# The Causal Effects of Online Dating Apps: Evidence From U.S. Colleges *

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January 2024

**Abstract**

Online dating apps have become a central part of the dating market over the past decade, yet their broader effects remain unclear. We analyze the impact of the popular dating app—Tinder—on dating behavior, relationships, and health of young adults. For identification, we rely on Tinder's early promotional strategy focused on Greek organizations (fraternities and sororities) on college campuses. Using a comprehensive survey containing more than 1.1 million responses, we estimate difference-in-differences models comparing student outcomes before and after Tinder's launch and across individuals with varying Greek organization membership. We show that the introduction of Tinder led to a sharp and persistent increase in the frequency of sexual activity with no corresponding impact on the likelihood of relationship formation. These results align with theoretical models suggesting that, by lowering search costs, dating apps foster a culture of more exploration and turnover in romantic couplings. The distributional implications of these changes differ significantly by gender. Male students predisposed to higher levels of sexual activity based on their observable characteristics experienced the most notable increase in the number of sexual partners, a heterogeneity pattern not observed among female students. Finally, in terms of overall well-being, dating apps have downstream benefits through relative improvements to students' mental health, but also costs due to increases in reported incidences of sexual assaults and sexually transmitted diseases.

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# 1 Introduction

The past two decades have seen a dramatic shift in how people form romantic relationships and, by extension, how the dating market operates. Notably, the share of U.S. heterosexual couples who met online has skyrocketed, growing fourfold since the early 2000s and reaching 39% by 2017. In fact, online dating has become the most popular mode of meeting romantic partners (see Figure 2).

The rapid growth of online dating in the past ten years coincided with the advent of smartphone-based dating apps. While online dating services have been around since the 1990s, the emergence of mobile-phone-based applications, headlined by the launch of Tinder, represented a structural change in what was previously a niche industry. By taking advantage of geolocational capabilities and offering an always-on-hand presence, Tinder and other apps that followed have redefined how people meet romantic partners and have popularized online dating to an unprecedented level.

Despite the growing popularity of dating apps, the broader implications of their mainstream adoption remain poorly understood. On one hand, economic theory would predict that the entry of a new matching technology, capable of reducing search costs and alleviating information asymmetries, could improve efficiency and allocations (Adachi, 2003; Hitsch, Hortaçsu, and Ariely, 2010a; Antler, Bird, and Fershtman, 2022). On the other hand, the rise of dating apps has been accompanied by growing public concern—numerous popular press articles have linked dating apps to the rise of hookup culture,[1] worse mental health,[2] and a more skewed distribution of dating matches.[3]

This paper provides the first empirical analysis of the causal impact of online dating apps. We focus on Tinder, a pioneer in the dating-app space that remains a dominant market leader to date.[4] We center our attention on U.S. college students, who were the main target audience of Tinder at the outset and who belong to the age group most affected by the advent of dating apps.[5]

To identify the causal impact of Tinder, we exploit a key institutional feature of Tinder's launch strategy, which was to identify socially influential members of college communities and harness preexisting social networks in order to promote the app. In practice, this involved leveraging Greek

[1] Is romance really dead? CNN, June 19, 2022.

[2] A decade of fruitless searching': the toll of dating app burnout. *The New York Times*, August 31, 2022.

[3] How she ghosted me: the men being radicalised by Tinder data. *New Statesman,* January 10, 2020.

[4] According to a PEW Research Center Survey in July 2022, 79% of U.S. adults between the ages of 18 and 29 who have ever used online dating have used Tinder at least once (McClain and Gelles-Watnick, 2023).

[5] In the spring of 2013, only 10% of adults aged 18 to 24 reported using online dating services. This number grew to 27% by 2015, after the rollout of Tinder (Smith, 2016). For other age cohorts, the change between 2013 and 2015 was much smaller. See Figure A1 for more details.

organizations (fraternities and sororities) operating on college campuses.[6] Tinder relied heavily on Greek organization members to serve as brand ambassadors, and it used fraternity and sorority events as a means to popularize the app.[7] This strategy was widely documented and attested to contemporaneously by both outside observers and the founders of Tinder themselves.[8] As a consequence, the adoption and use of Tinder on college campuses was said to be significantly higher among students who participated in Greek life.[9]

We start by providing quantitative evidence that Tinder was indeed targeting fraternities and sororities on college campuses. Analyzing the universe of college-newspaper articles from 2013 through 2016 available on LexisNexis, we document that, consistent with this narrative, Tinder was significantly more likely to be discussed at colleges with Greek organizations compared to colleges without Greek presence. The likelihood of newspapers reporting on Tinder was also increasing in the share of students participating in Greek life at a college. The articles also reveal personal anecdotes that corroborate the spread of Tinder through Greek systems on college campuses. In a separate exercise, we also show that colleges with Greek life were more likely to be located in towns that exhibited higher Google search intensity for Tinder during the app's initial rollout.

