



# Physical Activity Interventions for Adolescent Girls from Diverse Racial/Ethnic Backgrounds

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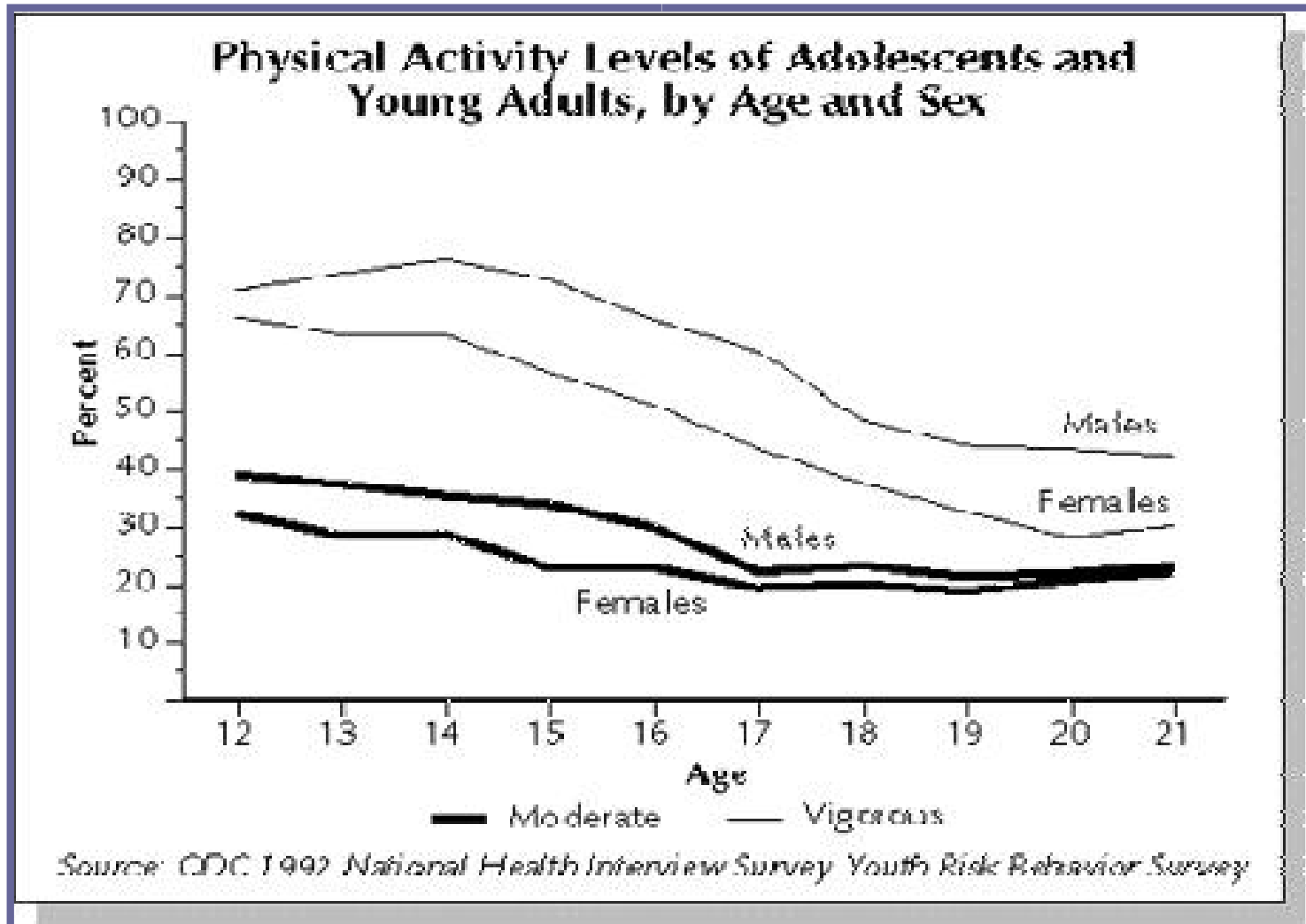
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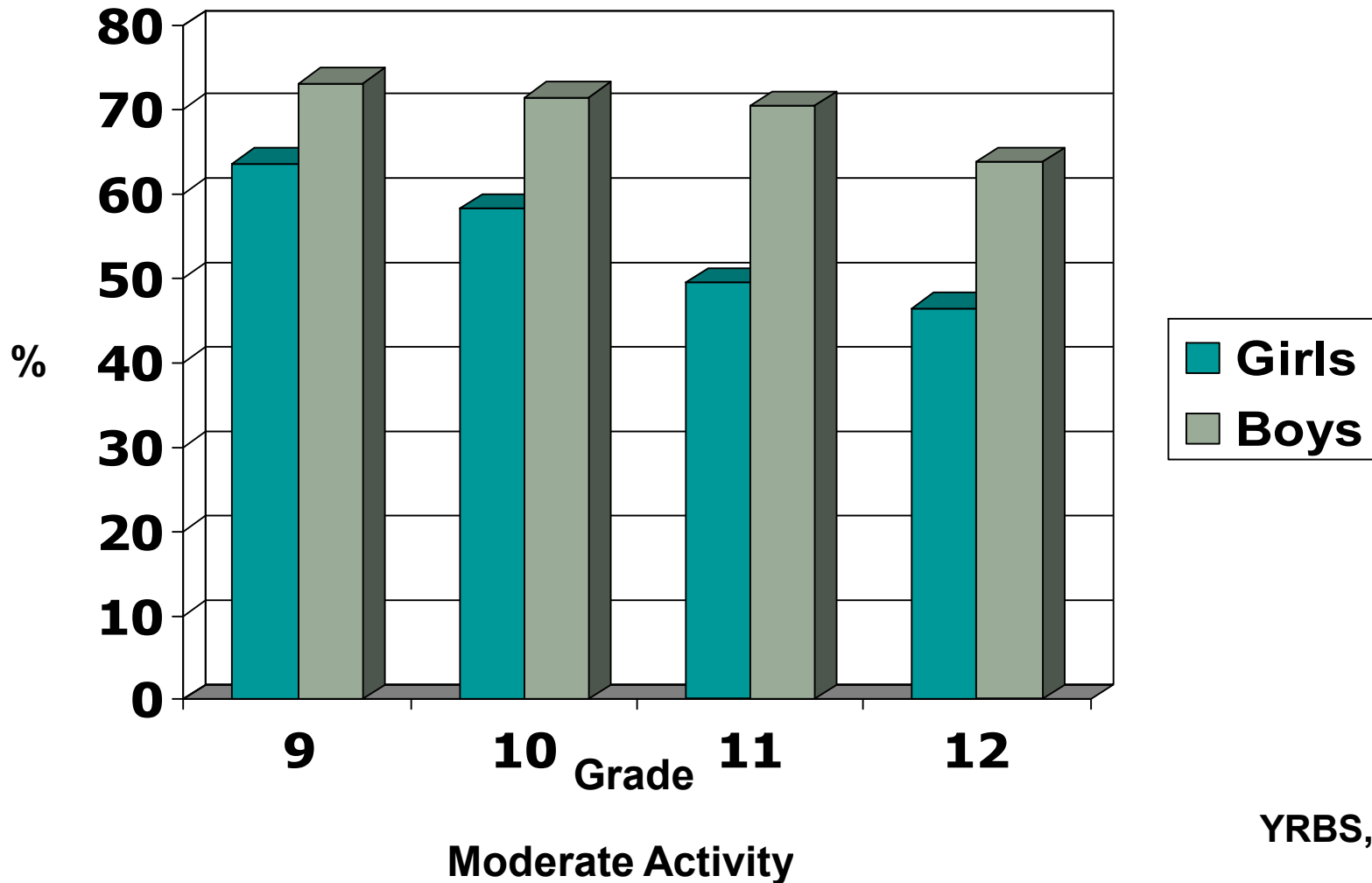
# Outline

