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PQHS 500

Project Abstract

2020-04-29

Background

Adolescents face a variety of sources of stress and learning proper coping mechanisms early can be beneficial. One avenue for teaching coping mechanisms that has been explored is school-based programs. There is some evidence from meta-analysis that these programs are effective (Kraag et al, 2006), but the focus of these studies was on the implementation of new programs rather than a general effect. There are some randomized experimental designs, but they are usually limited in the number and heterogeneity of students that are included in the schools starting these programs.

Objective

The objective of this project is to determine if school programs teaching about stress affect students' ability to relax and/or their risk of suicidal ideation. In particular, I want to assess if the absence of a school-based program covering stress in junior high schools (grades 7 & 8) and high schools (grades 9-12) increases the risk of students having trouble relaxing and/or suicidal ideation in the last 12 months, controlling for other stressors such as familial relationships, socioeconomic status, involvement in activities, and general health.

Methods

Using the public-use sample of the National Longitudinal Study of Adolescent to Adult Health (Add Health), I identified 2,582 students with complete data for the covariates of interest. I constructed propensity scores to estimate the average treatment effect on the treated (ATT). The major methods or propensity scores integration are matching (Greedy 1:1 without replacement, 1:1 Genetic search matching without replacement, 1:1 with replacement, 1:1 caliper matching) and weighting (ATT weights, TWANG ATT weights, and doubly robust weighting with linear adjustment for the propensity score). These were integrated with logistic regression models for the two binary outcomes of interest.

Results

Compared to the unadjusted odds ratio of 1.15 (95% CI: 0.97, 1.35), the average odds ratio for matched samples was close to 1.25, while that for weighting was 1.14 on the effect on ever having trouble relaxing. Compared to the unadjusted odds ratio of 1.47 (95% CI: 1.07, 1.88), the average odds ratio for matched samples was close to 1.35, while that for weighting was 0.73 on the effect on suicide ideation. There is some evidence that the absence of school-based coping mechanism programs confers a higher risk of ever having trouble relaxing, but the results for suicide ideation are mixed. Both outcomes are highly sensitive to differential assignment of learning coping mechanisms in school due to unobserved factors.

PQHS 500 - Evaluating the efficacy of school-based learning of coping mechanisms

Joseph G.P. Hnath

2020-04-30

Background

Existing Literature

- School programs targeting stress management in children and adolescents: A meta-analysis (2006)
 - Gerda Kraag, Maurice P. Zeegers, Gerjo Kok, Clemens Hosman, Huda Huijer Abu-Saad
- 19 studies, 16 were randomized or quasi-randomized

It is tentatively concluded that school programs targeting stress management or coping skills are effective in reducing stress symptoms and enhancing coping skills. Future research should use clear quality criteria and strive for less diversity in methodology and outcome assessment.

Research Questions

- Do students in grades 7-12 not learning about stress and coping mechanisms in school have more trouble relaxing, controlling for other stressors such as familial relationships, socioeconomic status, involvement in activities, and general health?
- Do students in grades 7-12 not learning about stress and coping mechanisms in school have an increased risk of suicidal ideation, controlling for other stressors such as familial relationships, socioeconomic status, involvement in activities, and general health?

The Data - Add Health

- National Longitudinal Study of Adolescent to Adult Health (1994-2008)
 - 80 High schools + feeder middle schools from the Quality Education Database (QED)
 - Approximately 200 students from each school pair
 - Focus on Wave 1 In-Home Survey
- Public-use sample contains 6,504 students in grades 7-12
 - 2,582 subjects with complete data for variables of interest

Key Variables

■ Exposure

- Please tell me whether you have learned about [stress] in a class at school.
- Had not - 919, Had - 1,663
- Fewer had not, define exposure like this for PS

■ Outcome: Trouble relaxing

- How often you've had trouble relaxing in the last 12 months?
- 5 levels, collapsed to Ever vs. Never
- Ever - 1,214 and Never - 1,368

