



The Influence of Peer Effect in Sports Behavior Among Youth Students

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Introduction

- Motivations influence a person's behavior in physical activity.
- Peer Effect
- Figure out:
 - To what degree does peer effect influences people's physical activity behaviors?
 - Youth Students
 - Methods: social networking analysis, Clustering, and Linear Regression Model in Python
- Hypothesis: There is a positive correlation between the peer effect and the youth students' sports behaviors.

Introduction

The Definition of 'Peer Effect':

Students can influence each other and educate themselves by their peers;
Peer effect exist when a person's behavior is affected by his or her peers.



Shining
light model

Bad apple
model



Introduction



- **Shining Light model :**

Positive externality of 'peer effect' that a few students with outstanding performance in class could positively enhance peers' performance by inspiring all students to increase their achievement

- ① Lazear, E. P. Educational production. (2001). *The Quarterly Journal of Economics, 16(3)*, 777-803.
- ② Hoxby, C.M. (2002). The Power of Peers: How Does the Makeup of a Classroom Influence Achievement? (Research). *Education Next, 2*, 57.

Introduction



- **Bad Apple Model :**

Negative externality of 'peer effect' that students with poor academic outcomes might negatively influences the academic performance of peers

- ① Lazear, E. P. Educational production. (2001). *The Quarterly Journal of Introduction to Economics*, 16(3), 777-803.
- ② Zimmerman, D.J. (2003). Peer Effects in Academic Outcomes: Evidence from a Natural Experiment. *Review of Economics and Statistics*, 85, 9-23.

Literature Review

Correlation between ‘peer effect’ and students’ physical activities.

- Jago, R., Brockman, R., Fox, K. R., Cartwright, K., Page, A. S., & Thompson, J. L. (2009). Friendship groups and physical activity: qualitative findings on how physical activity is initiated and maintained among 10-11 year old children. *The international journal of behavioral nutrition and physical activity*, 6, 4. <https://doi.org/10.1186/1479-5868-6-4>
- Ali, M. M., Amialchuk, A., & Heiland, F. W. (2011). Weight-related behavior among adolescents: the role of peer effects. *PloS one*, 6(6), e21179. <https://doi.org/10.1371/journal.pone.0021179>
- Stearns, J. A., Godley, J., Veugelers, P. J., Ekwaru, J. P., Bastian, K., Wu, B., & Spence, J. C. (2018). Associations of friendship and children's physical activity during and outside of school: A social network study. *SSM - population health*, 7, 008–8. <https://doi.org/10.1016/j.ssmph.2018.10.008>

Study Design

Participants: adolescents in grades 7-9 at a same school

Sample size: 100 students

Assess at two time spots:

1. in the first week of a new semester
2. in the last week of the semester

Independent Variable

Peer (friend) relationship

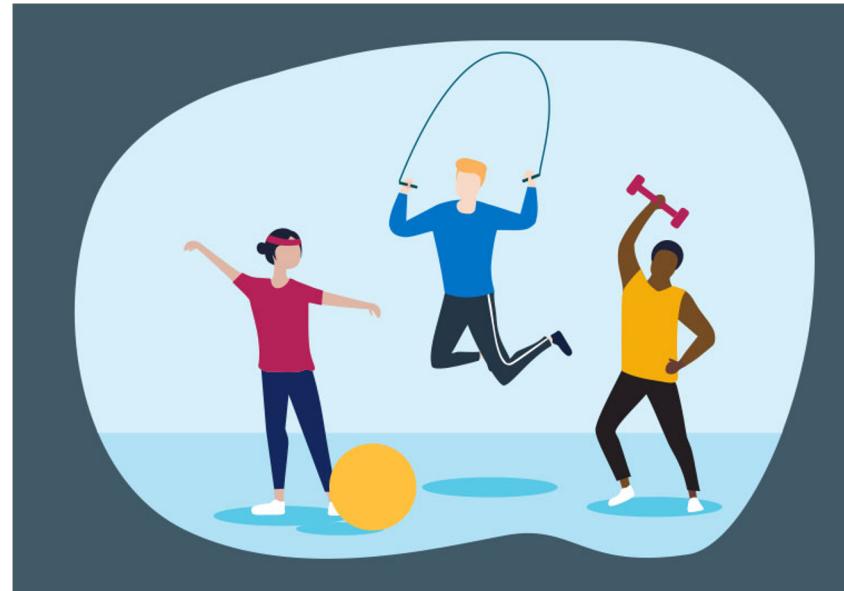
- All students name up friends in this school, evaluate the friendship quality in the scale of 1-5;
- We only consider it as a relationship if it is both nominated before and after the semester (the relationship remains for a semester);
- Average score of friendship quality before and after the semester;
- This variable has directions.



Dependent Variable / Outcome

Physical activity

- "How many hours do you spend on playing sports or doing exercise in a typical week?"
- Assess after the semester



Control Variables



1. Physical activity (assess before the semester)
2. environmental influences(assess before the semester)
 - "How many hours do the parents/guardians play sports or do exercise in a typical week?"
 - "Do you have access to public recreational facilities in your neighborhood?"

Data Analysis-first part

1. Build a directed adjacency matrix based on the friendship with the average friendship quality as weight. If student i named student j as a friend, with a friendship quality mean q ; then the i,j entry in the matrix will be a q .
2. Use Python to implement the social network analysis:
 - a. Missing data: delete isolated nodes;
 - b. Calculate the density, centrality to explore the overall characteristics of friendship at school;
 - c. Detect communities(groups).
3. Implement ANOVA to find any between-group differences in physical activities.

Data Analysis-second part

1. **Predictor:** Calculate the average physical activity of an individual's nominated friends.
2. Use Python to implement a linear regression analysis:

$$Y = \beta_1 x_1 + \beta_2 x_2 + \varepsilon$$

- Y : *individual's physical activity*;
- x_1 : *friends' average physical activity*;
- x_2 : *control variables*
- ε : *error*

Hypothesis

In social networking analysis & ANOVA:

The main effect of group is significant, which means that there is between-group difference for the physical activities.

In linear regression analysis:

An individual's friends' average physical activity can predict an individual's physical activity after controlling for the pre-test physical activity and environmental factors.

thank
you

A graphic featuring the words "thank you" in a flowing, purple cursive font. The letters are partially obscured by a cluster of approximately 20 small, semi-transparent hearts of various colors including orange, pink, yellow, blue, and red, scattered around the text.