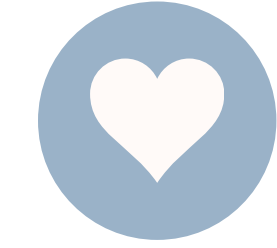


# COMPARING THE STRENGTH OF 3 DIFFERENT RISK FACTORS FOR DEPRESSION AMONG U.S. HIGH SCHOOL STUDENTS DURING THE COVID-19 PERIOD

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## Introduction

### Background

- Adolescent mental health has worsened in recent years.
- In the U.S., **40%** of high school students reported persistent sadness or hopelessness, and **20%** seriously considered suicide. (CDC, 2025)
- COVID-19 disruptions, including **school closures, social isolation, and reduced outdoor activity**, further intensified adolescent mental health challenges. (Ludwig-Walz et al., 2022)

### Literature Review

- Prior studies identify several **key risk factors** for adolescent depression
- **Violence exposure** (Eisman et al., 2015)
- **Cyberbullying**, especially among female students (Jackson et al., 2025)
- **Substance use**, including smoking, marijuana, and alcohol (Bommersbach 2025)

### Limitation

Although these associations are well established, **fewer** studies compare multiple risk factors within the **same sample**. This study examines which factor is most strongly associated with adolescent depression.

## Research Question

- Among violence exposure, electronic bullying, and substance use, which risk factor is most strongly associated with depression?
- In the electronic bullying model, how are physical activity and screen time associated with depression?
- Does the association between electronic bullying and depression differ by gender?

## Methods

### Sample

- The Adolescent Behaviors and Experiences Survey (ABES) represents a survey of U.S. high school students conducted by the CDC in spring 2021.
- The survey included students in grades 9–12 from public, Catholic, and private schools across the U.S. and D.C.
- The final analytic sample included 7,662 students with non-missing data.
- Students were ages 12–18 (M = 16.02, SD = 1.23).

### Measures

Category	Variable	Description
Outcome	Depression	Binary (1=Yes, 0=No) Felt sad or hopeless for 2 more weeks
Risk Factor	Violent Experiences	Aggregate (1=Yes, 0=No) Includes physical fighting, sexual violence, or dating violence
Risk Factor	Substance Use	Aggregate (1=Yes, 0=No) Includes alcohol, marijuana, or cigarette use
Risk Factor	Electronic Bullying	Binary (1=Yes, 0=No) Bullied via texting or social media in the past 12 months.
Control	Demographics	Age (12-18), Gender (1=Female, 0=Male)
Control	Physical Activity	Continuous (0-7 days) Active for 60 more mins per day in the past 7 days.
Control	ScreenTime	Ordinal (smaller than 1 --- more than 5) Daily use of electronic devices

## Result

	Model 1	Model 2	Model 3
Violence Exposure	OR = 3.65*** CI = (3.24, 4.12)	—	—
Electronic Bullying	—	OR = 3.76*** CI = (3.23, 4.40)	—
Substance Use	—	—	OR = 3.09*** CI = (2.75, 3.48)
Gender	OR = 2.55*** CI = (2.30, 2.82)	OR = 2.33*** CI = (2.11, 2.58)	OR = 2.49*** CI = (2.25, 2.76)
Physical Activity	OR = 0.92*** CI = (0.90, 0.93)	OR = 0.93*** CI = (0.91, 0.95)	OR = 0.92*** CI = (0.90, 0.93)
Screen Time	OR = 1.19*** CI = (1.15, 1.23)	OR = 1.16*** CI = (1.12, 1.20)	OR = 1.16*** CI = (1.12, 1.20)

