



The Association Between School Instructional Models And Depressive Symptoms Among US High School Students During Covid 19

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Introduction

- 37.1% of students experienced poor mental health during the pandemic and 44.2 % experienced persistent feelings or hopelessness (Jones et al., 2022).
- Research in Jordan stated that nearly two-thirds of senior high school students reported symptoms of depression or anxiety while staying at home during quarantine and having online education (AlAzzam et al., 2021). Scientists in Brazil also found that over 90% of students reported being affected by online learning, with many experiencing emotional and social impacts related to depressive symptoms (Pelucio et al., 2022).
- Students in online learning experienced lower levels of social support, which is directly connected to having more signs of depression (Pineda et al., 2022).
- However, there is a significant gap regarding to how different instructional models like remote, in-person, or hybrid influence high school students' mental state that uses data which truly represents the whole population of the high school student of USA.

Research Questions

- Is the school's instructional model (virtual vs. in person/hybrid) associated with symptoms of depression among high school students?
- If yes, does the association between instructional model and depressive symptoms remain after controlling for social interaction?

Methods

Sample

- Respondents (n=7705) from 128 schools were drawn from the Adolescent Behaviors and Experiences Survey (ABES), a nationally representative, cross-sectional survey of U.S. high school students that was conducted by the Centers for Disease Control and Prevention (CDC) during the spring of 2021

Measures

- Participants' general mental health was evaluated by looking at the "Percentage of students who reported that their mental health was most of the time or always not good (including stress, anxiety, and depression, during the 30 days before the survey"
- Instructional model (explanatory variable) was categorized into five types: Model 1.0 (Hybrid: some in-person, some virtual), Model 2.0 (Hybrid: students attend both virtual and in-person classes), Model 3.0 (In-person only), Model 4.0 (Virtual only), and Model 5.0 (Other)
- Social interaction was measured on a 5-point scale (1 = never to 5 = always), with higher values indicating more frequent interaction.

Results

Bivariate

- A Chi-square test showed that the proportion of students reporting bad mental health differed significantly across instructional models ($\chi^2 = 9.80, p = 0.020$).
- The highest prevalence was observed in Model 2.0 (Simultaneous Hybrid: 33.6%), compared to Model 1.0 (29.8%), Model 3.0 (29.4%), and Model 4.0 (29.2%).
- Post hoc analyses indicated that Model 2.0 had significantly higher rates of bad mental health than Model 1.0 ($\chi^2 = 7.20, p = 0.007$) and Model 4.0 ($\chi^2 = 7.42, p = 0.006$).
- No significant differences were found between purely in-person and purely virtual models.

Figure 1: Proportion of Students Reporting Poor Mental Health by Instructional Model