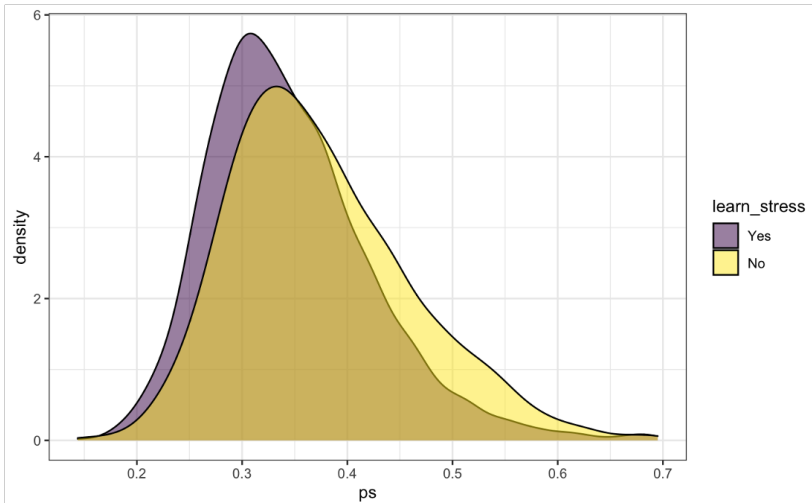
■ Outcome: Suicidal ideation

- During the past 12 months, did you ever seriously think about committing suicide?
- Yes - 314, No - 2,268

Covariates

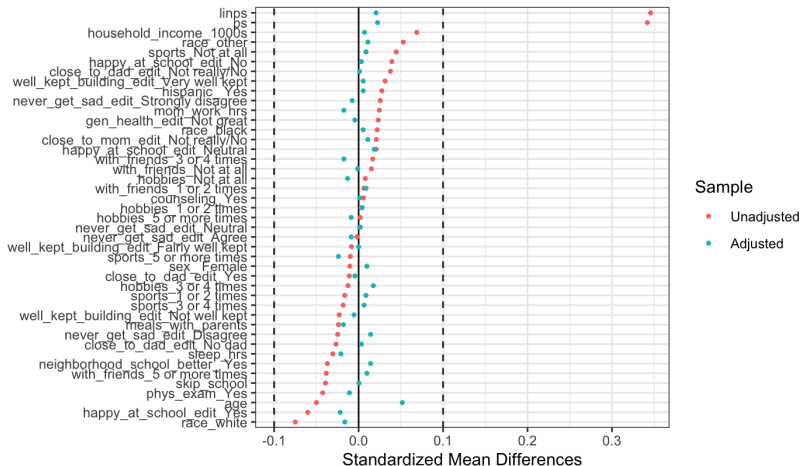
- Age, Race, Sex, Ethnicity
- Happiness with current school
- Cleanliness of home
- Total family income
- Family decision to live in this neighborhood because of the relative strength of the schools
- General perception of health
- Amount of time spent on hobbies / playing sports / spent with friends in the last week
- Average amount of sleep per night
- Number of times skipping school without an excuse this year
- How many evening meals did you have at least one parent present in the last week?
- How close do you feel to your mother / father?
- How much they agree with the statement of never getting sad

Propensity Score



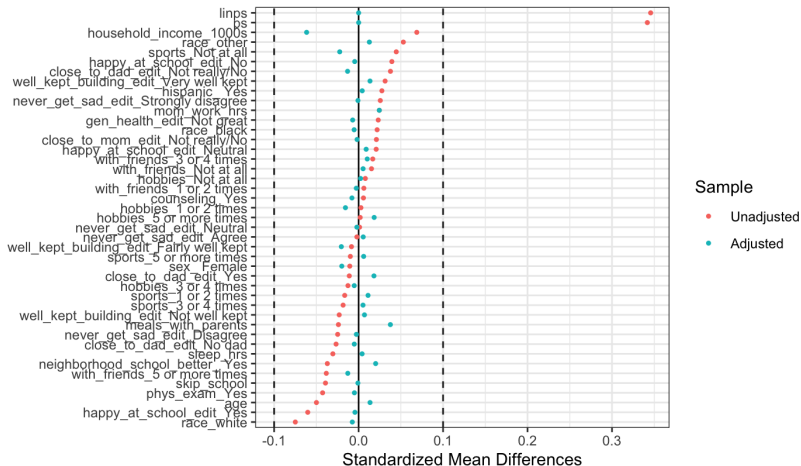
Match 1 - 1:1 Greedy w/o Replacement

Standardized Differences and Match 1



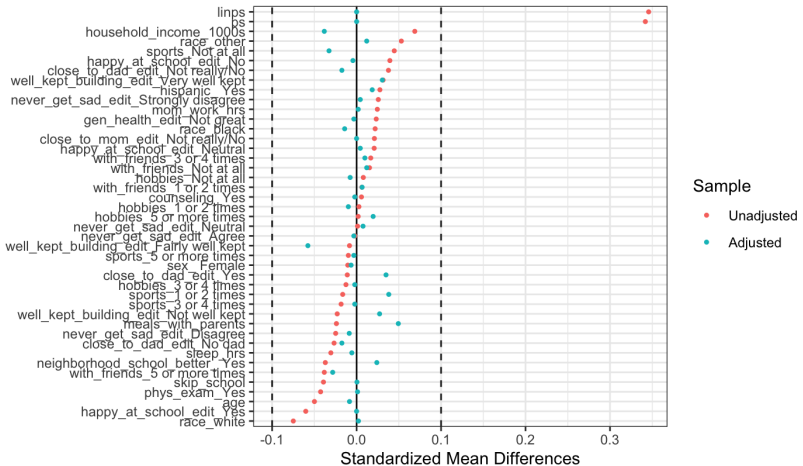
Match 2 - Genetic Search 1:1 w/o Replacement