- Describe 2 physical activity trials for adolescent girls
  - Background
  - Intervention approaches to address racial/ethnic diversity
  - Results
- Implications of results

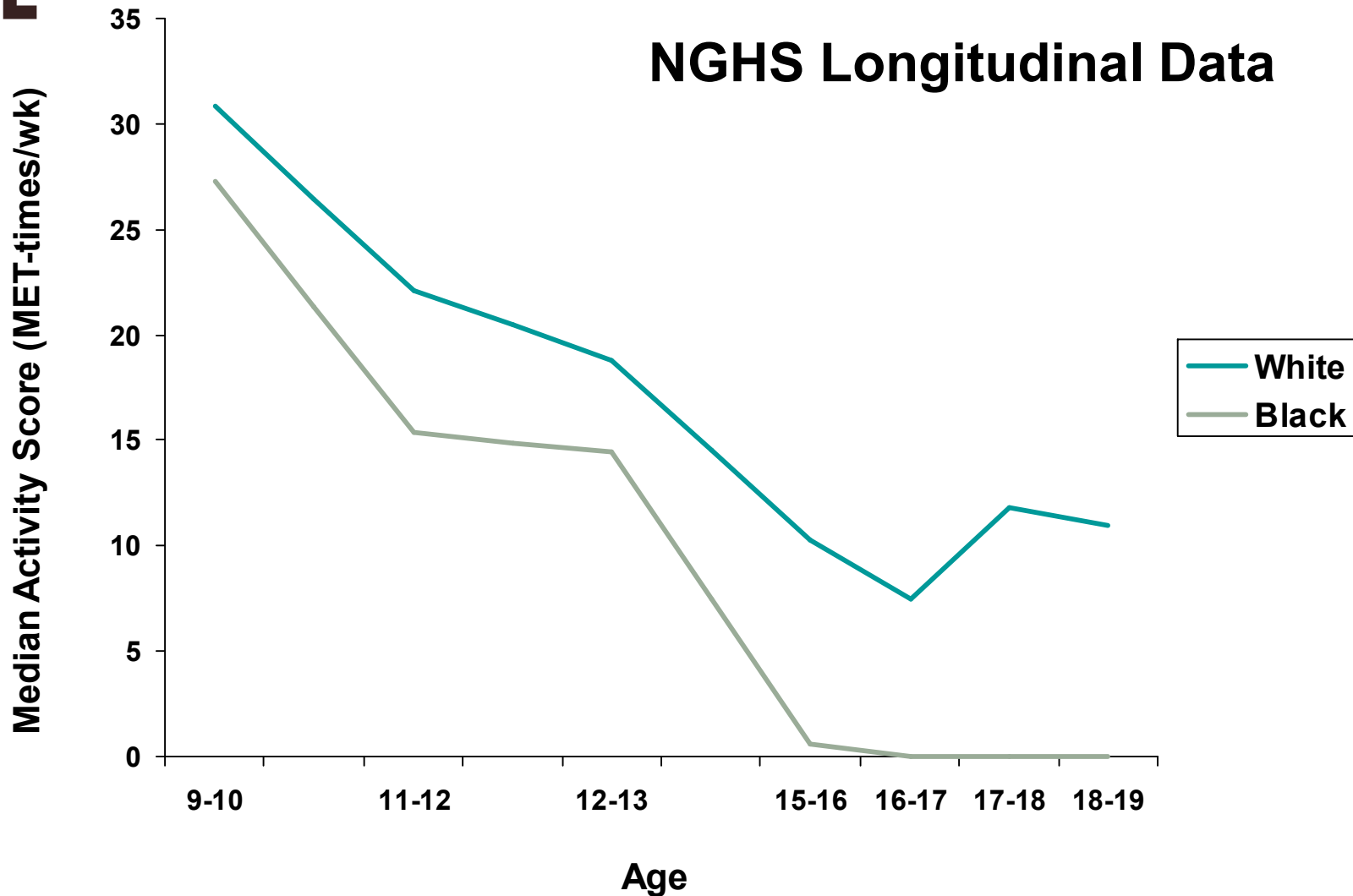
# Physical Activity Among Adolescents



# Physical Activity Prevalence in High School-Aged Adolescents



# Physical Activity Among Adolescent Girls



# Why Do We Care?

- Physical activity in adolescents:
  - Maintains normal weight and reduces risk for overweight
    - Diabetes
    - High blood pressure
    - Metabolic syndrome
    - Low self-esteem, anxiety, depression
  - Maintains musculoskeletal and cardiovascular health
  - Maintains normal blood pressure and lipoprotein levels

# Addressing The Issue

- Project Heart
  - Single-Center Trial: High School Girls
  - NHLBI (ROI HL63861)
  - 2000 - 2006
- Trial of Activity for Adolescent Girls
  - Multi-Center Trial: Middle School Girls
  - NHLBI (UO1 HL66857)
  - 2000 - 2007

