

The Impact of Policy and Environmental Outcomes on Youth Physical Activity

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Presentation Overview

- Background and Significance
- The Impact of the Built Environment on Adolescent Physical Activity
- The Impact of Policies on Neighborhood Environments

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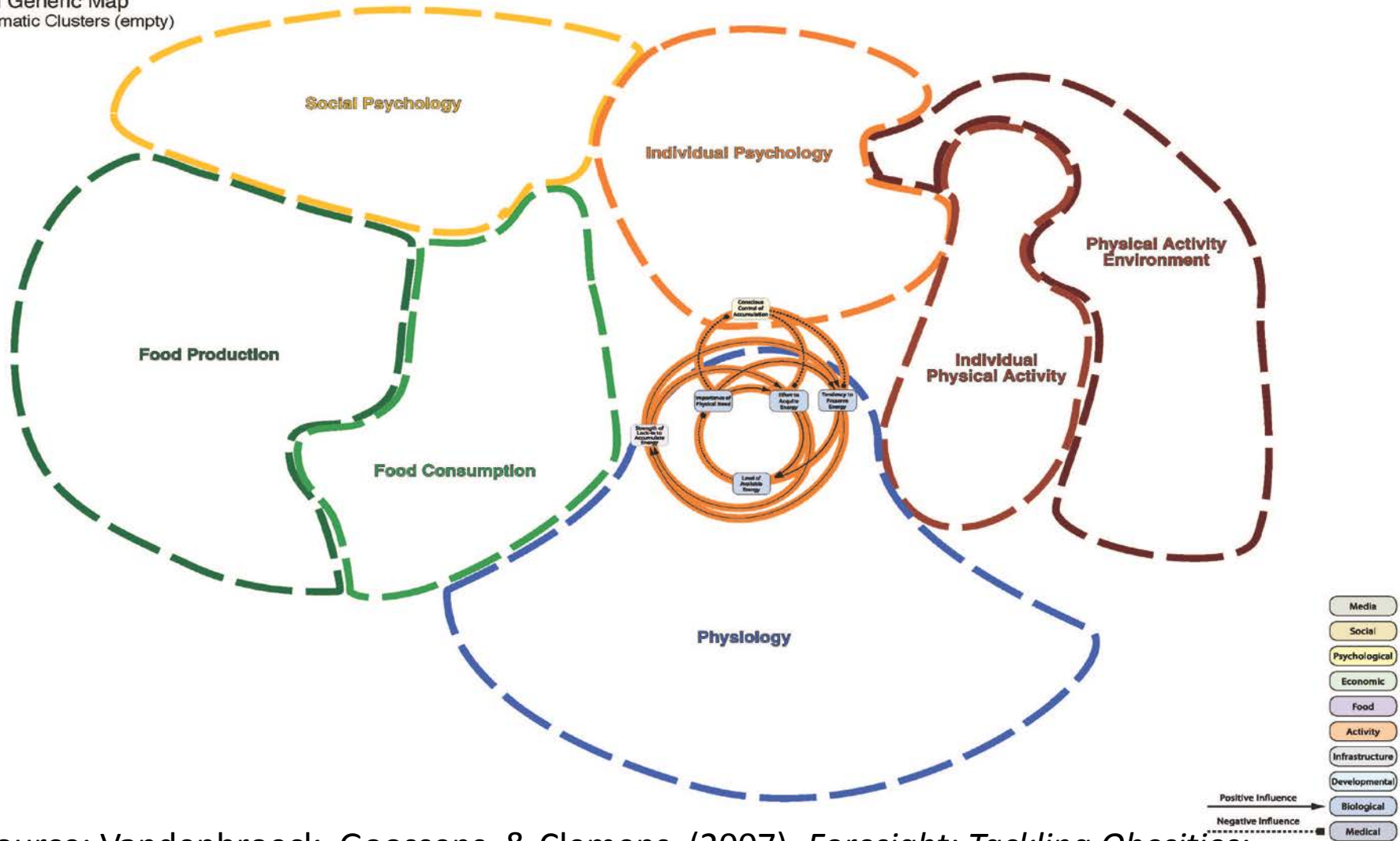
Background and Significance

- 32 percent of youth are at risk of being overweight or overweight and prevalence of obesity increases as youths move into adolescence.
- 48 percent of boys and 35 percent of girls (aged 6-11) obtain 60 minutes of daily physical activity.
- 12 percent of boys and just over 3 percent of girls (aged 12-15) obtain 60 minutes of daily physical activity.

