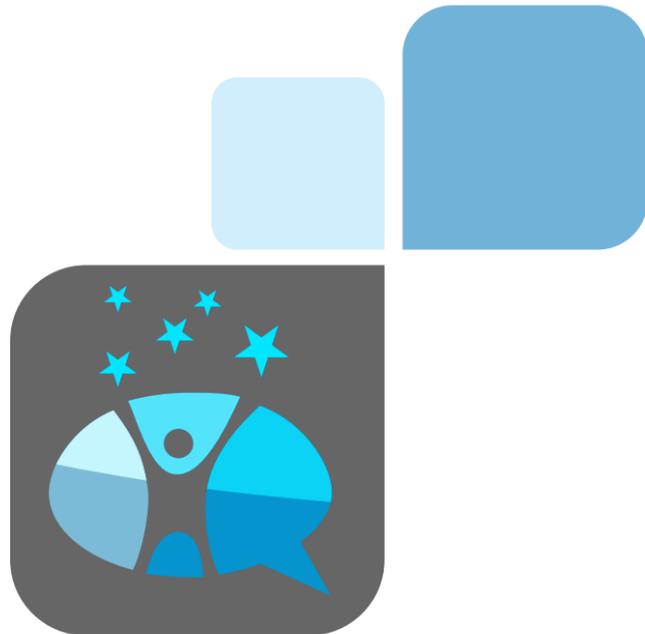
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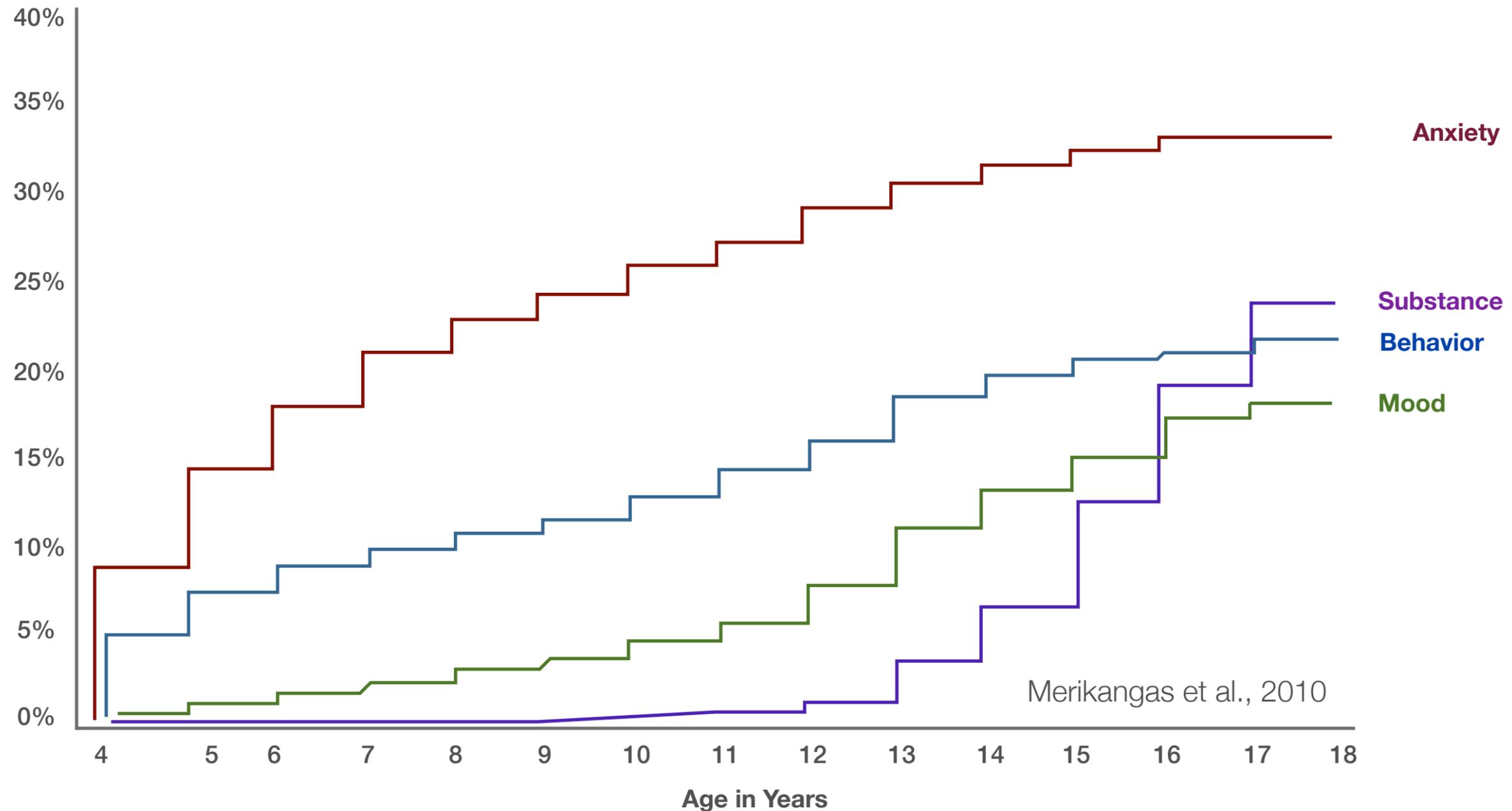
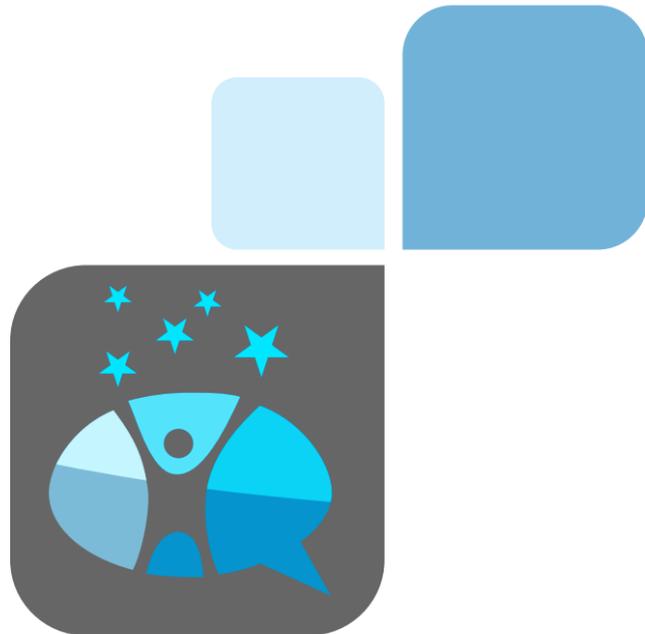
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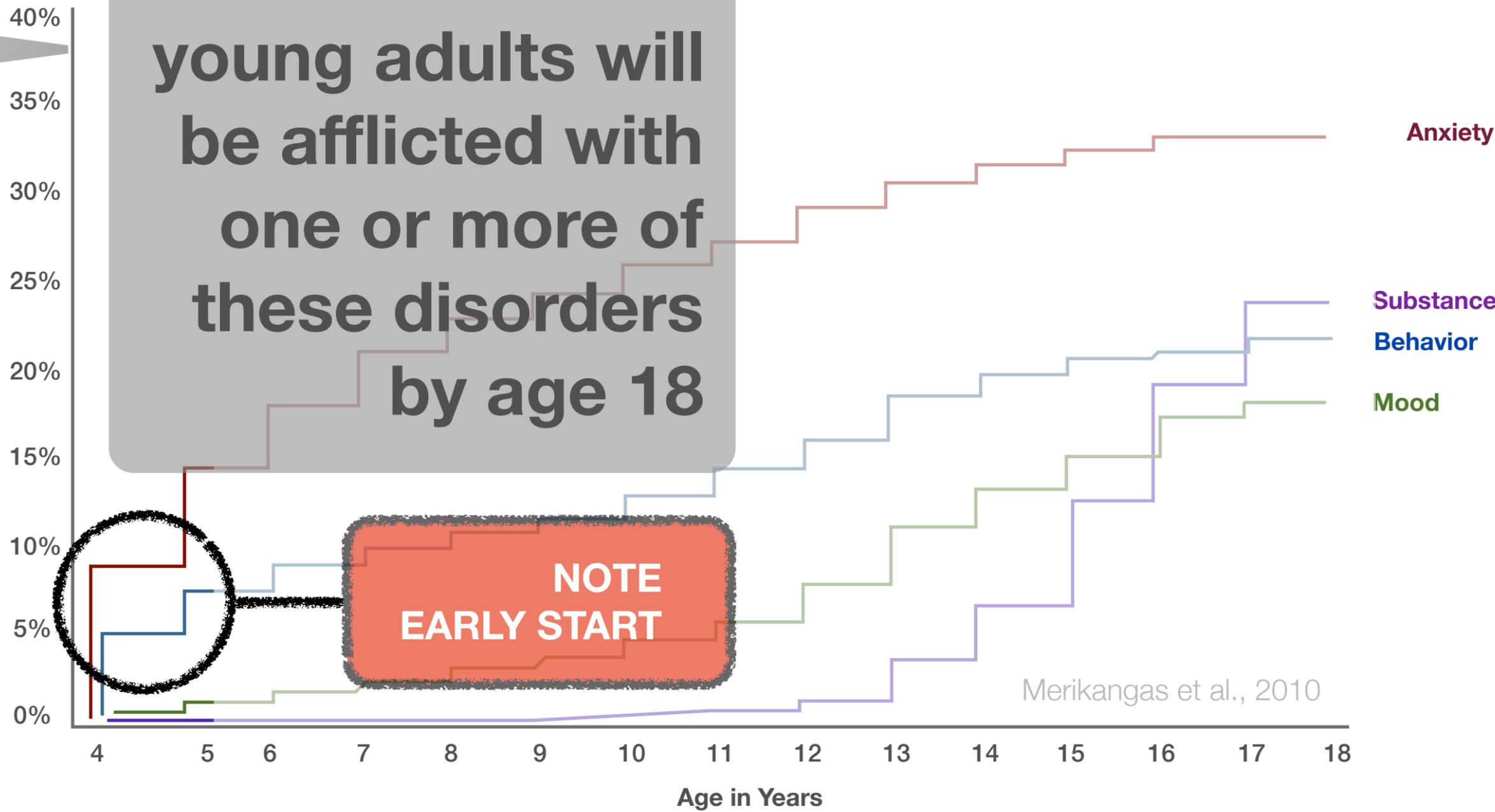
Lifetime Prevalence of Disorders in US Adolescents (N=10,123)



Lifetime Prevalence of Disorders in US Adolescents (N=10,123)



Lifetime Prevalence of Disorders in US Adolescents (N=10,123)



1-out-2 USA young adults will be afflicted with one or more of these disorders by age 18

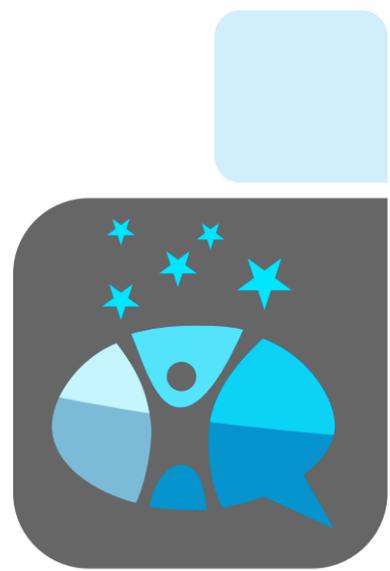
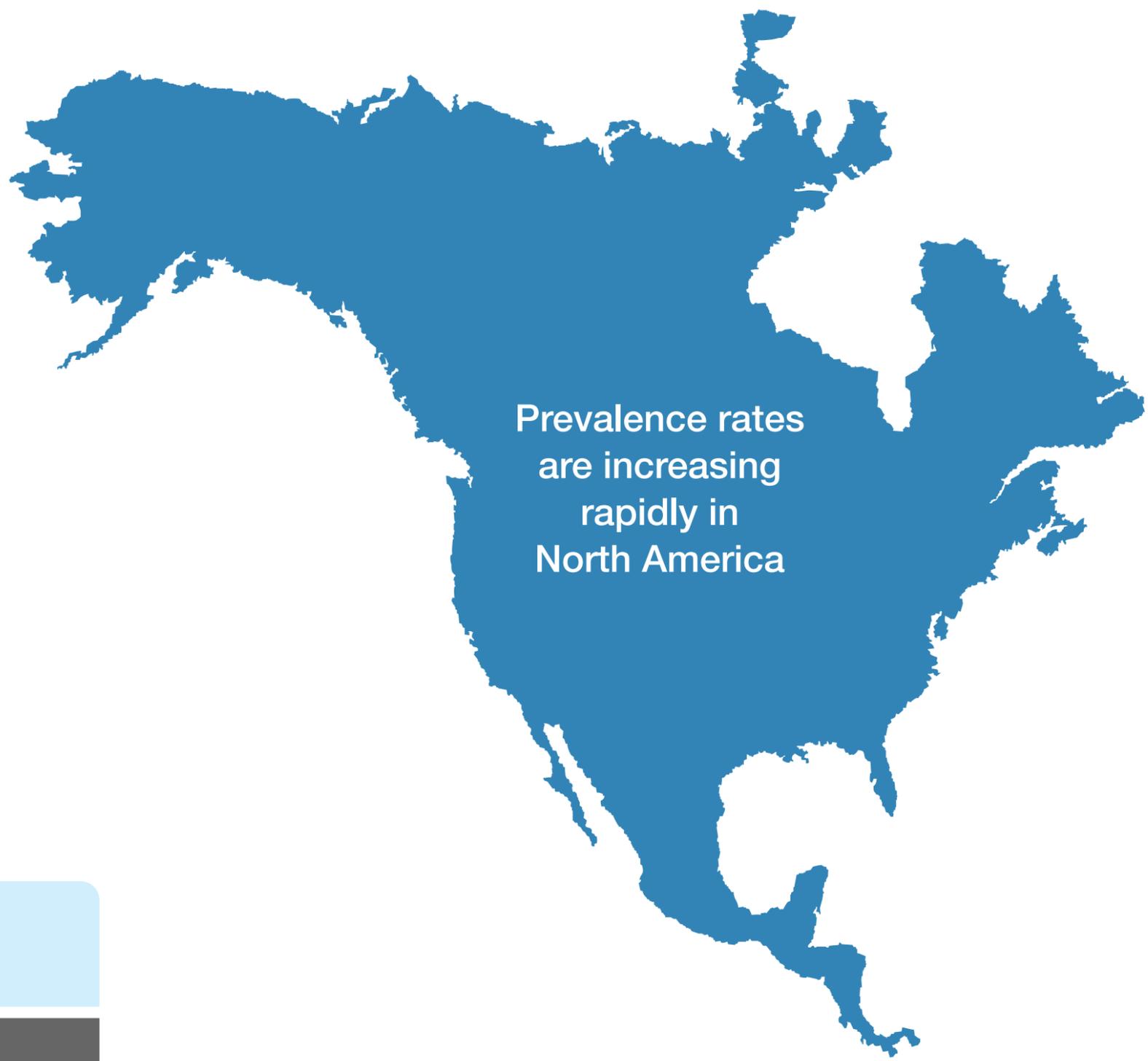
NOTE EARLY START

Merikangas et al., 2010



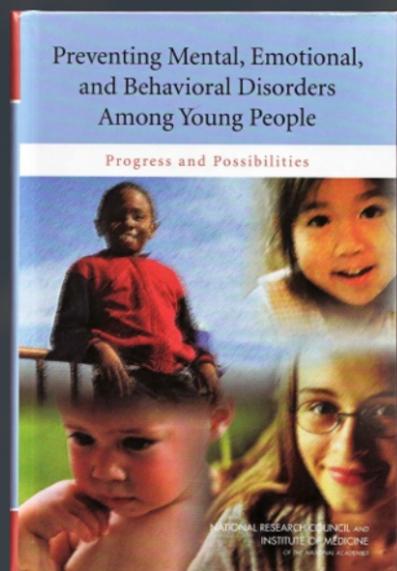


How do we handle this problem of mental illnesses?



How do we handle this problem of mental illnesses?

