Social Media and Mental Health

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Background

- As social media started gaining popularity in the mid-2000s, the mental health of adolescents and young adults in the United States began to worsen
- Facebook was created at Harvard in February 2004 and was rolled out gradually to other colleges in the United States and abroad over the subsequent two and a half years

Motivation

- A major depressive episode in the past year by 83 percent but the ultimate causes of these trends are largely unknown
- Concerns about negative effect of social media on mental health have become prominent but well-identified causal evidence remains scarce

Main Findings

- The introduction of Facebook at a college had a negative effect on student mental health.
- The negative effects on mental health are strongest for students who are predicted to be most susceptible to mental illness.
- In the short-to-medium run, the negative effects of Facebook on mental health increase with length of exposure to the platform.
- Students reported suffering some negative downstream effects as a result of their worsened mental health conditions.

Data Sources

- First Data Source: Dates in which FB was introduced at 775 US colleges.
  - First 100 colleges from previous studies(Traud, Mucha, and Porter 2012; Jacobs et al. 2015)
  - Remaining 675 colleges from Wayback Machine–an online archive containing snapshots.
- Second Data Source: NCHA survey from 2000 to 2018 on full-time undergraduate students' mental and physical health.

Variable Descriptions

- Construction of Outcome Variables: Poor mental health, symptoms poor mental health, depression services and depression symptoms
  - Higher values indicate worse mental health outcomes
  - Standardize those variables using means and standard deviations
  - Take an equally weighted average of components
  - Standardize the final index
- Construction of Treatment Indicators:
  - Treated: FB was available at her college when the respondent took survey
  - Disregard: FB was rolled out at her college when the respondent took survey

Identification Strategy

- Baseline Specification–TWFE:

$$Y_{icgt} = \alpha_g + \delta_t + \beta Facebook_{gt} + \gamma X_i + \psi X_c + \varepsilon_{icgt}$$

- Y_{icgt} represents an outcome for individual i who participated in survey wave t and attends college c that belongs to expansion group g
- α_g indicates expansion-group (college) fixed effects
- δ_t indicates survey-wave fixed effects
- $Facebook_{gt}$ indicates whether in survey t FB was available at colleges in expansion group g
- X_i, X_c: vectors of individual-level and college-level controls respectively.

Plausibility of Parallel Trends Assumption

- Estimate a fully dynamic version and check for potential pretrends.
- Alternative robust estimators introduced in De Chaisemartin and d' Haultfoeuille (2020); Borusyak, Jaravel, and Spiess (2021); Callaway and Sant' Anna (2021); and Sun and Abraham (2021).
- Robustness check that includes expansion-group-level linear time trends
- Include $college \times survey - wave$ fixed effects

Baseline Results

TABLE 1—BASELINE RESULTS: INDEX OF POOR MENTAL HEALTH

	Index of poor mental health			
	(1)	(2)	(3)	(4)
Post-Facebook introduction	0.137	0.124	0.085	0.077
	(0.040)	(0.022)	(0.033)	(0.032)
Observations	374,805	359,827	359,827	359,827
Survey-wave fixed effects	✓	✓	✓	✓
Facebook-expansion-group fixed effects	✓	✓		
Controls		✓	✓	✓
College fixed effects			✓	✓
FB-expansion-group linear time trends				✓

- Point estimates captures both direct effect of FB users and indirect effect of FB non-users.
- It' s unlikely that results are driven by non-users since penetration rate was around 85 percent.
- The impact of FB on mental health is around 22 percent of the effect of job loss.

Event-study of TWFE model

- With Indicators for distance to/from the introduction of FB:

$$Y_{igt} = \alpha_g + \delta_t + \beta_k \times \sum_{k=-8}^{5} D_{k(gt)} + \epsilon_{igt}$$

- $D_{k(gt)} = 1$ if for expansion group g in survey wave t, the introduction of FB was k semesters away.

- Use a set of proposed estimators that are robust to treatment effect heterogeneity: De Chaisemartin and d' Haultfoeuille (2020); Borusyak, Jaravel, and Spiess (2021); Callaway and Sant' Anna (2021); and Sun and Abraham (2021)

Event-study of TWFE model(cont.)