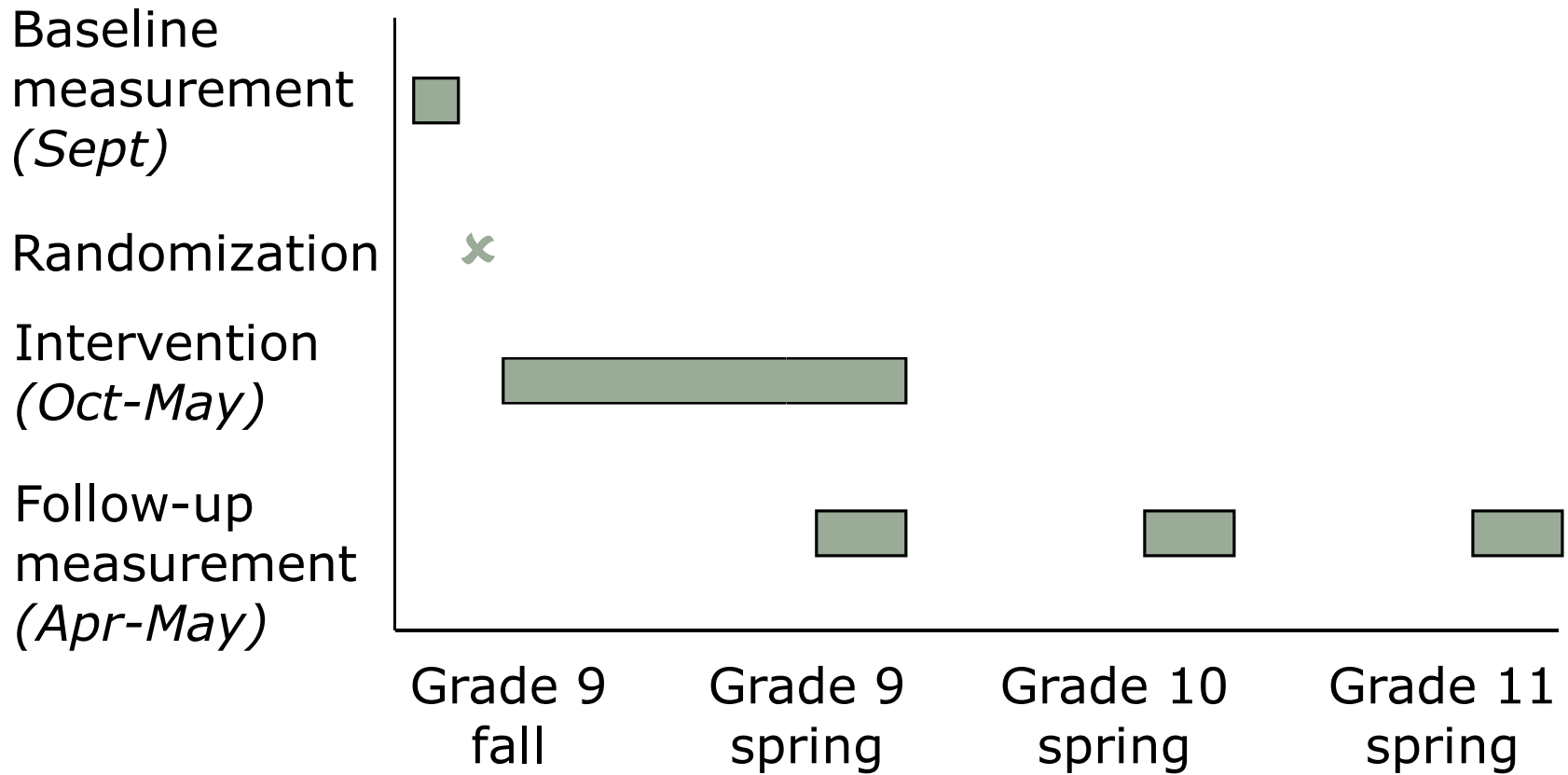
# Project Heart

- To determine if a 2-semester intervention, conducted in PE class, would increase daily physical activity and fitness relative to standard PE
  - Behavioral- and physical activity life-skills oriented lessons

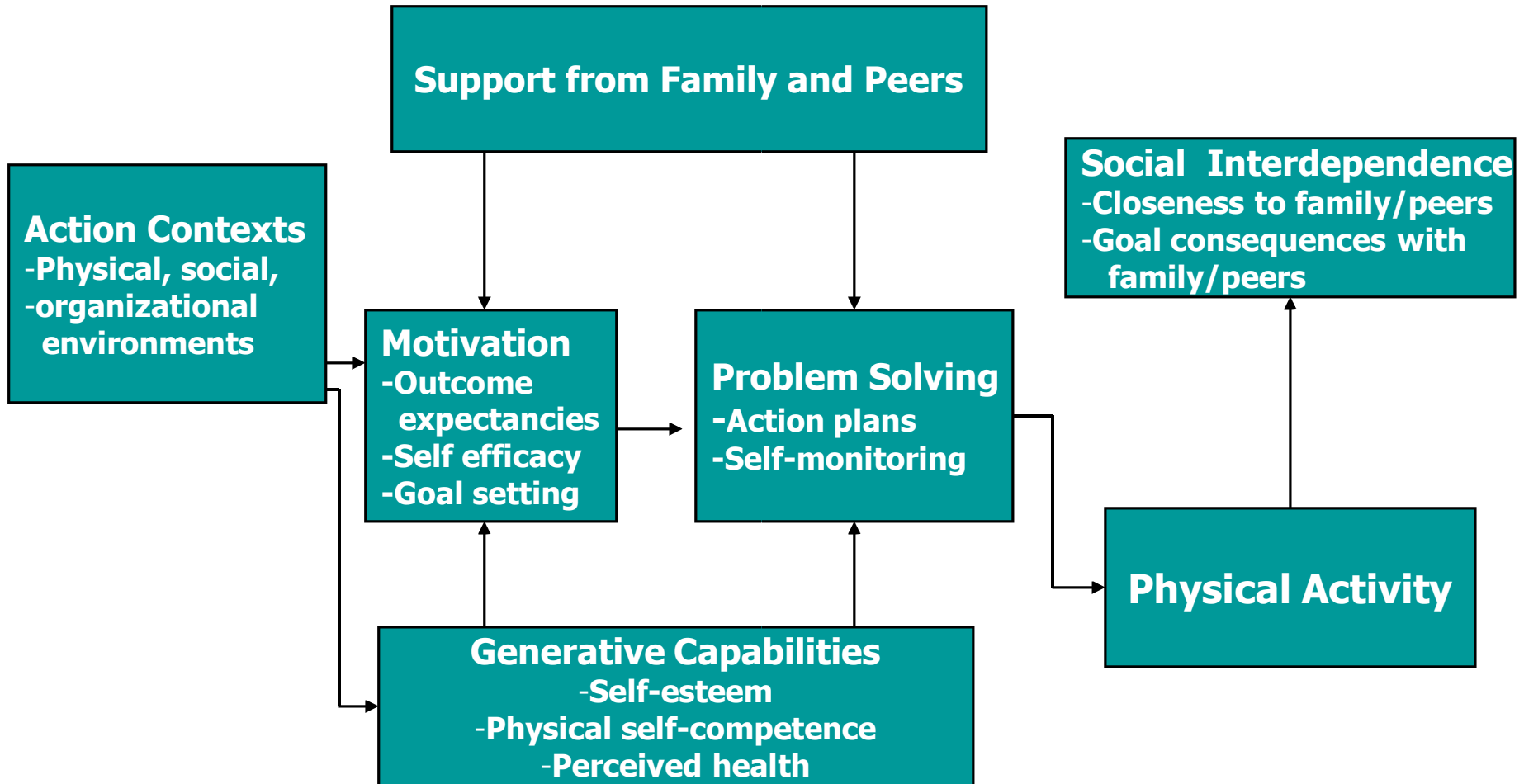
# Project Heart

- Eligibility criteria included all 9<sup>th</sup> grade girls
- 2-semester intervention
  - 5 days/week, 47-min class periods
  - Implemented by project staff - Teacher
- Intervention conducted within district's curriculum
  - 1 semester individual sports
  - 1 semester team sports

# Project Heart – Study Design



# Theoretical Framework: Social Action Theory



# [ Study School ]

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- Magnet, all-girls public high school in Baltimore
- Draws students from most neighborhoods
  - 80% African American
  - 41% free/reduced lunch

# Baseline and Primary (8-mo) Follow-up Measures

- Physical Activity
  - 7-Day Physical Activity Recall
  - Sedentary Activities
- Fitness
  - Multi-stage step test
  - Change in heart rate at stage 1
- Cardiovascular risk factors
  - Height, weight: Body Mass Index ( $\text{kg}/\text{m}^2$ )
  - Blood pressure, lipids