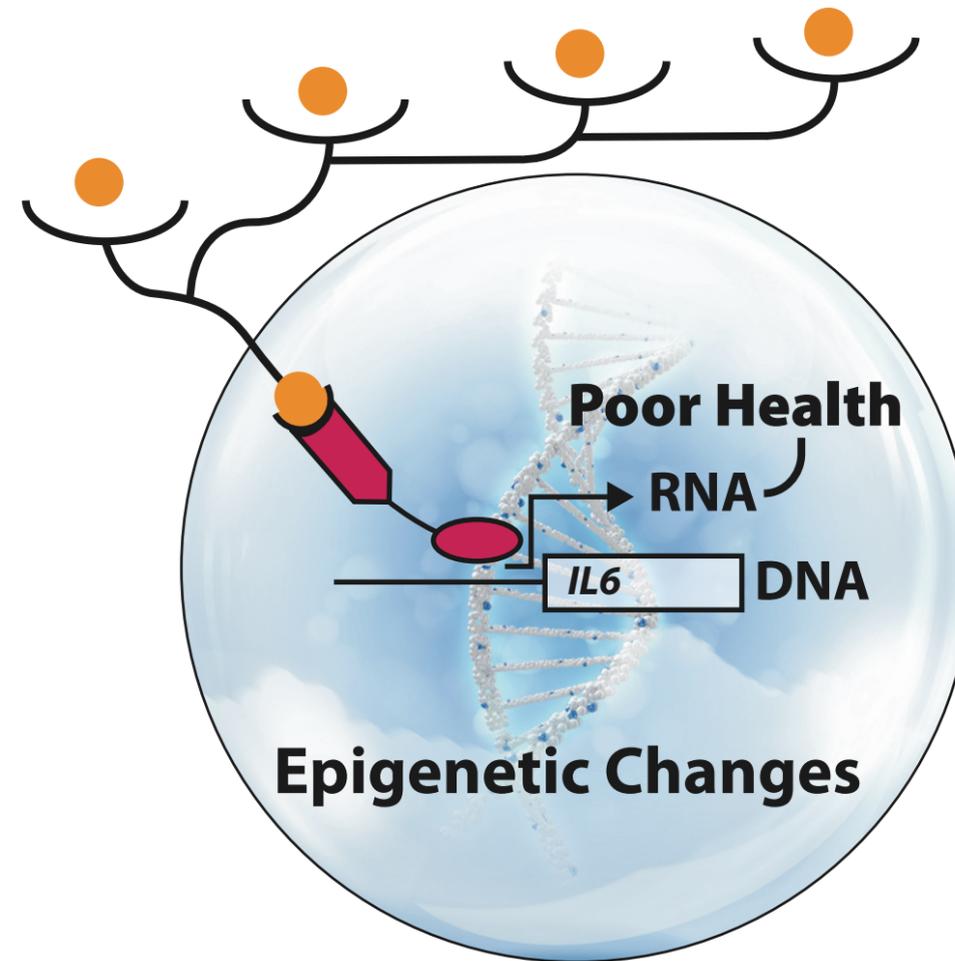
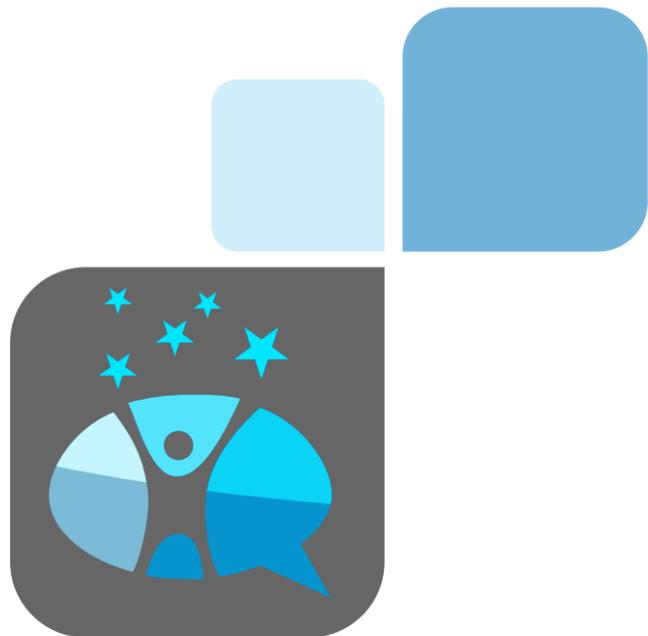




Excellent
or
promising
science
exists...

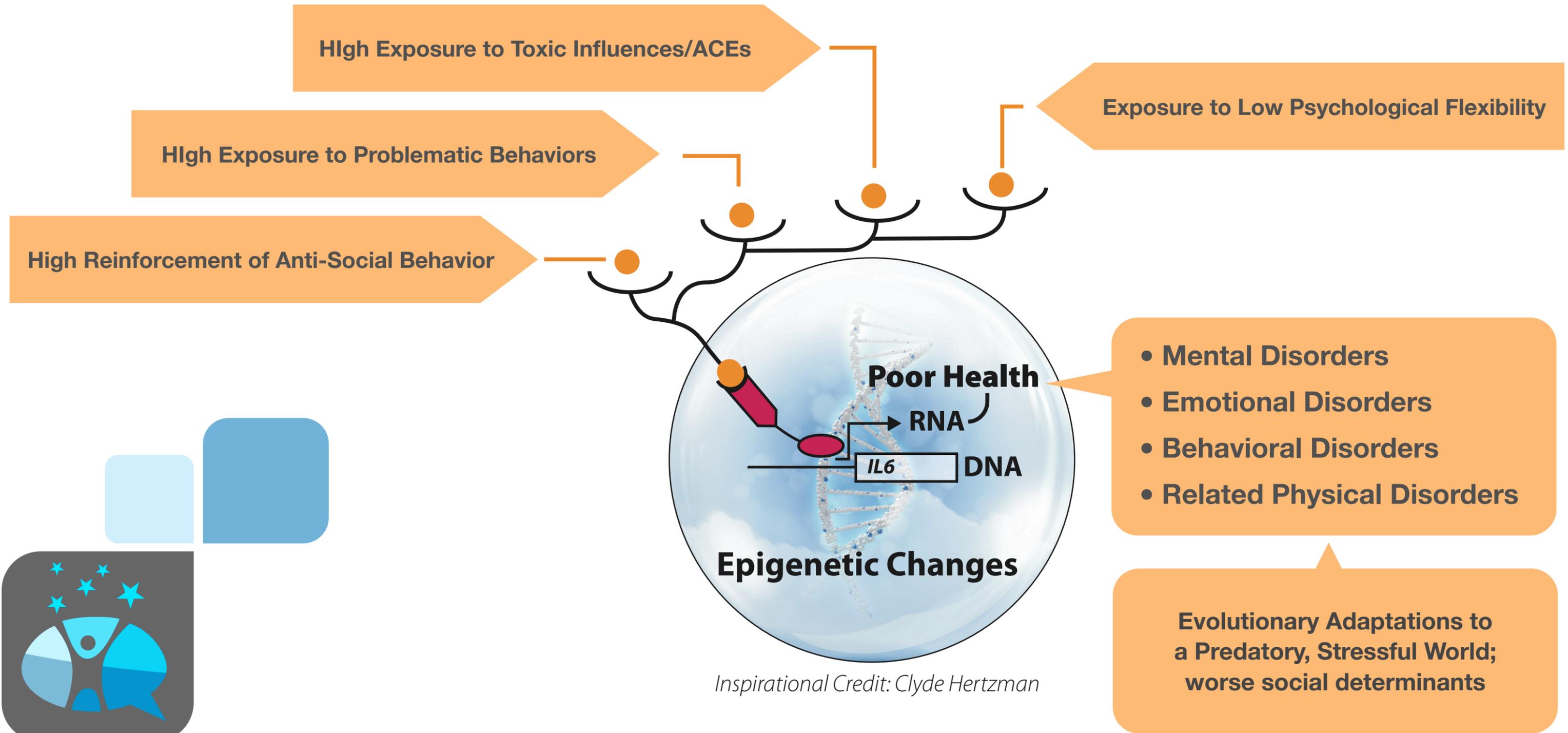
To prevent, protect against—and even recover from—mental, emotional, and behavioral disorders

Common set of conditions producing these negative trends...

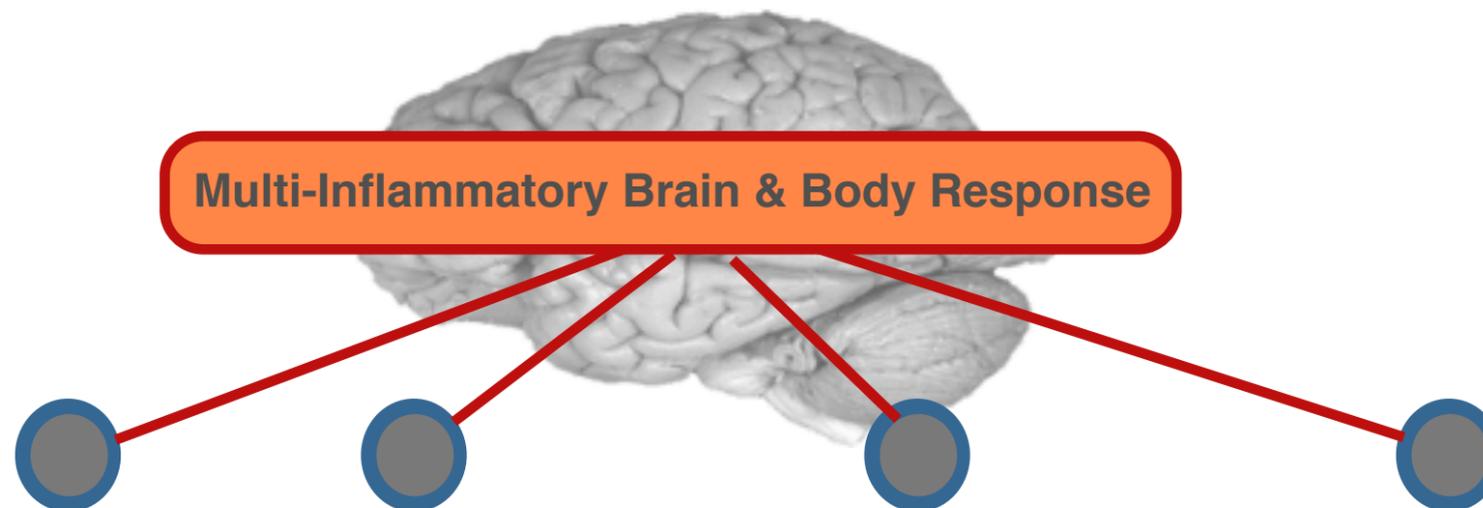
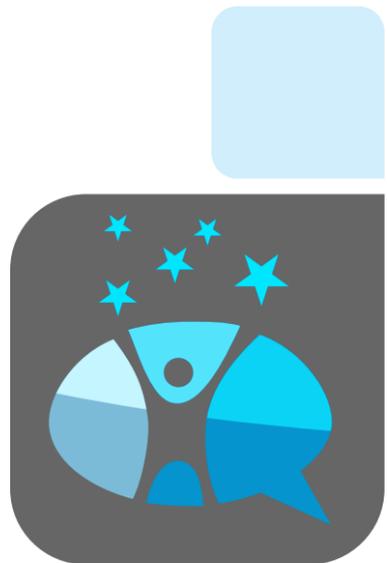


Inspirational Credit: Clyde Hertzman

Common set of conditions producing these negative trends...



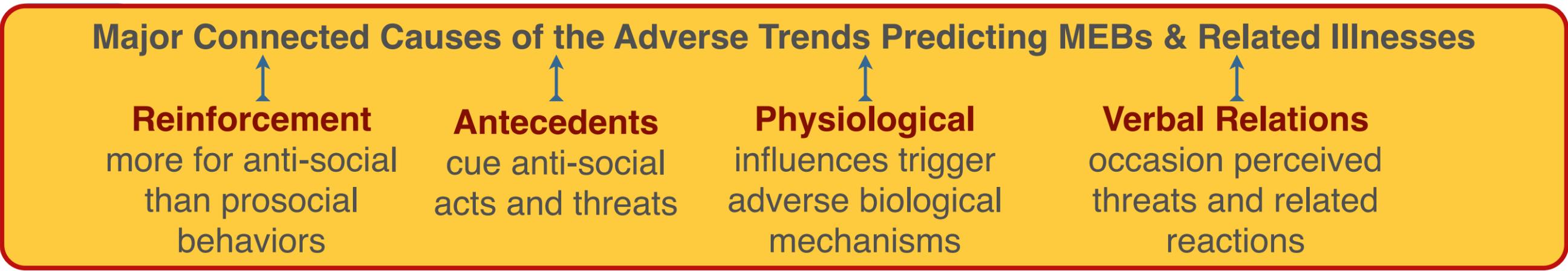
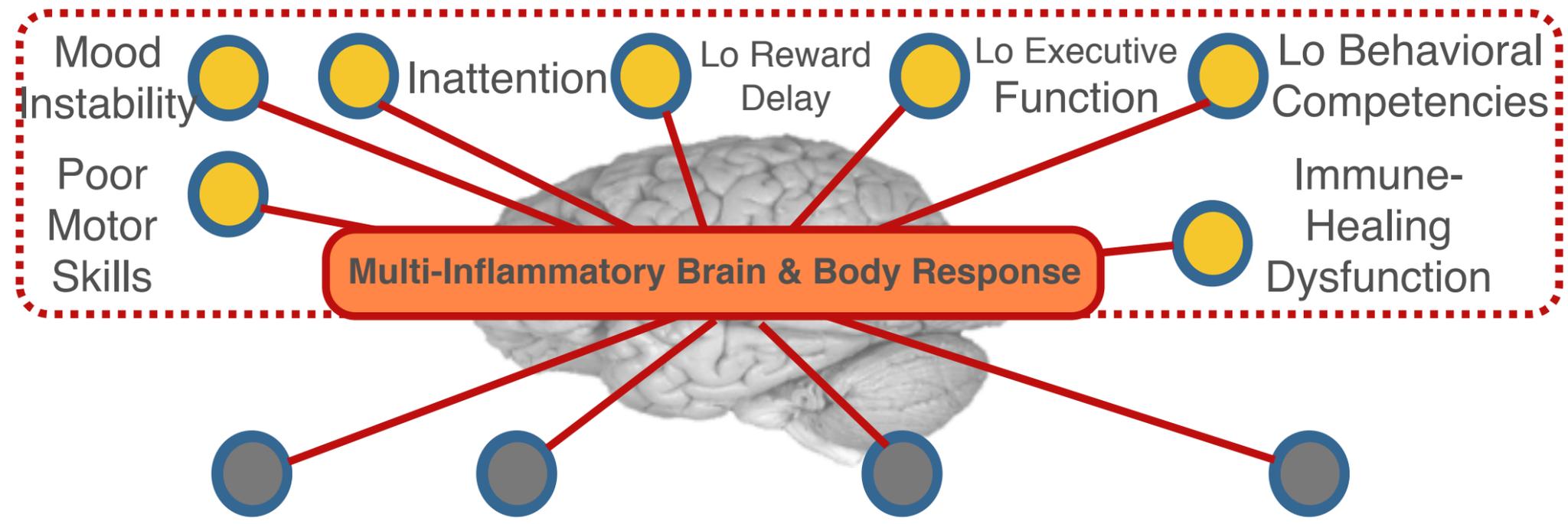
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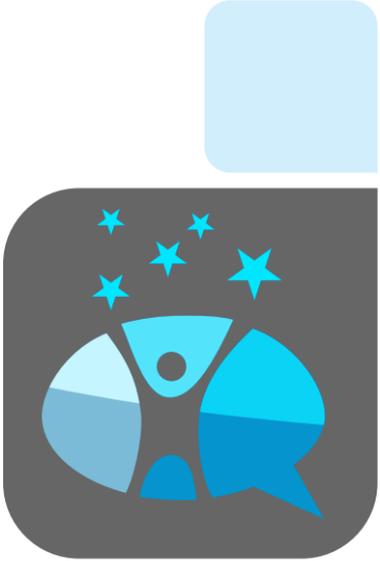
Major Connected Causes of the Adverse Trends Predicting MEBs & Related Illnesses