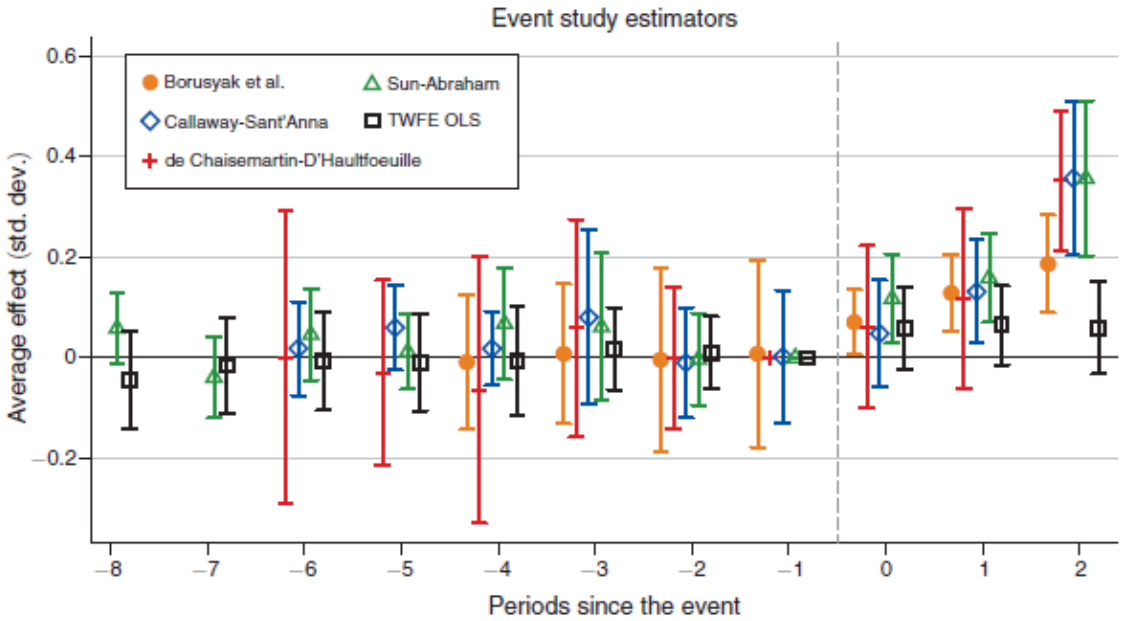

FIGURE 2. EFFECTS OF FACEBOOK ON THE INDEX OF POOR MENTAL HEALTH BASED ON DISTANCE TO/FROM FACEBOOK INTRODUCTION

- Treatment effects increase in the postperiods
- The effects becoming stronger as a function of length of exposure to the platform.

Heterogeneity

- By predicted susceptibility to mental illness:
  - LASSO prediction (mental health condition, immutable individual-level characteristics)
  - The effects of introduction of FB on symptoms of poor mental health tend to be stronger for individuals who are susceptible to mental illness.
- Other Dimensions of Heterogeneity
  - The results are stronger among women, non-Hispanic Whites, and a weaker among international students, younger students, and first-years

Length of Exposure to Facebook

- To study the effects of length of exposure to FB at the level of individual students:

$$Y_{icgt} = \alpha_c + \delta_t + \sum_{k=0}^{5} \beta_k \times Semesters_{k(ict)} + \gamma X_i + \epsilon_{icgt}$$

- $Semesters_{k(ict)} = 1$ if student i at college c in survey-wave t had access to FB for k semesters.
- $k = FB_{gt} \times (t - \max\{\tau_i, \tau_c\})$, t represents time in semesters
- FB_{gt} indicates whether FB was available at student i' s college c by time t

Length of Exposure Facebook(cont.)