# Intervention

- Maximize Physical Activity in Class
- Increase Out-of-Class and Weekend Activities
- Develop Behavioral Skills
- Enhance Social Support

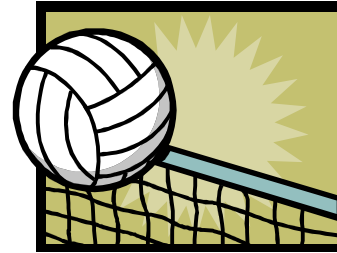
# Maximize Physical Activity in Class

## ■ Individual Sports



- Fitness (walking/jogging, circuit training)
- Swimming
- Aerobic dance

## ■ Team Sports



- Basketball
- Volleyball
- Soccer
- Fitness Fridays

# Develop Behavioral Skills

- Goal-Setting
  - Weekly exercise logs
- Communication Skills
  - Foster social support
- Role Modeling
  - Interview active adult
  - Teach segment of aerobic dance unit
  - Lead 'Fitness Fridays'
- Problem-Solving Barriers

# Enhance Social Support

- Identify Social Support Person
  - Asking for support included in logs
  - Skit assignment of asking for support
- Family Workshop
  - Viewed skits
  - Provide support tips
- Family Newsletters

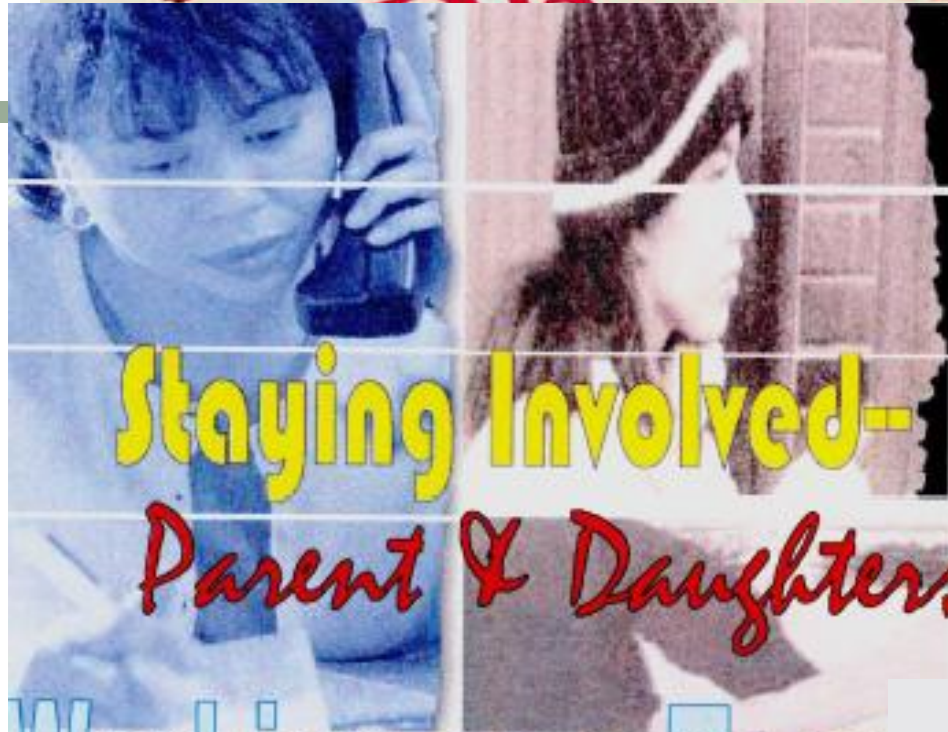
March 2002

## The Project Heart Newsletter

tween Western High School and University of Maryland



Project



### Staying Involved-- Parent & Daughters

Working as a Team

*Congratulations and good work!!!*

Atiya Rideout

Heather Buckner

Whitney Speaks

Jewel Parker

Brittney Randolph

What can I do as a parent to encourage my daughter to be physically active? Here's what some Project HEART parents have pledged to do:

- Show interest in what she's learning and ask what she's doing in PE class
- Ask her if she exercised and what she did for exercise that day
- Remind her to write down and keep track of her progress
- Attend her sports activities and events

## Small Talk

### Importance of Teamwork & Peer Support

*By Neva Tall Bear and Sarah Allen*

Here's what Neva & Sarah had to say about Teamwork and Peer Support.



What's new?



- **Role Models for Physical Activity**

*Work hard and have fun.*

- **Small Talk**

*Tips from the Experts*

- **Homework Activity**

*Role Models*

- **In Class this Month**

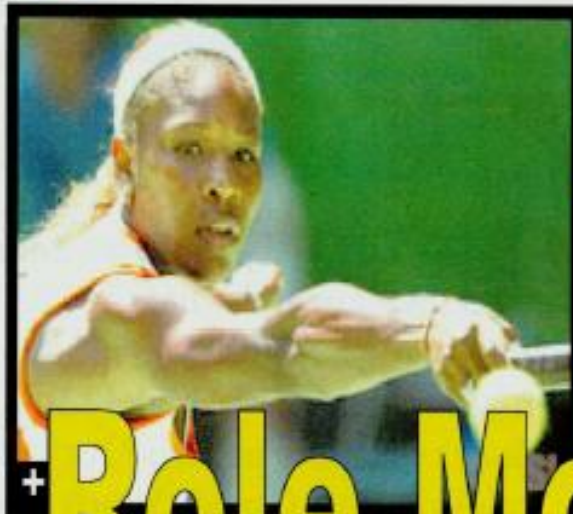
*Basketball*

- **Contact Us**

**Online Info.**

[www.shapeup.org](http://www.shapeup.org)

[www.turnstop.com/  
music/index.html](http://www.turnstop.com/music/index.html)



# Role Models for Physical Activity

*People we look up to influence us in many ways, even our attitudes about physical activity.*

Here's what Andrea Lloyd-Curry, a member of WNBA's Minnesota Lynx, said about her role models.

## Small Talk

*By Neva Tall Bear and Sarah Allen*

*Here's what Neva & Sarah had to say about Role Models:*

**Neva** : My role model at fourteen was my sister, because she was always good at sports.

**Sarah** : My role models were the other girls in my class. They were all really physically active and enjoyed it.

**Neva** : A person who has a good attitude about being physically active could also be a good role model. And parents could even be role models for their daughters by setting good examples.