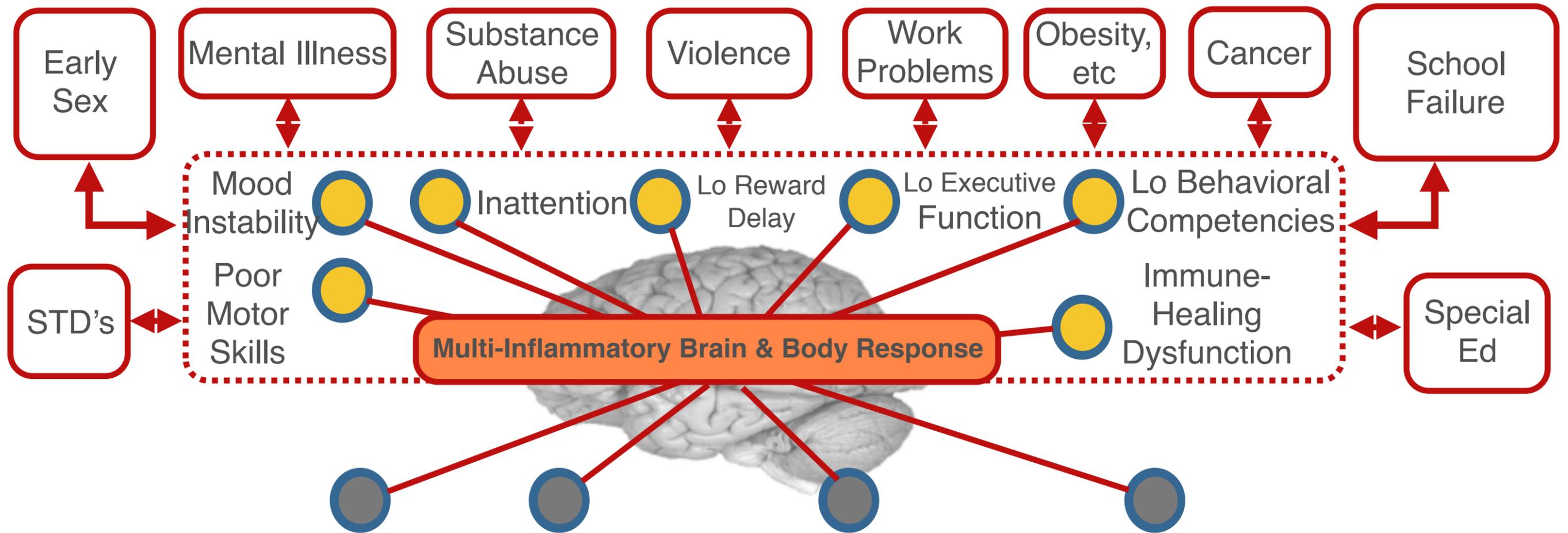
Reinforcement more for anti-social than prosocial behaviors	Antecedents cue anti-social acts and threats	Physiological influences trigger adverse biological mechanisms	Verbal Relations occasion perceived threats and related reactions
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The Same Mismatches Predict Multiple MACH Disorders



The Same Mismatches Predict Multiple MACH Disorders

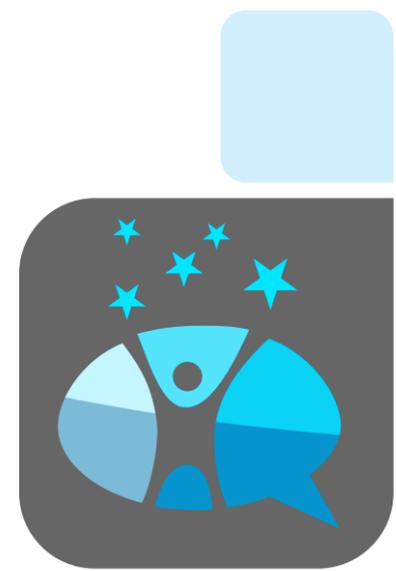




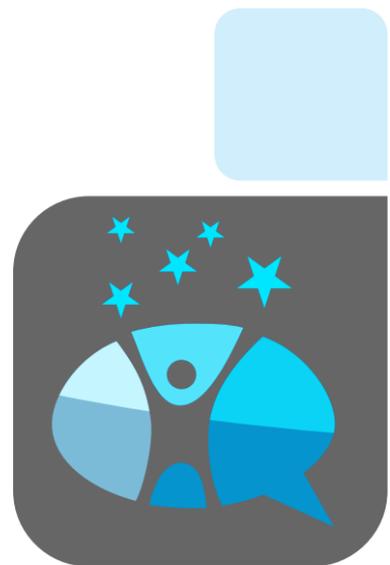
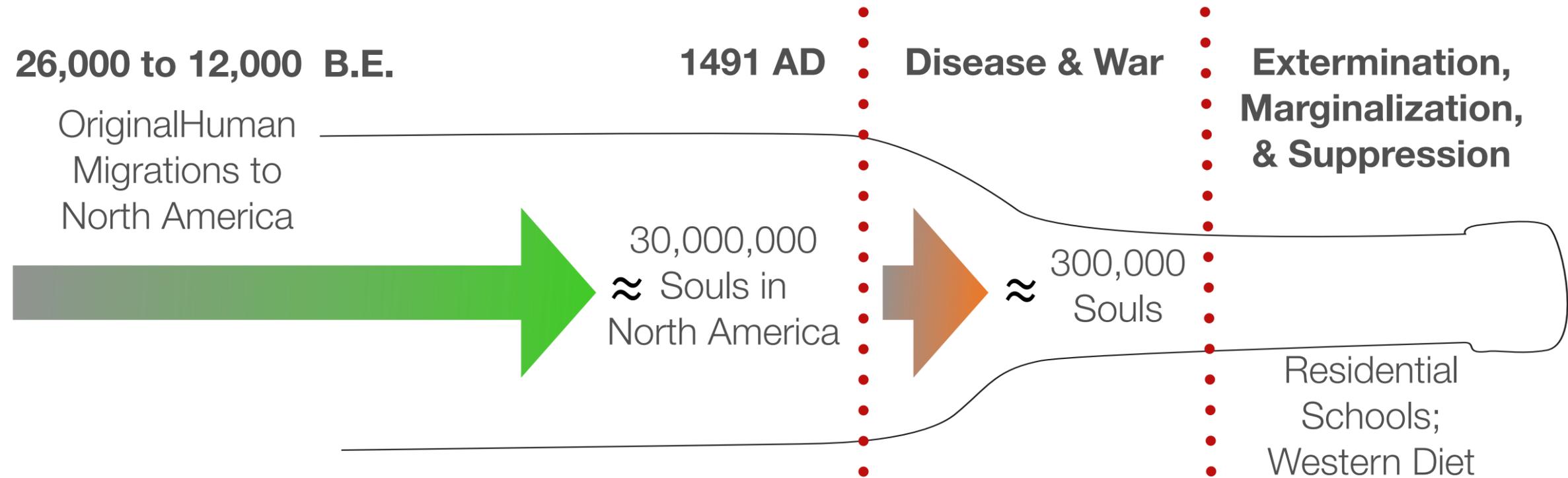
Major Connected Causes of the Adverse Trends Predicting MEBs & Related Illnesses

<p>Reinforcement more for anti-social than prosocial behaviors</p>	<p>Antecedents cue anti-social acts and threats</p>	<p>Physiological influences trigger adverse biological mechanisms</p>	<p>Verbal Relations occasion perceived threats and related reactions</p>
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The Same Mismatches Predict Multiple MACH Disorders

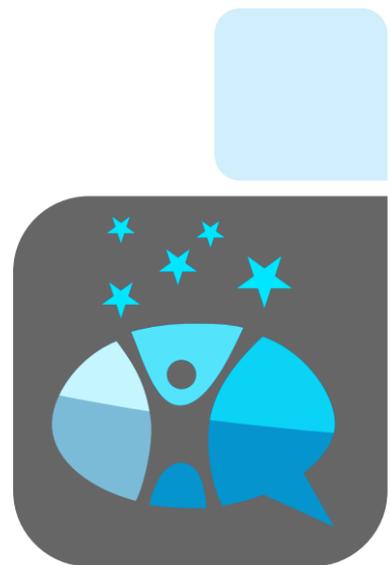
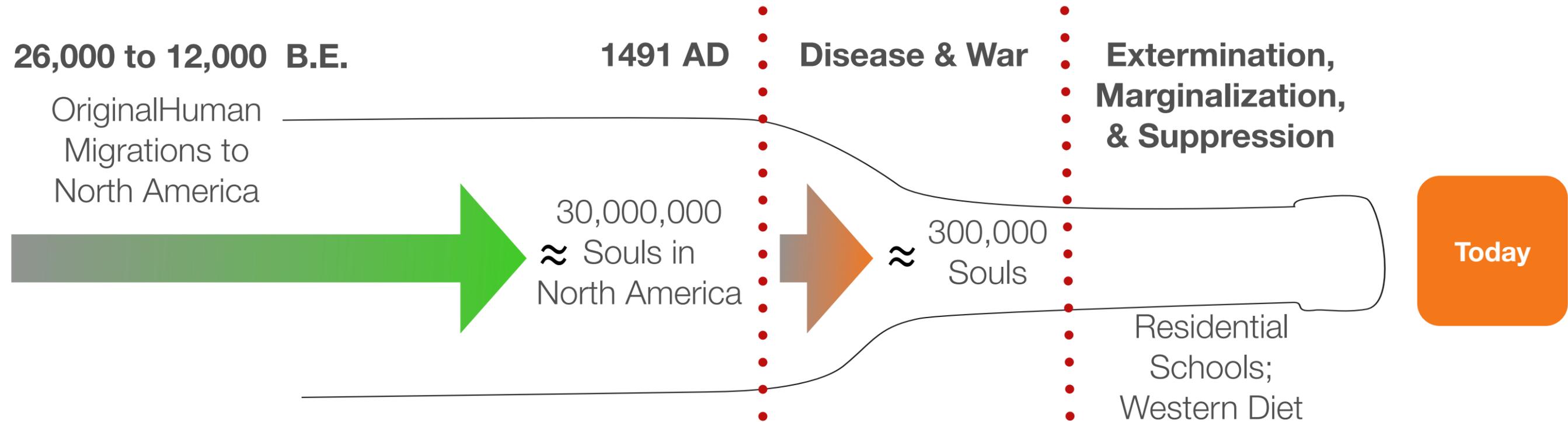


The America's First Peoples...



Evolutionary bottleneck

The America's First Peoples...



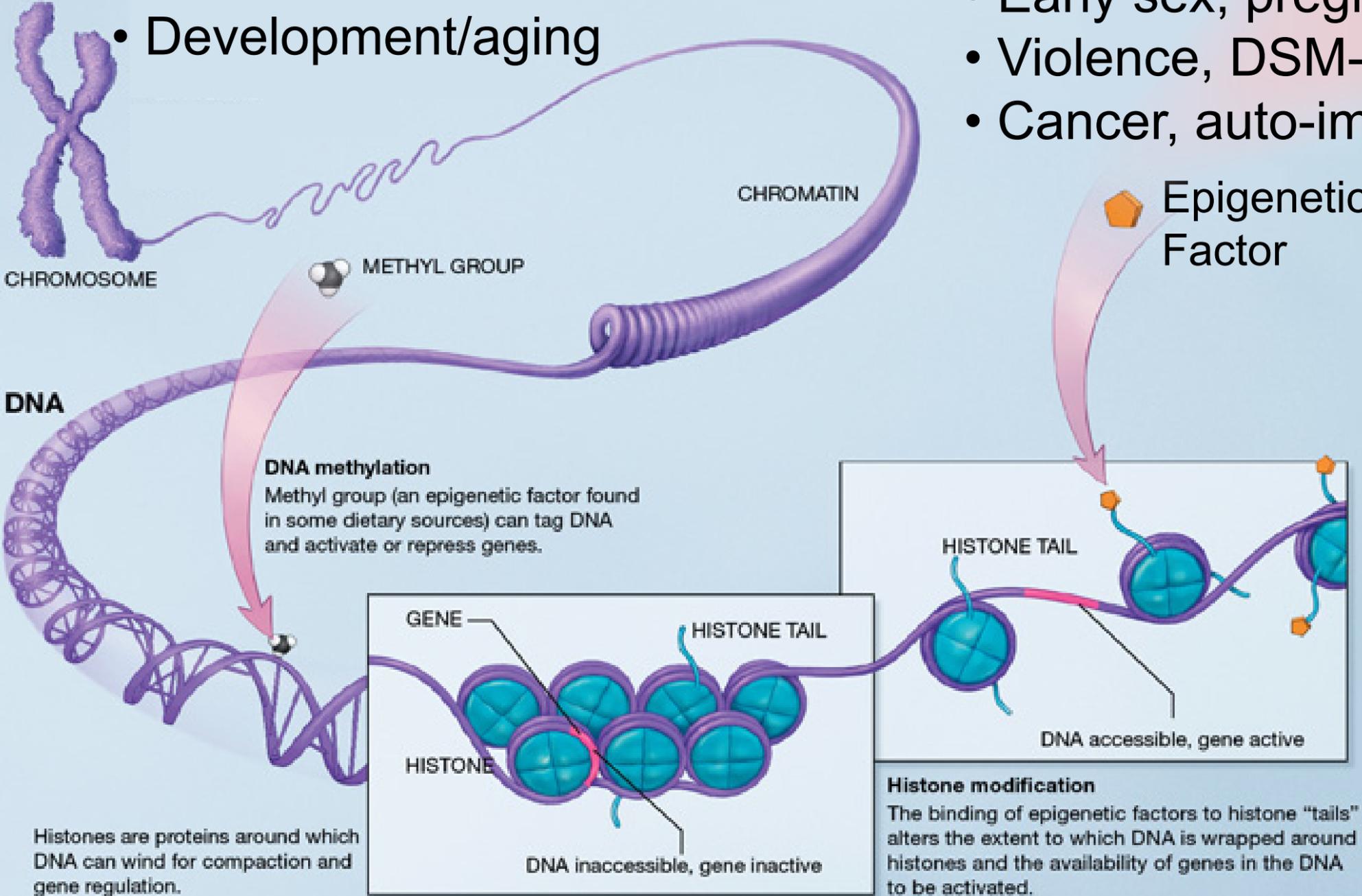
Evolutionary bottleneck

Yes, the social and physical environment of humans changes gene expression.