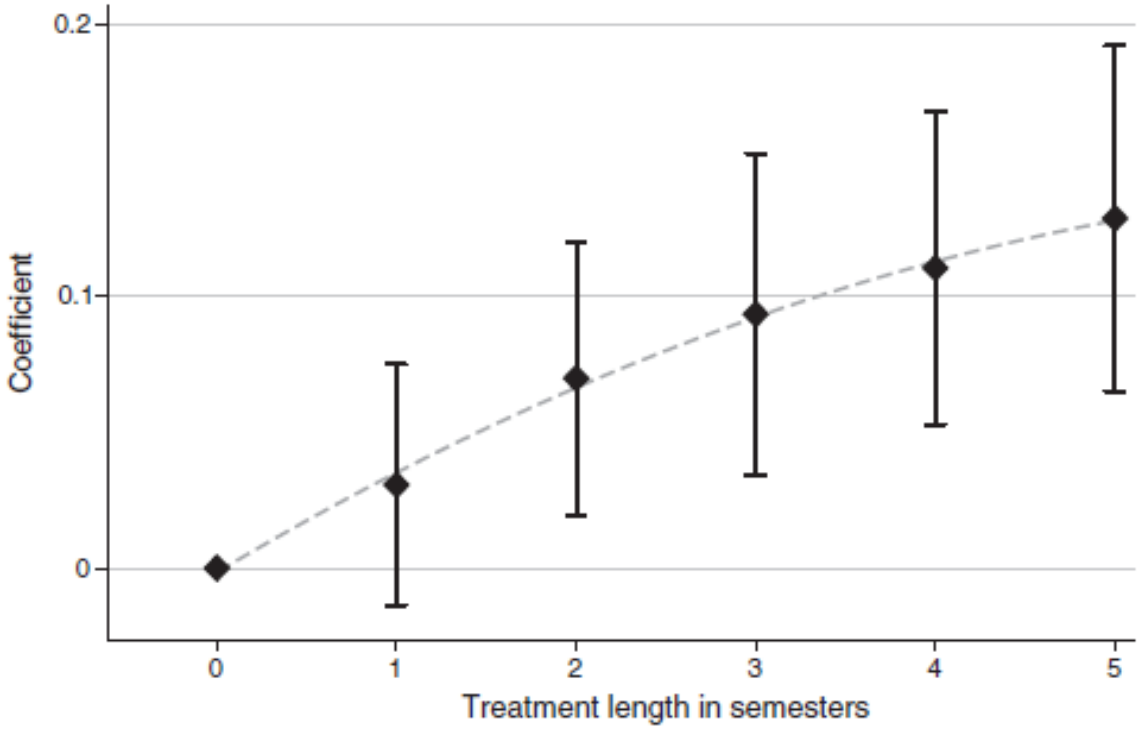

FIGURE 4. EFFECT ON POOR MENTAL HEALTH BY LENGTH OF EXPOSURE TO FACEBOOK

- The negative effects of the introduction of Facebook on mental health worsen the longer students are exposed to FB.

Robustness Checks

- the construction of our index of poor mental health
- the construction of our treatment variable
- particular Facebook expansion groups driving the effects
- particular variables driving the effects
- Parallel trends assumptions
- The level at which standard errors are clustered

Alternative Explanations

- FB affected the stigma associated with mental illness
- Conclusions:
  - The introduction of FB did not affect the reporting of other stigmatized conditions (being a victim of sexual assault or consuming illegal drugs)
  - Find no detectable effects of the introduction of FB on eating disorders