(Ogden et al. 2008; Troiano et al. 2007)

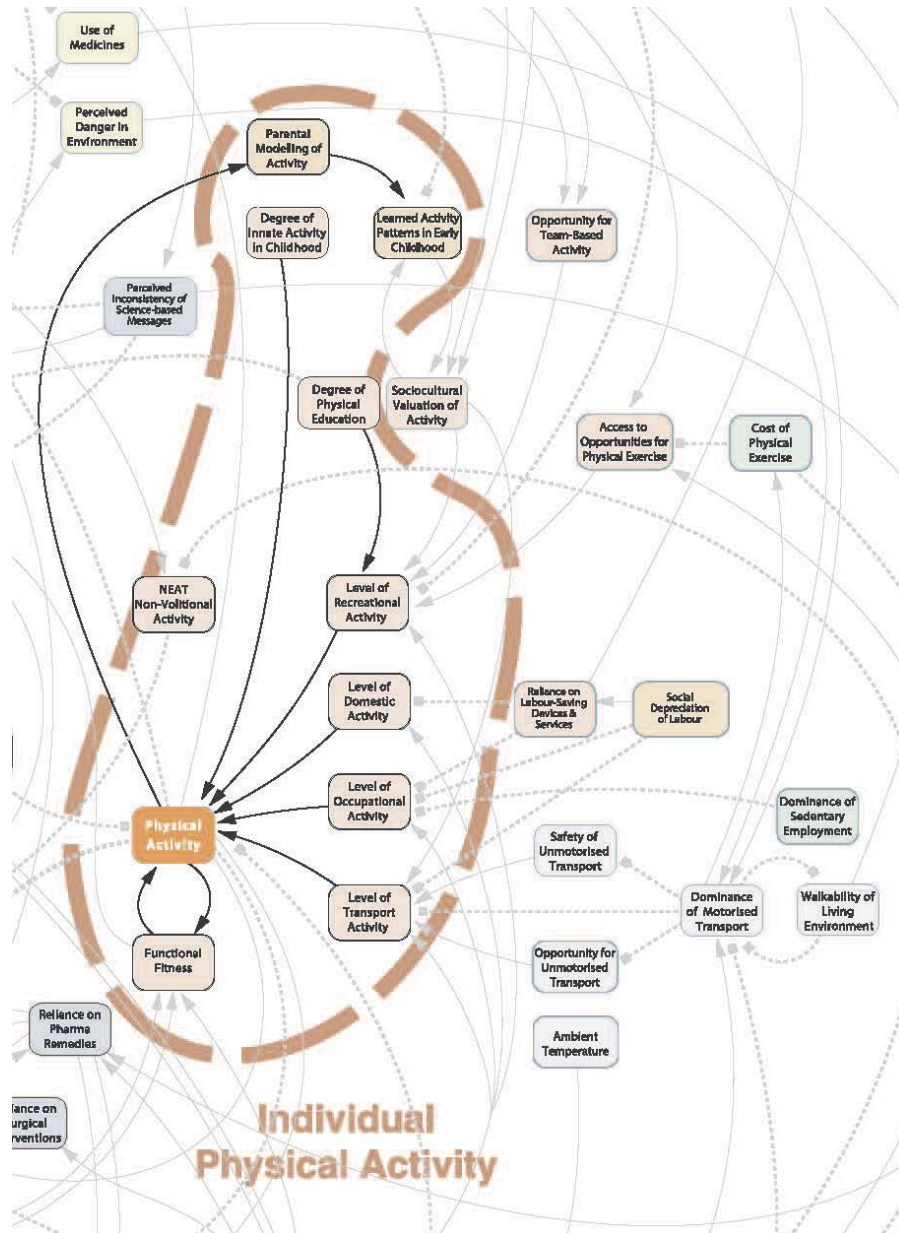
Obesity Systems Map Framework

Full Generic Map
Thematic Clusters (empty)



Source: Vandebroek, Goossens, & Clemens. (2007). *Foresight: Tackling Obesities: Future Choices – Obesity System Atlas*.

