

Physical Activity, Sedentary Behavior, & Overweight Among Youth

James F. Sallis, Ph.D.

San Diego State University

Rodrigo Reis

Federal Univ of Santa Catarina, Brazil

Youth physical activity and health

Biddle, Sallis, & Cavill. Young & Active? 1998

Effects during youth:

- ++ Mental health
- ++ Weight loss for obese youth
- ++ Diabetes control
- ?? Musculoskeletal injuries

Youth physical activity and health

Biddle, Sallis, & Cavill. Young & Active? 1998

Potential prevention of adult chronic diseases

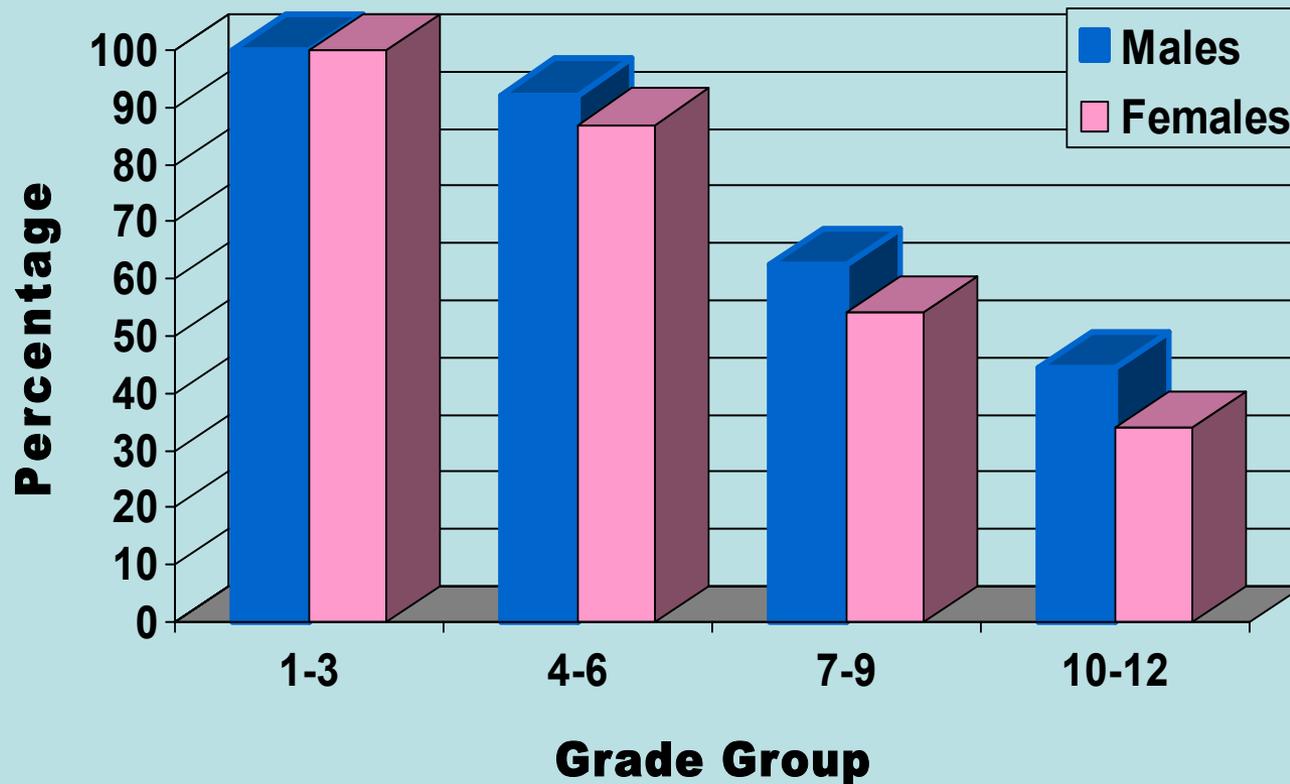
- + Blood pressure control in risk groups
- + Increase HDL-C in risk groups
- ++ Increase bone density
- + Weight gain prevention

Multiple PA Guidelines for Youth

- UK Consensus Group
 - Mod to Vig PA for 60+ min per day
 - Strength, flexibility, & weight bearing activities 2 days per week
- National Assn for Sports and Physical Ed
 - Accumulate 60+ min of PA daily
- Healthy People 2010
 - Moderate PA for 30 min on 5+ days
 - Vigorous PA for 20 min on 3+ days
- Sedentary Behavior
 - 2 or fewer hours per day of TV (HP2010)
 - Extended periods of inactivity are discouraged (NASPE)

Percent of young people meeting Guideline of ≥ 60 min per day of Moderate PA

Amherst, MA. 7 days monitoring with accelerometer.



Sallis, Prochaska, Taylor, 2000 Review Associations of PA & Weight

Age group	Significant	Non-signif
Children (3-12)	17 (35%)	32
Adolescents (13-18)	8 (35%)	23

Recent cross-sectional studies PA & youth weight status

Findings derived from 5 studies

PA measure	Signif comparisons	Non-signif
Objective	11 (30%)	37
Objective, excluding pedometers	6 (60%)	4

Cross-sectional objective PA studies summary

- Most NS correlations from one multi-country study using pedometers
- Signif correlations = .3 to .5
- Patrick et al. Adjusted OR = .92 for boys & .93 for girls
- Age range: 6-15 years
- Weight outcomes: BMI, skinfolds, DEXA
- PA measures: pedometers, accelerometers, doubly-labeled water
- Sample size range: 50-1954 (3 countries)

Recent prospective studies PA & youth weight status

PA measure	Signif comparisons	Non-signif
Objective	1 (50%)	1
Self-report	4 (57%)	3