Epigenetic Mechanisms

- Nurturing environments
- Toxic environments
- Development/aging



Health & Behavior

- Obesity, asthma, diabetes
- Early sex, pregnancy
- Violence, DSM-IV
- Cancer, auto-immune



The Path Predictors

Prediction makes protection possible



HURRICANE SANDY



SANDY HOOK

The Path Predictors

Prediction makes protection possible

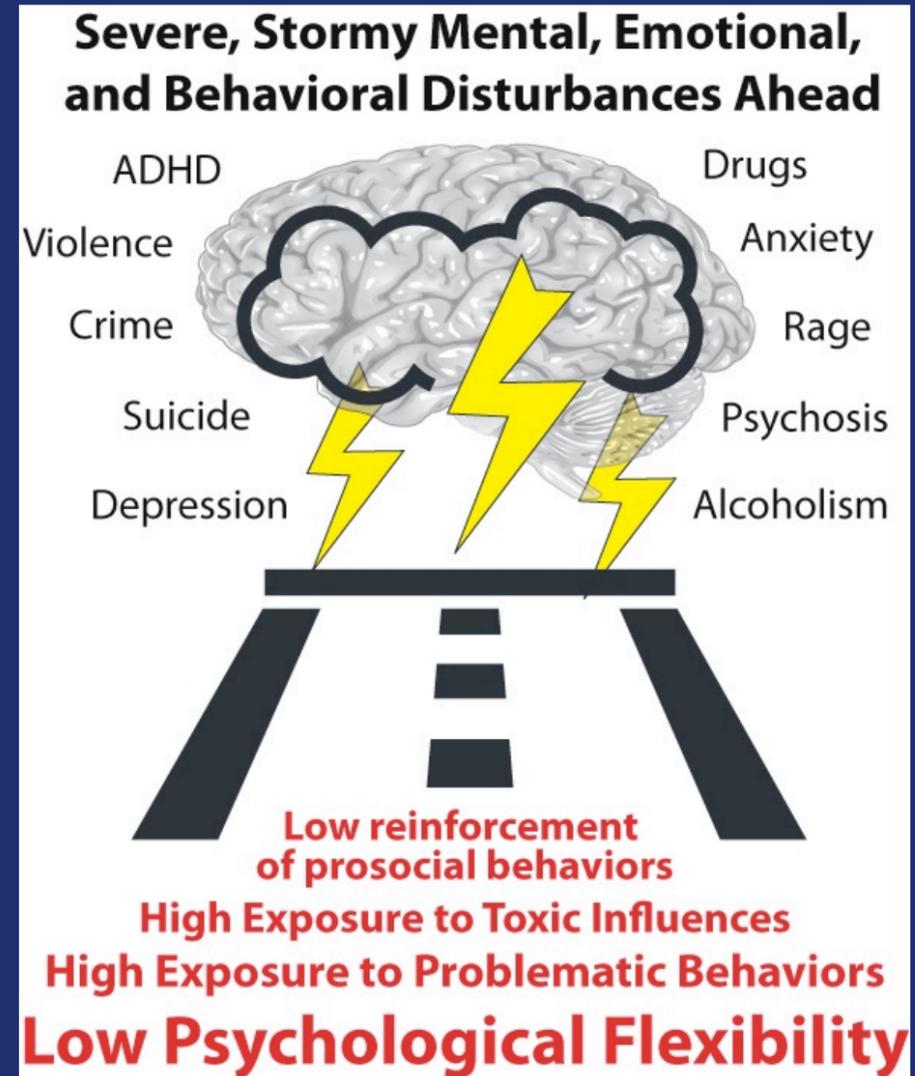


HURRICANE SANDY



The Path Predictors

SANDY HOOK

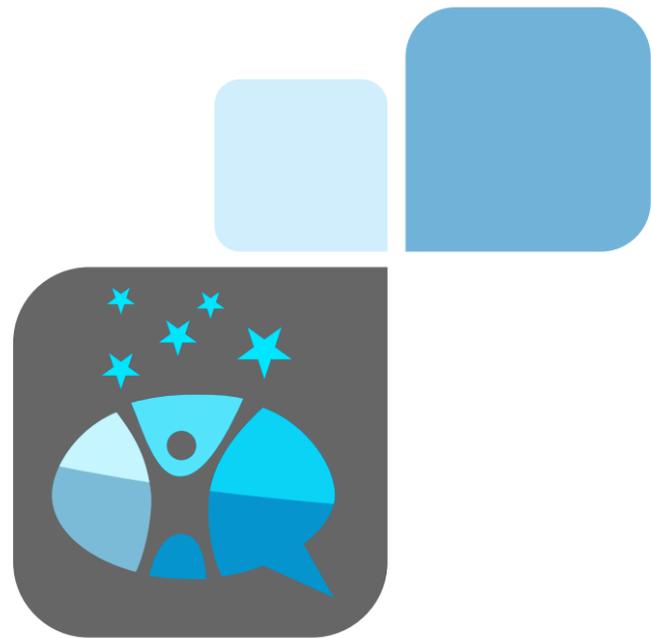


The Early Path Predictors

Prediction makes protection possible

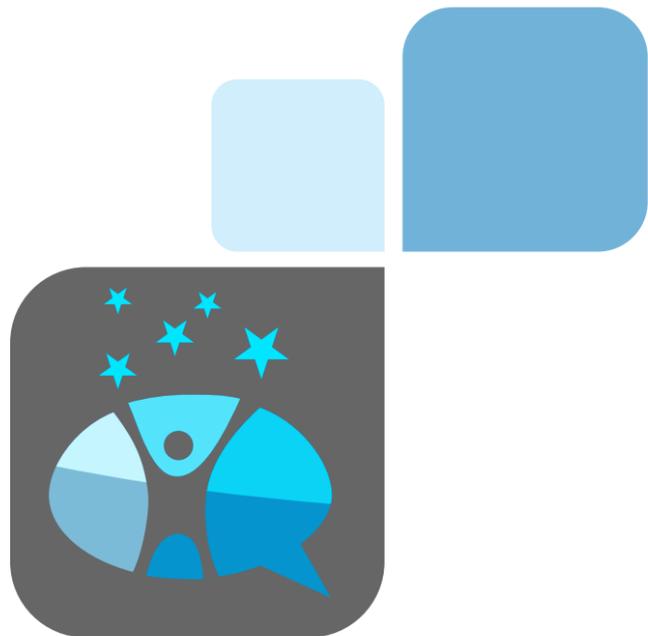


What shall we do to save Canada's Future

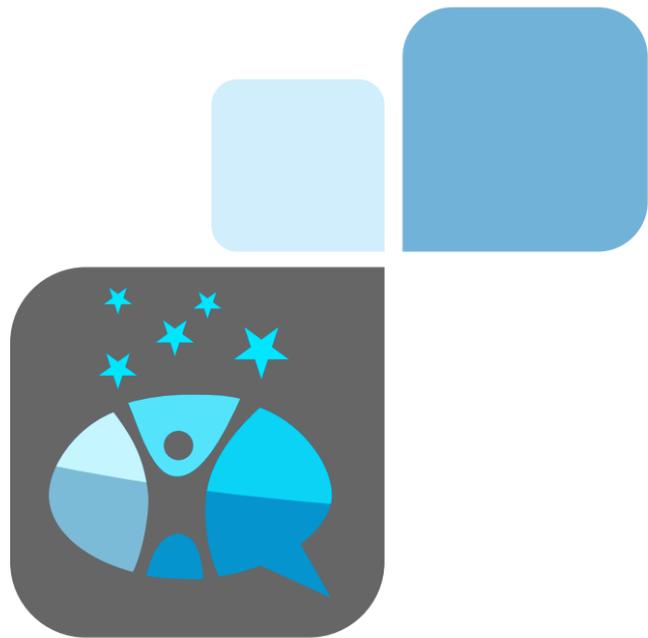




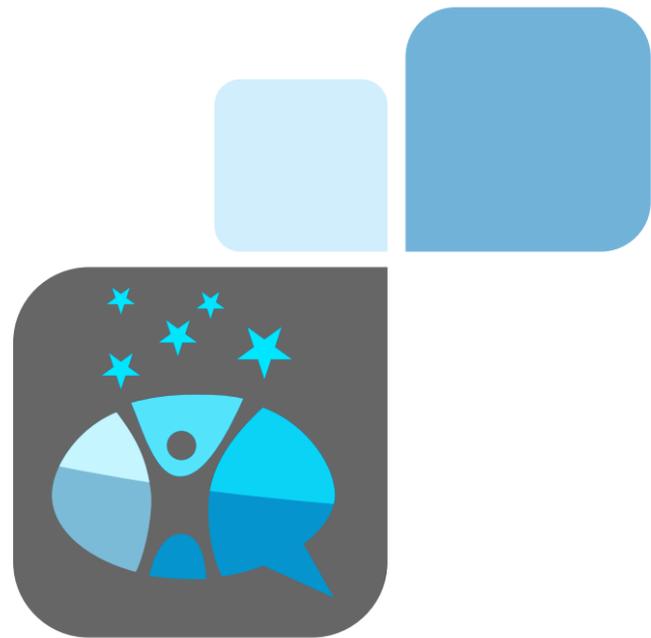
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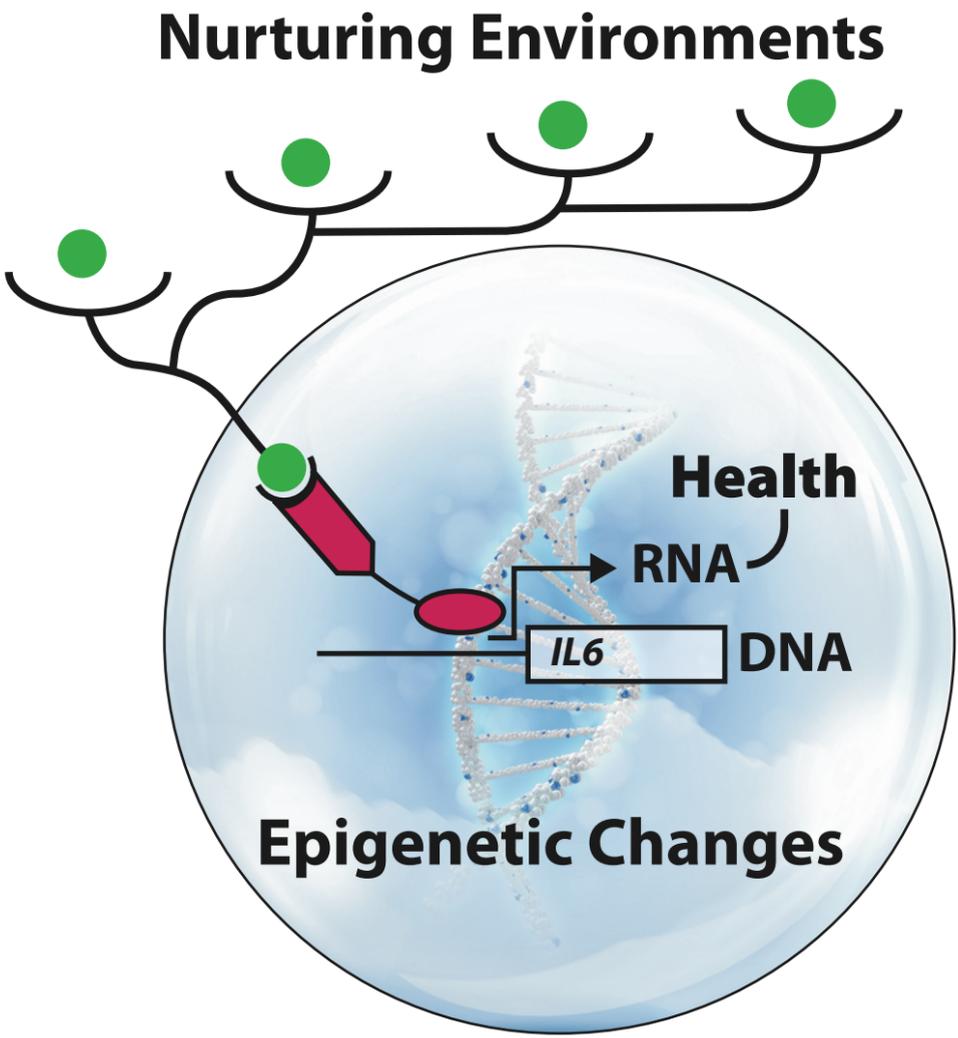
Ramp up
treatment
after
problems
happen



Increase
promotion
and
prevention
(protection)

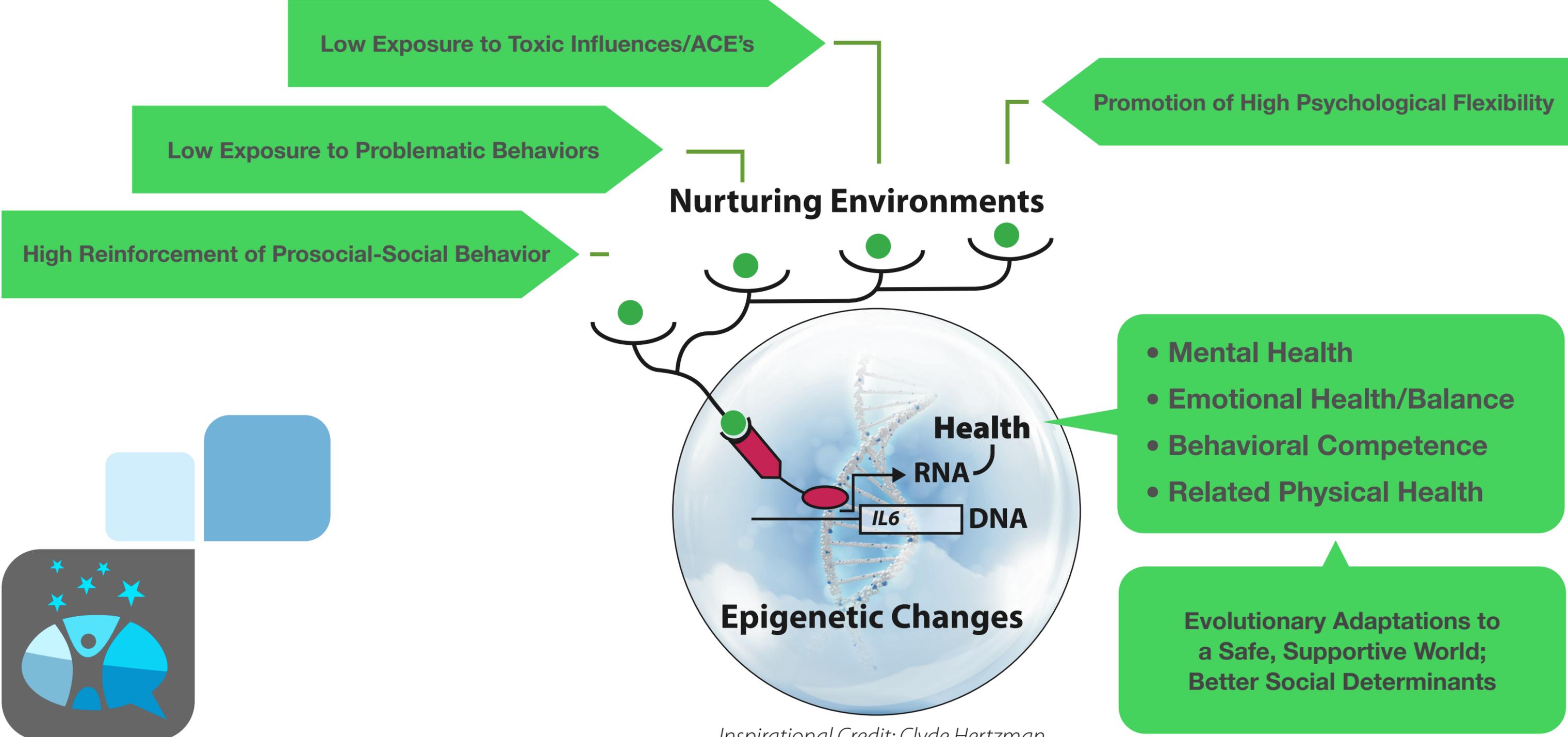


Common set of conditions producing positive, healthy trends...

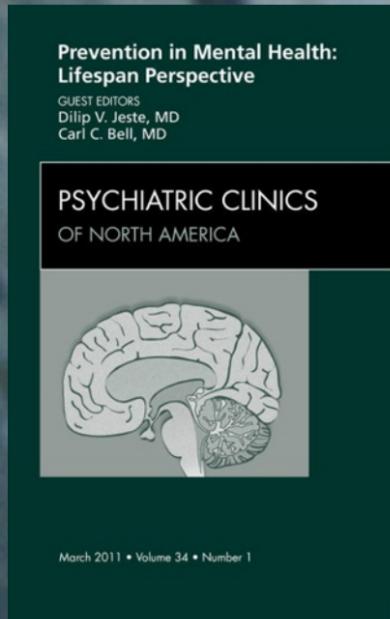


Inspirational Credit: Clyde Hertzman

Common set of conditions producing positive, healthy trends...



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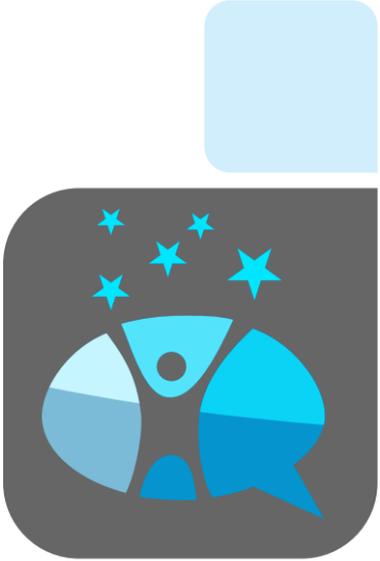
Behavioral Vaccines and Evidence-Based Kernels: Nonpharmaceutical Approaches for the Prevention of Mental, Emotional, and Behavioral Disorders

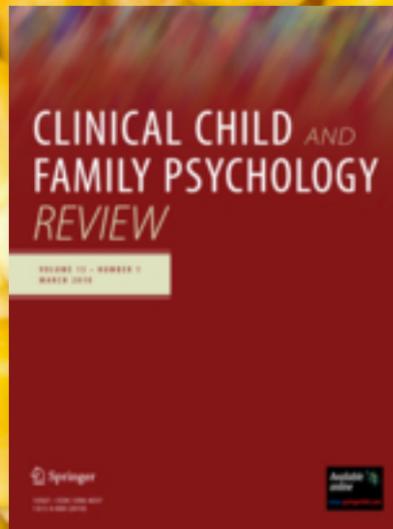
Dennis D. Embry, PhD

KEYWORDS
• Evidence-based kernels • Behavioral vaccines • Prevention • Public health

The Institute of Medicine Report on the Prevention of Mental, Emotional and Behavioral Disorders Among Young People¹ (IOM Report) provides a powerful map for how the United States might significantly prevent mental illnesses and behavioral disorders like alcohol, tobacco, and other drug use among America's youth. This document is already shaping United States policies, and will almost certainly affect Canada and other countries' policies. Mental, emotional, and behavioral disorders (MEBs) among America's youth and young adults present a serious threat to the country's national security² and to our economic competitiveness compared with 22 other rich countries.³⁻⁷ Such MEBs are also the leading preventable cost center for local, state, and the federal governments.^{1,4} Further, safe schools, healthy working environments, and public events or places are seriously compromised by MEBs as well.