**Sarah** : I think that whomever the girls pick as their role models, the person should be decent all around.



# [ Standard PE ]

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- Skill-Oriented Curriculum
- Grade determined by skill level, knowledge of sport rules
- Family Newsletter
  - Health topics
  - What's going on in class (skills)

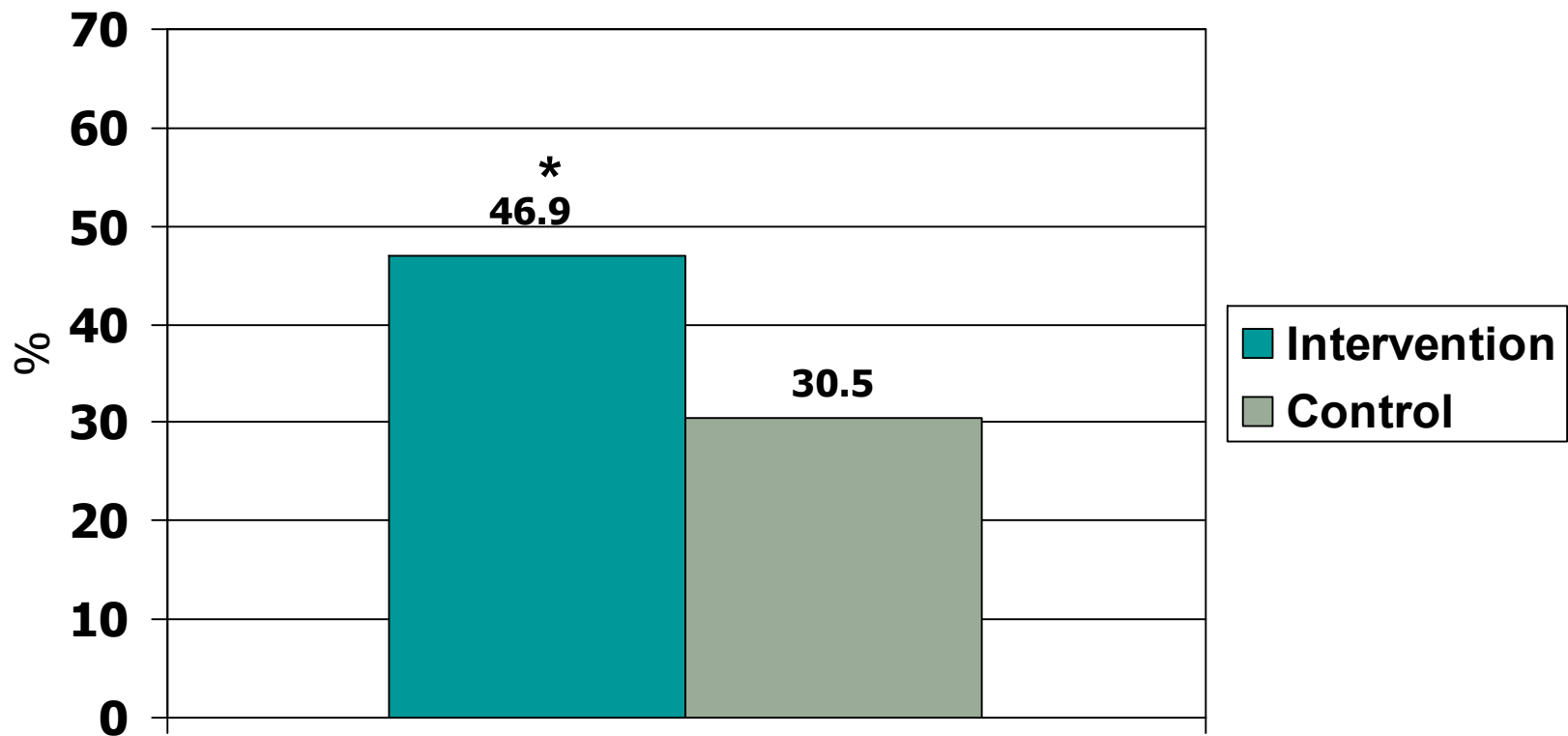
# Baseline Measures (n=221)

	Standard PE (n=105)	Intervention PE (n=116)
Age (yr)	13.8	13.7
African American (%)	83	83
BMI (kg/m <sup>2</sup> )	25.2	25.0
Estimated Energy Expenditure (Kcal/kg/day)	34.9	34.6

# Physical Activity in PE Class

- Adapted SOFIT assessment (McKenzie et al)
  - Lying down, sitting, standing, walking, active
  - Moderate activity= Walking + active
- Observed 81 classes over 3 years

# Percent Time in PE Spent in Moderate to Vigorous Activity



\* P < 0.0001

# Results: 8-month Change

	Intervention		Control	
	Baseline	Follow-up	Baseline	Follow-up
Energy Exp (Kcal/kg/day)	34.6	34.2	34.9	34.2
≥ 3 hr TV watching (%)	22.3	17.0	26.7	26.7‡
Fitness (HR change)	n/a	-6.2*	n/a	-3.5*
Waist-to-hip ratio (mmHg)	0.79	0.77*	0.78	0.77
Systolic BP (mmHg)	109.4	108.3	110.3	106.8*
HDL cholesterol (mg/dL)	52.2	54.0*	52.7	55.7*

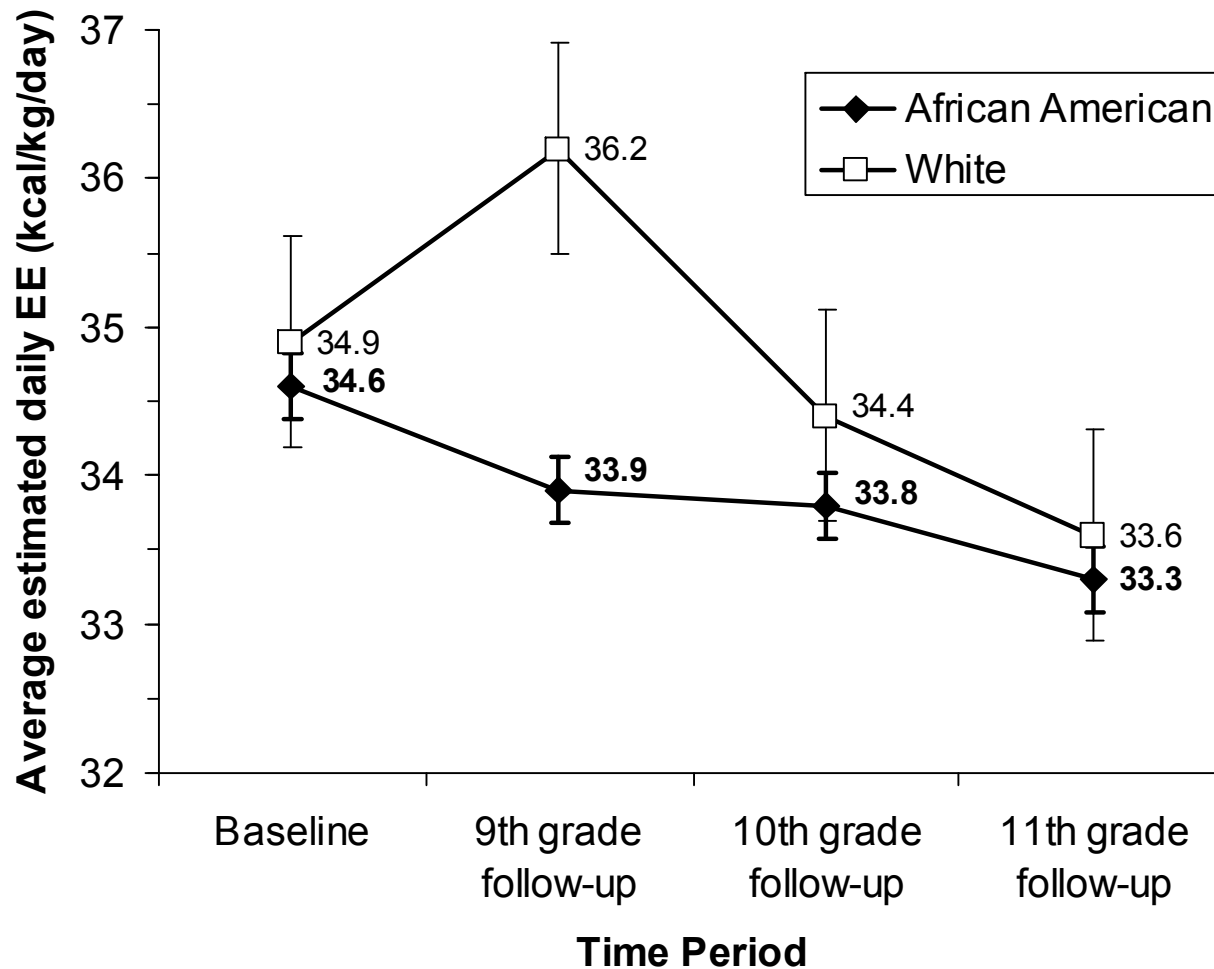
Analyses adjusted for baseline value and race