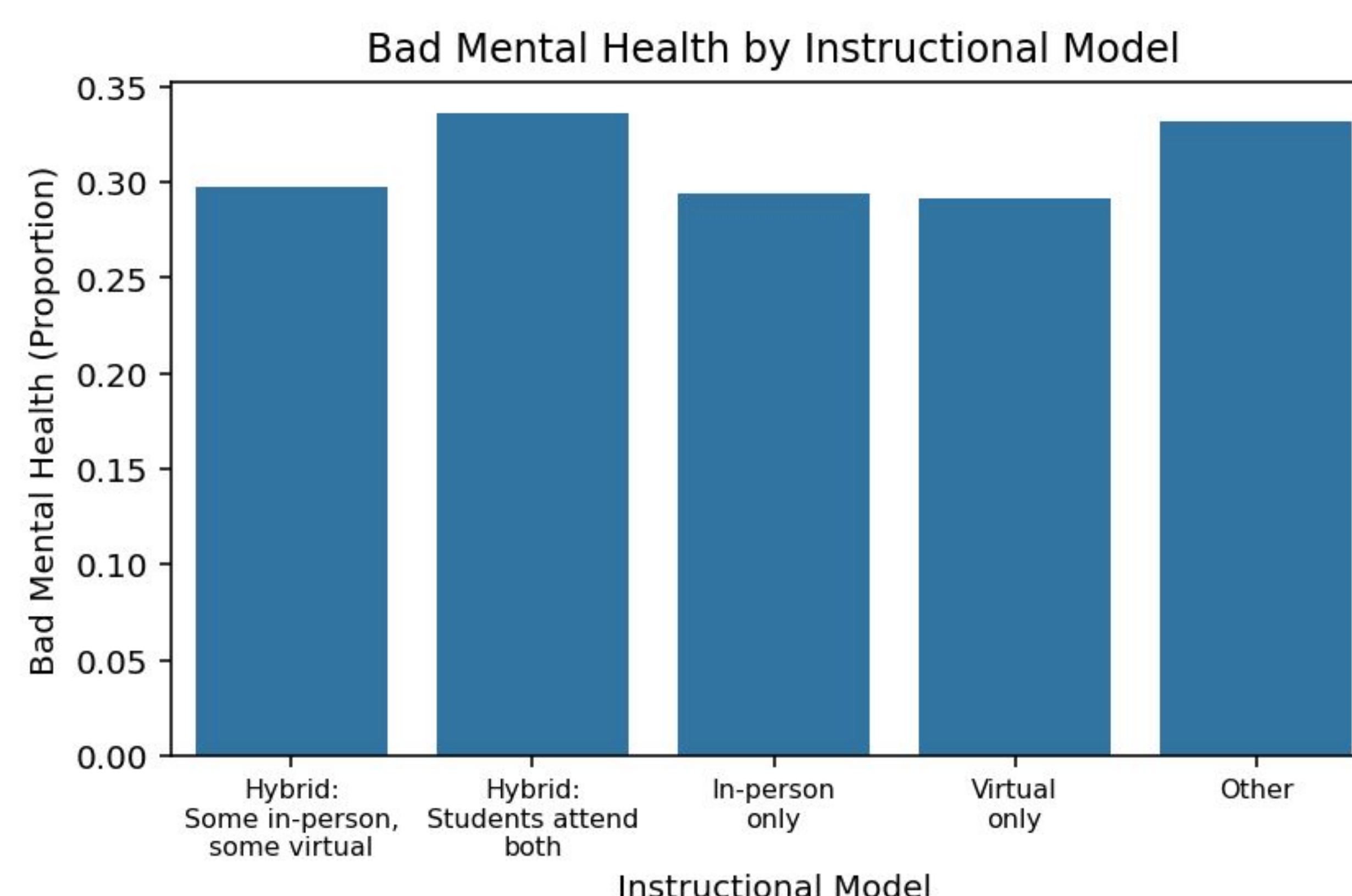
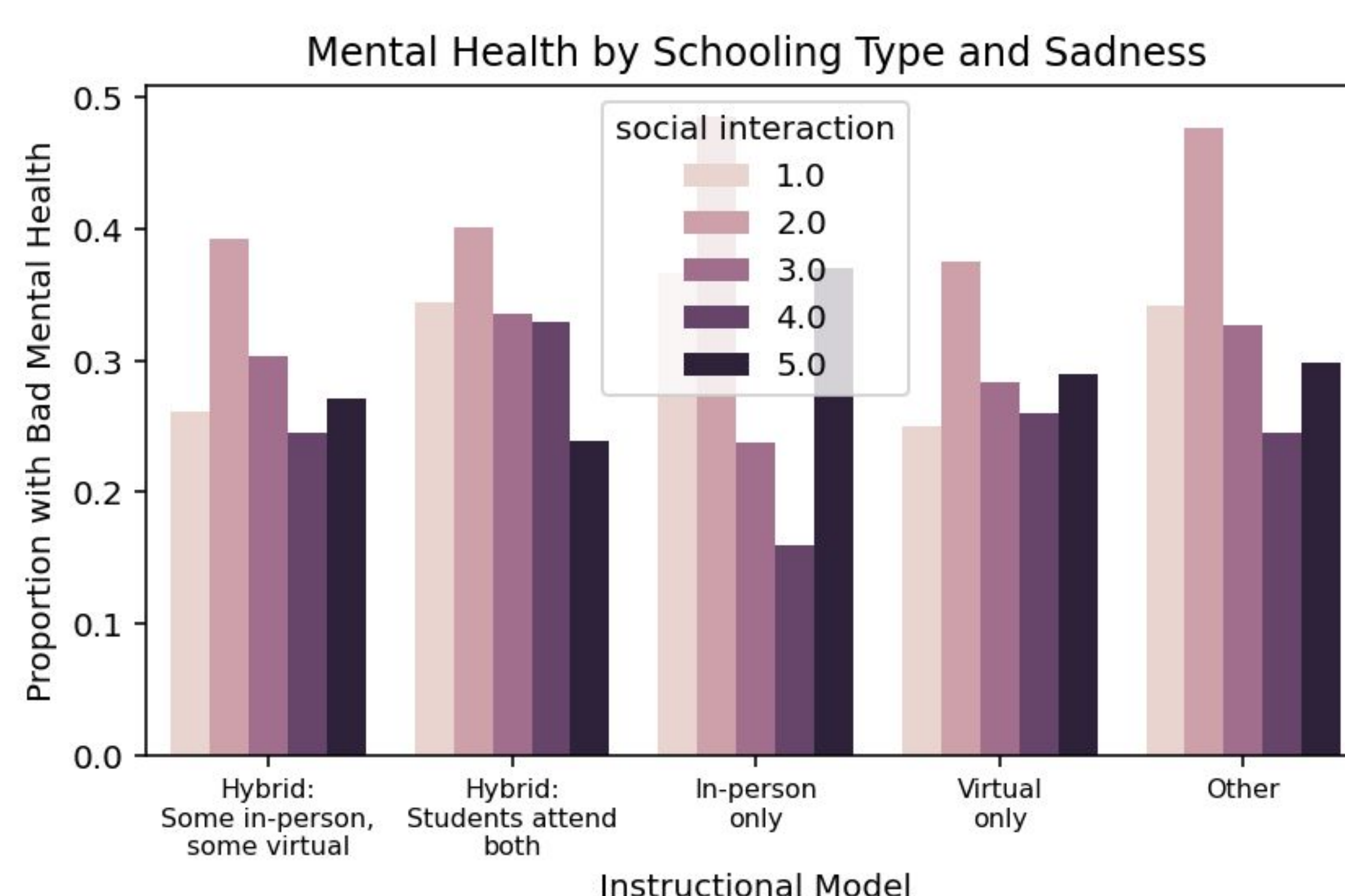


Figure 2: Poor Mental Health by Instructional Model Across Levels of Social Interaction



Discussion

- The initial association between instructional model and poor mental health is no longer significant after controlling for social interaction, suggesting that the observed differences are explained by variation in social interaction rather than instructional model.
- These findings suggest that social interaction plays a key role in student mental health, regardless of whether instruction is virtual, in-person, or hybrid.
- Small effect size (low pseudo R^2) limits the explanatory power of the model.
- Further studies should consider/include the following:
 - Larger and more diverse samples
 - More detailed measures of social interaction (quality vs. frequency)
 - Additional psychological factors (e.g., anxiety, stress, support systems)

References

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Multivariate

- A logistic regression analysis examined the association between instructional model and bad mental health while controlling for social interaction.
- Instructional model was not a significant predictor of bad mental health ($\beta = 0.003, p = 0.859$).
- Social interaction was a significant predictor ($\beta = -0.114, p < 0.001$), with higher levels of social interaction associated with lower odds of reporting bad mental health (OR = 0.893).
- As shown in figure 2, students experienced lower levels of social interaction consistently reported higher proportions of bad mental health across all instructional models.