Prospective PA—Overweight Studies with Objective PA

Author	Sample	Wt Meas	PA Meas	Fol-up	Findings
Moore, 1995	106, 4yo	Skinfol d, BMI	Acceler ometer	2-3 Yrs	OR 3.8
Salbe, 2002	138, 5yo, Pima	18-O dilution	DLW	5 yr	NS

Prospective PA—Overweight Studies with Reported PA

Author	Sample	Wt meas	PA meas	Fol-up	Findings
Berkey , 2000	10,779 , 9- 14yo	BMI	Rec PA	1-yr	Girls signif
O'Loug hlin, 2000	2318, 9-11 yo	BMI	Rec PA	1 & 2- yr	Girls Y1, Boys Y2
Maffeis , 1998	298, 8.7 yo	BMI	Rec PA	4 yr	NS

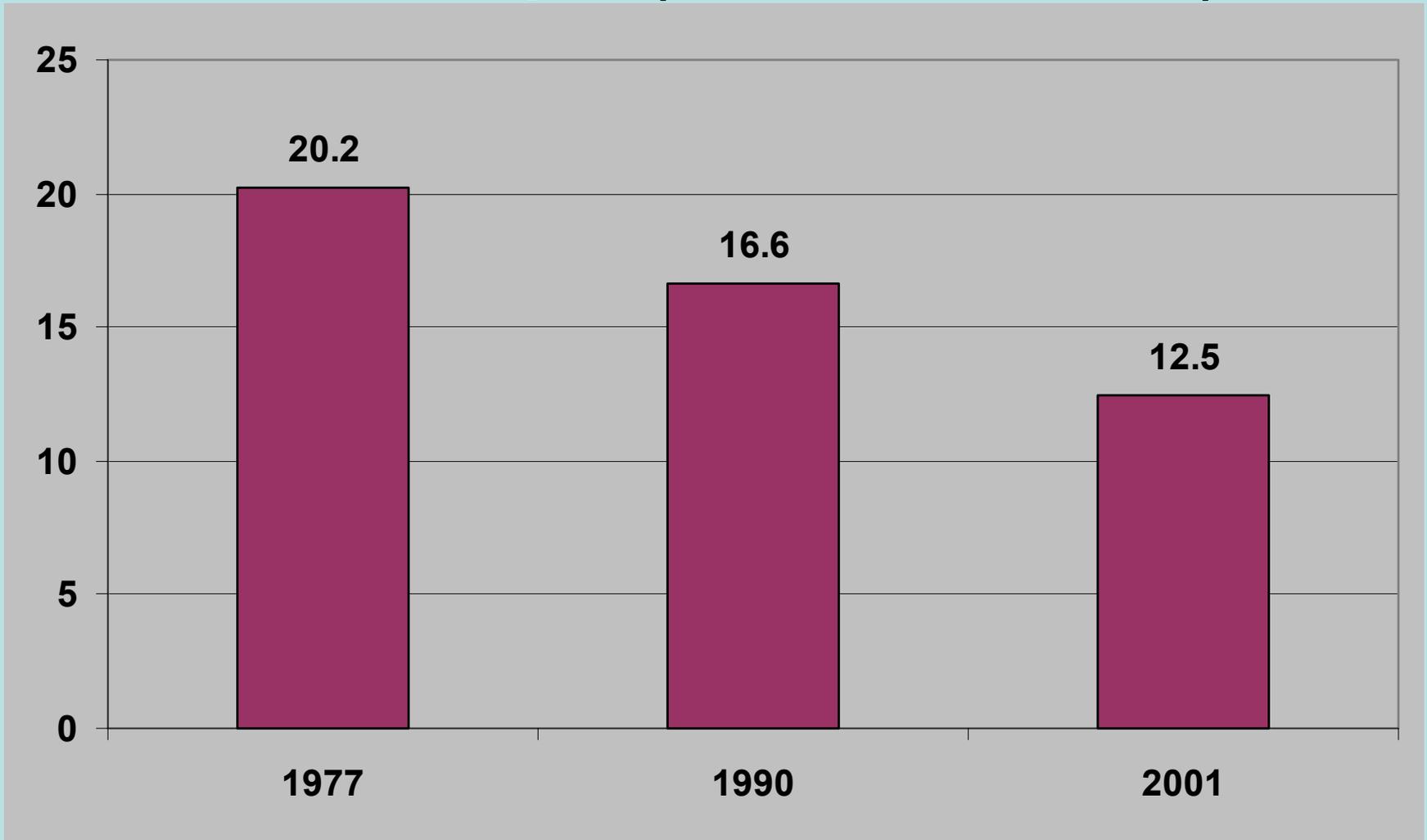
Prospective PA Studies Summary

- Most are studies of children
- Follow-up range: 1-5 years
- Sample size: 52-10,779
- Significant OR's: 1.90-3.8

Owens, Gutin et al. MSSE, 1999

- PA training study w/74 obese children, aged 7-11 years. No diet changes.
- 4 months training, 5 d/wk, 40 min, 70% max
- 87% adherence
- Net results of training
 - -2.2% body fat, net
 - +.5% vs +8.1% change in visceral fat
 - +6.1% fat-free mass, net

Walking to School as Percent of School Trips (Children 5-15)



Source: NPTS 1977, 1990 and NHTS 2001 for children 5-15

Active Commuting to School

- Cain, Sallis, et al. Society of Behavioral Medicine, 2004
 - Reported active commuting in elementary students predicted significantly less weight gain and skinfold increase across 1 year, in boys only

BAZOOKA JOE and his **GANG®**

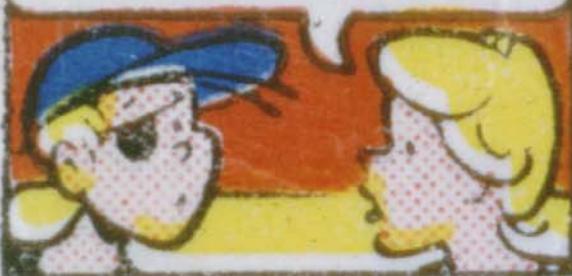
JOE, DON'T YOU DO ANYTHING BESIDES WATCH TV ALL DAY?