Within group difference \*p<0.05; ‡ Between group difference p<0.05

# Summary

- Intervention increased MVPA in PE class, but not daily physical activity
- Intervention decreased sedentary activities
- 5-day/week for 2 semesters PE increased fitness
- 5-day/week for 2 semesters PE improved selected CVD risk factors

# Change in Daily Energy Expenditure Over Time



# Limitations

- Field measures
  - Fitness assessment
- Loss to Follow-up
  - Physical activity-only data on 91% of sample
- Generalizability
  - Predominantly African American girls
  - Single, magnet high school

# [ Summary ]

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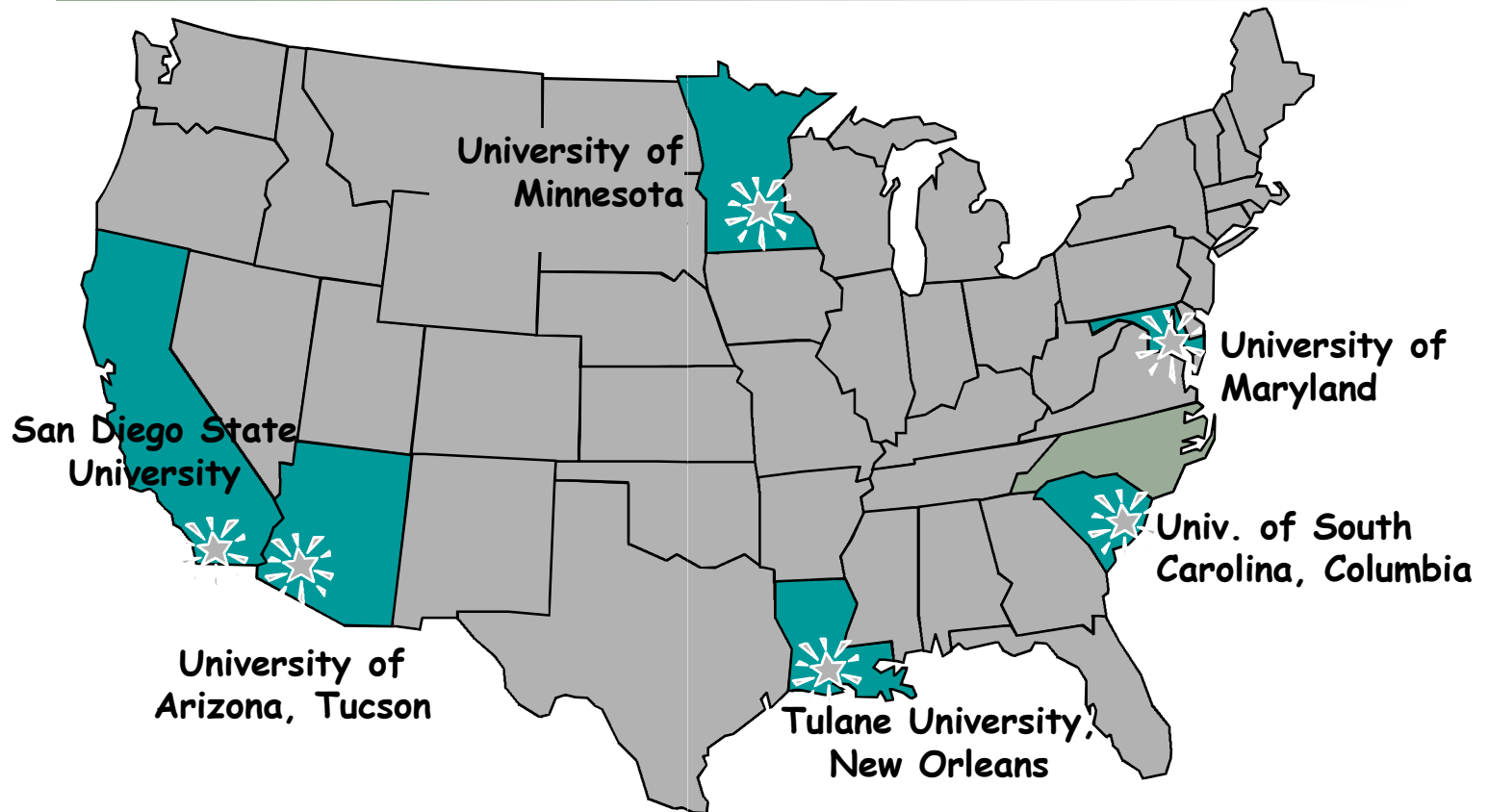
- Perplexing race effects with physical activity over time
  - PE program factors?
  - Sociocultural factors?

# Trial of Activity for Adolescent Girls (TAAG)

- Most physical activity occurs outside of school
- Interventions in schools only may not be potent enough to influence daily physical activity
- Need to link to broader community