Note: OR = odds ratio; CI = 95% confidence interval

\* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

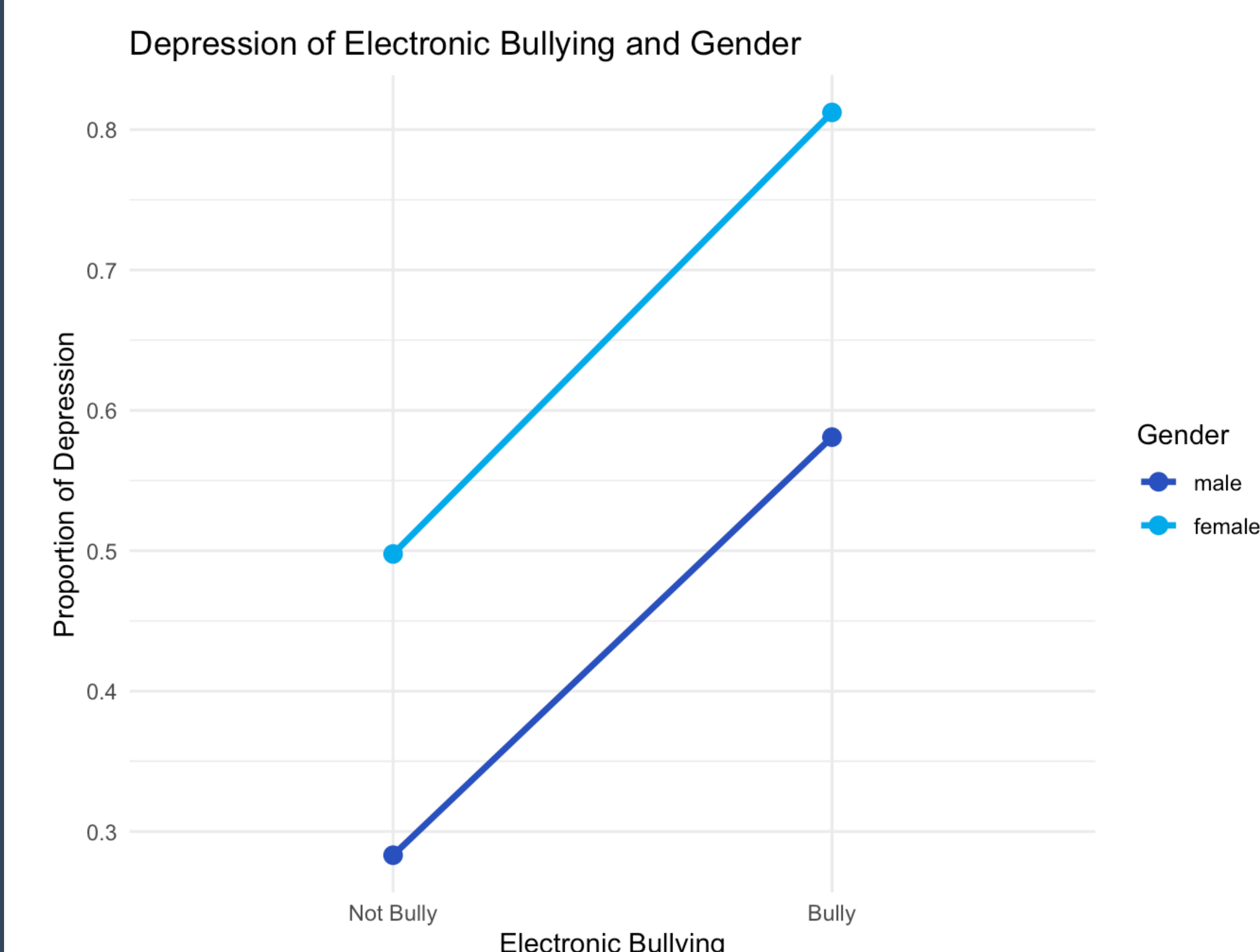
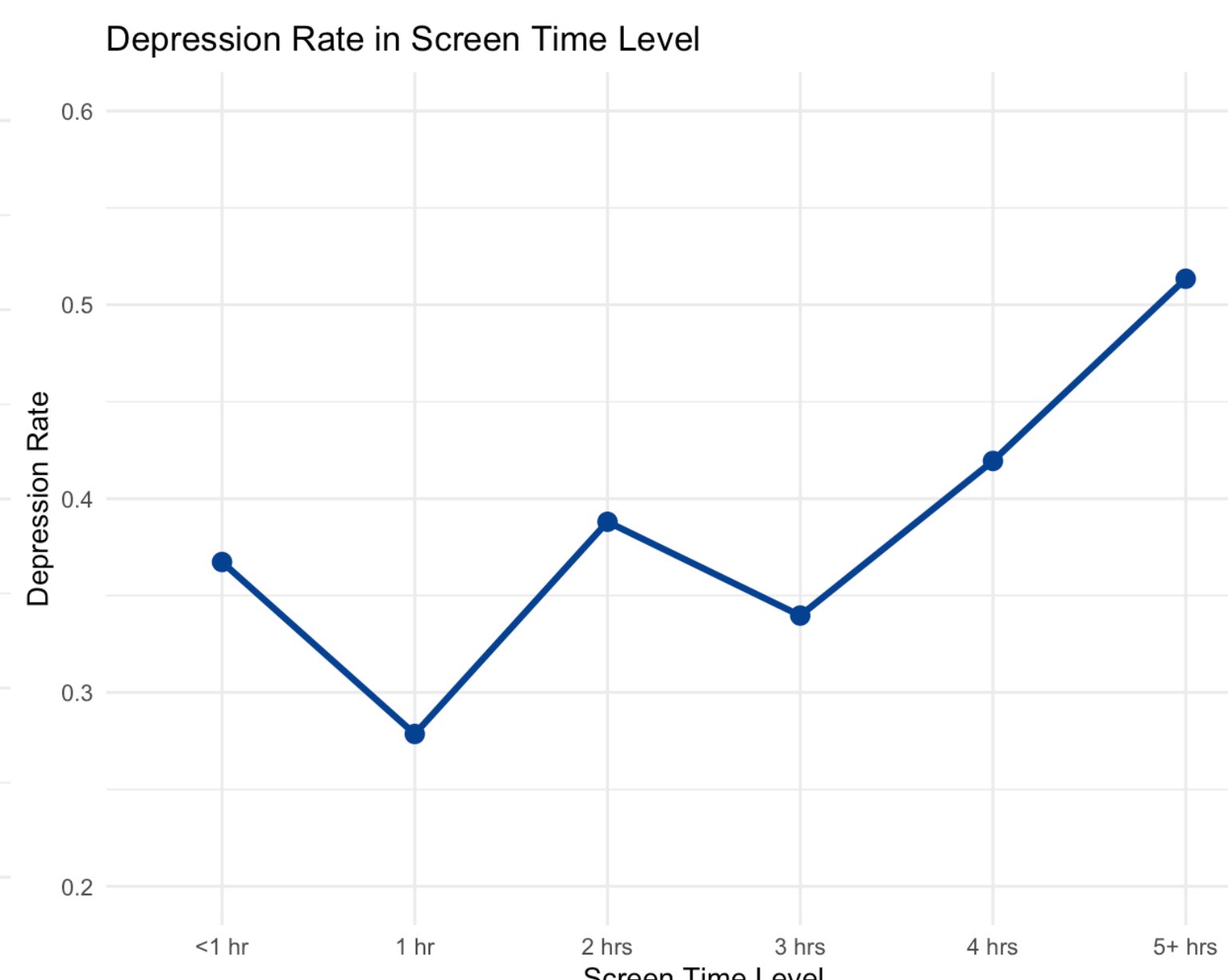
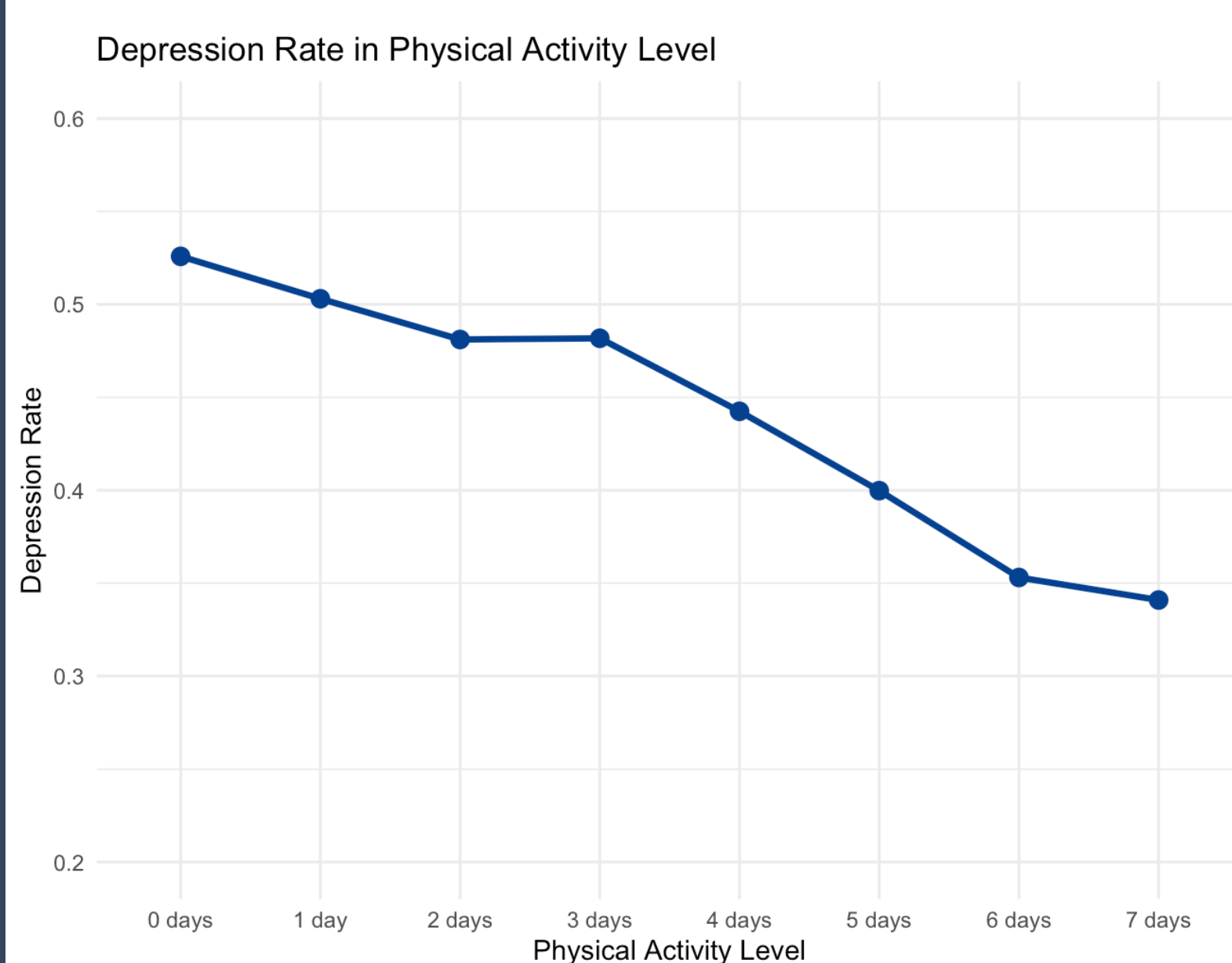
### Risk Factors