SURE! SOMETIMES I TAKE A BREAK IN THE AFTERNOON!



OH? AND WHAT DO YOU DO DURING YOUR BREAK?



PLAY VIDEO GAMES!



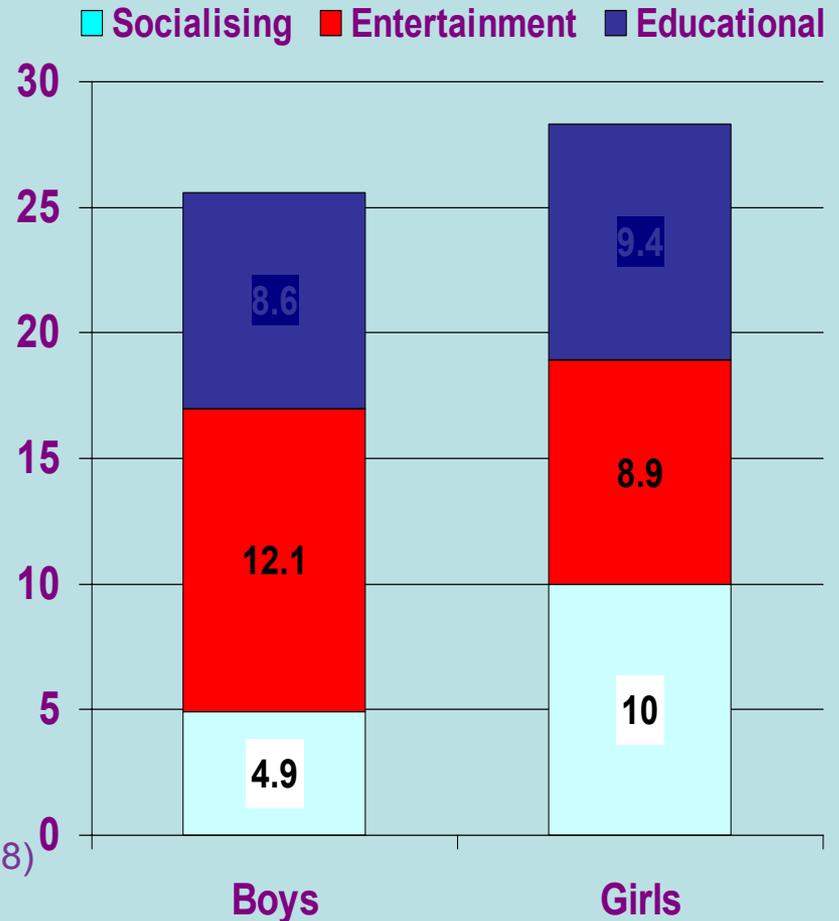
FORTUNE: A SURPRISE TRIP IS COMING YOUR WAY SOON.

Hours per week of self-reported sedentary behaviors in middle school students

- **Girls more sedentary, especially in socializing and educational activity**
- **Boys engage in more sedentary entertainment**



(Marshall et al., 2000, N=1678)



Sedentary Behavior

- Reduces time available for PA
- Provides opportunities for eating
- 80% of 8-16 yr olds watch more than 3 hrs of TV per day (Andersen 1998)
- In 1990, 10-15 yr old Americans watched mean of 34 hrs per week (Gortmaker 1996)
- TV watching higher in boys, blacks, low SES

Saelens 2003 chapter in R.E. Andersen. Obesity

Review of studies relating sedentary behavior to youth overweight + 4 new

Design	Significant	Non-signif
Cross-sectional	21 (78%)	6
Prospective	5 (83%)	1

Saelens 2003 chapter in R.E. Andersen. Obesity

- Generally consistent evidence of association of sedentary behavior & overweight in youth: 80% of studies
- Numerous inconsistencies within studies (e.g., across measures or subgroups)
- Gortmaker (1996): 60% of obesity in 10-15 yr olds attributable to TV watching, controlling for SES
- Filozof (1999): relative risk of 4-5 for becoming obese in 80 mo, comparing 31 vs 11 hr/wk

Saelens 2003 chapter in R.E. Andersen. Obesity

- Sedentary-TV associations strongest in 8-12 yr old group, which is peak watching age
- Findings more often significant for boys, who watch more TV
- Parent reports of sedentary behavior more likely to be signif than child reports
- Recent studies more likely to have signif associations