# What was TAAG?

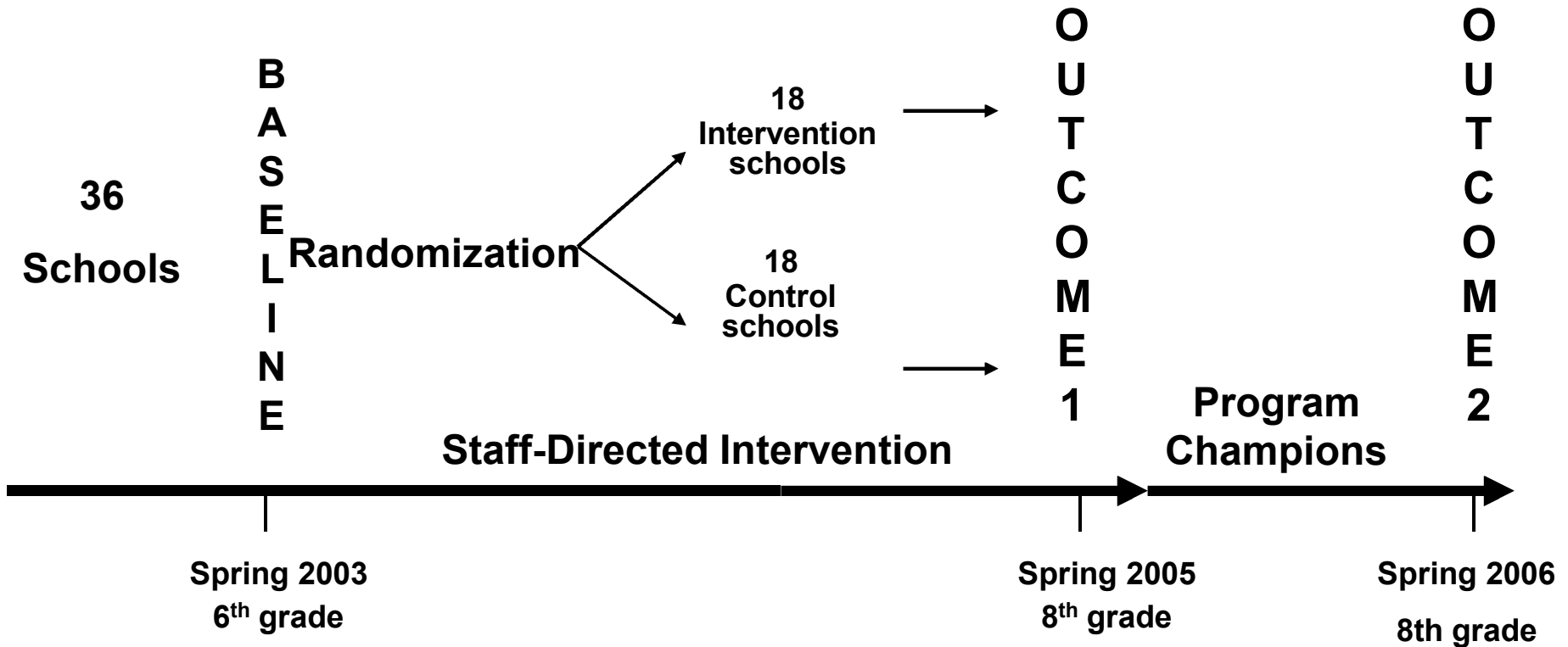
- Multi-center school-based field trial
  - 6 field sites; 36 middle schools
- Linked schools to community agencies
- Evaluate the effectiveness of an intervention linking schools to community organizations to reduce the age-related decrease in MVPA in middle school girls
  - Intervention maintenance



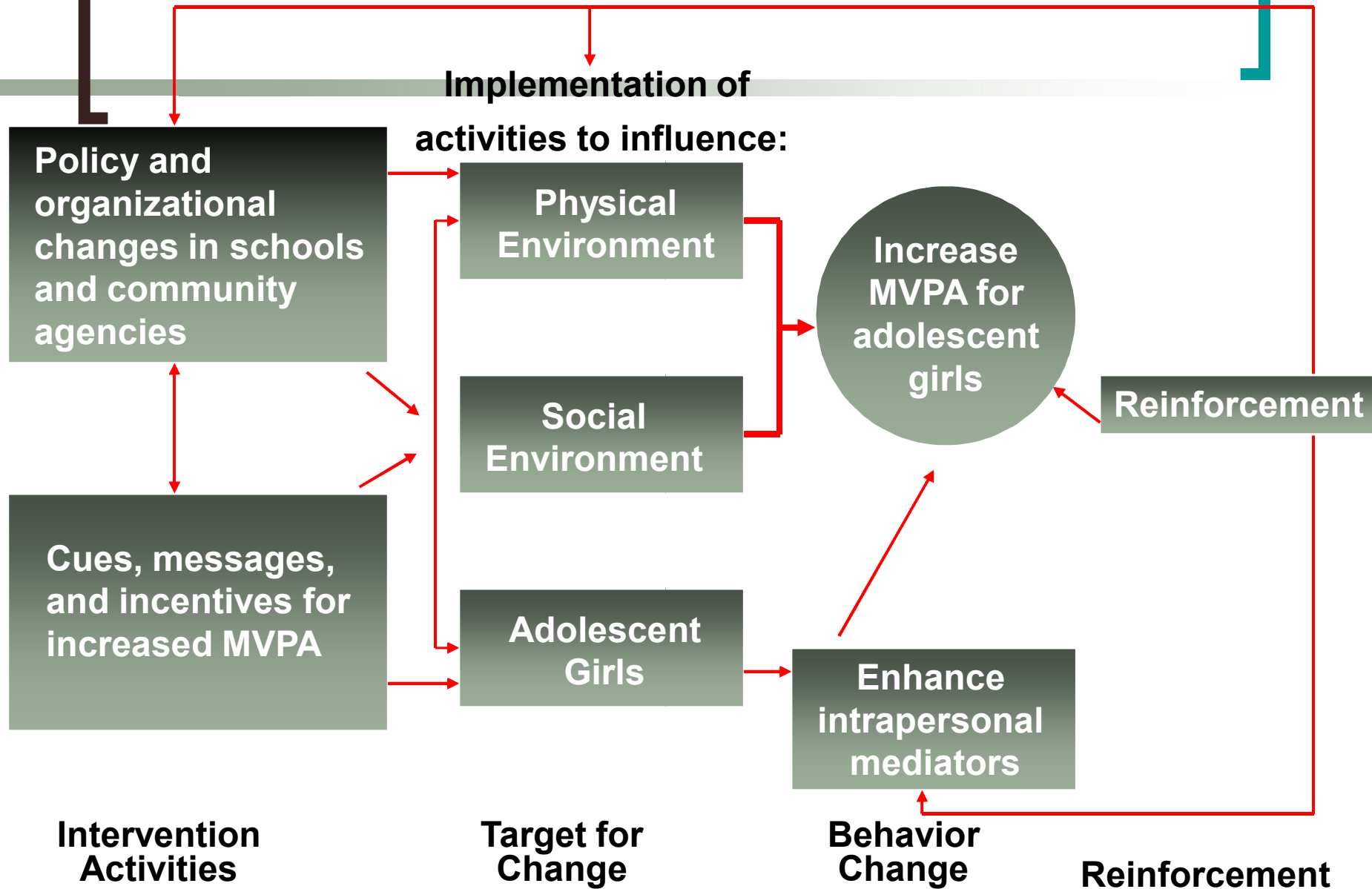
University of North Carolina, Chapel Hill is the TAAG Coordinating Center  
TAAG is funded by the National Institutes for Health (NIH)

# TAAG Study Design

Three cross-sectional samples



# TAAAG Social-Ecological Model



# TAAG Intervention

- Health Education with Activity Challenges
- Physical Education
- Promotions
- Programs for Physical Activity
- Program Champions
  - Enhance intervention maintenance

# Health Education with Activity Challenges

- Six health education lessons for 7th and 8th grade
- Lessons in a traditional classroom or PE class
- Emphasis on building behavioral skills (communication, self-monitoring, goal setting)
- Activity Challenges to practice skills introduced in class

# HEAC Sample 8<sup>th</sup> Grade Lesson

## LESSON 3

### BARRIER BUSTERS!

Identifying and Breaking Barriers to Physical Activity



#### OBJECTIVES

**Students will be able to:**

1. identify specific barriers to being physically active; and
2. develop strategies for overcoming barriers to physical activity.