Motivated by this pattern of early diffusion, we pursue a difference-in-differences research design that exploits the differential diffusion of Tinder between Greek and non-Greek students following its launch. To carry out our analysis, we utilize the National College Health Assessment (NCHA), which surveys college students on a semester-by-semester basis—approximately 1.1 million students at 500 colleges from 2008 through 2019—and provides detailed measures of students' sexual activity, relationships, and physical and mental health.

Applying the difference-in-differences strategy, we compare students before and after the launch of Tinder and across their Greek affiliation. College-by-survey-wave fixed effects allow us to account not only for variables whose impact on student behavior is constant across colleges and time, such as college selectivity or country-wide shocks, but also for any time-varying differences across colleges, such as idiosyncratic norm changes within college cohorts. We confirm the absence of pretrends in our estimates, which supports the validity of the parallel-trends assumption.

[6] Fraternities and sororities are social organizations at American colleges and universities. They play a central role in the college experience of many American undergraduate students (Even and Smith, 2022).

[7] Here's one of the college kids helping Tinder take over campuses. *Huffington Post,* July 2, 2013.

[8] How Tinder used Greek life for more than just hookups. *Fortune,* August 9, 2016.

[9] This is supported by myriad anecdotal and narrative evidence, which we discuss in detail in Section 2.

First, we characterize the impact of online dating apps on the dating market equilibrium in terms of sexual activity and relationship formation. This empirical analysis is guided by theoretical predictions of Antler et al. (2022), namely, that reduced frictions in the dating or marriage market can lead to an increase in search duration. Our results are consistent with this notion. Specifically, we find that the introduction of Tinder led to a significant differential increase in the frequency of sexual activity and the number of sexual partners among students involved in Greek life, as compared to their peers at the same institutions in the same semester. In terms of magnitude, after the introduction of Tinder, Greek-affiliated students (hereafter, "Greek students"), on average, had 0.21 more sex partners and became 2.9 percentage points more likely to have had sex in the previous 12 months. At the same time, we find no evidence that Tinder affects the share of students in a cohabiting relationship status. Taken together, these results suggest that online dating apps may induce greater experimentation and turnover in sexual relationships prior to the establishment of a stable romantic match. These results are in line with observations that the rise of dating apps has led to more frequent sexual activity but not to an increase in the number of stable relationships, facilitating the rise of so-called "hook-up" culture.[10]

Second, we examine the implications of dating apps for relationship quality. Matching on dating apps differs greatly from offline dating. On one hand, the former is associated with substantially lower search costs. Accordingly, one might speculate that the introduction of Tinder would possibly lead to higher relationship quality. On the other hand, matching in online dating apps relies on arguably more superficial informational cues which can lead to worse pairings. We measure relationship quality using self-reported instances of relationship problems. We find little evidence that Tinder affects the share of students experiencing relationship difficulties, suggesting that Tinder neither improves nor worsens match quality.

Next, we attempt to identify the distributional consequences of Tinder in the dating market. Economists have long recognized that technologies facilitating an increase in market scale may increase inequality across the "talent" distribution (Rosen (1981) and Koenig (2023)). In the case of the dating market, online dating apps promote economies of scale by reducing search costs and allowing individuals to meet people well beyond the confines of their immediate social networks. Consequently, we show that, for male students, the positive effects on sexual activity and relation-

[10] Tinder and the dawn of the "Dating Apocalypse." *Vanity Fair,* July 6, 2015.

ship formation are significantly larger for students predisposed to experiencing a higher baseline level of sexual activity based on their observable characteristics. In other words, for males, the "gains" from online dating accrue disproportionately to individuals who were already successful with respect to dating prior to the new matching technology. For females, this pattern of heterogeneity is completely absent and the impact of online dating apps was largely equalized across groups. These contrasting findings suggest that the distributional effects of Tinder vary significantly by gender and in the case of males, the introduction of online dating apps may facilitate a rise of "superstars" in the dating market.

Having shown the primary effects of Tinder on sexual and romantic activity, we explore the potential downstream ramifications of increased sexual activity on mental health and physical well-being. In terms of mental health, we find that Tinder has a positive impact on the reported mental well-being of students involved in Greek life. The improvement is around 0.05 standard deviations in magnitude and is observed across all components of the index, including severe depression and reported instances of self-harm. This finding contradicts the view that dating apps are causing disproportionate mental distress among young adults due to factors such as online harassment (Smith and Duggan, 2013). It also stands in contrast to the deleterious effects of other social networking platforms, such as Facebook (Allcott, Braghieri, Eichmeyer, and Gentzkow, 2020; Braghieri, Levy, and Makarin, 2022). We speculate that the effect could be consistent with an improvement in self-image as a result of students receiving more romantic attention after the introduction of dating apps (Jung, Bapna, Ramaprasad, and Umyarov, 2019).

