

Promoting Healthy Energy Balance Behaviors and Freedom from Addictive Behaviors in Middle School and High School Populations



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Results of a multi-media multiple behavior obesity prevention program for adolescents

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Health in Motion (PI: Mauriello)

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TBM

ORIGINAL RESEARCH

Multiple behavior interventions to prevent substance abuse and increase energy balance behaviors in middle school students

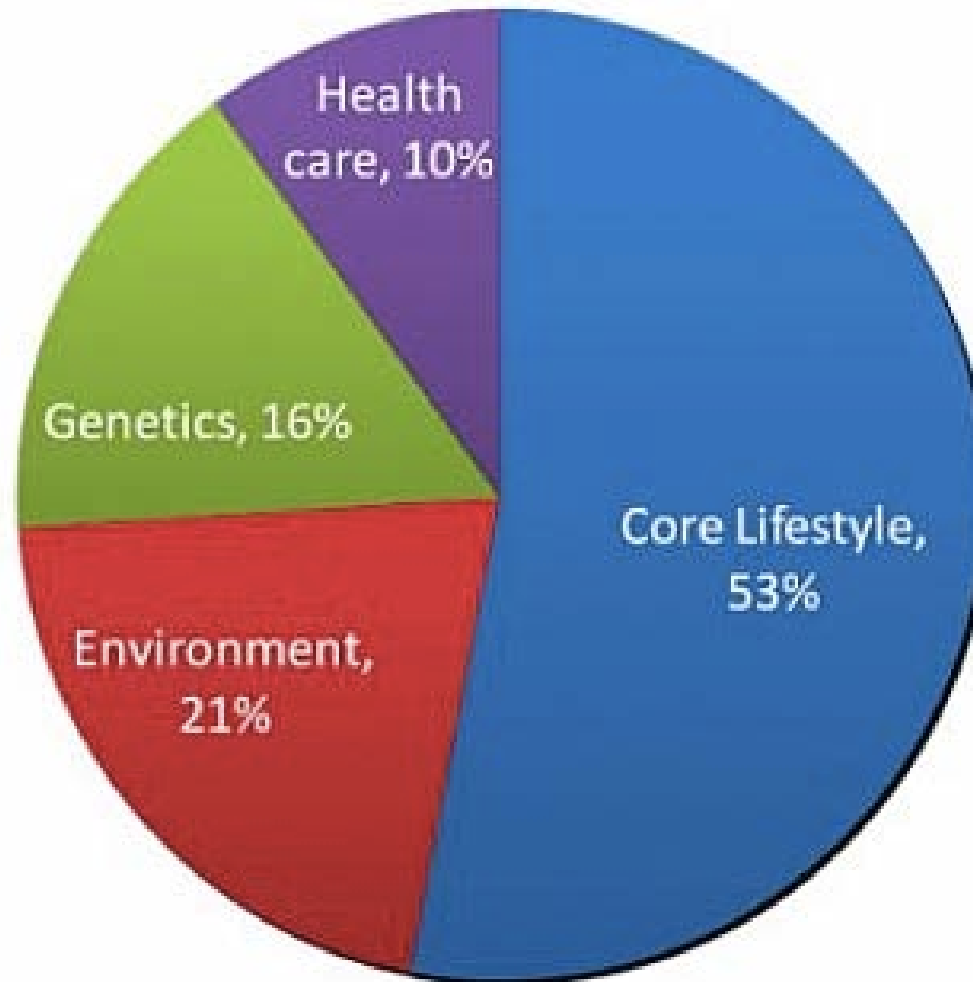
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Project BEST (PI: Velicer)
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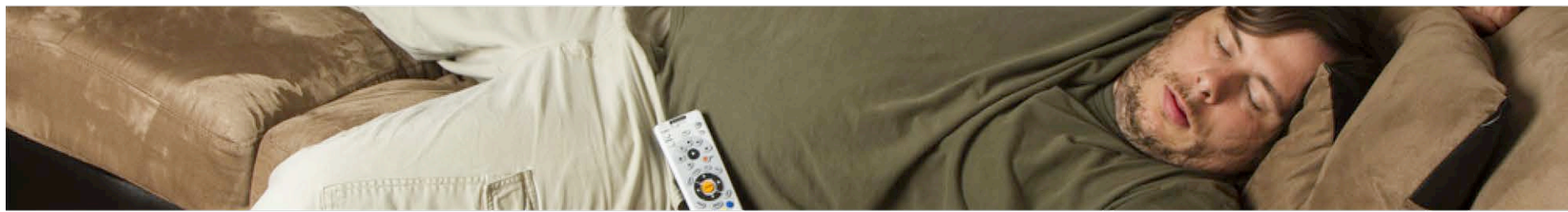




Determinants of Health



Four behaviors cause much of the illness, suffering and early death related to chronic diseases and conditions:



Multiple Behavior Change



Physical Activity



Healthy Nutrition



Sleep



Water Consumption



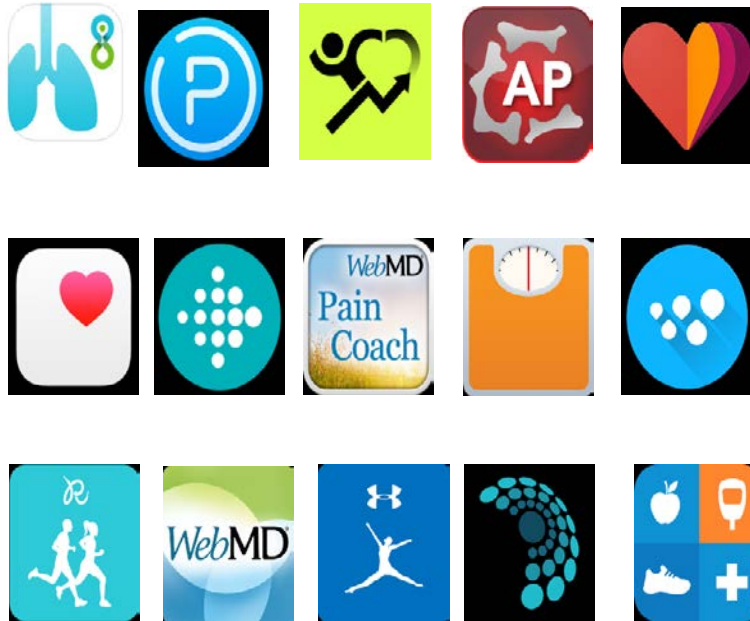
Stress Management



Promoting Healthy Lifestyles Requires

- Population-based
- Prevention targeted at youth
- Scalable
- Cost effective
- Personalized and relevant
- Address multiple behaviors
- Facilitate sustained behavior change

Digital Therapeutics



Youth LifeStyle

Health In Motion

Your Stage of Change

First, we'll tell you what Stage of Change you're in when it comes to eating enough fruits and vegetables. That means eating 5 or more servings each day. Here's what the stages mean:

- **Stage 1**—You aren't planning to start eating enough fruits and vegetables.
- **Stage 2**—You are planning to start eating enough fruits and vegetables.
- **Stage 3**—You're ready to start eating enough fruits and vegetables soon.
- **Stage 4**—You've already started eating enough fruits and vegetables.
- **Stage 5**—You've been eating enough fruits and vegetables for more than 6 months.



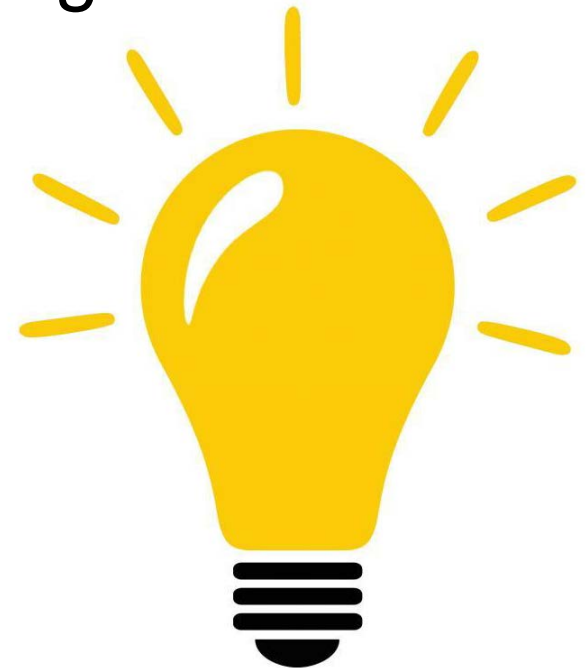
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Population Health Breakthroughs with Youth

- Facilitate Adoption of Healthy Behaviors
- Prevent Acquisition of Unhealthy Behaviors
- Facilitate Multiple Behavior Change



Adolescent Multiple Behavior Interventions

- Transtheoretical Model of **Behavior Change**
- Basis for **developing interventions** to promote health behavior change, to either:

Health in Motion



Acquire healthy behaviors

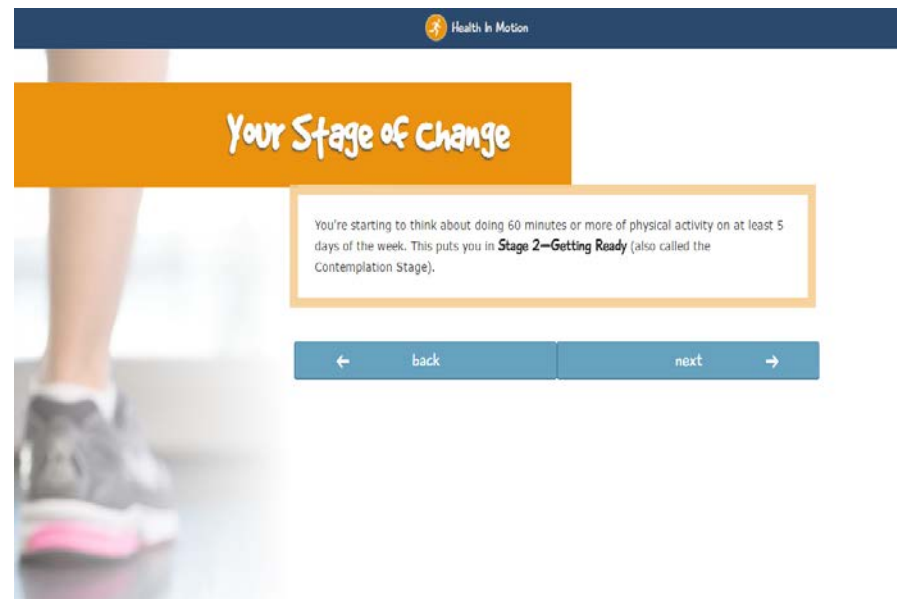
Project BEST



Prevent Risky Behaviors

Target Behaviors

- **Physical Activity** – getting at least 60 minutes of activity on at least 5 days/week
- **Fruit & Vegetable Intake** – eating at least 5 servings of F & V each day
- **Limiting TV Time** – watching no more than 2 hours of TV each day
- **No Smoking**
- **No Alcohol Use**



Framework

- Built on a foundation of formative research
- Promotes multiple behaviors
- Grounded in theory (Transtheoretical Model)
- Delivers assessments and tailored feedback messages on key change variables on repeat occasions
- Includes multimedia components
- Designed for ease of dissemination

Health In Motion

Your own Experiences

How often did you have this experience in the last month?

