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

①Lazear, E. P. Educational production. (2001). The Quarterly Journal of Introduction to Economics, *16(3)*, 777-803.

②Hoxby, 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

①Lazear, E. P. Educational production. (2001). The Quarterly Journal of Introduction to Economics, *16(3)*, 777-803.

②Zimmerman, 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

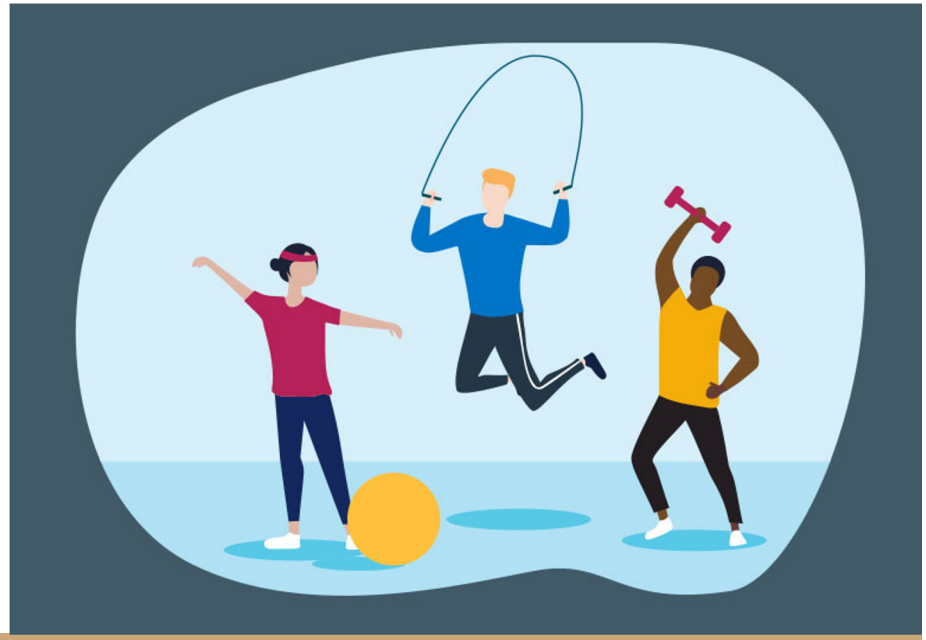
Peer (friend) relationship

- ❏ 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:

$$Y = \boldsymbol{\beta}_1 \ x_1 + \boldsymbol{\beta}_2 x_2 + \varepsilon$$

➔ *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