Behavioral vaccines as public-health measure





Evidence-based Kernels: Fundamental Units of Behavioral Influence

Dennis D. Embry · Anthony Biglan

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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

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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-

Evidence-Based Kernels for public-health measure



Antecedent
Kernel

Happens BEFORE
the behavior

Reinforcement
Kernel

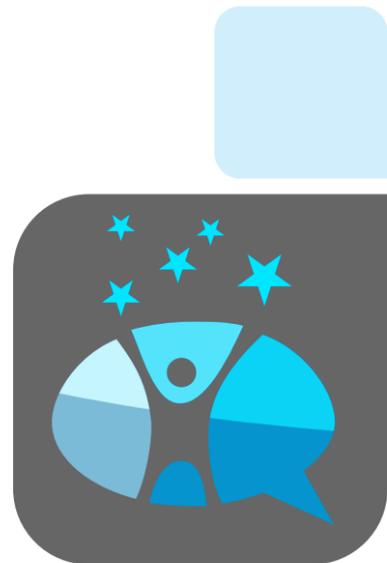
Happens AFTER the
behavior

Physiological
Kernel

Changes
biochemistry of
behavior

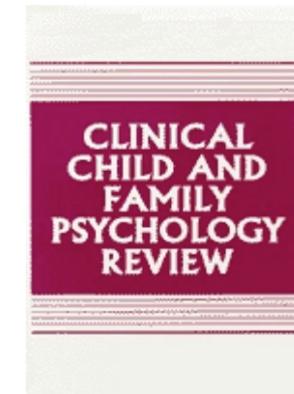
Relational
Frame
Kernel

Creates verbal
relations for the
behavior

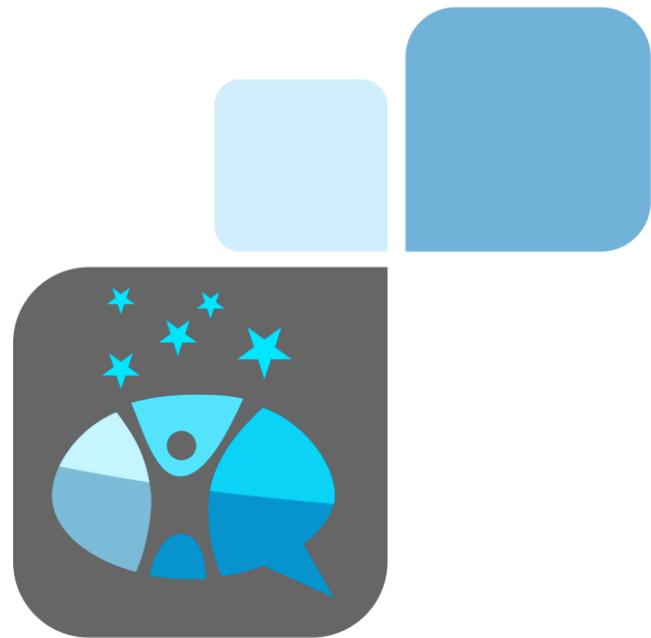


Four Types of Kernels

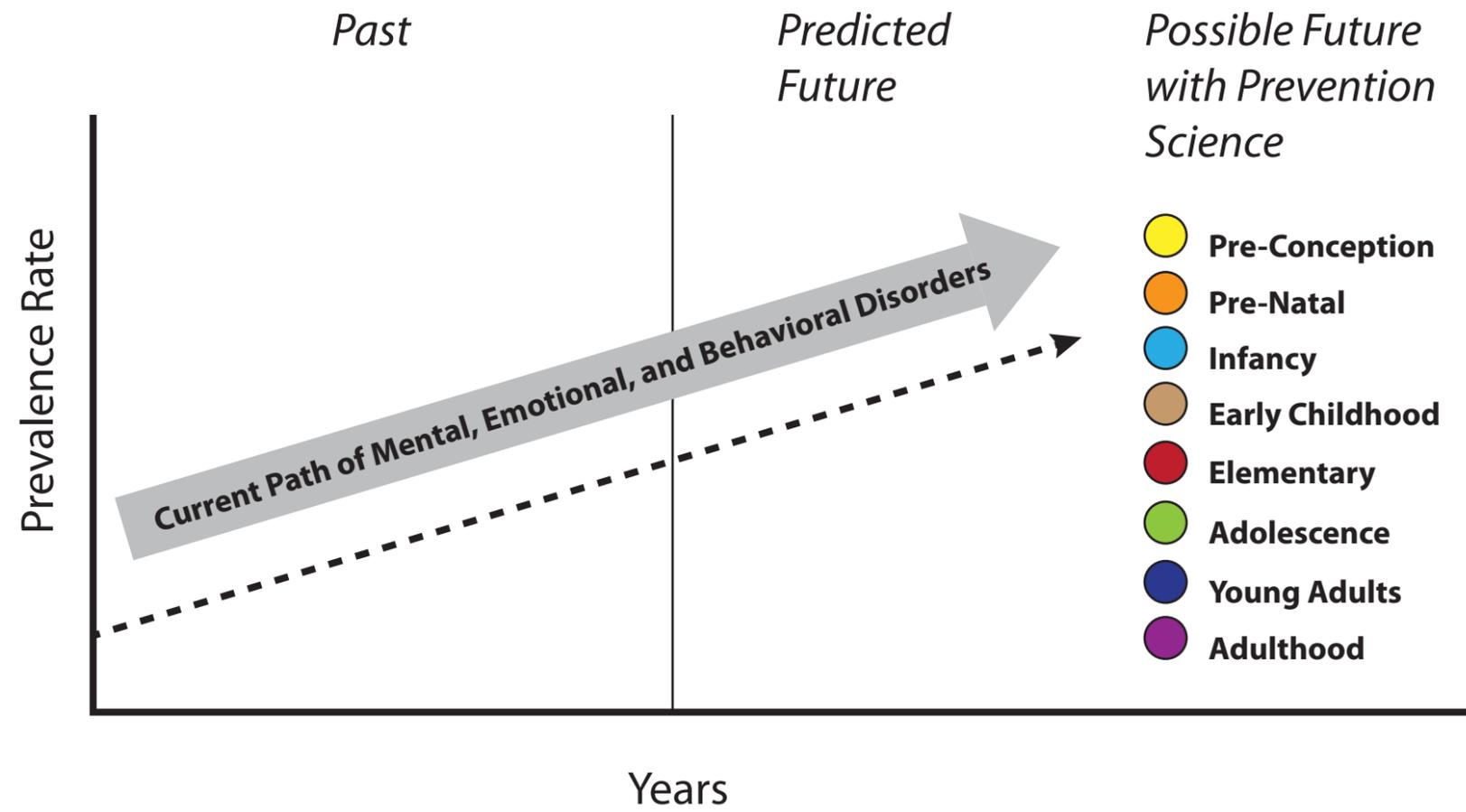
Embry, D. D., & Biglan, A.
(2008). Evidence-Based
Kernels: Fundamental Units of
Behavioral Influence. *Clinical
Child & Family Psychology
Review*, 39.



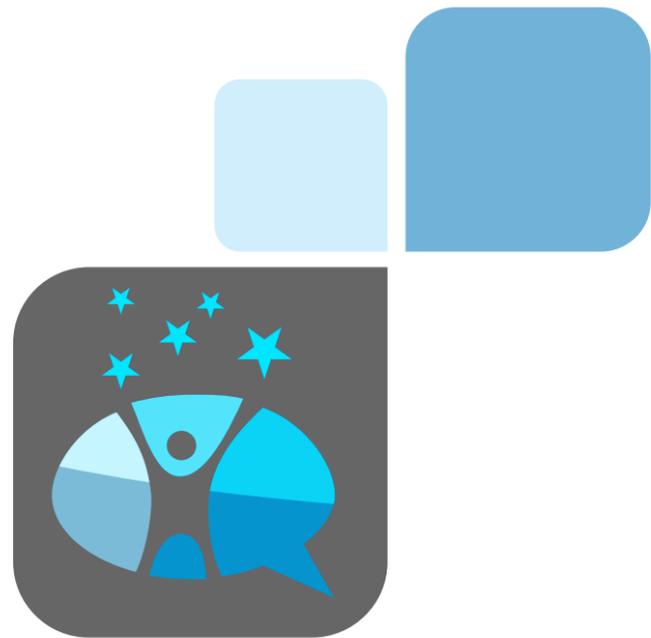
First, Select Some Early Wins Across Age Groups



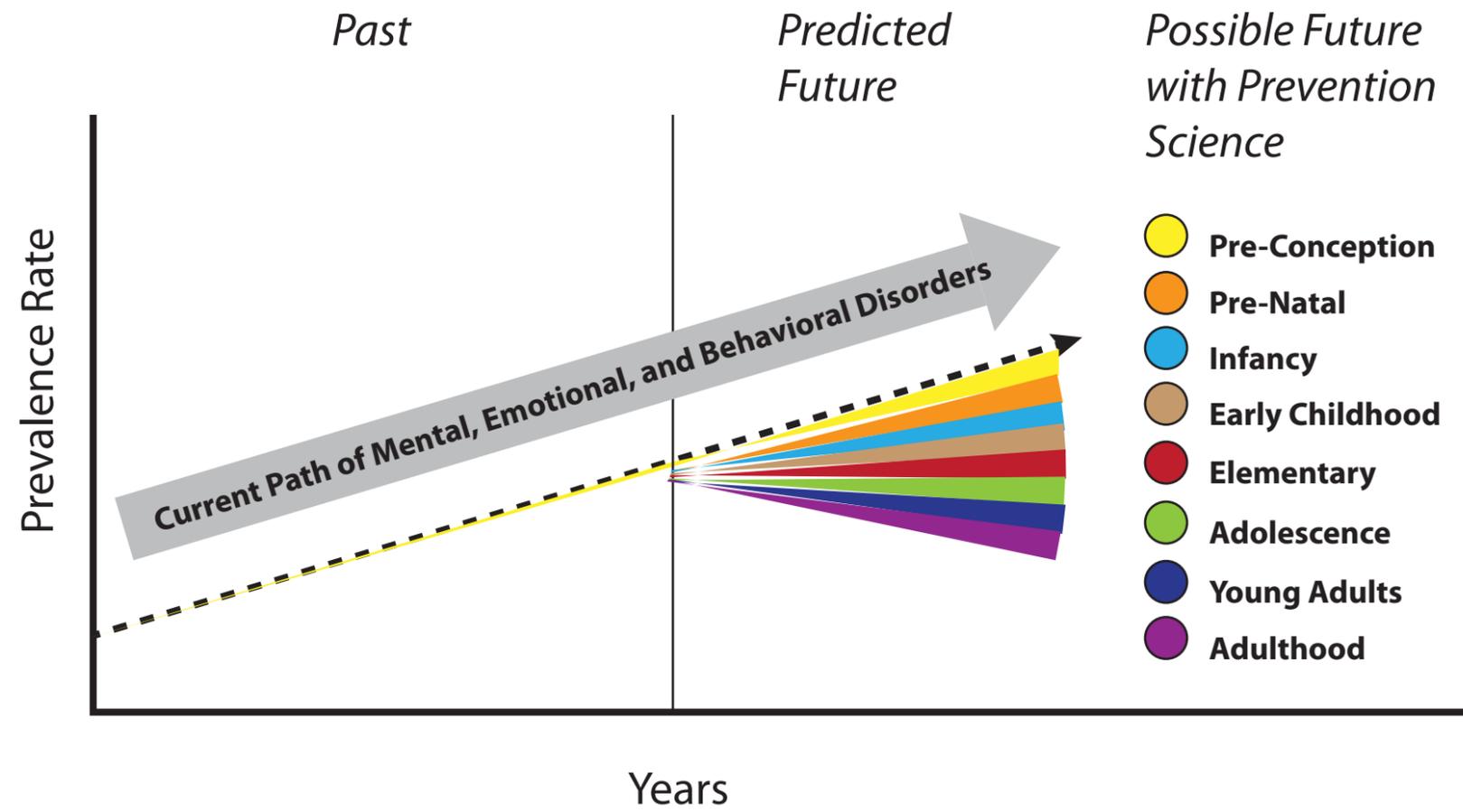
Trajectory of Mental, Behavioral, and Emotional Disorders
(illustrative graph only)



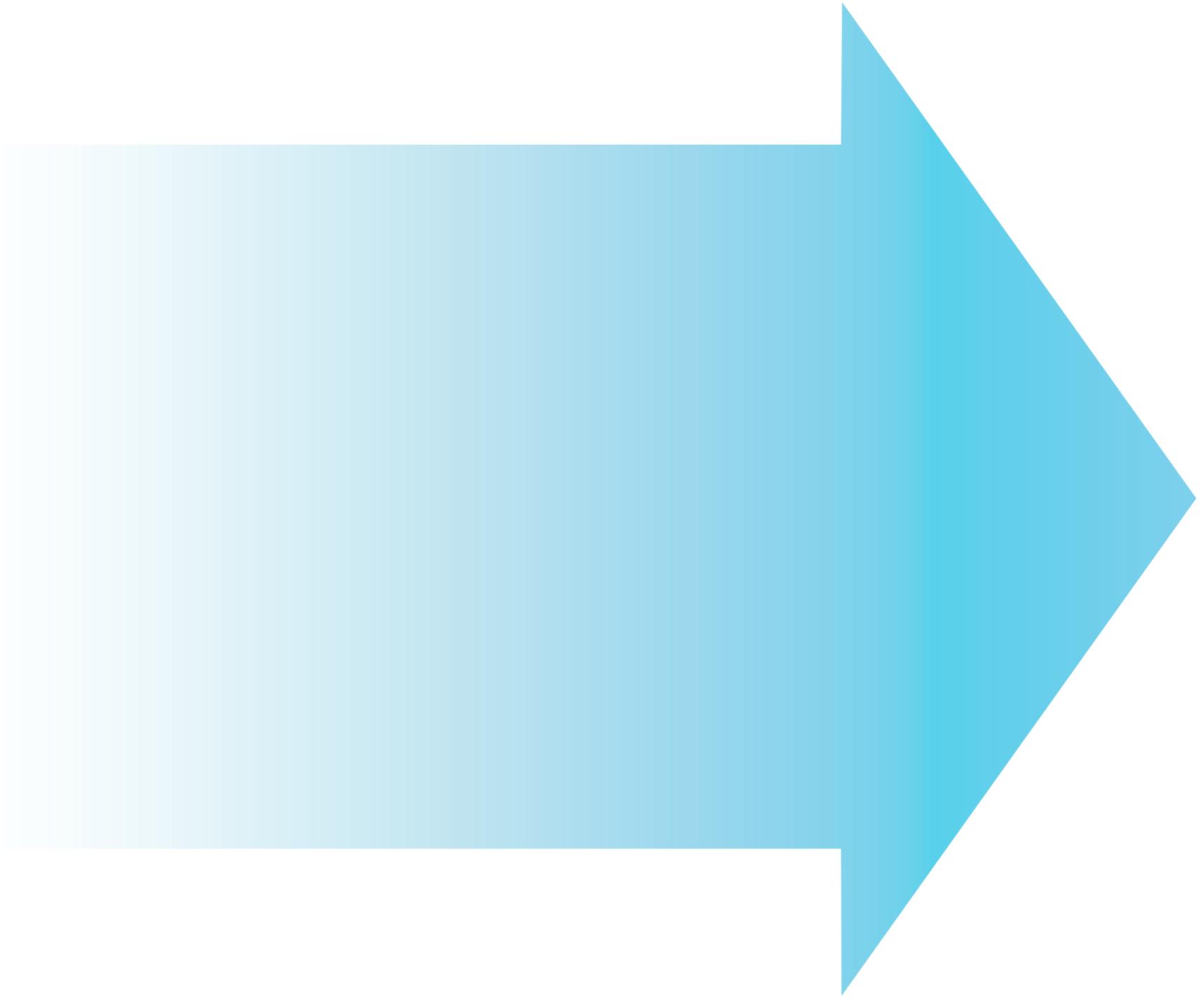
First, Select Early Wins Across Age Groups