	Never	Not very often	Sometimes	Often	Very often
You were inspired by stories about people who got into shape or improved their fitness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You noticed that more people are making sure to get enough physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You wore sneakers or brought extra clothes with you so you could do a physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You paid attention to the information you heard about how getting enough physical activity can help you maintain a healthy weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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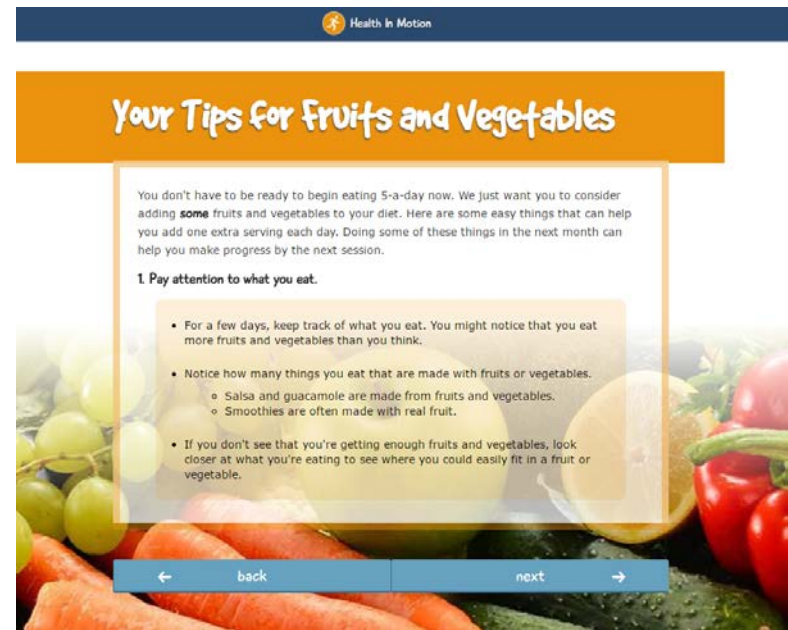
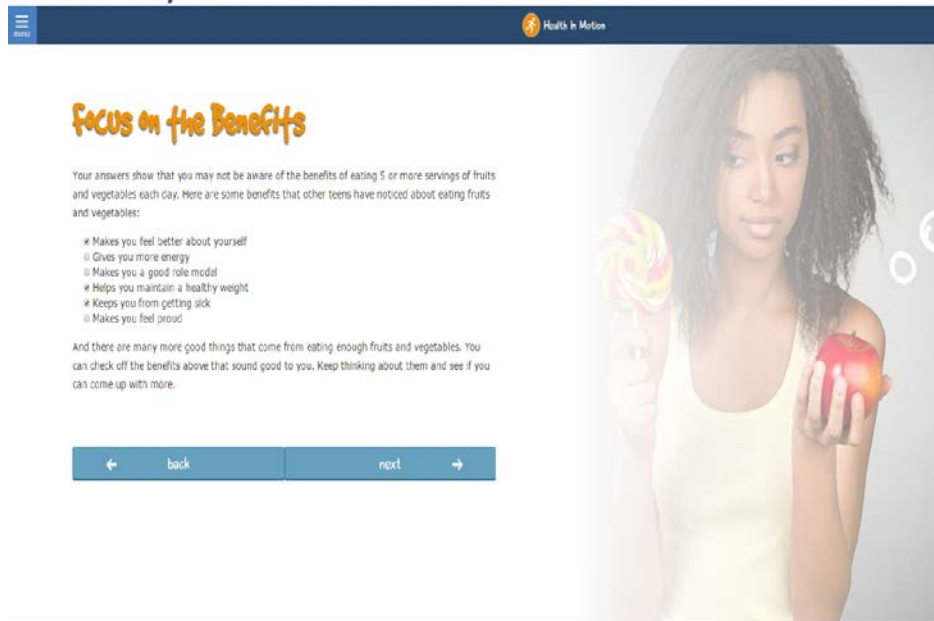
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Delivery Channel

- Computer tailored interventions delivered in schools
- Required limited school staff training and involvement
- Population based: relevant for all

YouthLifeStyle



Health in Motion Baseline Sample

1800 **high school students** from 8 schools located in RI, MA, NY, and TN

- 50.8% female
- 71.5% White, 10.5% Black, 5.5% Hispanic, 12.4% Other/Combination
- 21.5% 9th, 24.7% 10th, 51.8% 11th, 2.1% 12th
- 2.2% underweight, 74.7% normal, 7.6% at risk, 15.5% overweight
- Mean age = 15.97
- 65.7% retention at 12 months (no difference by group)