Standardized Differences and Match 2



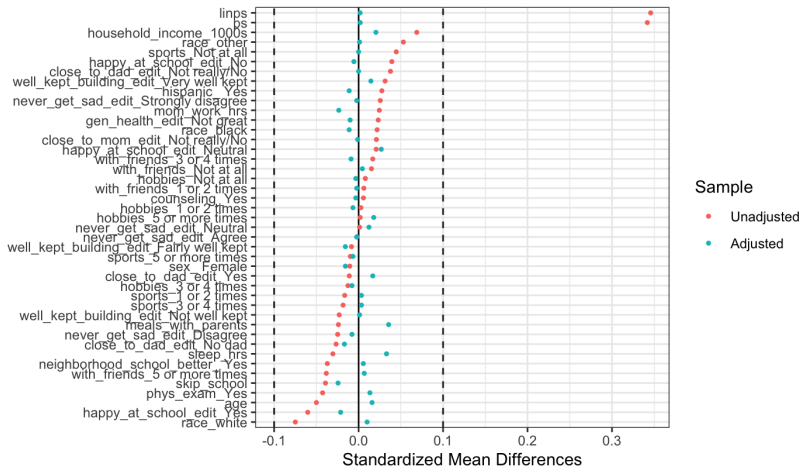
Match 3 - 1:1 Greedy with Replacement

Standardized Differences and Match 3



Match 4 - 1:1 Caliper w/o Replacement

Standardized Differences and Match 4



Match Comparison

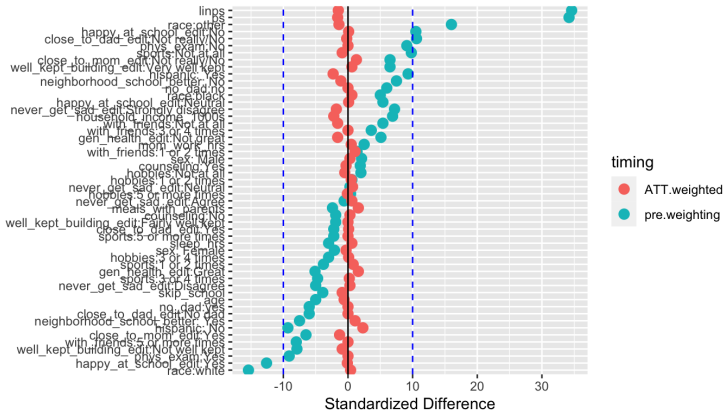
Match	RR1	RR2	Love Plot	Matched Sets	Description
None	35.8	1.17	–	–	No Matching
1	2.1	1.05	Okay	919	1:1 greedy w/o repl
2	0	1.00	Good	919	Genetic Search 1:1
3	0	1.00	Okay	919	1:1 greedy with repl
4	0.2	1.01	Best	894	1:1 caliper w/o repl

ATT Weighting

- Rubin's Rule 1: 1.5
- Rubin's Rule 2: 0.91

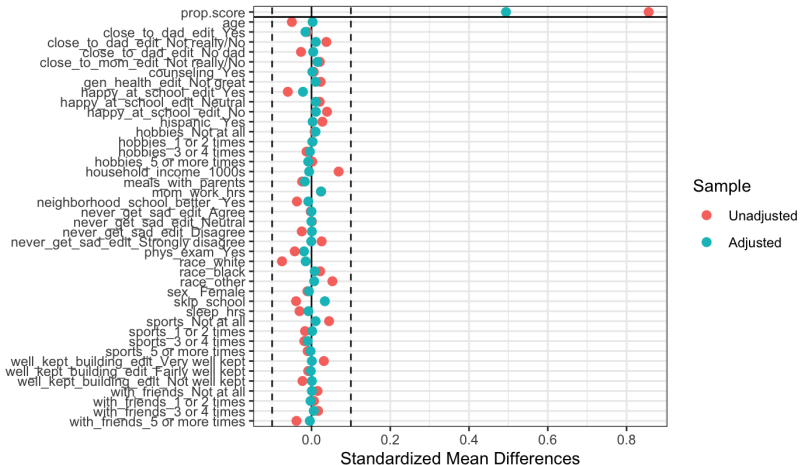
Standardized Difference before and after ATT Weighting