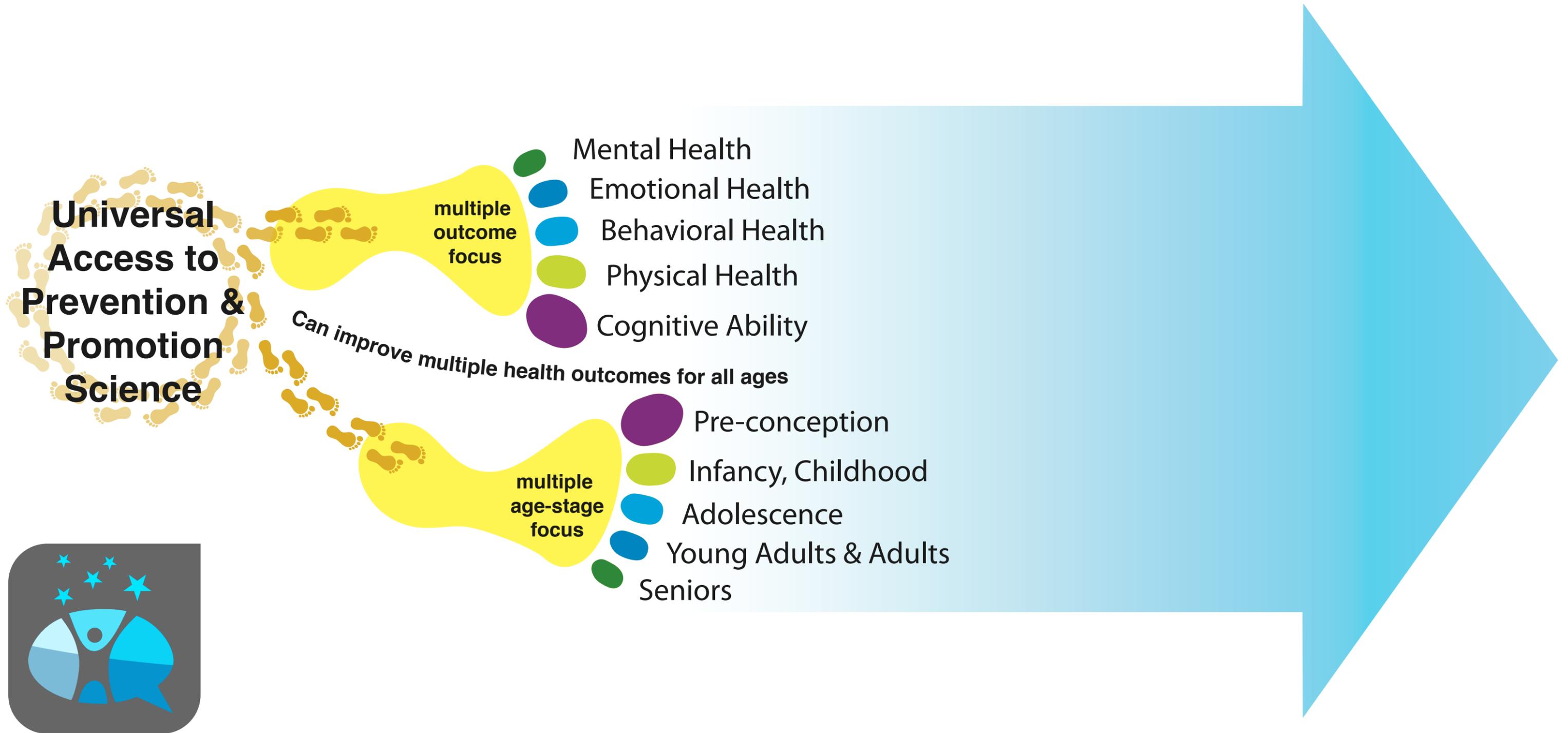
Trajectory of Mental, Behavioral, and Emotional Disorders
(illustrative graph only)



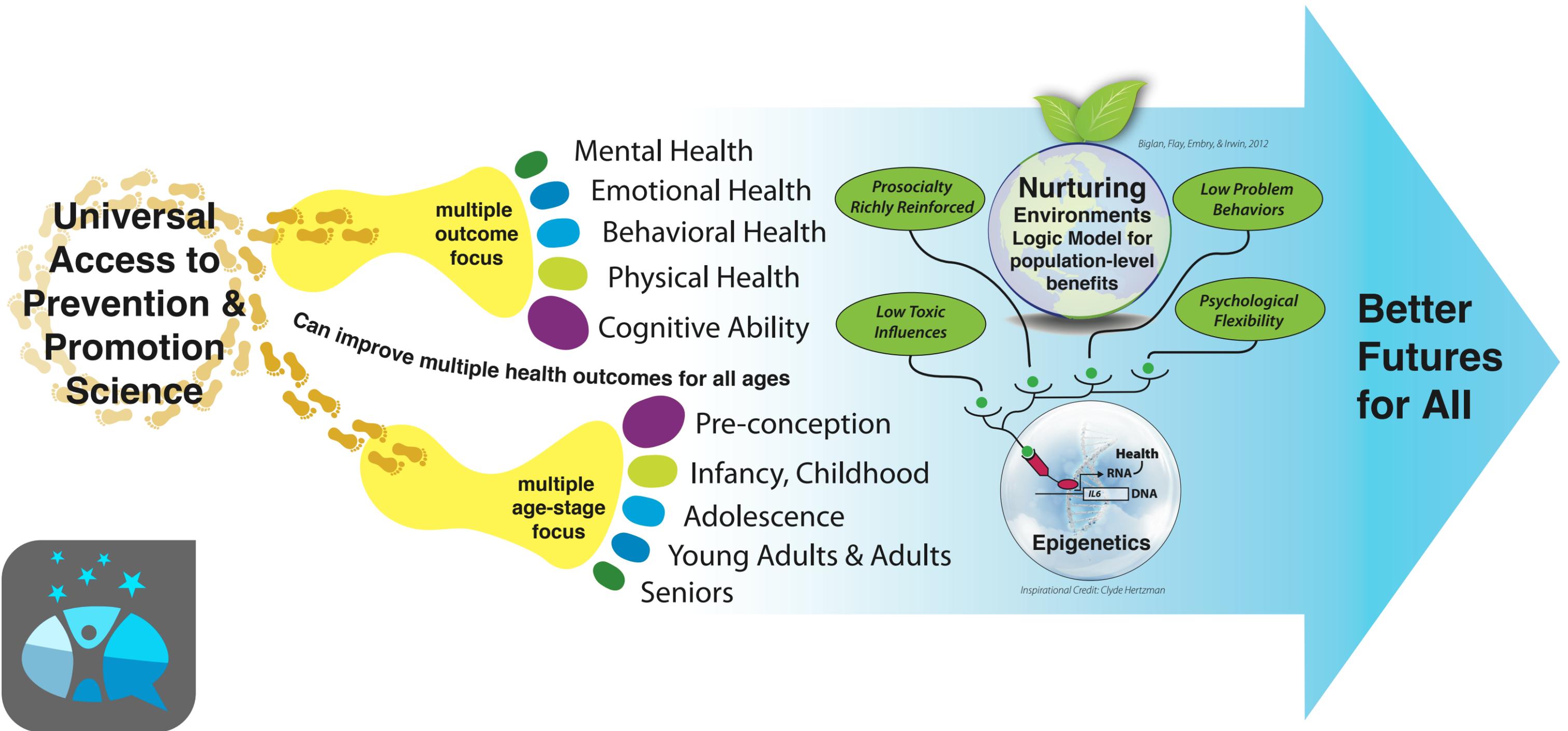
Select Early Wins with multiple footprints



Select Early Wins with multiple footprints, all ages



Select Early Wins also with long-term outcomes for all





Estimate the costs of **NOT** acting...

Estimate the benefits of acting to the public and private purse sort, medium and long term...



Predict Benefits (including economic)

Make the numbers real and human

Quantify by epidemiology how much **suffering** will happen by NOT acting



Make the numbers real and human



Quantify by epidemiology how much **suffering** will happen by NOT acting



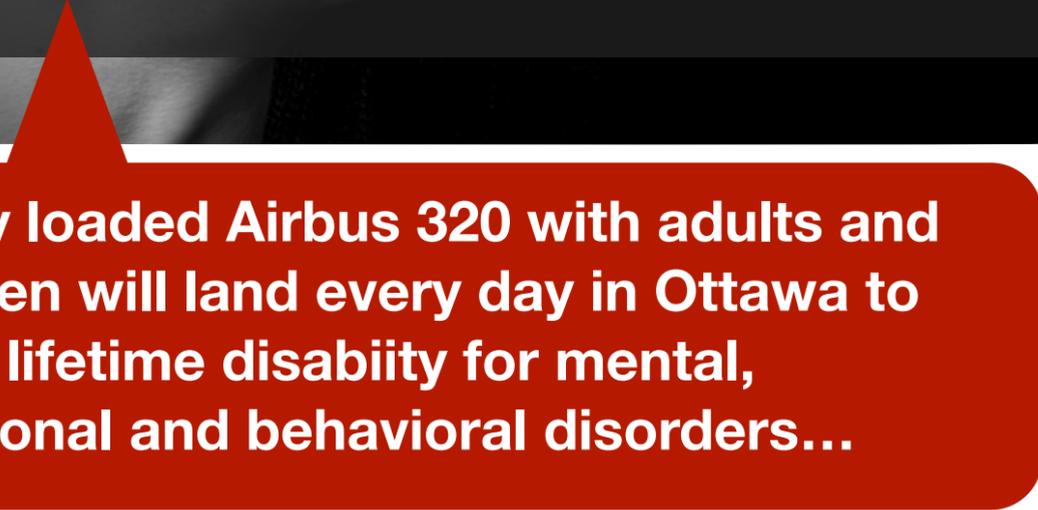
A fully loaded Airbus 320 with adults and children will land every day in Ottawa to claim lifetime disability for mental, emotional and behavioral disorders...



Make the numbers real and human



Quantify by epidemiology how much **suffering** will happen by NOT acting



A fully loaded Airbus 320 with adults and children will land every day in Ottawa to claim lifetime disability for mental, emotional and behavioral disorders...



Quantify by epidemiology the **positive** outcomes will happen from action

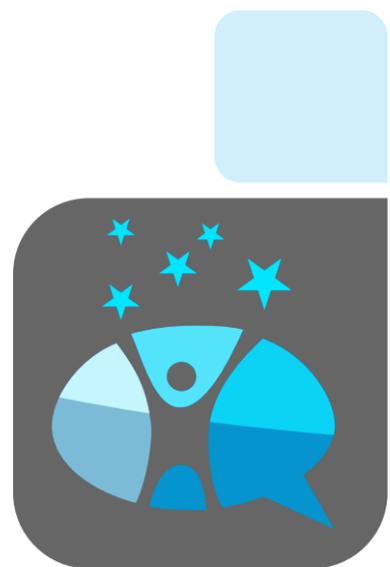


Everyday in Canada, 320 more adults and children will wake up to happier, healthier, and more productive lives...



Policy

A policy is described
government, private
"Statement of Inter
important organiza



Create policy, advocacy, and organizational supports to foster cooperation for common good



ELINOR OSTROM

2009 Nobel Laureate
in Economic Sciences

Nobel medal © © The Nobel Foundation



Policy Example: Children's Futures as Common Pool Resource





- Richly Reinforce Pro-social Behaviors
- Limit Problematic Behaviors
- Reduce Toxic Influences
- Increase Psychological Flexibility

Biglan et al., American Psychologist, (4), 2012



Cultivate stories of early adopters' successes...
and endorsement from important stakeholders



- Richly Reinforce Pro-social Behaviors
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Biglan et al., American Psychologist, (4), 2012



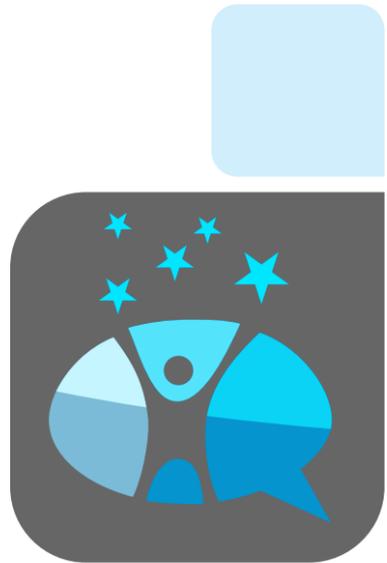
Cultivate stories of early adopters' successes...
and endorsement from important stakeholders



Develop a business model for sustainability



If the problem is increasing,
there is an implicit or explicit
business model supporting
the problem...

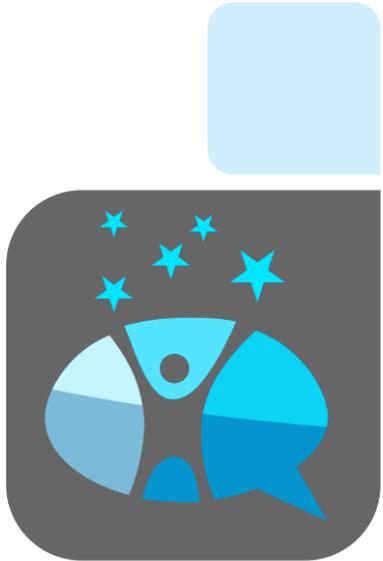


Develop a business model for sustainability



Pay for change and success,
instead of paying for the problem -
including Social Impact Bonds

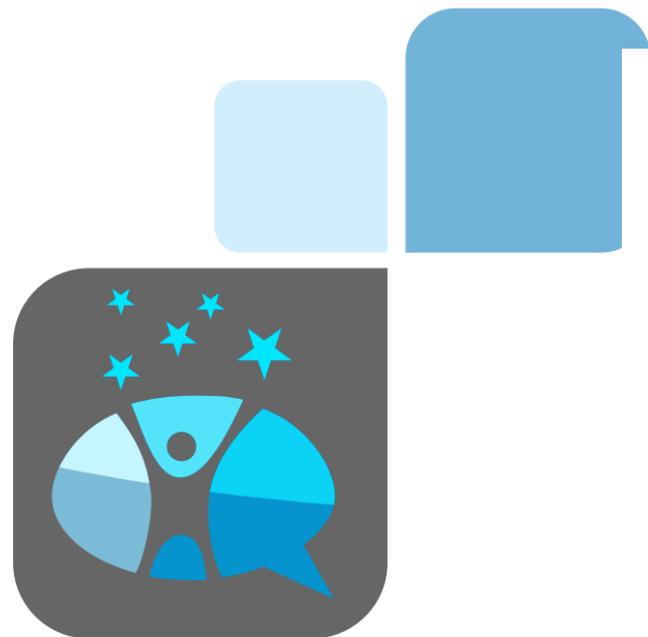
If the problem is increasing,
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Develop a business model for sustainability

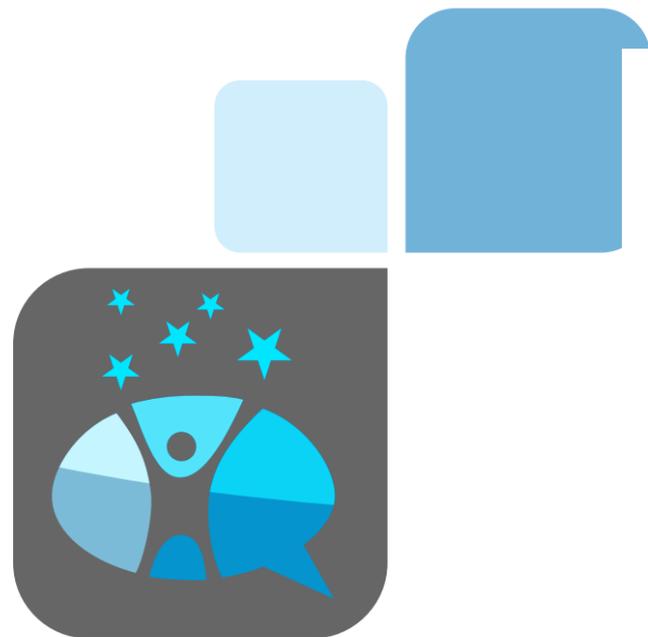
Leverage RE-AIM

- Reach
- Efficacy
- Adoption
- Implementation
- Maintenance (Measurement)