Saelens 2003 chapter in R.E. Andersen. Obesity

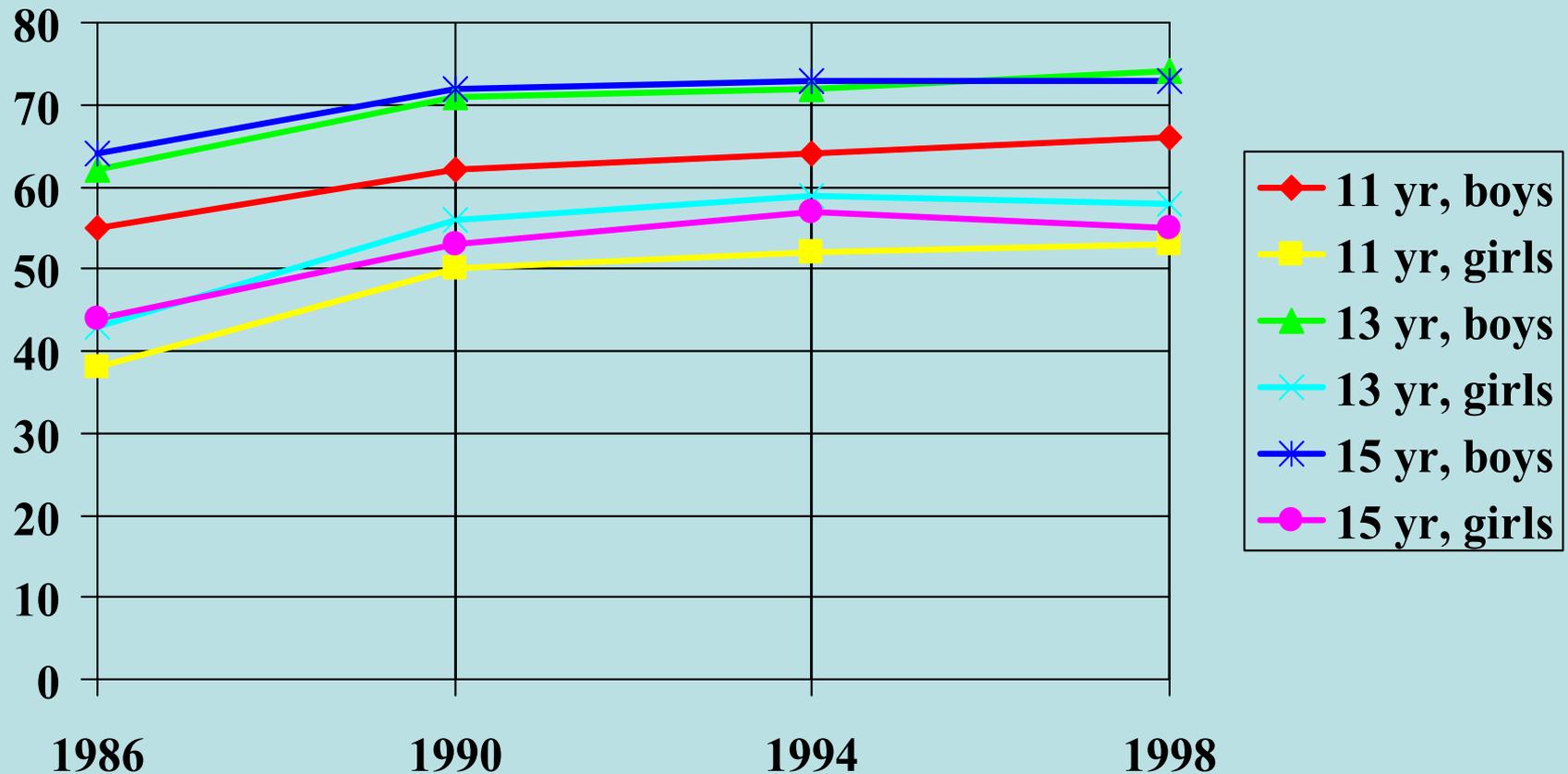
Interventions w/obese youth

- Earned TV time by riding stationary cycle & lost weight (Faith 2001)
- Setting goals for sed behav more effective at wt loss than setting goals for PA (Epstein, 1995)
- Setting goals for sed behav & PA equally effective for wt loss (Epstein 2000)

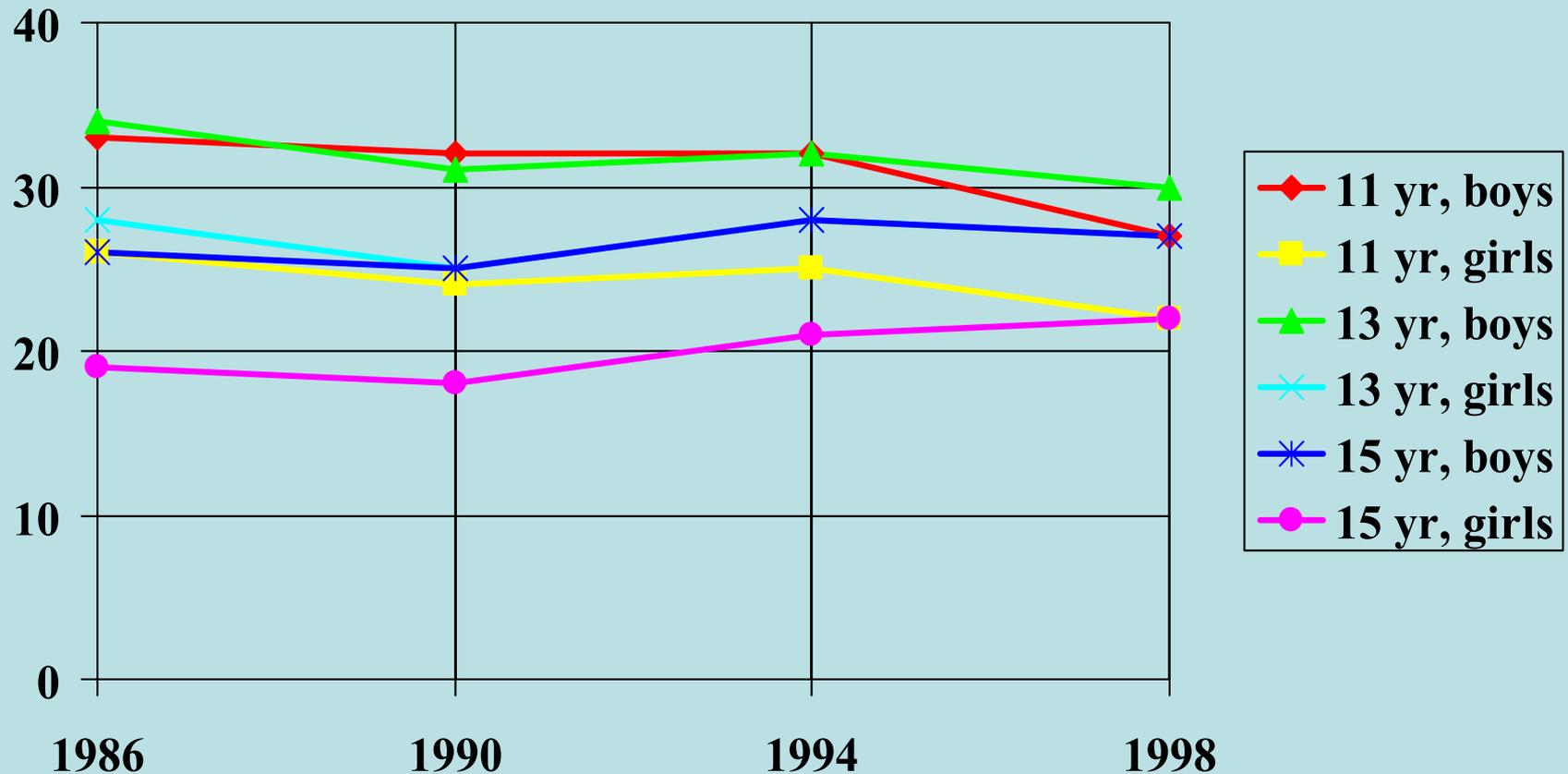
HBSC results on PA prevalence and trends