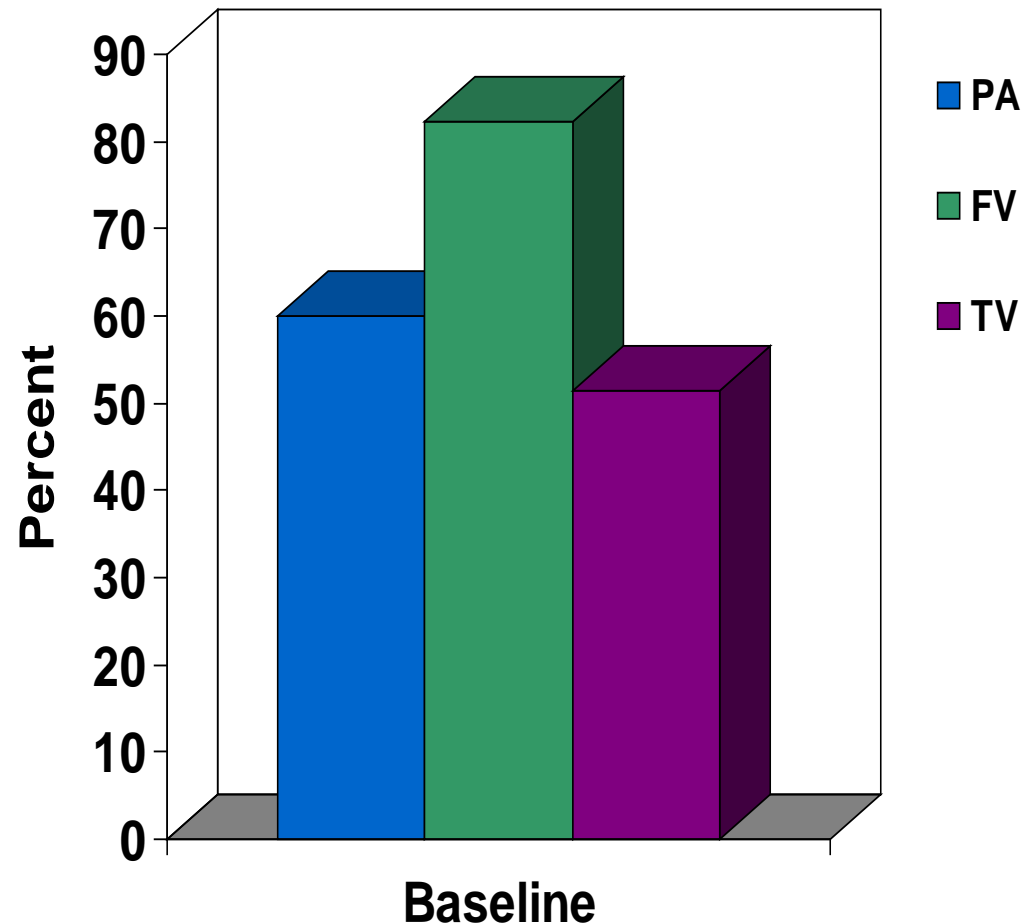
Health in Motion Design

- Treatment group
 - Three intervention sessions (BL, 1 month, and 2 months) and two follow-up assessments (6 and 12 months)
- Control group
 - Four assessment-only sessions (BL, 2 months, 6 months, and 12 months)

Health in Motion Baseline At-Risk

Students at-risk, or in the pre-action stages:

- 60% at-risk for physical activity
- 82.2% at-risk for fruit and vegetable consumption
- 51.4% at-risk for TV time



Project BEST (Middle School)

Goal: Test middle school as appropriate intervention point for prevention of substance uptake & ability to engage youth at time when majority are not even thinking about using substances

Treatment Group:

- Addictive Behavior Prevention (tobacco & alcohol)

Comparison Group:

- Energy Balance Promotion
(healthy diet, physical activity & reduced TV time)

Project BEST Baseline Sample

N=4153 - 6th Grade Students

- Age = 11.4 years
- 52.7% Male
- Race/Ethnicity:
 - 62% White
 - 14.3% Mixed race/ethnicity
 - 12.5% Hispanic
 - 4% Black
- 97.8% Nondrinkers + 2.1% Drinkers
- 98.6% Nonsmokers + 1.4% Smokers

Retention

12 months (7th grade): 82.7%

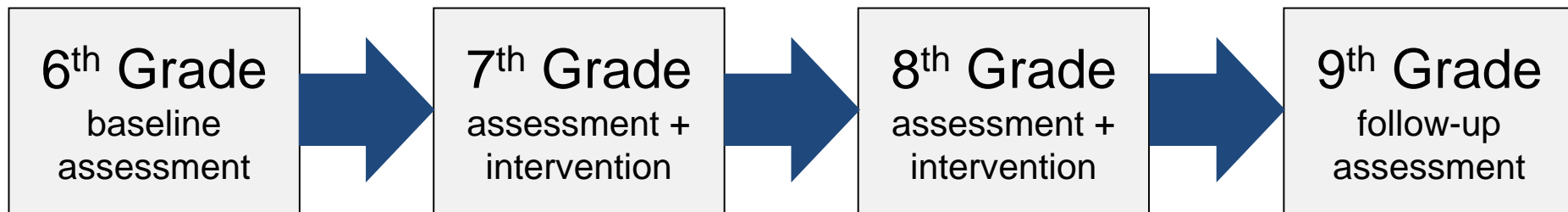
24 months (8th grade): 76.6%

36 months (9th grade): 71.1%

Project BEST Study Design

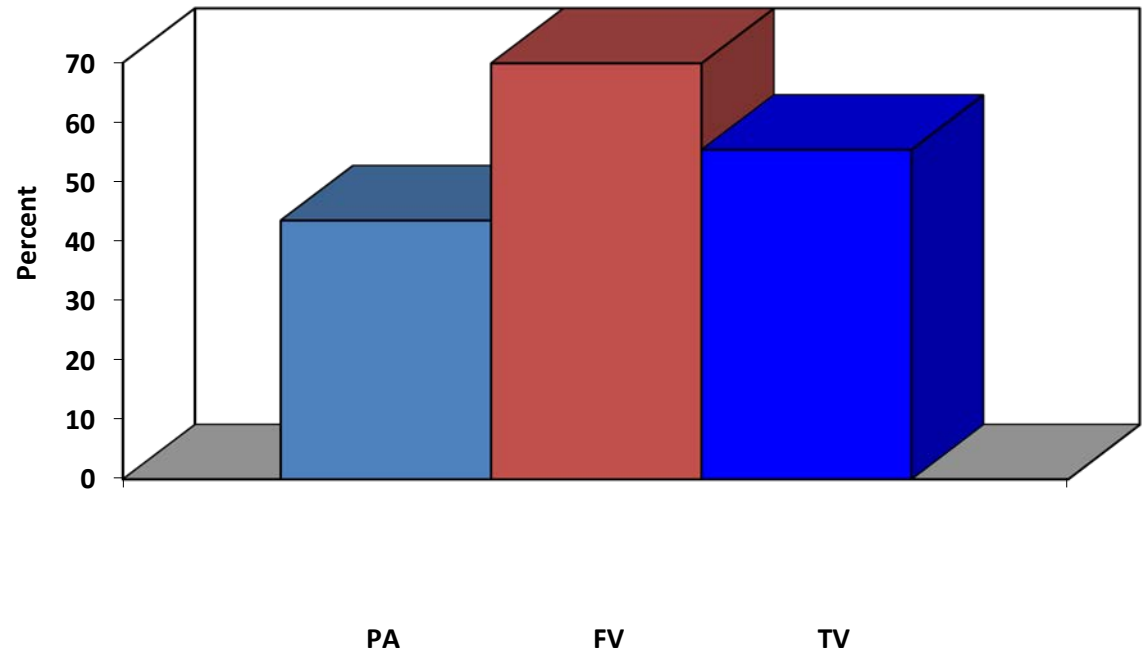
School-based randomized effectiveness trial targeting multiple health behaviors