Available: <http://www.bis.gov.uk/assets/bispartners/foresight/docs/obesity/11.pdf>



Key Individual Physical Activity Levers

Recreational activity

Domestic activity

Occupational activity

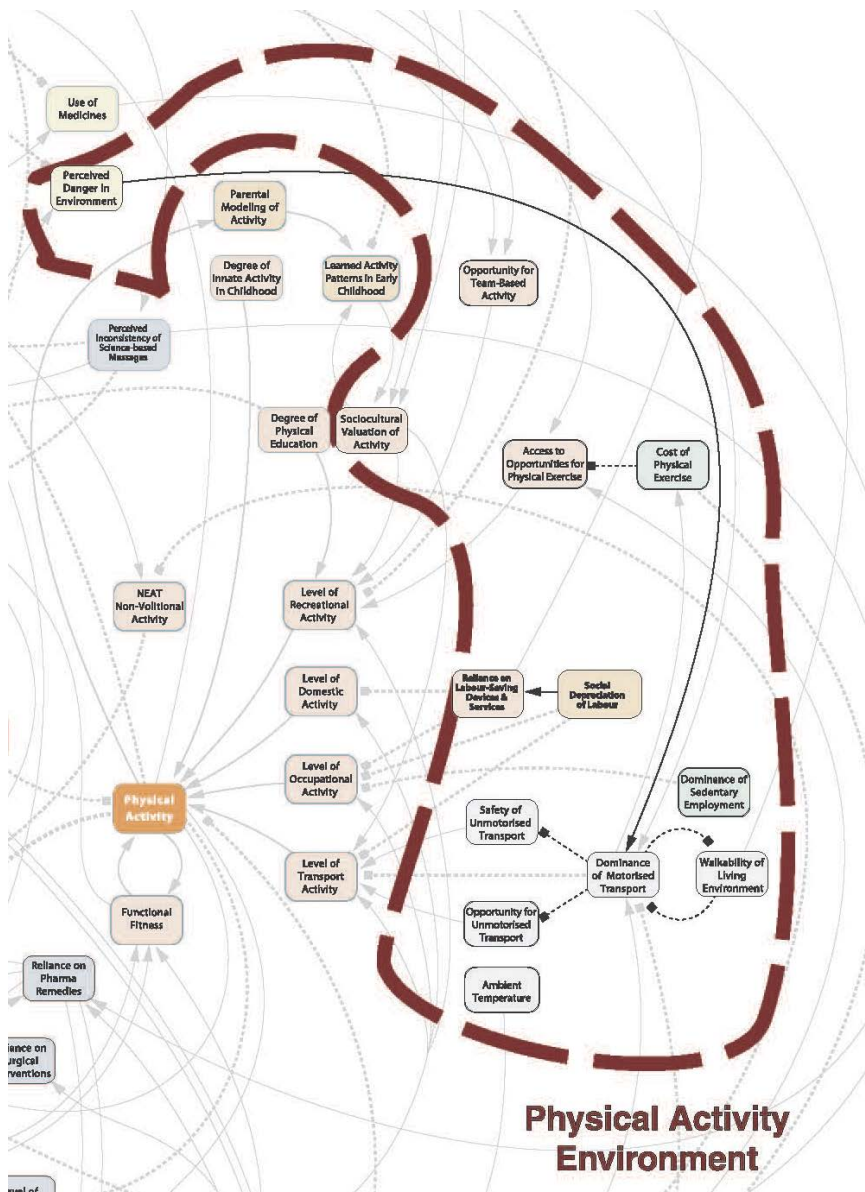
Transport activity

Physical education

Innate activity in childhood

Learned activity patterns in
early childhood

Parental modeling of activity



Key Physical Activity Environment Levers

Perceived danger in the environment

Opportunities for team-based activity

Sociocultural valuation of activity

Access to/cost of opportunities for physical exercise

Reliance on labor-saving devices and services

Social depreciation of labor

Dominance of motorized transport

Safety of/opportunity for unmotorized transport

Walkability of living environment

Dominance of sedentary employment

Ambient temperature/ seasonality

After a Systematic Review of the Scientific Literature, the Task Force on Community Preventive Services Recommends the Following Environmental and Policy Approaches to Increase Physical Activity