- 6 countries with data from 1986 to 1998
 - Austria, Finland, Hungary, Norway, Scotland, Sweden, Wales
- Vigorous PA (VPA) 2+ hrs/week
- TV 4+ hrs/day
- Sex and age differences

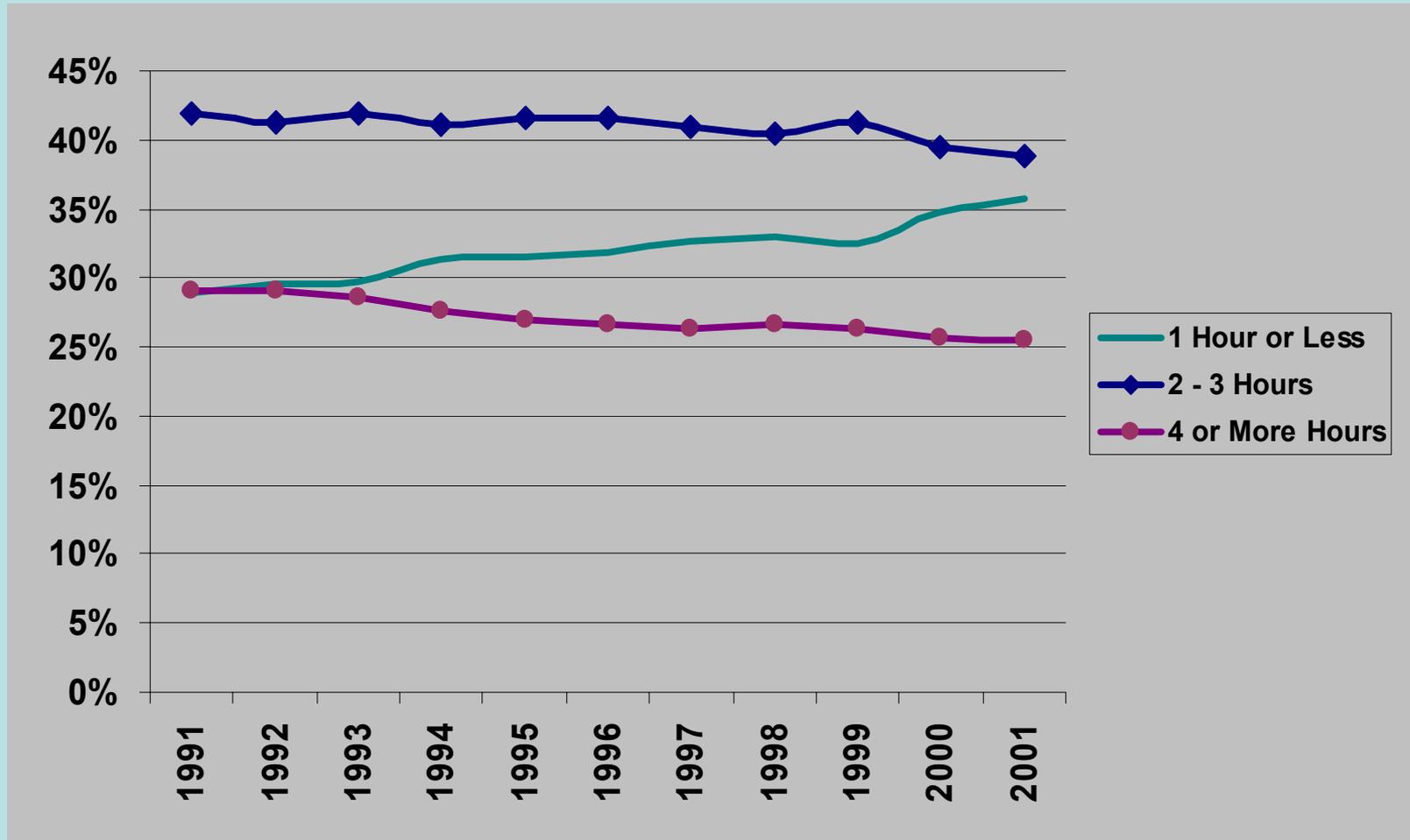
VPA 2 h/week+ by age and gender