- 2 computer-delivered, TTM-tailored interventions: Energy Balance (EB) + Substance Prevention (SP)
- 20 RI middle schools, matched & randomized (MAUM)
- (N=4158) students were 47.8% female, 65.0% white, 15.6% Hispanic



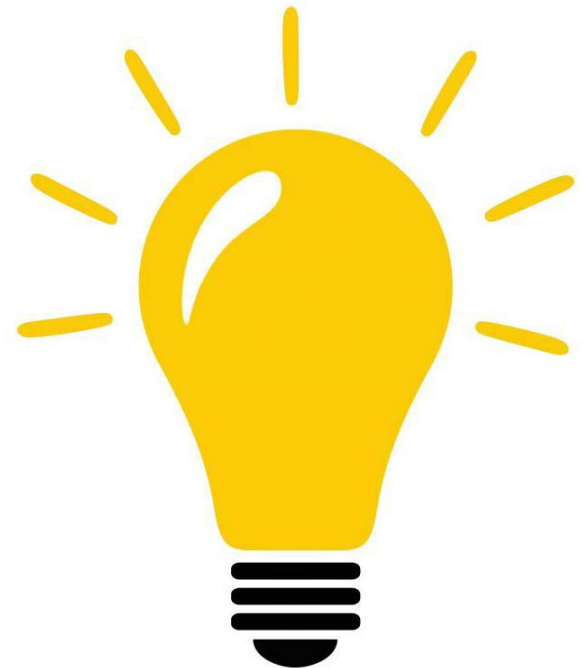
Project BEST Baseline At-Risk

- No differences between randomized groups
- Students at risk/not at criterion (PC, C, PR stages)
 - 44% PA
 - 70% FV
 - 55% TV