Leverage RE-AIM

- Reach
- Efficacy
- Adoption
- Implementation
- Maintenance (Measurement)





Develop community prevention scoreboards to monitor progress



Develop community prevention scoreboards to monitor progress

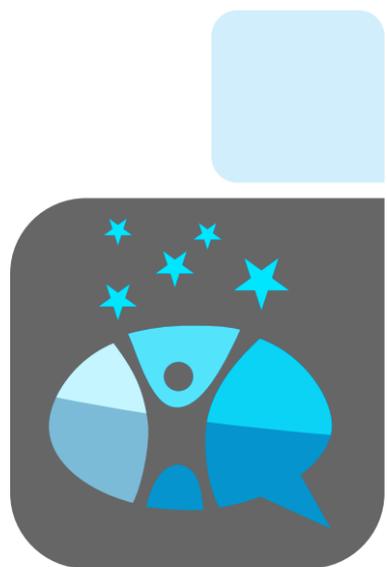
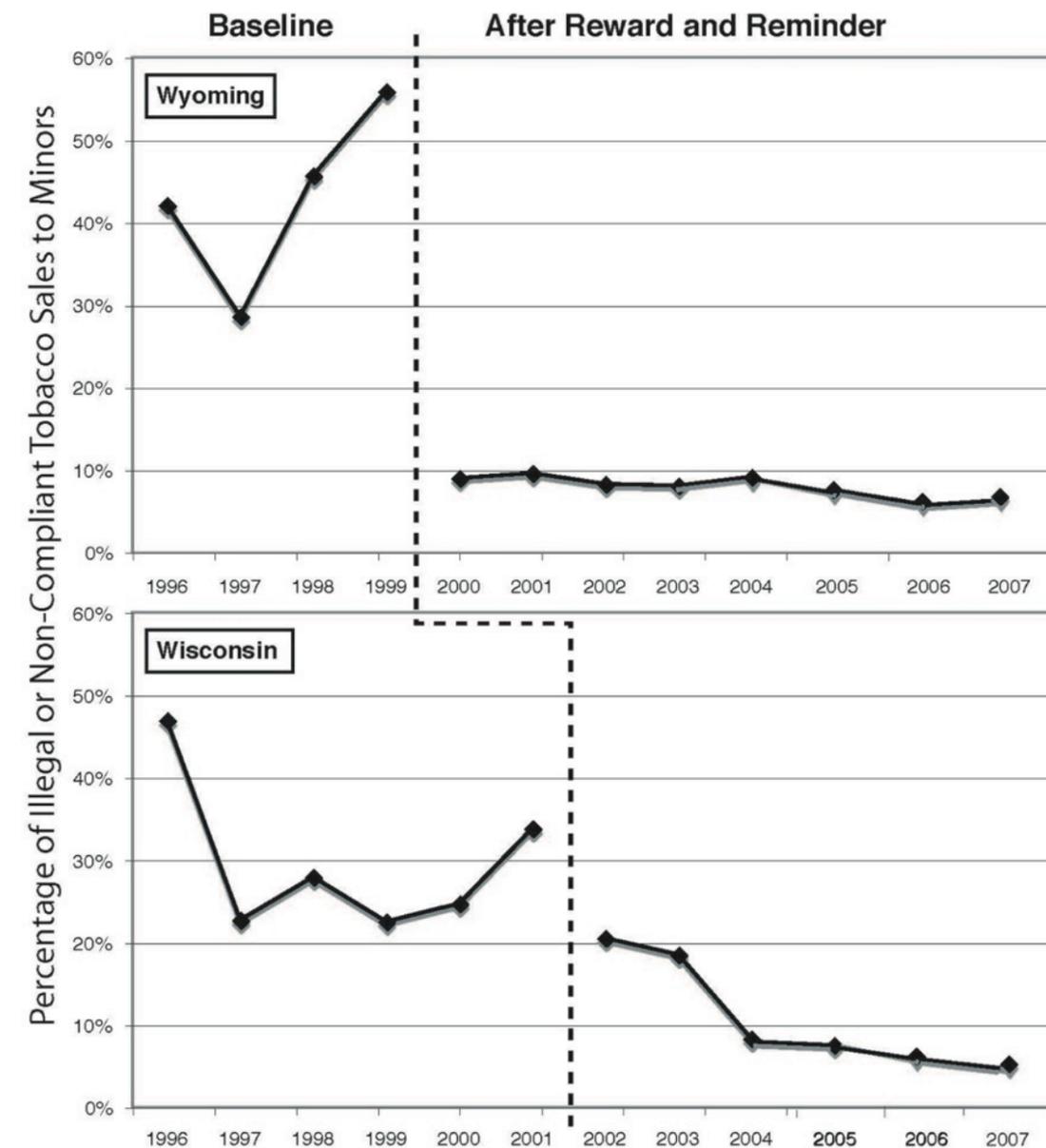
Click to find out results in your area



00% Percent of Time Youth Can Buy Tobacco

Counties with 20% or lower illegal sales are within the federal goal. The lower the numbers, the more clerks and retailers that are doing the right thing. Counties with rates lower than 10% of illegal tobacco sales are more likely to have an impact on reduced tobacco use and addiction by Wisconsin youth. Results are in real-time. Browse this site and learn what you can do to help Wisconsin Win.

County:	Sales:
ADAMS	8.57%
ASHLAND	3.45%
BARRON	8.46%
BAYFIELD	5.71%
BROWN	1.58%



Develop community prevention scoreboards to monitor progress

Launch Social Marketing: Advocacy & Media

Products have catchy, positive name (a meme)

Performance names benefits & little pain

Place for getting product is easy & non-stigmatizing

Price is low for to use in money or time.

Promotion focuses on popularity, joining, aligned values & benefits for all. Creative epidemiology aligns people & organizations for common action.

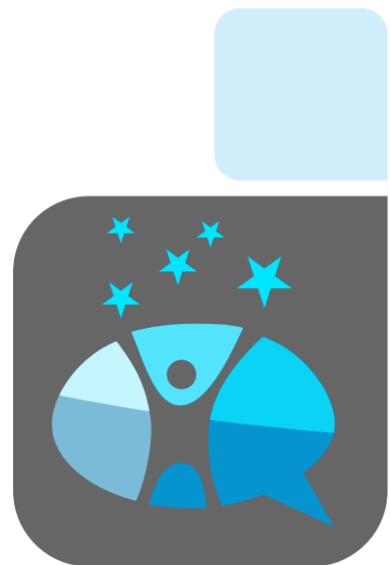
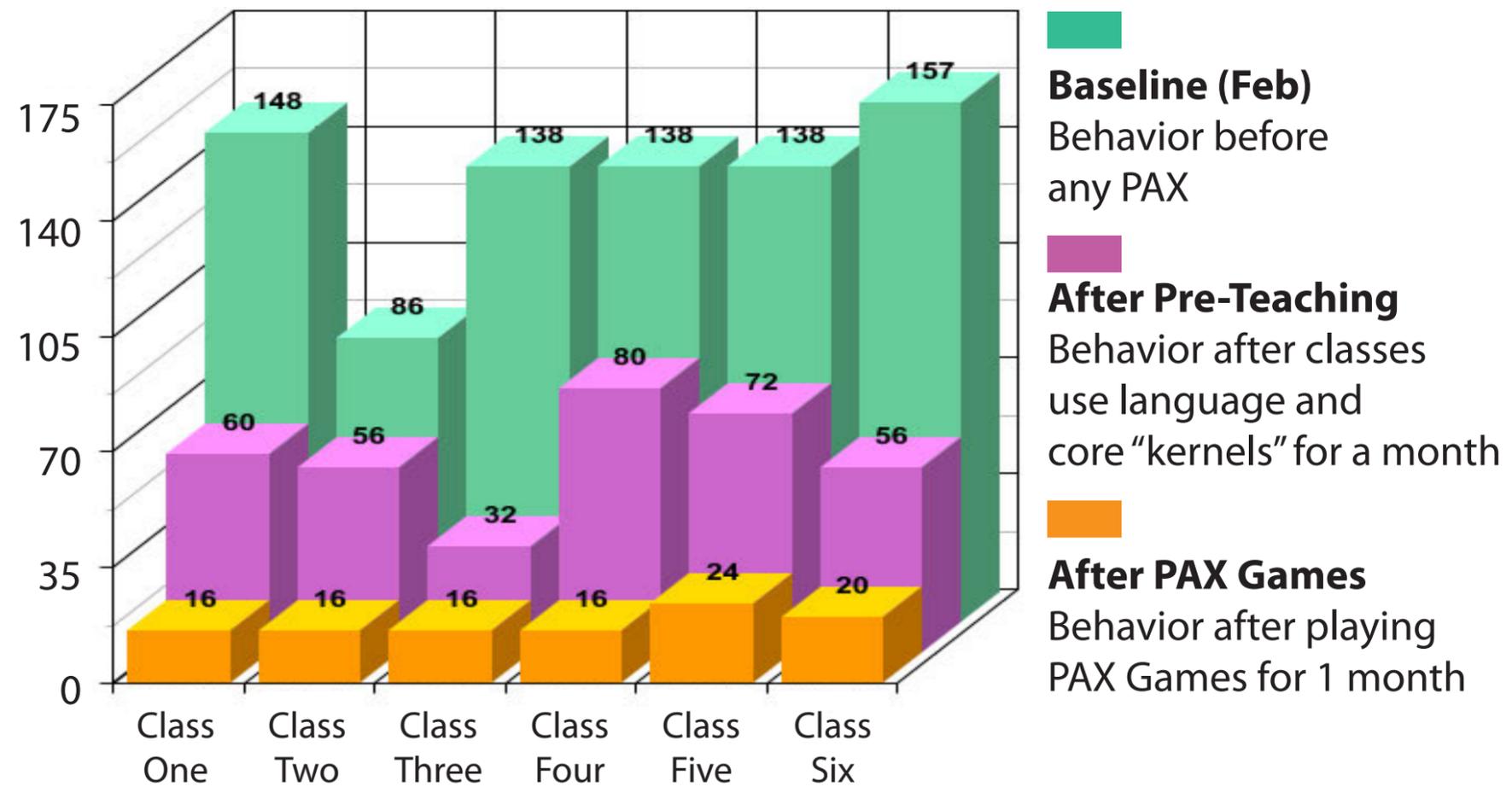
**Social Marketing of
Mental Health Prevention and Promotion**

It's NOT about the Problem



Data feedback on proximal outcomes...

Rate per Hour
of Disturbing,
Disruptive, &
Inattentive
Behaviors

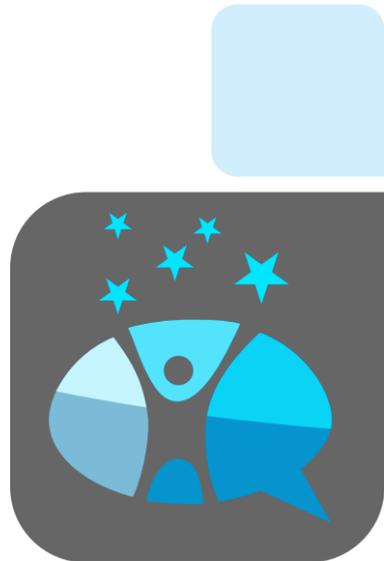


Data feedback on proximal processes...

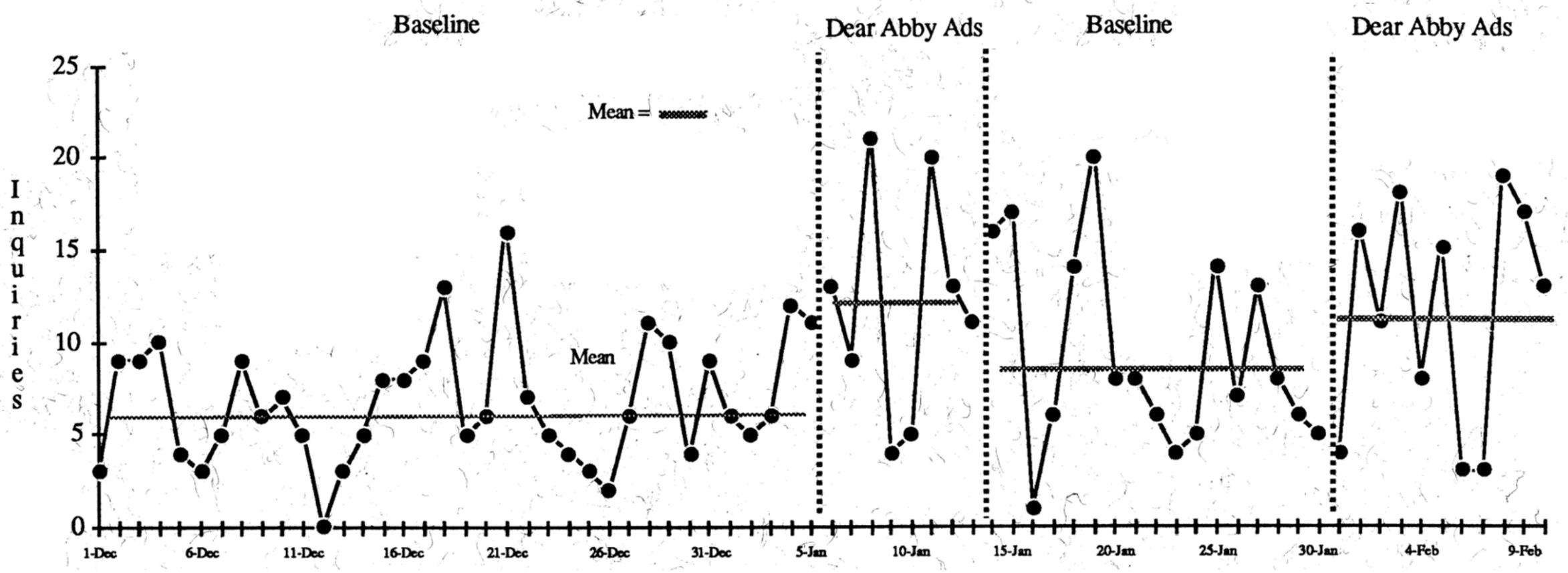
District/School			Preparing the Students for Game start (PAX Quiet Kernel)	Choice of Activity (Appropriateness of task for Game)	Timing the Game (Beat the Timer Kernel)	Teams (Soft-team competition)	Spleem Tracking System (Tally sheet, scoreboard , etc.)	Response to Spleems (Non-emotional response kernel)	Granny's Wacky Prizes (Mystery Motivator/P remark Kernel)	After the Game - Reviewing Spleems (Teacher or team captain can facilitate any of these)	PAX Language (Relational frame kernel)	PAX Cues (PAX Quiet, PAX Hands, PAX Voices, Thumbs up/down, Go)	Tootle Notes (Tootle/PAX IT Kernel)	Additional PAX Elements (Kernels that bridge success when no Game)	TOTAL PAX IMPLEMENTATION
DPPS	Hale	2/6/12 Betty Murray	4	4	4	4	4	4	4	4	0	3	0	2	37
DPPS	Hale	2/29/12 Betty Murray	4	4	4	4	4	4	4	4	4	4	0	2	42
DPPS	Hale	4/10/12 Betty Murray	4	4	4	4	4	4	4	4	0	3	0	0	35
DPPS	Hale	4/10/12 Betty Murray	4	4	4	4	4	4	4	4	0	3	0	0	35
DPPS	Hale	5/4/12 Betty Murray	2	3	4	4	4	4	4	4	0	2	0	0	31
DPPS	Kempton	1/30/12 Betty Murray	2	3	4	4	4	4	4	4	0	2	1	1	33
DPPS	Kempton	2/29/12 Betty Murray	4	4	4	4	4	3	3	4	0	2	2	0	34
DPPS	Kempton	3/27/12 Betty Murray	4	4	4	4	4	4	4	4	0	2	0	0	34
DPPS	Kempton	4/10/12 Betty Murray	4	4	4	4	4	4	4	4	0	2	0	0	34
DPPS	Kempton	5/4/12 Betty Murray	4	4	4	4	4	4	4	4	0	2	0	0	34
DPPS	Mendez	2/2/12 Betty Murray	3	2	3	4	2	2	4	4	0	2	0	0	26
DPPS	Mendez	2/6/12 Betty Murray	4	4	2	4	2	1	4	1	2	1	0	0	25
DPPS	Mendez	3/27/12 Betty Murray	3	3	2	4	4	4	4	4	0	2	0	0	30
DPPS	Mendez	4/10/12 Betty Murray	2	4	4	4	2	4	4	4	0	2	0	3	33
DPPS	Mendez	4/10/12 Betty Murray	0	4	4	4	4	3	3	4	0	0	0	0	26
DPPS	Mendez	5/4/12 Betty Murray	3	4	4	4	4	4	4	4	0	2	0	0	33
DPPS	Teimmons	3/6/12 Betty Murray	3	3	2	2	2	3	2	3	0	1	1	0	22
DPPS	Teimmons	3/27/12 Betty Murray	4	3	1	3	2	3	0	3	0	1	0	0	20
DPPS	Unami	1/30/12 Betty Murray	1	4	1	4	1	2	4	4	0	1	0	0	22
DPPS	Unami	2/6/12 Betty Murray	2	4	4	4	4	2	4	4	0	2	2	0	32
DPPS	Unami	2/29/12 Betty Murray	3	3	3	4	4	4	4	4	2	2	2	0	35
DPPS	Unami	3/27/12 Betty Murray	4	4	4	4	4	3	4	4	0	2	2	0	35