Environmental Policy Approach	Strategies
Enhanced School-based Physical Education	Increase # of minutes spent in MVPA
Community-Scale and Urban Design Land Use Policies	Mixed use, street connectivity, aesthetics and safety
Street-Scale Urban Design Land Use Policies	Roadway design standards, traffic calming, safe street crossings, street lighting

Promise of Built Environment Changes

- Many believe we have built a world that supports unhealthy habits.
 - Neighborhood design requires driving
 - Lack of walking and biking infrastructure
 - Many options for sedentary behavior
- For long-term solutions, built environment changes may be an essential component.
- Built environment changes are permanent

The Built Environment



Example: Traffic Circle



Example: Compact Neighborhood



Example: Neighborhood Park



Example: Bike Paths



Example: Sidewalks

Results of the Association between Environmental and Physical Activity Measures

- Built Environment Measures
 - physical disorder scale, outdoor pa settings scale, commercial pa facilities, student perception of safety, walkability index, street safety

- MTF data on student reports of physical activity, height and weight (2001-2003)
 - frequency of vigorous exercise; participation in school athletic teams (sports); participation in sports, athletics, and exercise (PA); and indicator for overweight

Source: Slater et al., 2010

Results of the Association between Environmental and Physical Activity Measures

Found that:

- Higher levels of physical disorder were significantly associated with reduced sports participation and higher prevalence of overweight.
- Greater numbers of commercial PA facilities were significantly associated with increased vigorous exercise and sports participation.
- Students' perception of feeling unsafe going to and from school was significantly associated, particularly for girls, with decreased vigorous exercise, sports participation, and PA participation.
- More walkable neighborhoods were associated with reduced sports participation and lower prevalence of overweight.
- Changes in the built environment could have the greatest effect on decreasing adolescent overweight, i.e., the youth most at risk.

Source: Slater et al., 2010

Impact of the built environment and Safe Routes to School-Related policies on youth active travel in a national sample of public elementary schools- Preliminary Results

A Snapshot of the Built Environment

Preliminary descriptive results of about 7,000 residential street segments audited in a nationally representative sample of communities where 8th, 10th and 12th grade students reside shows:

- Less than 1 percent of streets had bike lanes
- The average number of land uses was 1.6 (min. 0, max. 12)
- About 3 percent of segments had special speed limits posted (e.g. school zones)
- Street/sidewalk lighting was present on 50 percent of the streets
- Sidewalks were present on 38 percent of streets (30 percent on both sides of street)
- 10 percent of streets had marked crosswalks
- Approximately 1 percent of streets had traffic calming features (traffic circles, speed humps or bulbouts)
- Walkability Scale=5.5 (CA=0.79, Range: 0-25 walkability markers)

The Food and Fitness Survey Data

- The Food and Fitness Project was launched in 2007 to assess obesity-relevant policies and practices among US elementary schools and their corresponding schools districts.
- Data were obtained from annual mail-back surveys of school administrators at nationally representative samples of public elementary schools in 2007, 2008, and 2009.
- Stacked cross-sectional analysis of 1,020 public elementary schools, nested within 47 states.
- State laws were obtained through primary legal research.
- All models controlled for region, school locale, racial composition, free-reduced lunch, and total number of students

The Food and Fitness Survey Data

- 17.6 percent of students in the sample walk/bike to school, 84% of schools allow students to walk/bike.
- 54% of schools in sample allow all students to bike to school
- 77% allow all students to walk to school
- 31% of principals reported lack of sidewalks as a barrier to walking/biking
- 56% of principals reported traffic danger as a barrier to walking/biking
- 44% of principals reported distance as a barrier to walking/biking
- 20% of principals reported lack of crossing guards as a barrier to walking/biking
- On average buffers had an intersection density of 372/sq. mi.
- On average 55% of the streets in our buffers had higher road classifications (i.e. speed limits)

The Food and Fitness Survey Data

- 49% of states have a Minimum Bussing Distance law.
- 22.2% require Sidewalks to be maintained or constructed around schools.
- 9.8% require crossing guards
- 38.6% require traffic control measures (e.g. speed humps, traffic calming devices)
- 81% require speed zones around schools.