TV 4 h/week+ by age and gender

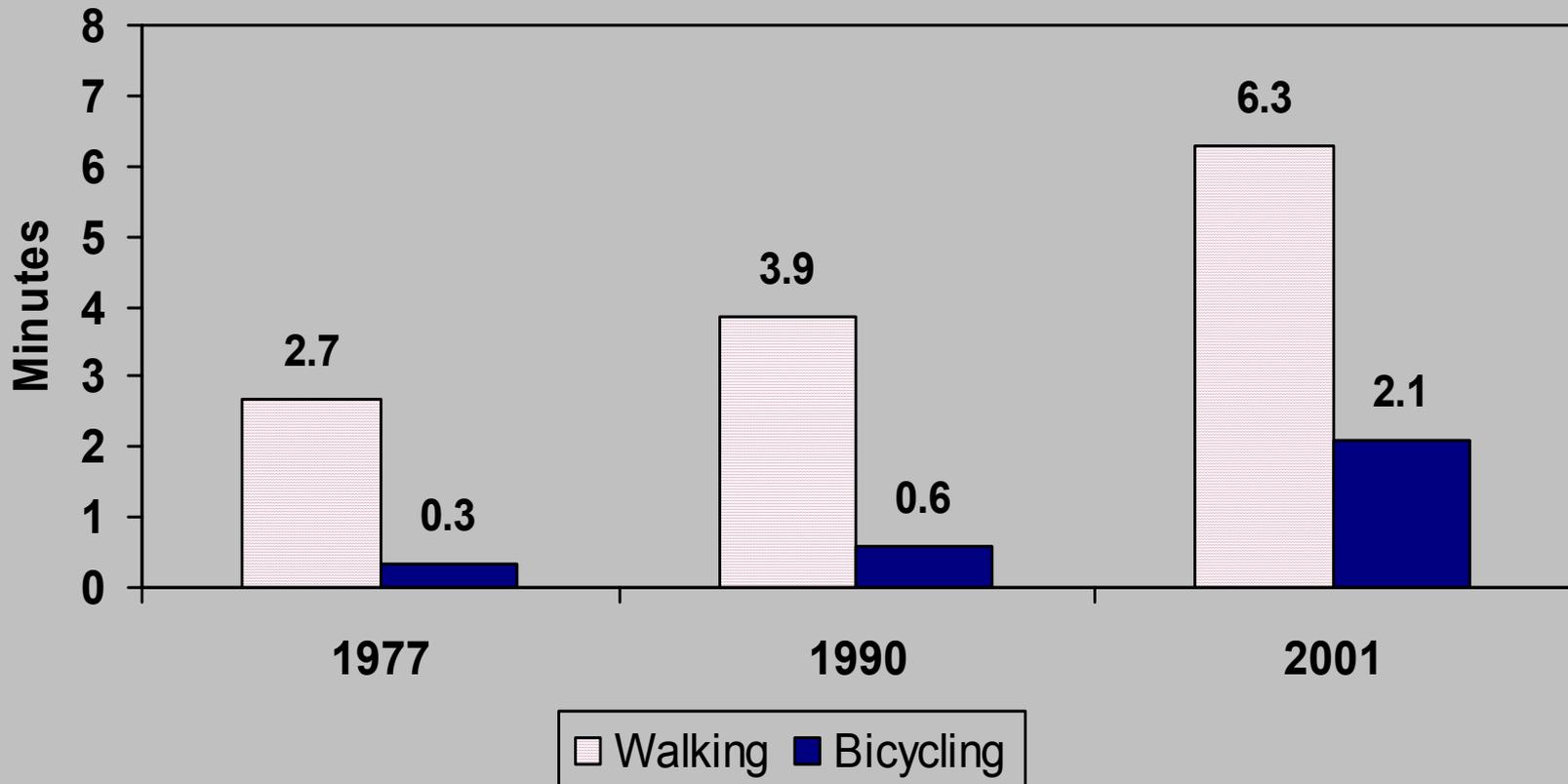


Continuing Decline in TV Watching Among Teenagers: 1991-2001



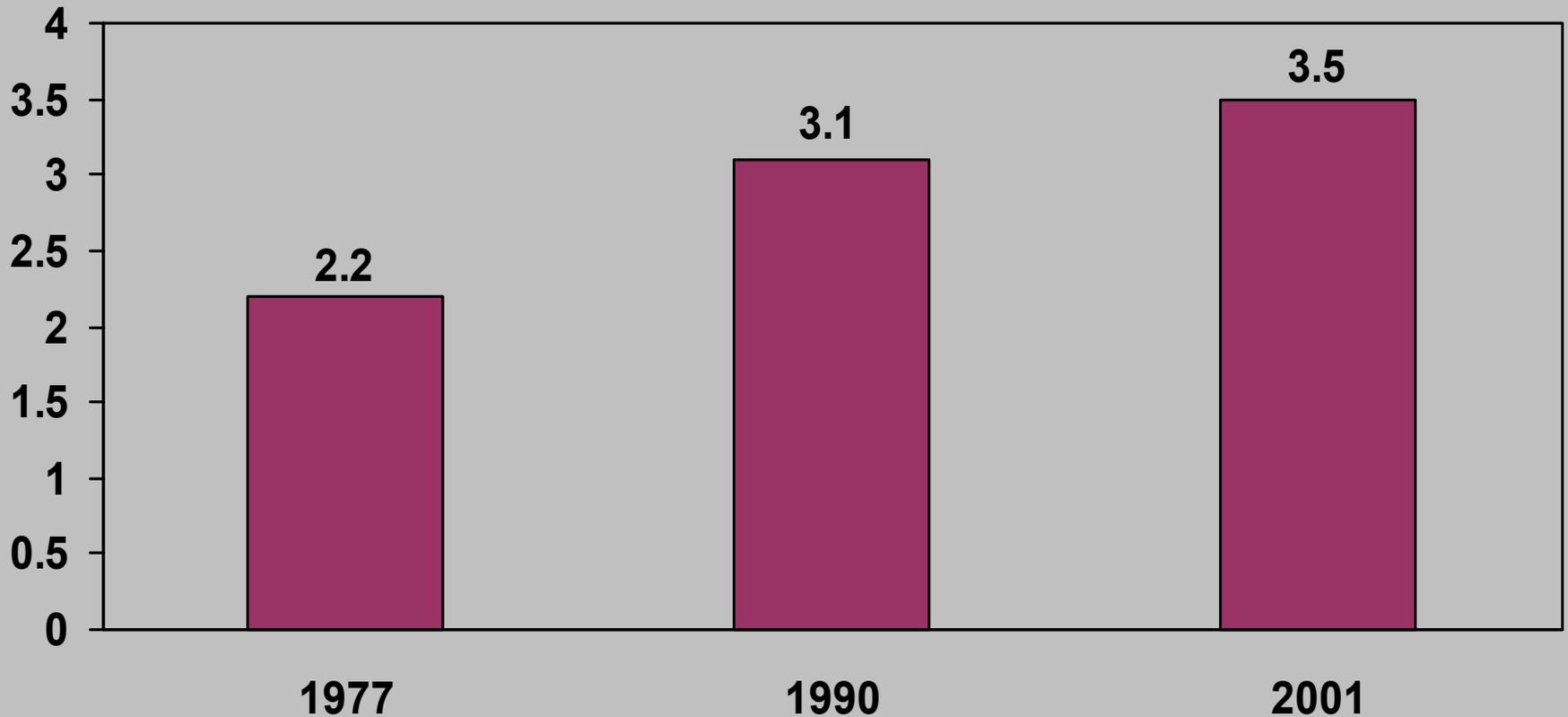
Analysis by Child Trends based on data from *Monitoring the