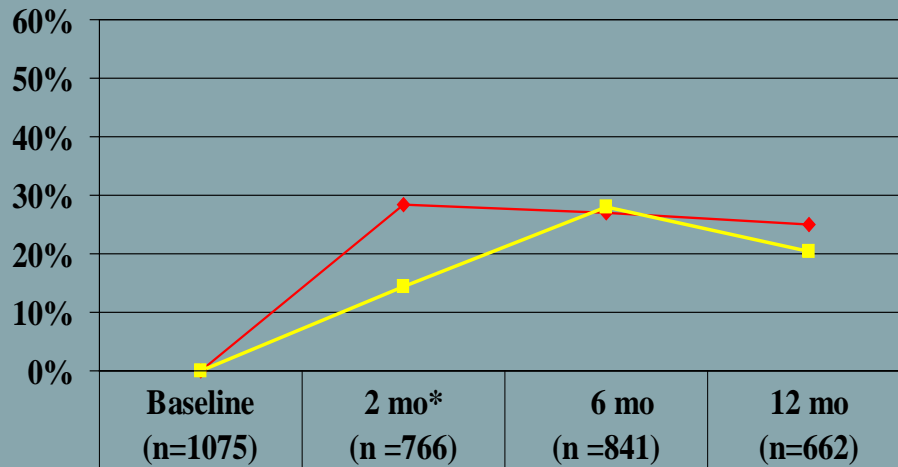


Breakthrough

- Facilitate Adoption of Healthy Obesity Prevention Behaviors with Youth

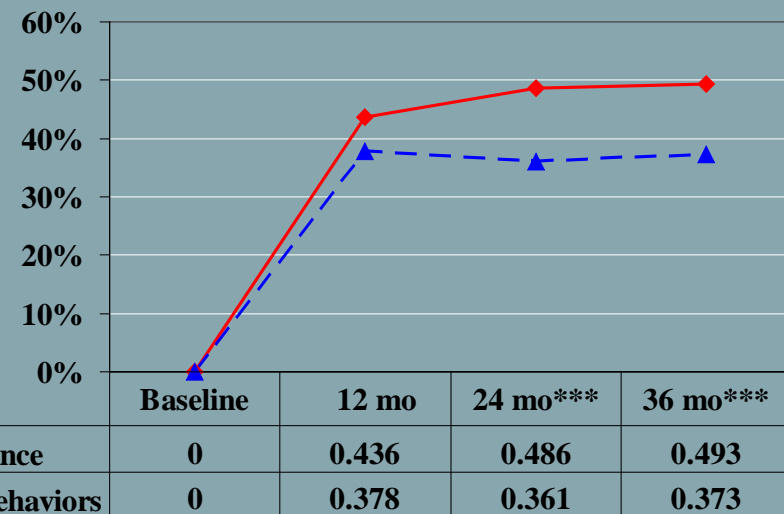


Physical Activity: Movement to Action/Maintenance

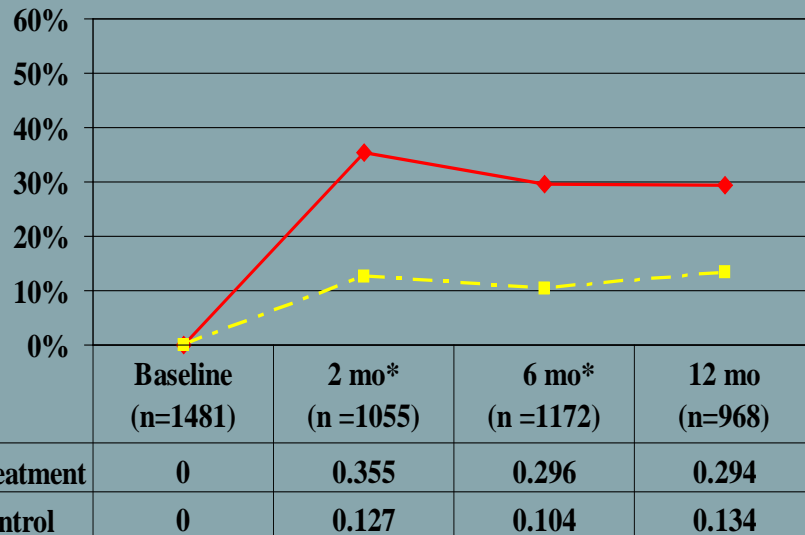


← Health in Motion / High School

Project BEST / Middle School →

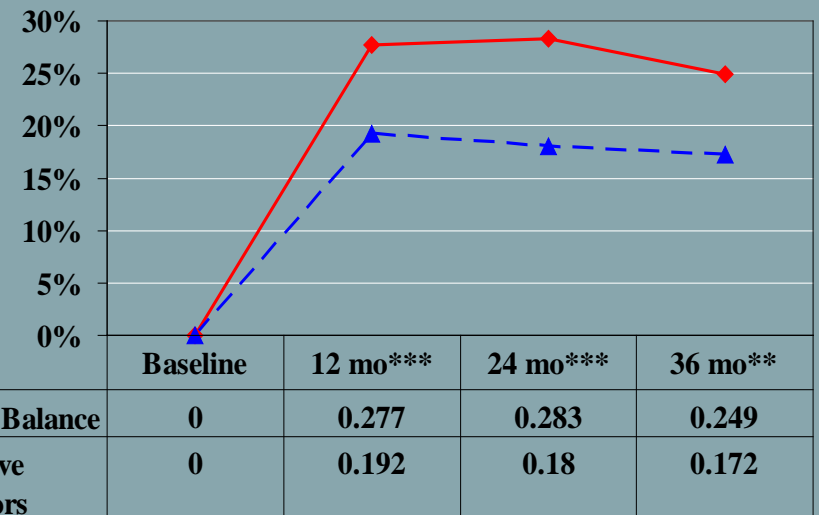


Fruit & Vegetable: Movement to Action/Maintenance

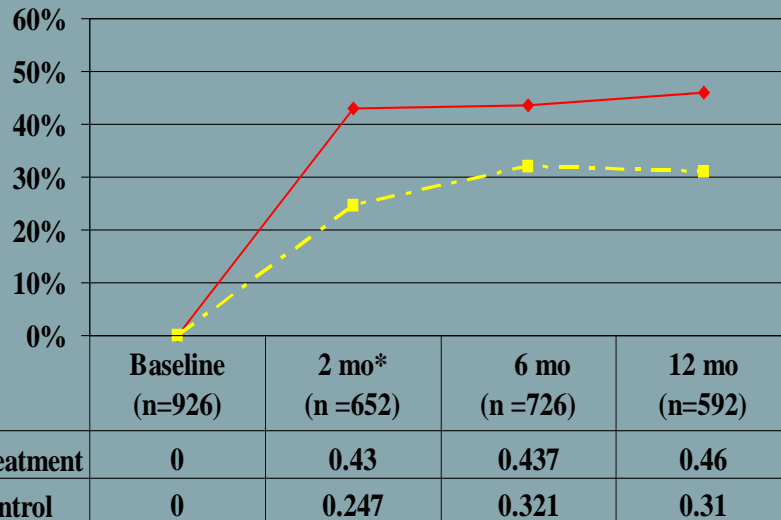


← Health in Motion / High School

Project BEST / Middle School →

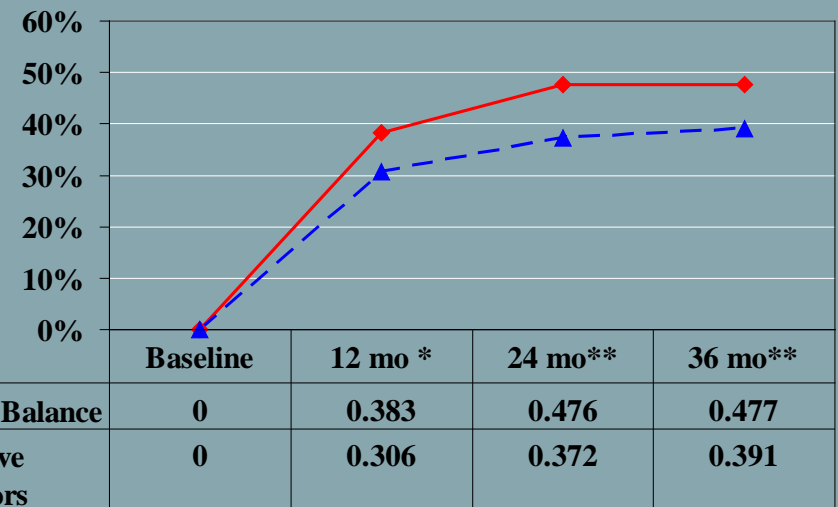