Legend for PAX Implementation

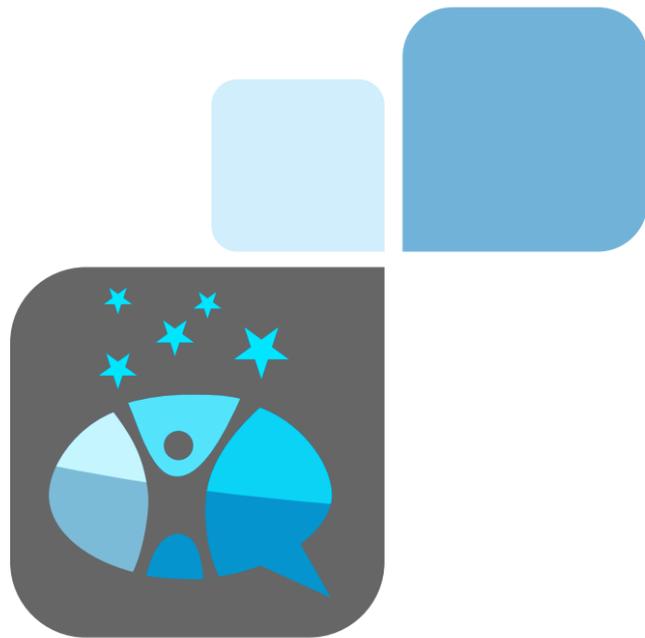
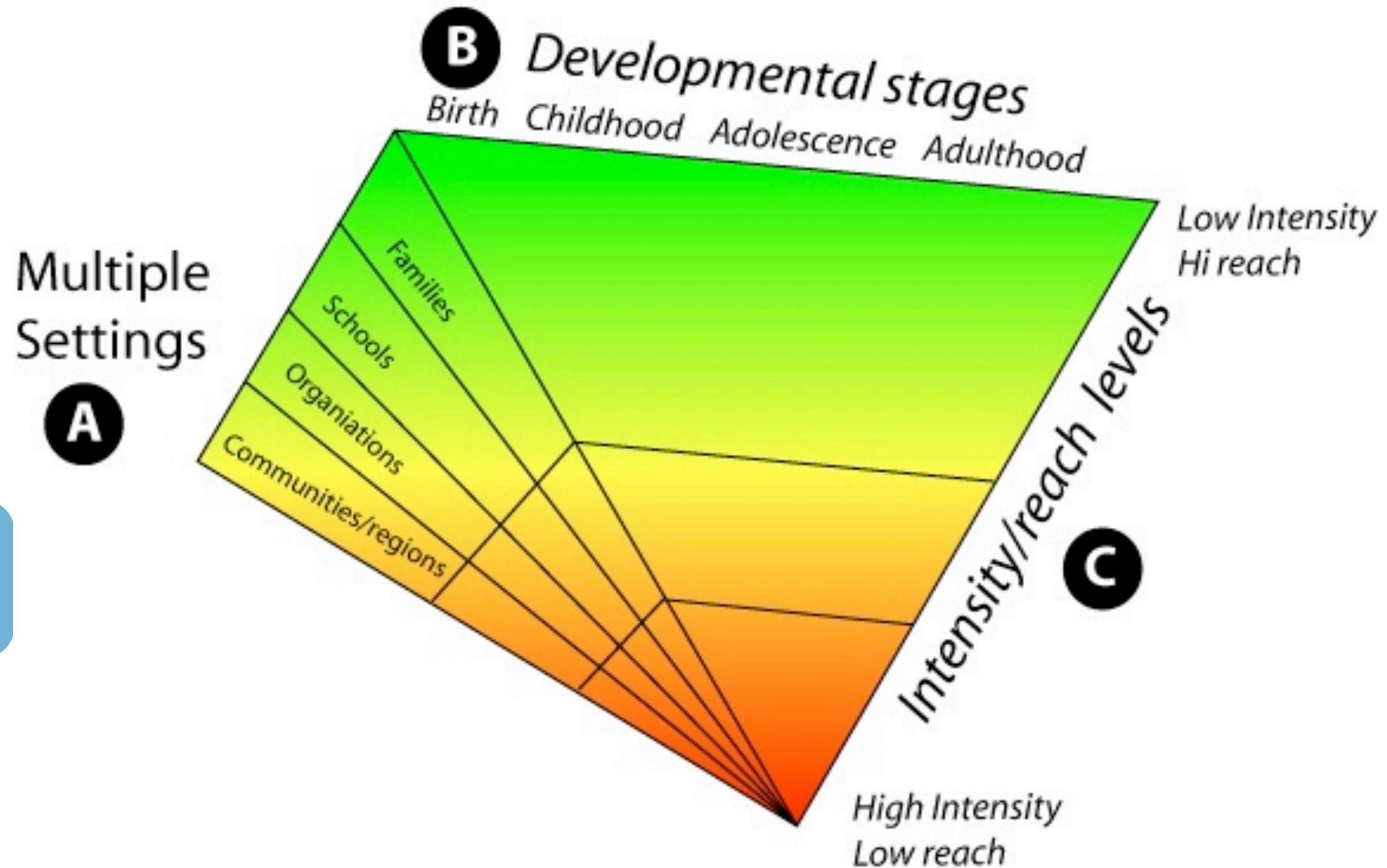
- Solid Green means "Purfect PAX"
- Green Shade Means PAX IS Good and It Can Be Improved
- Yellow Shade Means Some PAX Exists That Needs Improvement
- Orange Shade Means Little PAX Exists and It Needs Significant Attention to Improve
- Red Shade Means Little or No PAX Exists and Needs MAJOR Attention to Increase



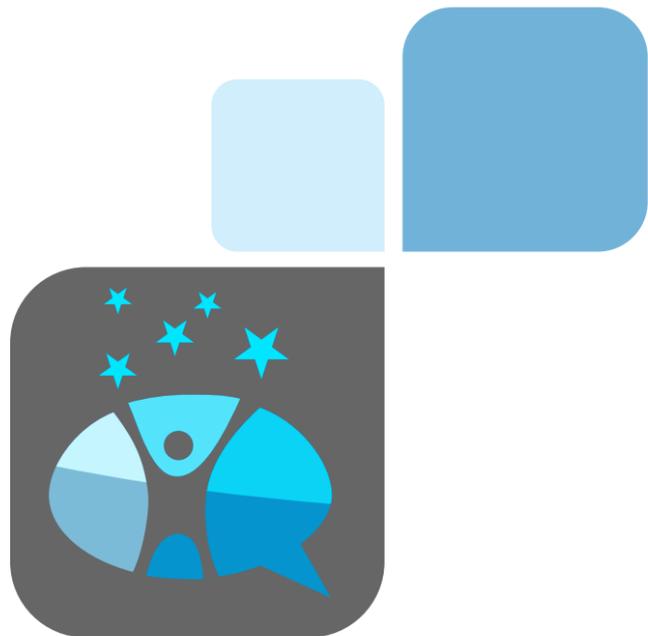
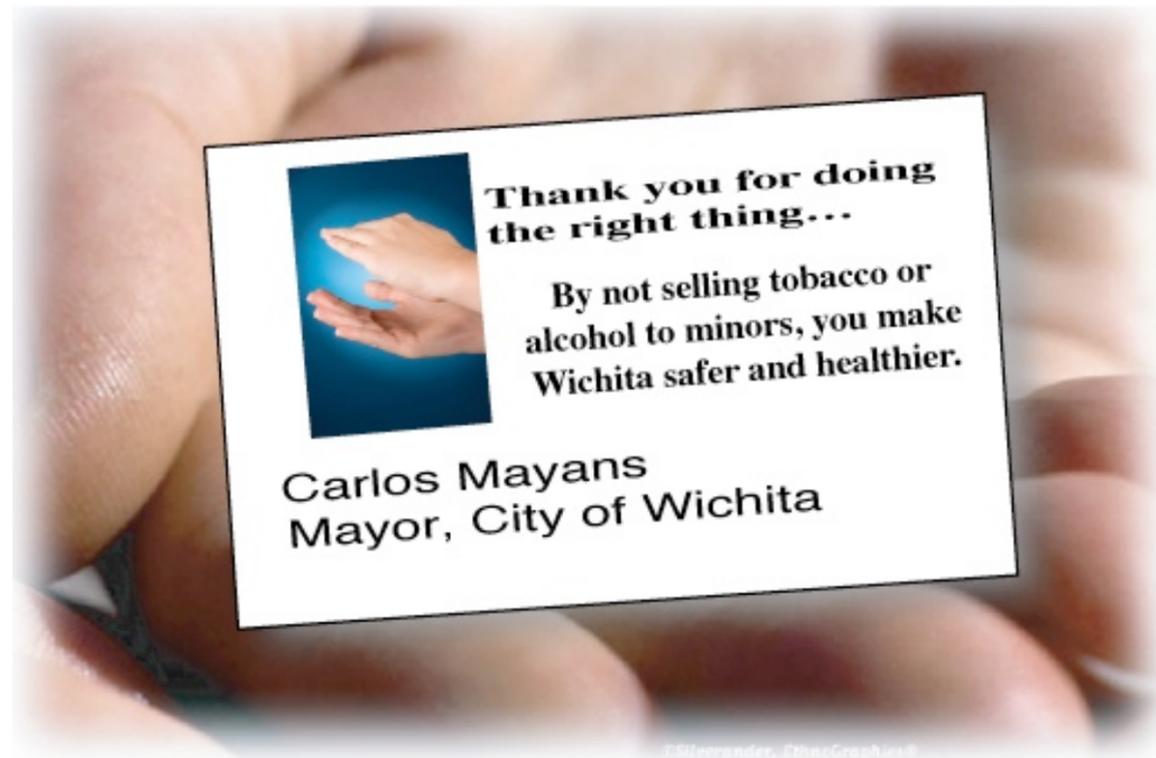
Social marketing offers real help not awareness



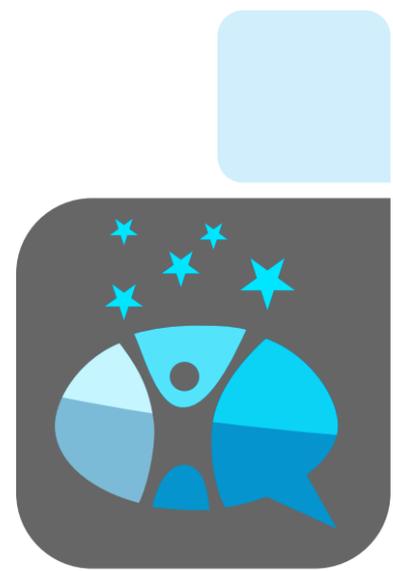
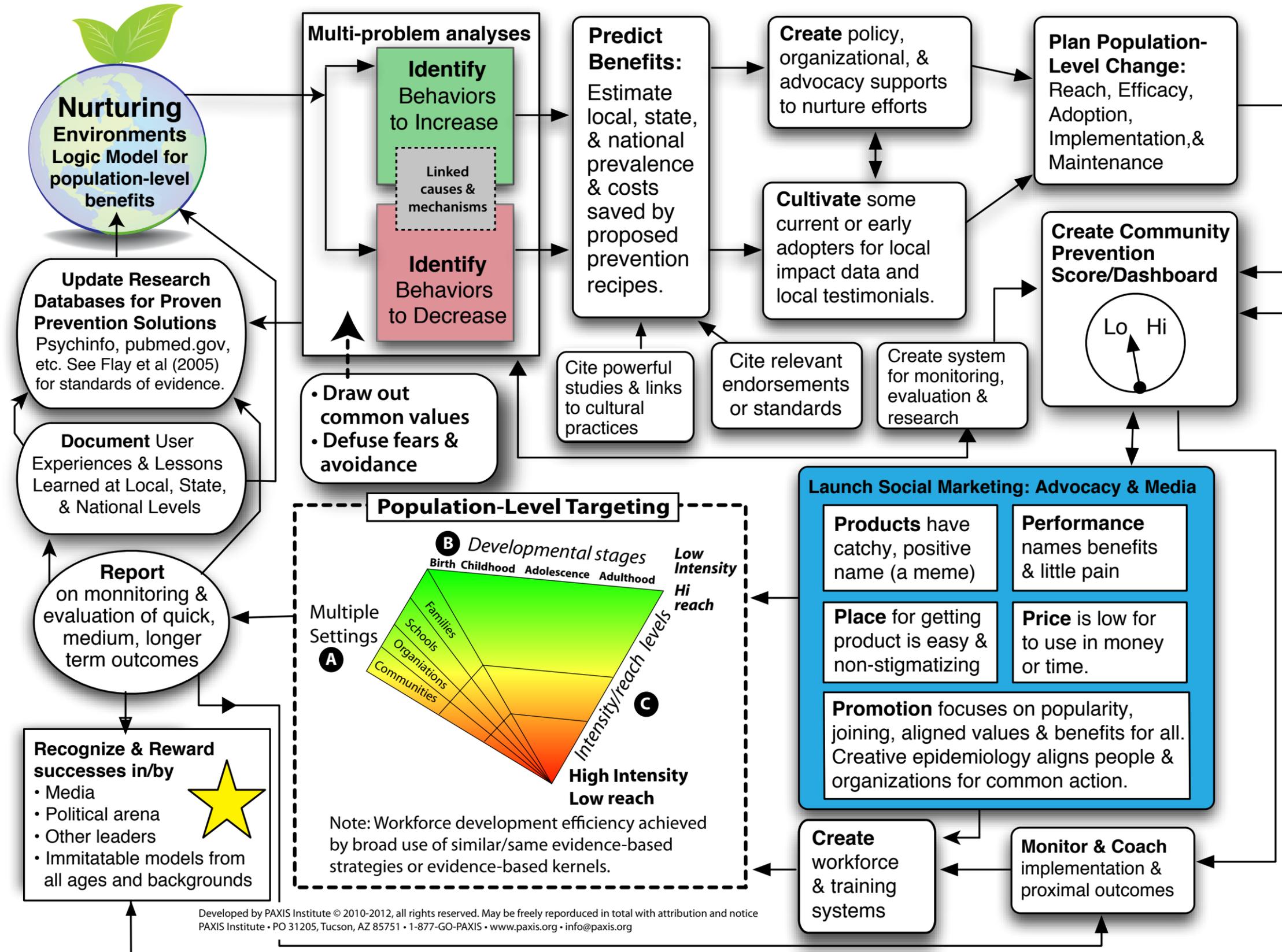
Multi-Level Model for Public Health Prevention Outcomes



Awards and Recognition



Safe Playing Programme
Case Study
New Zealand



1 Year Old



64 Years Old



Further Reading

- Search www.pubmed.gov (National Library of Medicine) for the following:
 - “Behavioral Vaccines
 - “Evidence-based kernels”
 - “Nurturing Environments

Image of the **Koru**,
the Maori infinite
symbol of spiral of life

Thank you

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- Video clip from CBC National for Good Behavior Game
- Nobel Prize Committee photo of Elinor Ostrum

Dennis D. Embry



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