Future*, 1990-2001, available at <http://www.childtrendsdatbank.org/indicators/55WatchingTV.cfm>

Average Active Travel Time in Minutes (Children 5-15)



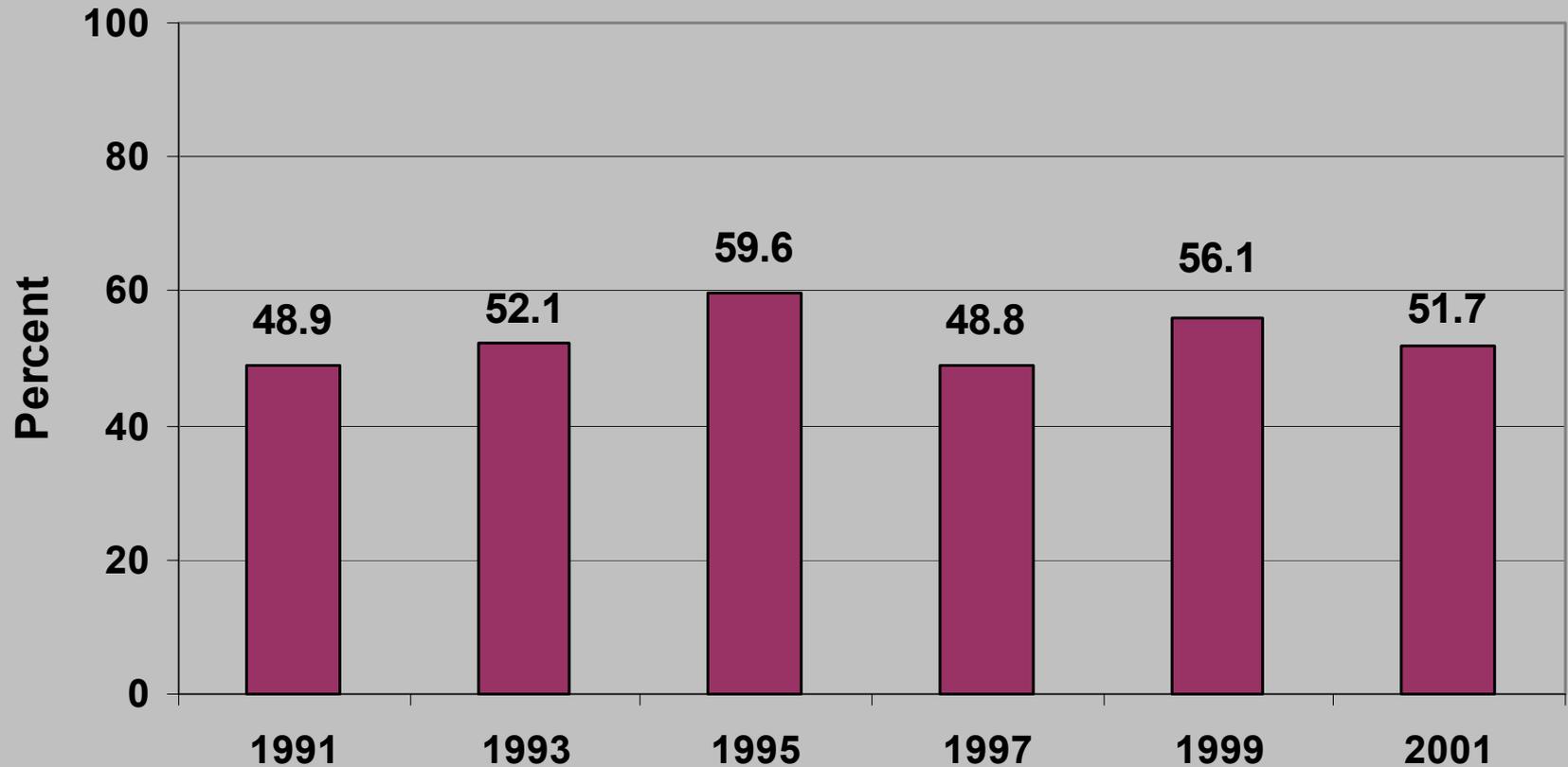
Source: NPTS 1977, 1990 and NHTS 2001 for children 5-15

