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Does cyberbullying impact youth suicidal behaviors?☆

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ABSTRACT

Even though several youth fatal suicides have been linked with school victimization, there is lack of evidence on whether cyberbullying victimization causes students to adopt suicidal behaviors. To investigate this issue, I use exogenous state-year variation in cyberbullying laws and information on high school students from the Youth Risk Behavioral Survey within a bivariate probit framework, and complement these estimates with matching techniques. I find that cyberbullying has a strong impact on all suicidal behaviors: it increases suicidal thoughts by 14.5 percentage points and suicide attempts by 8.7 percentage points. Even if the focus is on statewide fatal suicide rates, cyberbullying still leads to significant increases in suicide mortality, with these effects being stronger for men than for women. Since cyberbullying laws have an effect on limiting cyberbullying, investing in cyberbullying-preventing strategies can improve individual health by decreasing suicide attempts, and increase the aggregate health stock by decreasing suicide rates.

1. Introduction

Despite increased attempts to protect students from the harmful effects of school victimization, bullying still persists. Estimates from the Centers for Disease Control and Prevention (CDC) (2016) indicate that 20% of students have been bullied, with an additional 20% having experienced cyberbullying at some point during their life.[1] Even though both traditional and electronic bullying are detrimental to students, there are concerns that cyberbullying may be even more severe due to easier and faster transmission of the harassing behaviors through the internet. Accessing the internet has become ubiquitous; by 2006, 95% of youth had access to the internet, with 74% able to access it through a mobile device (Madden et al., 2013). With more prevalent access to the internet, the effort required to engage in cyberbullying decreases, which can partly explain the increase in cyberbullying rates from 18.8% in 2007 to 34% in 2016 (Patchin and Hinduja, 2016). To curtail this trend, several states have introduced cyberbullying policies which impose higher costs to cyberbullying perpetrators, especially after recent incidents linking cyberbullying with youth fatal suicides (see the cases of Ryan Halligan (2003), Megan Meier (2006), Jessica Logan (2008), Hope Witsell (2009), Tyler Clementi (2010), Amanda Todd (2012)).

Despite this evidence, the causal link between cyberbullying and suicide remains unclear partly because of lack of individual-level data on cyberbullying. The purpose of this paper is to identify the effects of cyberbullying on the health capital of U.S. adolescents with emphasis on suicidal behaviors. To investigate this question, I use individual-level data from the Youth Risk Behavioral Survey (YRBS) and information on whether the students have experienced bullying in cyberspace. Since the goal is to identify whether cyberbullying has a causal impact on suicidal behaviors—thoughts, plans, attempts, or injuries—of *cyberbullied* youth, I begin with utilizing changes in state-level cyberbullying laws as instruments for cyberbullying. These policies can prevent cyberbullying because they increase both awareness about the severity of cyberbullying and the costs of engaging in cyberbullying, so states with such laws should experience fewer cyberbullying incidents.[2] The results ver-

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[1] Electronic (internet) harassment includes cyberstalking, cyberharassment, and cyberbullying. *Cyberstalking* refers to any threatening or malicious behavior with a credible threat of harm (Smith, 2009). *Cyberharassment* does not involve a credible threat, but it includes threatening or harassing email messages, instant messages, or blog entries dedicated to tormenting an individual (Smith, 2009). This is in contrast to *cyberbullying* (electronic bullying) which is defined as any purposeful, repeatedly harmful action (Hinduja and Patchin, 2008) inflicted on school-aged children through the use of electronic means such as computers, cell phones, and other electronic devices (Smith, 2009).

[2] Within the existing laws, 16 states refer to cyberbullying as a cyber-crime and some define specific disciplinary consequences for individuals who engage in cyberbullying: 29 states classify cyberbullying as a misdemeanor (e.g., Colorado, North Carolina, Pennsylvania) or an offense (e.g., Arizona, Florida, Louisiana), while three

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ify that youth in states with such laws have a lower probability of being cyberbullied by 7.1%.

The bivariate probit results show that cyberbullying has a strong effect on the probability of all suicidal behaviors. For example, it increases suicidal thoughts by 14.5 percentage points (p.p.) and suicide attempts by 8.7 p.p. However, these bivariate probit results may capture local average treatment effects. To identify the effect of cyberbullying on suicidal behaviors for all youth (and not only the marginal youth who is affected by changes in the legislation), I employ propensity score matching methods which give the average treatment effect of cyberbullying. These non-parametric methods corroborate the previous results; cyberbullying increases all behaviors, with suicidal thoughts being higher by 14.3 p.p. and suicide attempts by 6.4 p.p. These effects are stronger for women than for men consistent with evidence on youth suicide statistics from the CDC (2016).

Cyberbullying can not only diminish individual health capital (nonfatal suicides), but it can also decrease the overall health stock in the economy (fatal suicides). Because fatal suicides impose an additional cost to the society due to increased medical costs and foregone earnings, I extend my analysis to evaluate the effect of cyberbullying rates on statewide fatal suicide rates. Because the YRBS data is not suitable for measuring fatal suicides, for the statewide analysis I employ a different dataset and therefore a different estimation technique. Using a mixed-2SLS method and data from the National Vital Statistics System, the state-level results corroborate the individual-level results; a decrease in cyberbullying rates by 1% leads to a decrease in suicide deaths by 11 deaths per 100,000 population, which is equivalent to savings of approximately $12.3 million.