TV Viewing: Movement to Action/Maintenance



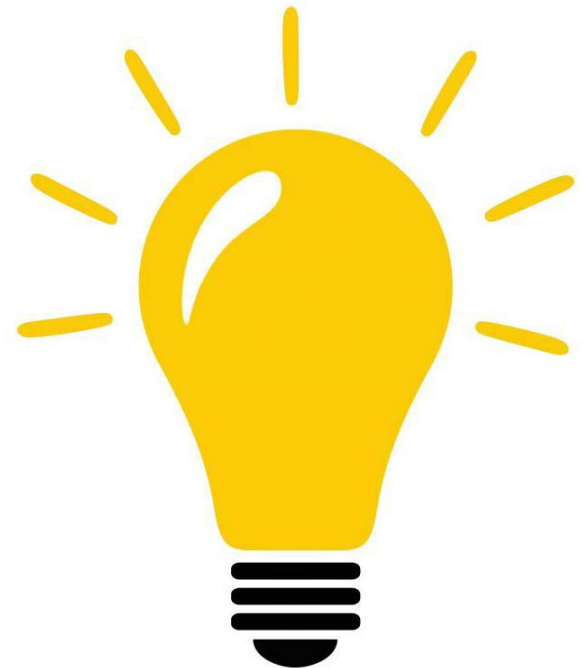
← Health in Motion / High School

Project BEST / Middle School →



Breakthrough

- Prevent the Acquisition of Unhealthy Behaviors



Stages of Substance Acquisition

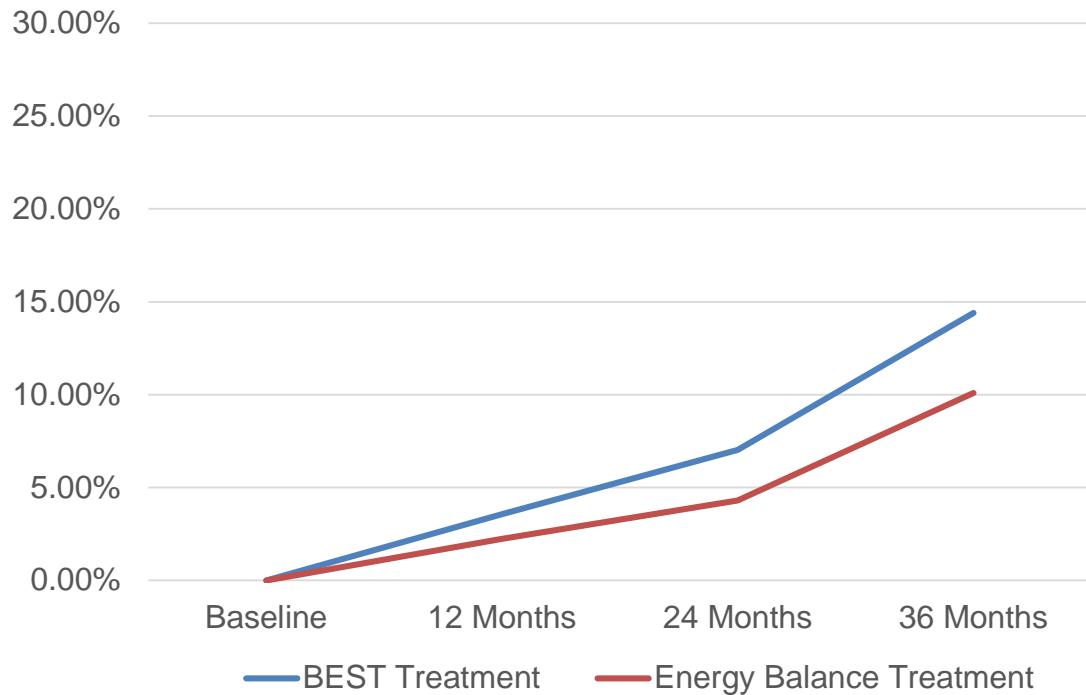
- Precontemplation for Acquisition (aPC):
 - *Not considering trying it within the next 6 months*
- Contemplation for Acquisition (aC):
 - *Thinking about trying it within the next 6 months*
- Preparation for Acquisition (aPR):
 - *Planning to try it in next 30 days*