Downstream Implications

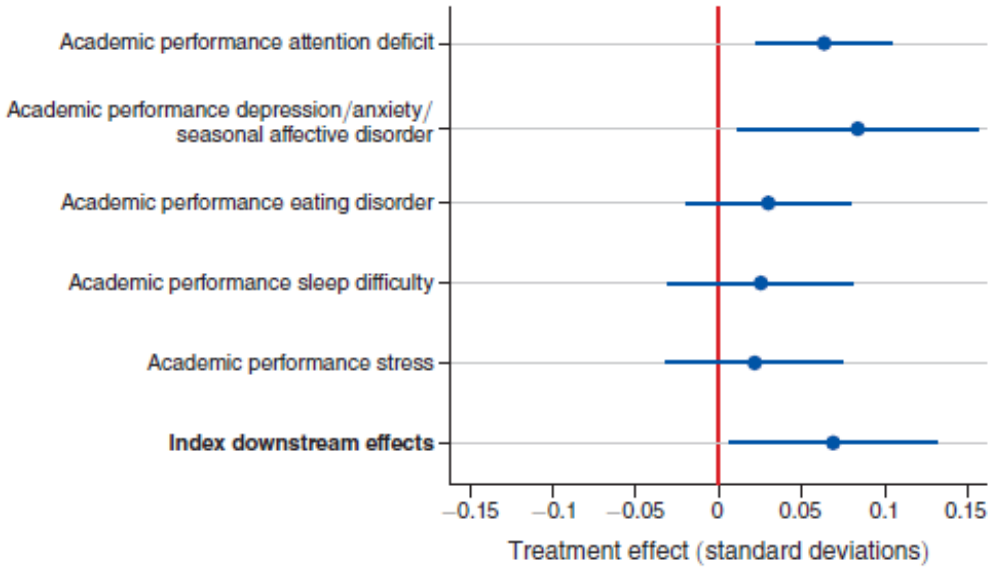

FIGURE 5. DOWNSTREAM EFFECTS ON ACADEMIC PERFORMANCE

- After the introduction of FB, students were more likely to report that their academic performance was impaired as a result of poor mental health.
- The negative effect on self-reported academic performance is especially pronounced among most susceptible students.

Unfavorable Social Comparisons

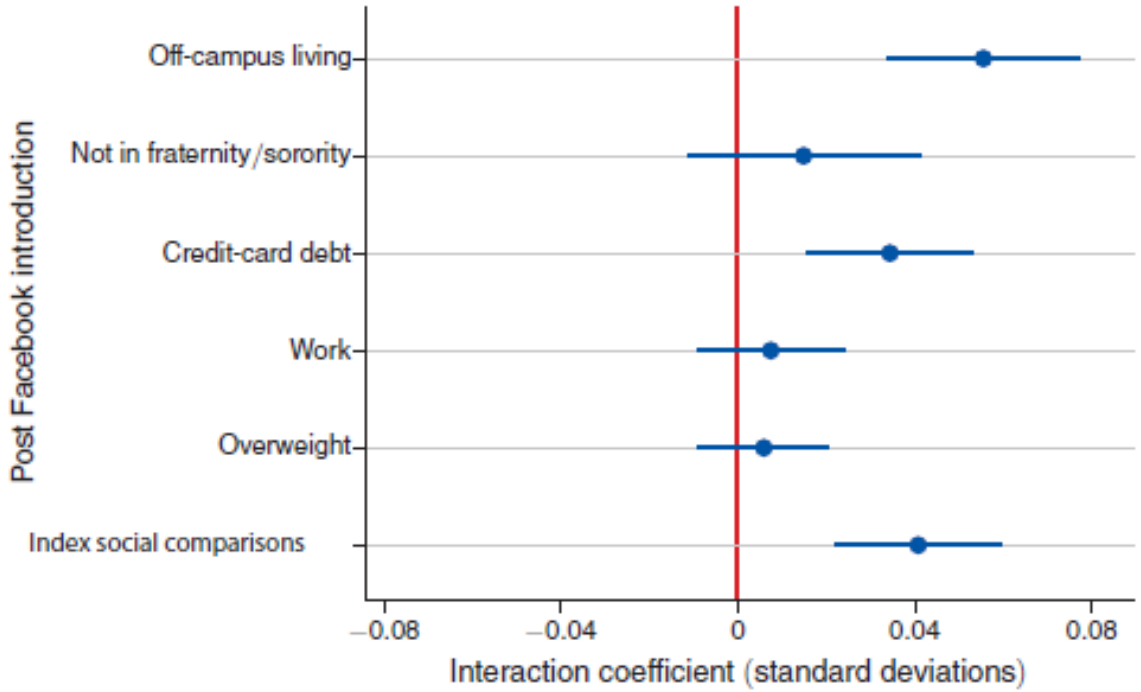

FIGURE 6. HETEROGENEOUS EFFECTS AS EVIDENCE OF UNFAVORABLE SOCIAL COMPARISONS

- The introduction of FB at a college affected more severely the mental health of students who might be more likely to be affected by unfavorable social comparisons.

Disruptive Internet Use

Table A.15: Effect on Outcomes related to Disruptive Internet Use

	Internet, computer games experienced	Internet, computer games academics
	(1)	(2)
Post Facebook Introduction	0.023	0.004
	(0.016)	(0.009)
Baseline mean	0.52	0.11
Observations	375,263	375,263
Survey Wave FE	✓	✓
Controls	✓	✓
College FE	✓	✓

- The share of students experiencing internet or computer games as an issue increased by around 5 percent, but the effect is not statistically significant.

Thanks!