Add health - stress management

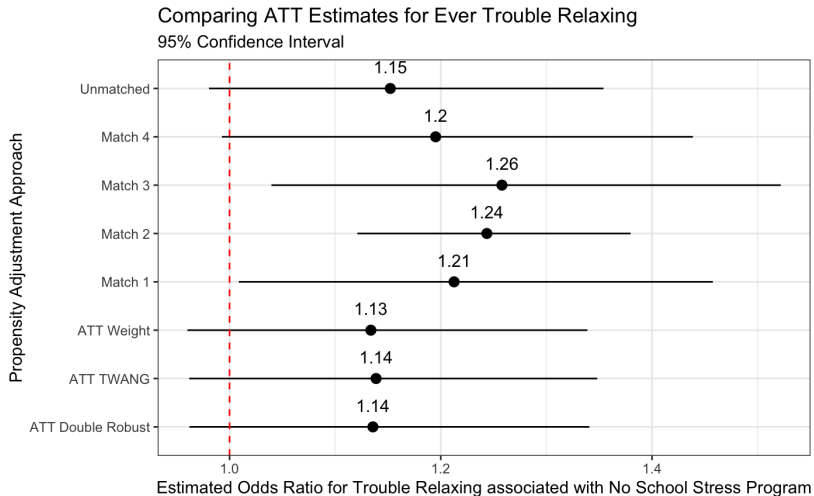


TWANG ATT Weighting

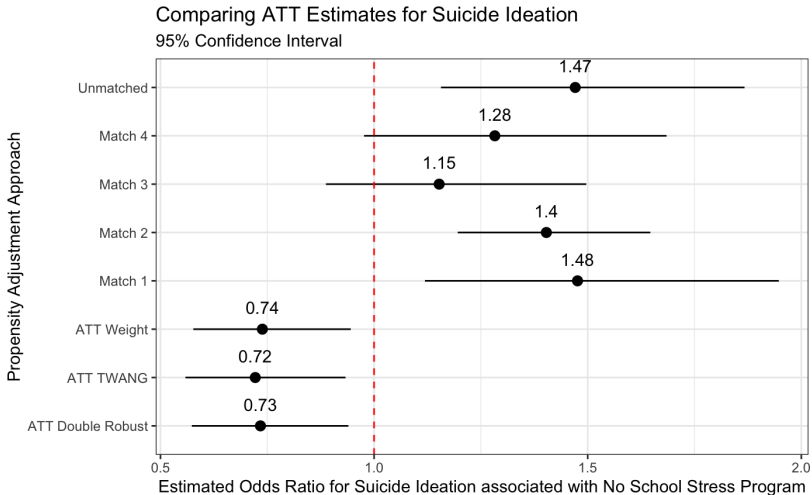
Standardized Diffs and TWANG ATT weighting



Results - Trouble Relaxing



Results - Suicide Ideation



Sensitivity Analysis for Matched Samples

Outcome	Match	Gamma - Low	Gamma - High
Trouble Relaxing	1	1.00	1.05
Trouble Relaxing	2	1.05	1.10
Trouble Relaxing	3	1.00	1.05
Suicide Ideation	1	1.10	1.15
Suicide Ideation	2	1.10	1.15

Conclusions

- Evidence of an increased risk of ever having trouble relaxing associated with not learning about coping mechanisms in school
 - Odds increased by about 25% in matching approaches
 - Effect size attenuated in weighting approaches
- Mixed results about the association between not learning about coping mechanisms in school and suicide ideation
 - Odds increased by about 45% in matching approaches
 - Odds reduced by about 25% in weighting approaches
- Both are highly sensitive to differential assignment of learning coping mechanisms in school due to unobserved factors

Limitations

- Temporality of treatment compared to outcomes and covariates is not explicitly defined
 - Also how recent to outcomes was the exposure
- Collapsing of factor variables could hide more nuanced relationships
- Bias from complete cases inclusion
- Different definitions/understandings of ever feeling stressed or suicide ideation
- Variation between the quality of school-based programs about coping mechanisms
- Other unobserved factors contributing to both exposure and outcomes

Next steps

- Incorporating other PS approaches (e.g. stratification)
- Utilizing more variables from Wave 1 (only 35 out of 6,000+)
 - Learning about suicide, combination of different programs
- Adding data from other waves of Add Health or the restricted-use data