The current literature has examined separately the economic, social, and physiological aspects of suicidal behaviors (Cutler et al., 2001; Marcotte, 2003), and the association of cyberbullying with mental health (Beckman, 2013; Hinduja and Patchin, 2014). Only one study has examined whether cyberbullying legislation—but *not* cyberbullying victimization—affects suicide rates and attempts, and finds no significant relationship between the two (Dasgupta, 2016). However, it is surprising that evidence on the causal impact of *cyberbullying* on any outcomes remains elusive. My study fills exactly this gap in the literature: it is the first study to quantify the causal effect of cyberbullying on fatal and nonfatal suicides for U.S. youth.

With the expanding access to the internet and the use of social media, there have been increasing calls for protection against cyberbullying. Given that both levels of analysis indicate that cyberbullying laws were successful with limiting cyberbullying—which subsequently decreases youth suicidal behaviors—increasing the costs of engaging in cyberbullying is a viable remedy to this problem. That is, interventions that limit school victimization—such as additional policies, amendments to existing laws or harsher punishments for engaging in cyberbullying—should be supplemented with current policies promoting mental health and suicide prevention. Such interventions can prevent both fatal and nonfatal youth suicides with significant economic gains, in addition to lower mortality rates.

The paper proceeds as follows: in Section 2, I present previous studies on the topic and in Section 3 I show how cyberbullying affects the decision to commit suicide within a present discounted value of living framework. The individual-level analysis for the impact of cyberbullying victimization on suicidal behaviors is given in Section 4, and the aggregate-level analysis for the effect of cyberbullying rates on fatal suicide rates is given in Section 5. The last section concludes with some suggestions for relevant policy implications.

2. Background

The literature on suicidal behaviors has examined both fatal suicides through suicide rates and nonfatal suicides through suicidal ideation.[3] The decision to commit suicide can be rational if it depends on the discounted lifetime utility an individual expects to receive from retaining a positive stock of health (Hamermesh and Soss, 1974). On the one hand, the lower the expected income stream, the higher the probability of committing suicide due to lower expected benefits from continuing life: income uncertainty matters, as suicide rates increase when wages are expected to decrease in future periods (Suzuki, 2008). Empirical evidence verifies such income effects as short-term rises in unemployment are positively associated with suicide deaths (Luo et al., 2011), and suicides are higher in periods of economic recession (Ruhm, 2000). However, this decision depends on relative economic conditions too: being unemployed when the majority of the population is employed will have a more detrimental effect on the decision to commit suicide compared to when the majority of the population is unemployed (Noh, 2009). Even when the focus is on *youth* suicide rates, lower income (and income fluctuations) is associated with higher suicide rates (Freeman, 1998). On the other hand, a longer time horizon available to realize these future benefits suggests that there might be a monotonic relationship between age and suicide rates (Hamermesh and Soss, 1974). However, recent empirical studies illustrate that this age effect follows an inverse-U pattern (CDC, 2016): suicide rates have tripled among youth and declined among adults from 1950 to 1990 (Cutler et al., 2001), and the peak remains at around 15 years old for the 1990–2014 period (Adrian et al., 2016).

Because not all suicide attempts result in death—for approximately every 25 attempts there is one fatal suicide (CDC, 2016)—more recently the focus has shifted from understanding what determines suicide rates to evaluating the incidence of suicide attempts. Individual-specific characteristics have been shown to be good predictors of nonfatal suicides. Consistent with evidence from fatal suicide rates, younger individuals are more likely to think about (Kessler et al., 1999) and attempt to commit suicide (Adrian et al., 2016). But the health literature documents a gender paradox (McLoughlin et al., 2015): females have higher frequency of nonfatal suicide attempts and males have more frequent suicide completions (Cutler et al., 2001; Molina and Duarte, 2006; CDC, 2016). One explanation for this heterogeneity in *nonfatal* suicides is that women are more likely to talk about their feelings (Becker and Posner, 2004) in expectation of eliciting more sympathy than men—since men are supposed to be more immune to psychological distress (Cutler et al., 2001)—while women have lower *fatal* suicides because they choose methods that are less likely to lead to death (e.g., poison, pills) compared to men (guns or other violent methods) (Becker and Posner, 2004).

Differences also exist in terms of ethnicity, with some evidence that whites are more likely to attempt suicide than any other ethnicity, though blacks are over twice as likely to commit suicide by violent means such as firearms (Cutler et al., 2001;

states (Alaska, Hawaii, Texas) classify it as a felony. Even in states that do not have specific legal repercussions in their cyberbullying laws, provisions allow victims of cyberbullying to seek other legal remedies as they pertain to violation of civil rights on harassment. In terms of definition, 24 states explicitly define cyberbullying in the law, 41 states include the term electronic harassment, and 38 states refer to cyberstalking. Moreover, 17 states define separately cyberbullying, cyberharassment and cyberstalking, 19 states include separate definitions for only two terms, and 14 states define only one term in their legislation.

[3] See Cutler et al. (2001) and Chen et al. (2012) for a detailed review of studies on suicides.