- Electronic bullying in Model 2 has the highest Odds Ratio (**OR = 3.76**) compared to Model 1 (OR = 3.65) and Model 3 (OR = 3.09).
- All three variables are highly significant (p < 0.001)
- **Control variables** show consistent patterns: Females consistently face a 2.3-2.5-fold higher risk; physical activity is a protective factor (OR ≈ 0.92); and screen time is a steady risk factor (OR ≈ 1.16).



### Control Variables

- **Physical activity** was associated with **lower** depression rates. **Screen time** was associated with **higher** depression rates.
- The relationship between screen time and depression is not perfectly linear, but students with 4+ hours show clearly higher depression rates



- Both male and female students who experienced electronic bullying had higher depression rates than those who did not.
- **Female** students had **higher** depression rates than male students in both the bullied and non-bullied groups.
- The **parallel lines** suggest that the bullying-depression association was similar across genders. And gender is not a confounding factor.

## Discussion

### Core Findings

- Electronic bullying showed the strongest association with depression, which may be because it continues through phones, social media, and online platforms.
- Physical activity may be protective, while high screen time may be a potential risk factor.
- Gender differences were present.

### Limitation

- Since an observational survey, the results can only show association rather than causal effects
- The self-reported survey may cause bias

### Future

- Future research may be specific to the field of why females have a higher rate of being bullied
- Whether the effect will differ across race, age, or school differences
- The School mental health center should give more focus on students who have been electronic bullying

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