## ASK THE STUDENTS

- What stops you or gets in your way of being physically active?
- What is your biggest barrier to being physically active?

Possible examples:

- lack of time
- lack of energy, willpower, or motivation
- • asthma or other health conditions
- lack of support (friends or family are not physically active)
- fear of injury
- • lack of money (organized sport or other activities)
- lack of skill
- weather (too hot or cold)
- • family obligations (taking care of siblings)
- it isn't fun
- other activities are more appealing (like TV-watching)
- busy schedule (too many commitments)
- unrealistic expectations and disappointments (weight loss),
- • don't want to get sweaty or mess up my hair
- • transportation (my parents work and can't drive me)

**PHYSICAL  
ACTIVITY BARRIERS**

**BARRIER  
BUSTER TIPS**

<b>Lack of skill</b>	Choose an activity that you already know how to do and like to do. That way you will be starting out with an activity that you are comfortable with already. You can move on to new activities when you are ready.
<b>Don't have the right stuff!</b>	Start out with activities that do not require too much equipment or money. Jumping rope is a great way to stay fit, and a jump rope is an affordable piece of equipment.
<b>But, how do I get there?</b>	<p>If you want to get to an activity but don't have a ride, ask your PE and Health teacher if there are similar opportunities closer to where you live.</p> <ul style="list-style-type: none"><li>• Start out with an activity that is after school and see if the activity bus is available to take you home.</li><li>• Try and work out a deal with your parents or older sibling for a ride to and from an activity on a day they are available.</li><li>• Ask a friend along whose parents may be able to pick you up.</li></ul>

# [ TAAG PE ]

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- Staff development approach
- MVPA for 50% of class time
- Girls have choice, enjoy being active, increase competence
- Encourage girls to participate in physical activity outside of PE class

# [ TAAG Promotions ]

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- Promote physical activity to diverse segments of girls
- Events:
  - Pedometer Challenge
  - Passport Program

Maryo



Be unpredictable!

Check out the  
free afterschool  
drop-in program.

Hey, it's not just  
for athletes.

Don't you love to  
keep people guessing?

TAAG. Real girls. Real activities. Real fun.



**"Did you hear?  
Tonia had a blast at that  
afterschool dance program!"**

**TAAG. Real girls. Real activities. Real fun.**

# Programs for Physical Activity

- Increase opportunities to participate in physical activity programs
- Link schools with community agencies to provide programs
- Goal: Increase # of programs per school each semester





# [ Program Champions ]

- Identified by school administration
  - Usually teacher and/or community leader
- Trained by project staff in year 2
- Directed intervention activities in year 3
  - Project staff provided technical support
- Received small stipend

# Primary Outcome: Moderate to Vigorous Physical Activity

- Actigraph accelerometers
- 6 complete days of monitor wear time
- MET-weighted minutes of MVPA

# Other Measurements

- Fitness
  - PWC 170 cycle ergometer test
- Body composition
  - Height
  - Weight
  - Triceps skinfold thickness
  - % body fat
- Process evaluation

# Sample Demographics

	<b>6<sup>th</sup> grade Spring 2003 (n=1721)</b>	<b>8<sup>th</sup> grade Spring 2005 (n=3504)</b>	<b>8<sup>th</sup> grade Spring 2006 (n=3502)</b>
<b>White</b>	<b>793 (46%)</b>	<b>1578 (45%)</b>	<b>1628 (46%)</b>
<b>African- American</b>	<b>404 (24%)</b>	<b>771 (22%)</b>	<b>612 (17%)</b>
<b>Hispanic</b>	<b>212 (12%)</b>	<b>738 (21%)</b>	<b>785 (22%)</b>
<b>Multi-ethnic</b>	<b>184 (11%)</b>	<b>220 (6%)</b>	<b>243 (7%)</b>
<b>Asian/American Indian</b>	<b>100 (6%)</b>	<b>177 (5%)</b>	<b>204 (6%)</b>

# Mean MET-weighted Daily Minutes of MVPA

	Intervention Schools	Control Schools	Difference
6 <sup>th</sup> grade	145.2	148.7	-3.5
8 <sup>th</sup> grade 2005	136.5	136.9	-0.4
8 <sup>th</sup> grade 2006	136.4	125.5	10.9*

\*p<0.05

# Mean Minutes of Sedentary Behavior per Day

	Intervention Schools	Control Schools	Difference
6 <sup>th</sup> grade	456.5	458.0	-1.5
8 <sup>th</sup> grade 2005	510.5	514.0	-3.5
8 <sup>th</sup> grade 2006	524.4	532.6	-8.2*

\*p<0.05

# Mean MET-weighted Minutes of MVPA per Day by Ethnicity

	Black		Hispanic		White	
	I	C	I	C	I	C
6 <sup>th</sup> grade	148.5	152.4	141.9	127.2	148.9	157.8
8 <sup>th</sup> grade 2005	131.3	137.6	131.6	132.1	140.9	142.2
8 <sup>th</sup> grade 2006	129.0	124.5	137.6	113.3	140.4	130.6

**Whites significantly greater than Blacks and Hispanics at all time points**

# [ Other Outcomes ]

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- No treatment effects for BMI, % fat, fitness

# Summary

- After three years, the TAAG intervention showed a reduction in the decline in PA
  - Less time in sedentary activity
  - No difference in BMI, % fat, fitness
  - No differences by race/ethnicity
- Unexpectedly active control group in 2005
- Program Champions able to sustain PA
  - Length of time for intervention?
  - Strength of Program Champions?

# Comparison of Results

## ■ Project Heart

- Results modest
- Race differences over time
  - PA of Whites increased, then declined
- Age: High school
  - PA patterns may be more set for Blacks

## ■ TAAG

- Results modest
- Racial/ethnic differences across all time points
  - MVPA of Whites greater than Blacks or Hispanics
- Age: Middle school
  - PA patterns responded similarly

# Conclusions

- Interventions in schools must take into account diversity of students
  - When they do, may have similar results across race/ethnicity
- Age of students may be a factor
- Continuing need to understand sociocultural influences of PA

# Thanks

## ■ TAAG

- National: Russ Pate (USC), Tim Lohman (UA), Larry Webber (Tulane), John Elder (SDSU), Leslie Lytle (UM), June Stevens (UNC), Charlotte Pratt (NHLBI)
- Local (UMd): Joel Gittelsohn (JHU), Margarita Treuth (JHU), Cheryl Alexander (JHU), Brit Saksvig (UMd) Carolyn Voorhees (UMd)
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  - JoAnn Kuo, Daheia Barr-Anderson, Jennie Phillips, Sarah Camhi, Soo Eun Chae

## ■ Project Heart

- Jennifer Haythornthwaite (JHU), Debra Mekos (JHU), Young Kim (JHU)
- Jeanette Harris, Marcella Sapun, Sue Shang, Tavon English, Tao Yu, Jie Li
- Jennie Phillips, JoAnn Kuo, Daheia Barr-Anderson, Sarah Camhi