Total Number of Daily Trips



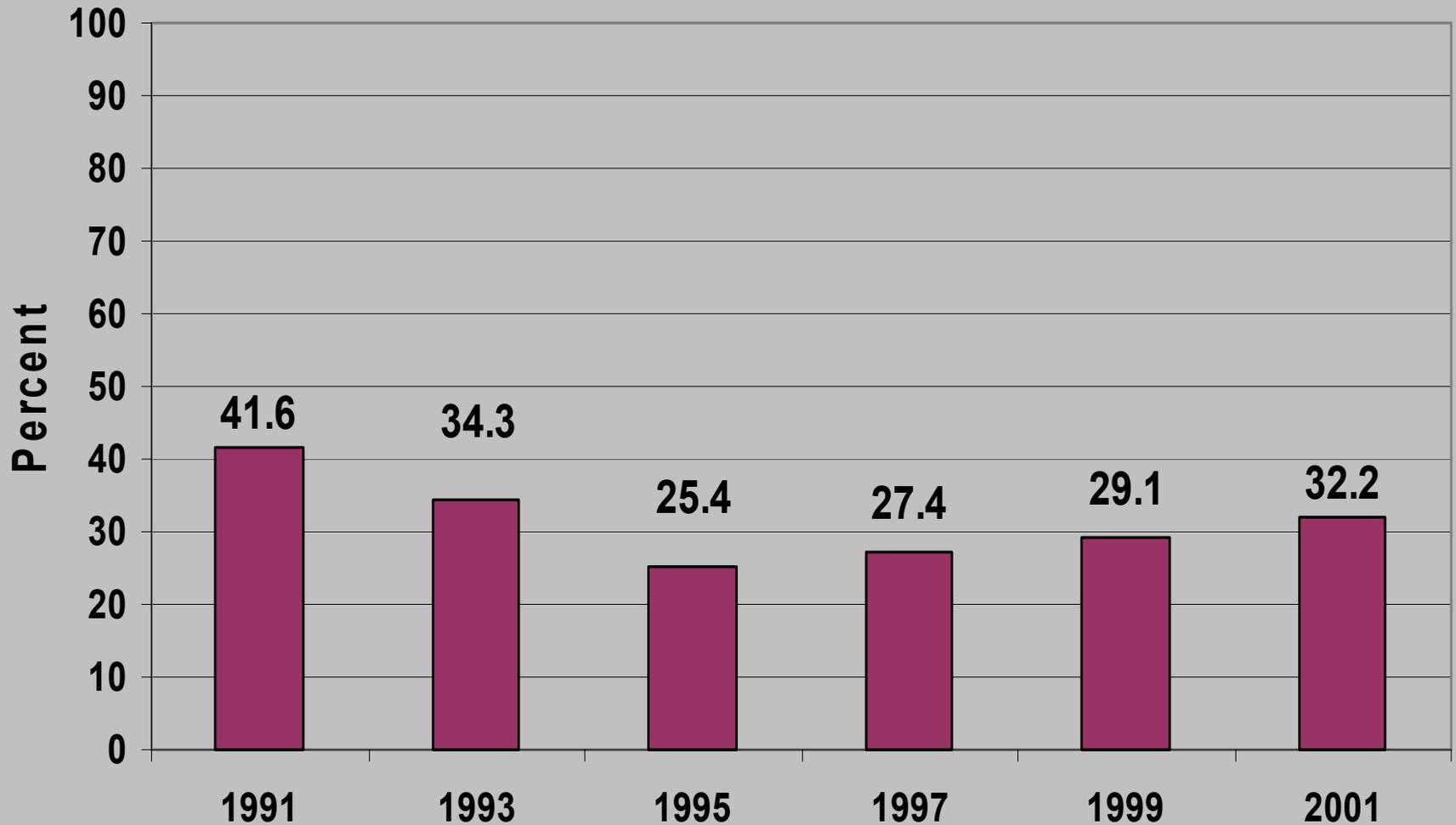
Source: NPTS 1977, 1990 and NHTS 2001 for children 5-15

% students attending PE class 1+ days in average school week



Source: CDC, YRBS, various years

% students attending daily PE



Source: CDC, YRBS, various years

Conclusions

- PA has benefits beyond weight control
- PA--Overweight: mixed results
- Sedentary behavior—Overweight: consistent associations
- Active commuting to school—Overweight: more study needed
- Cannot comment on associations in specific subgroups, but children studied more than adolescents

Conclusions

- No good US data on youth PA trends; objective measures should be used
- TV viewing declined
- Active commuting to school declined
- Quantity of PE in high school declined; no data in elementary school; no data on quality

Recommendations

- Prioritize national surveillance of youth PA using objective measures
- Begin national surveillance of psychosocial & built environment correlates of PA
- Develop practical objective measures of sedentary behaviors
- PA & sedentary behavior are independent, so separate interventions needed



www.drjamesallis.sdsu.edu