Impact of state laws on elementary schools allowing students to walk/bike to school

Found that:

- States with minimum bussing laws were more likely to allow all students to walk to school.
- Schools were more likely to allow all students to bike to school in states requiring crossing guards around school.
- State laws requiring crossing guards around schools are effective at reducing barriers to walking/biking to school.
- State laws requiring speed zones around schools increased the prevalence of youth walking/biking to school.

Source: Chriqui et al., forthcoming

Impact of built environment on principal-reported barriers to elementary student walking/biking to school

Built Environment Measures	Principal Reported Barriers to Walking/Biking to School			
	Distance	Traffic	Lack of Sidewalks	Lack of Crossing Guards
Speed Limit	1.07 (0.8, 1.3)	1.03 (0.8, 1.3)	1.29 (1.1, 1.7)	0.95(0.7, 1.3)
Intersection Density	0.99 (0.9, 0.9)	0.99 (0.9, 0.9)	0.99 (0.9, 0.9)	0.99 (0.9, 0.9)
Ratio of 4-Way Intersections	1.63 (0.7, 3.9)	0.61 (0.3, 1.4)	0.43 (0.2, 1.2)	1.22 (0.4, 4.3)
Traffic Danger	2.54 (1.6, 3.8)	1.82 (1.2, 2.7)	1.11 (0.8, 1.5)	1.6 (1.1, 2.3)

Source: Slater et al., in development

Impact of built environment on elementary schools allowing all students to walk/bike to school-Preliminary Results

Independent Variables	Allow all students to walk to school*		Allow all students to bike to school	
	Adj. OR	95% CI	Adj. OR	95% CI
Speed Limit	0.72	0.47, 1.10	1.07	0.85, 1.33
Intersection Density Ratio of 4-way Intersections	1.00	0.99, 1.00	1.00	0.99, 1.00
Traffic Danger	0.81	0.46, 1.42	0.67	0.49, 0.91
Minimum Bussing Dist.	2.25	1.12, 4.51	1.80	1.25, 2.61
Hazardous route exemption	1.11	0.57, 2.13	2.32	1.65, 3.28
Sidewalk construction	1.01	0.70, 1.44	0.75	0.61, 0.92
Crossing guards	0.94	0.59, 1.49	1.35	1.06, 1.72
Traffic control	1.17	0.82, 1.65	0.98	0.81, 1.19
Speed zones	1.01	0.97, 1.04	1.21	0.77, 1.92

*2009 only

Source: Slater et al., in development

Impact of the built environment and Safe Routes to School-Related policies on youth active travel in a national sample of public elementary schools-Preliminary Results

Independent Variables	Students Walk/Bike	
	OR	95% CI
Speed Limit	0.78	0.55, 1.10
Intersection Density	1.01	1.01, 1.01
Ratio of 4-way Intersections	6.90	1.54, 30.74
Traffic Danger	1.04	0.73, 1.45
Minimum bussing distance	1.72	0.99, 2.98
Hazardous route exemption	1.71	0.98, 2.97
Sidewalk construction	1.21	0.88, 1.65
Crossing guards	1.51	1.02, 2.22
Traffic control measures	0.98	0.73, 1.32
Speed zones	1.04	0.53, 2.00

Source: Slater et al., in development

Conclusions

- We found different measures of the built environment were associated with schools allowing all students to walk vs. bike to school.
- Results also show that policies impact the built environment, which in turn affects school active travel policies, and the prevalence of youth active travel behavior.
- Our analyses show that policies are effective at changing the built environment directly surrounding schools, which can increase elementary students active travel to and from school.