Project BEST: Middle School

Baseline Stages of Acquisition Among Nonusers

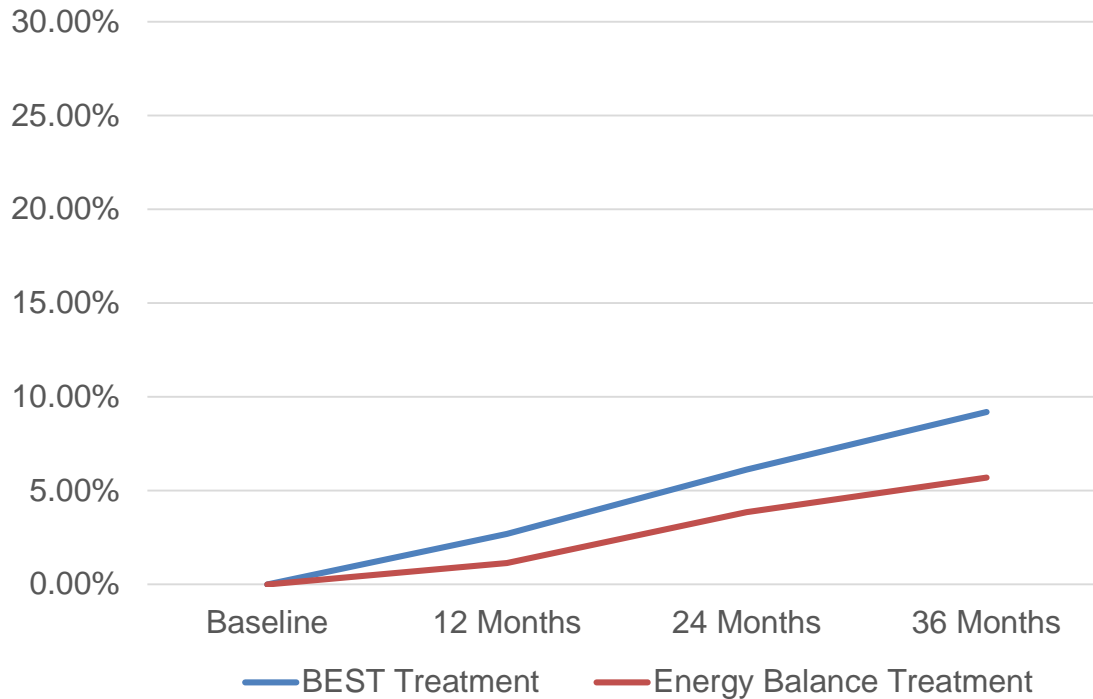
Acquisition Stage	Smoking (n=4101)	Alcohol (n=4019)
Acq. Precontemplation	99.0%	95.6%
Acq. Contemplation	0.4%	1.3%
Acq. Preparation	0.6%	0.9%

Alcohol Acquisition by Group



	Baseline	12 Months	24 Months	36 Months
BEST Treatment	0.00%	3.56%	7.03%	14.4%
Energy Balance	0.00%	2.24%	4.31%	10.1%

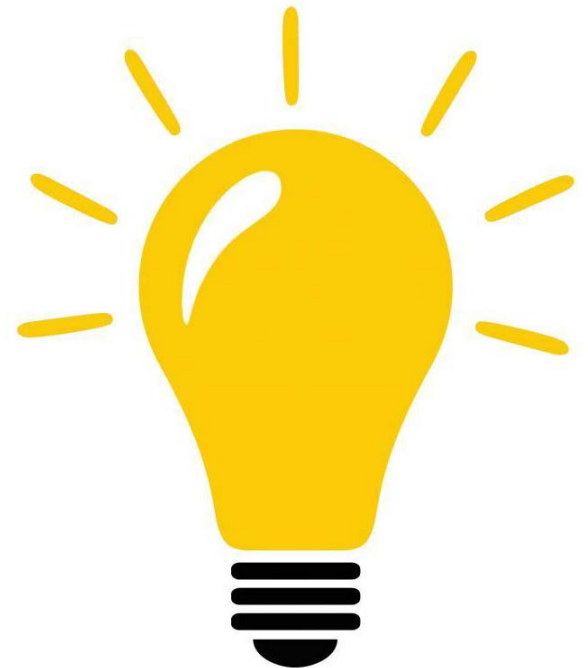
Smoking Acquisition by Group



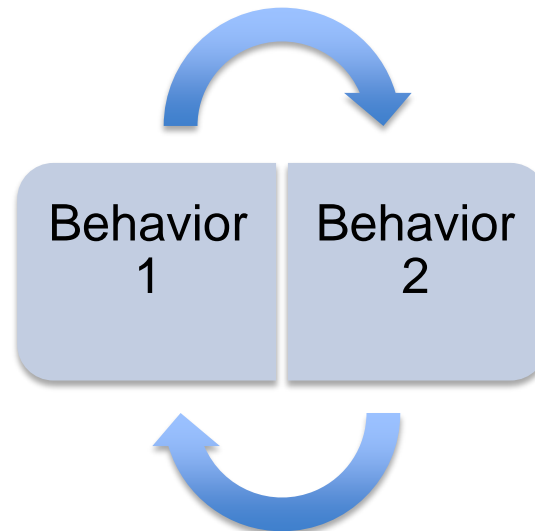
	Baseline	12 Months	24 Months	36 Months
BEST Treatment	0.00%	2.70%	6.13%	9.2%
Energy Balance	0.00%	1.15%	3.86%	5.7%

Breakthrough

➤ Facilitate Multiple Behavior Change



Coaction refers to the increased probability that individuals who adopt a health behavior will adopt another health behavior



Coaction at 2 months

Odds Ratios					
PA & FV		PA & TV		FV & TV	
Treatment	Control	Treatment	Control	Treatment	Control
(N=432)	(N=202)	(N=277)	(N=145)	(N=327)	(N=207)
4.20*** (2.66, 6.65)	1.02				
		2.60*** (1.53, 4.43)	0.513		
				2.13** (1.34, 3.37)	0.969

Coaction at 6 months

Odds Ratios					
PA & FV		PA & TV		FV & TV	
Treatment	Control	Treatment	Control	Treatment	Control
(N=471)	(N=233)	(N=304)	(N=163)	(N=364)	(N=238)
3.36*** (2.14, 5.28)	1.04				
		2.08** (1.23, 3.52)	0.498		
				1.99** (1.26, 3.15)	0.906

“ Studies demonstrate that coaction may not be a naturally occurring phenomenon given that it occurs much more in groups receiving tailored behavior change treatments.”

-Johnson, et al. 2015

Coaction in	Odds Ratio
Control Group	1.2-2.6
TTM Intervention Group	2.5-5.2

Schools for Population Based Programming

- High engagement and retention
- Feasible and easy to deliver
- Reach large number of youth



Take Away Points

- Important to treat whole populations of youth for prevention
 - Promote adoption of behaviors
 - Reduce risk acquisition
- Multiple behavior change treatment is possible & meaningful
 - Empower people to learn effective change strategies and translate into other areas
- Digital and tailored technologies can reach many and are efficacious = IMPACT

Thank you!

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