

# **The Relationship between Academic Performance & At-risk for Overweight in Children**

Cheyenne Hughes  
Lehigh University

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# Acknowledgment



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# What is childhood obesity?

- Prevalence
  - 1 in 7 children and adolescents is obese
  - Has risen to 16% within the past 2 decades
- Body Mass Index (BMI) Considers: height, weight, sex, & age (Center for Disease Control & Prevention recommendations)
  - At or above 85<sup>th</sup> percentile = At risk for overweight
  - At or above 95<sup>th</sup> percentile = Overweight
    - Corresponds to an adult BMI of 30 (obese)

(Hedley et al., 2004; Pietrobelli et al., 1998; Schwimmer, Burwinkle, & Varni 2003)

# Negative Risk Factors

- Health Problems:
  - Asthma, Type II Diabetes, Hypertension, Sleep Apnea, Orthopedic Complications (i.e., leg bowing), Increased risk of later mortality
- Psychosocial Problems:
  - Negative perceptions of health-related quality of life
  - Lower self esteem, & higher levels of nervousness, hopelessness, sadness and loneliness
  - Highly stigmatized

(American Obesity Association 2005; Carr & Friedman, 2005; Falkner et al., 2001; Schwimmer, et al., 2003; Strauss 2000; Tiggeman & Wilson-Barrett, 1998;)

# Negative Risk Factors- Academic

- More behavioral problems & more likely to be placed in special education or a remedial class (Tershakovec et al., 1994)
- More likely to consider themselves poor students (Falkner, 2001)
- Predicts lower academic performance in children (Li, 1995; Mikkila et al., 2003)
  - Relationship varies depending on what variables are controlled for
    - At-risk for overweight accounted for 10% of the difference in academic achievement. (Crosnoe & Muller, 2004)
    - Differences disappeared when controlling for demographic & lifestyle variables EXCEPT boys' math scores (Datar et al., 2004)
    - Relationship remained even after controlling for demographics (Mo-suwan, 1999)

# Limitations of Previous Research

- Self-reported height & weight
  - Reports may be biased or inaccurate
  - Calculating BMI at the time of data collection may be more reliable
- Self-reported academic scores
  - Reports may be biased or inaccurate
  - Low internal validity
  - Need for standardized academic achievement measures
- Other variables should be examined

# Potential Moderating Variables

- **Gender differences**
  - (Datar et al., 2004; Falkner et al., 2001; Linder, 1991; & Morill, 1991)
- **Body Dissatisfaction**
  - Weight dissatisfaction was found in children regardless of weight status (Mikkila et al., 2003)
  - Perceived weight status higher correlation to depressive feelings than actual weight status (Daniels, 2005)

# Potential Mediating Variables

- **Participation in extracurricular activities**
  - Protective factor & predicted positive academic outcomes (Eccles et al., 2003; Mahoney et al., 2003)
  - Children who are overweight are less likely to participate in extracurricular activities (Berkey et al., 2003)
- **Television viewing**
  - Children who watched more television were less likely to be physically active & to have higher BMI's (Anderson et al., 1998)
  - Better predictor of later test scores (Datar et al., 2004)

# Purpose of this study

- The purpose of this study is to further extend the previous literature by examining the relationship between overweight and academic performance by using standardized, rather than self-reported, measures of both constructs.
- If the relationship truly exists, this relationship will be examined further to see what role factors such as gender, extracurricular activity participation, television viewing, & body dissatisfaction have in moderating or mediating this relationship.

# Research Questions

- 1. Do students who are at risk for overweight differ from students of average weight on academic achievement?**
  - It is hypothesized that students that are overweight will have lower achievement than students that are not overweight.
- 2. Are there gender differences for this relationship?**
  - It is hypothesized that girls will exhibit this relationship more than boys.
- 3. Does participation in extracurricular activities & television viewing mediate the relationship?**
  - It is hypothesized that low participation & high level of television viewing will explain more of the variance in achievement than overweight status alone.
- 4. Does body dissatisfaction moderate this relationship?**
  - It is hypothesized that students who are overweight & have a high level of BD will have lower achievement.

# Roadblock...



# Participants

- Original dataset:
  - 151 6<sup>th</sup> grade students
    - Recruited from 3 Northern New York Schools
    - 50.7 % girls & 49.3 % boys
    - Mostly Caucasian (80.8 %)
    - 13.2%-24.8% eligible for free or reduced lunch
- Current sample:
  - 36% return rate of consent forms
  - $N = 37$

# Materials

- **Weight Status**

- Body Mass Index (BMI)
- Healthy weight (between 5<sup>th</sup> and 85<sup>th</sup> percentiles)
- At risk for being overweight (above 85<sup>th</sup> percentile)

- **Academic Achievement**

- Scaled scores of English language arts & math from achievement tests, Terra Nova (CTB/McGraw Hill 2002)
- Highly reliable & valid test (alphas in the low to mid .90's)

# Materials (cont.)

- **Extracurricular Participation**
  - Scored on a scale of 0-4
- **Television Viewing**
  - Scored on a scale of 0-4
- **Body Dissatisfaction**
  - Contour Drawing Rating Scale (Thompson & Gray, 1995)
  - Good test-retest reliability ( $r = .78, p < .0005$ )

*Each will be rated low, moderate, or high based on sample*

# Procedure

- School approval obtained from each superintendent
- IRB approval (full committee review)
- Letters & consent forms sent to parents
- Collection of academic scores

# Results- Test of Mediation

- Extracurricular Activity

- Step 1- Extracurricular activity participation was regressed on weight status, ( $b = .073$ ), not significant ( $F(1, 35) = .19, p = .67$ ).
- Step 2- Terra Nova test scores were regressed on weight status.  $b = -.251$ , not significant ( $F(1, 35) = 2.35, p = .14$ ).
- Step 3- Terra Nova scores regressed on weight status & extracurricular activity, not significant ( $F(2, 34) = 1.15, p = .33$ ). Betas were  $-.249$  for weight status and  $-.017$  for extracurricular activity participation.

- Television Viewing

- Step 1- Television viewing was regressed on weight status ( $b = .175$ ), not significant ( $F(1, 35) = 1.10, p = .30$ ).
- Step 2- Terra Nova test scores regressed on weight status, negative but non-significant relationship ( $b = -.251, F(1, 35) = 2.35, p = .14$ ).
- Step 3- Regressed Terra Nova test scores on both weight status ( $b = -.247$ ) & television viewing ( $b = -.018$ ), not significant ( $F(2, 34) = 1.15, p = .33$ ).

# Results

*Means for the Variables of Interest by Weight Status*

Variable	Health Weight Status ( <i>n</i> =25)			At-risk for Overweight Status ( <i>n</i> =12)	
	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>
Age	11.84	.46		11.80	.46
BMI	18.50	1.42		26.87	4.80
Extracurricular Activity Participation	12.64	9.50		14.33	14.22
TV Viewing	2.28	1.10		2.83	2.13
TerraNova Test Scores	680.52	21.15		667.83	28.17

# Discussion

- Sample too small to detect group differences (effect size  $r = .25$ )
- Differences were in the hypothesized direction which may suggest that students of healthy weight performed at higher academic levels than peers who were not of a healthy weight.

# Limitations & Future Research

- Limitations

- Small sample size
- Low return rate
- Limited power
- Existing database
- Self-report bias
- Limited external validity

- Future Research

- Larger sample
- Across grade levels
- More diverse sample
- Direct measures or multiple informants of TV viewing & extracurricular activity participation



**Questions?**