Finally, while our findings suggest that the introduction of Tinder has led to improved mental health among Greek students, it has also been associated with some negative consequences. Specifically, we observe a significant differential increase in the incidence of sexual assault reports among Greek students; we also find a positive impact on the probability of being diagnosed with chlamydia and having tested for HIV. The effects are substantial in magnitude, with the probability of sexual assault and HIV tests both rising by 2 percentage points, and the probability of being diagnosed with STDs growing by 0.5 percentage points off the mean of 2%.

We perform a series of tests to rule out competing explanations. First, to assuage the issue of selection into Greek organizations, we estimate a version of our specification that includes the interactions between the post-Tinder-introduction indicator and a set of student characteristics, in-

cluding age, gender, race, height, and BMI. Our results remain unchanged. Next, to account for the possibility of complex interactions between control variables, we predict the number of sex partners using a LASSO (least absolute shrinkage and selection operator) procedure based on the set of control variables, their square terms, and first-order interactions, and then we include the LASSO-predicted number of sex partners interacted with post-Tinder-introduction as a control variable. Our results remain invariant to this change as well. These robustness checks suggest that our results are unlikely to be driven by omitted differences between Greek members and other students.

Another potential concern is that our estimates could be biased by self-image-driven misreporting. This is unlikely for several reasons. First, the NCHA survey is anonymous and does not involve individually assigned enumerators. Second, the cause for misreporting would have to be convoluted, such that it accounts for both increases in the reported number of sexual partners and in reported STD diagnoses. Third, we observe no differential change in nonresponse rates for our outcomes. We also take steps to show that our results are not driven by the administrative crackdown on Greek activity that occurred at select universities during our study period.

A remaining issue critical to our research design is the viability of the Stable Unit Treatment Values Assumption (SUTVA) in this setting. Because non-Greek students were not prohibited from using Tinder and because Greek and non-Greek students inhabit the same campuses (where they are free to associate and interact), spillovers between treated and nontreated units can occur. This may lead to complications with the veracity of our estimates and questions about whether these estimates may be somehow impacted by the possible effects of Tinder on non-Greek students.

To alleviate this concern, we employ a complementary research design that defines treatment at the college level based on the share of college students active in Greek life. The idea behind this approach is that, because of strong network effects in the utility of dating apps, the overall usage of Tinder is likely greater on campuses with a larger Greek presence. This is partially attested to by our college-newspaper findings and by Tinder's strategy of targeting Greek students. With this approach, we can estimate the impact of Tinder on all students by comparing more-Greek versus less-Greek colleges. With the sole exception of mental health improvement, our individual-level results generalize to the overall student population. In particular, we find positive effects on sexual activity, no effect on cohabitation incidence or mental health, and increases in reported experiences of sexual assaults and STDs. The effect sizes are somewhat larger than in the individual-level spec-

ification, suggesting that, if anything, spillovers attenuate the true effect of Tinder's introduction. Overall, our findings suggest that Tinder has indeed altered the dating-market equilibrium and may have facilitated the rise of hookup culture on college campuses.

**Related Literature** This paper is the first to study the causal impact of mobile online dating technologies on individual outcomes. The vast majority of existing research relies on correlational exercises—see Bonilla-Zorita, Griffiths, and Kuss (2021) for the literature review. For instance, in a survey of 400 college students, Shapiro et al. (2017) find that Tinder use is positively associated with the number of sex partners and having experienced nonconsensual sex. Surveying more than 650 college students in Hong Kong, Choi, Wong, and Fong (2018) find that dating-app users were more likely to report being sexually abused in the previous year relative to nonusers. Holtzhausen et al. (2020) find a negative association between the use of swipe-based dating apps and mental health. While these studies are informative about the potential issues associated with the use of dating apps, causal evidence is lacking. Bonilla-Zorita et al. (2021) advise that "it is recommended for further study to [...] consider methodologies that can establish causality" (p. 2272).

The only study identifying a causal relationship between online dating and health is Greenwood and Agarwal (2016). Using the staggered introduction of Craigslist across cities in Florida from 2002 to 2006 for identification, the authors find that Craigslist entry is associated with significantly higher asymptomatic HIV counts, especially among Black patients. In contrast, we focus on Tinder, a platform used solely (and much more often than Craigslist) for online dating, studying it during a time when online dating became normalized (Rosenfeld, Thomas, and Hausen, 2019). We also study a variety of additional outcomes, not only STDs, thus drawing a much more comprehensive picture of the overall effects of online dating technologies.[11]

This paper also relates to significant literature on marriage markets in economics, dating back to Becker's Theory of Marriage (Becker (1973); for a recent overview, see Chiappori (2020)). The dating market as a precursor to the marriage market has also received attention from economists. For instance, the theoretical impact of dating apps on the dating market has been studied in Antler

[11] A few studies examine how online-dating-platform design causally shapes user behavior. Bapna, Ramaprasad, Shmueli, and Umyarov (2016) analyze the impact of an anonymous viewing feature on user behavior. Jung et al. (2019) study the impact of the mobile-app creation by online dating sites on users who initially use the online platform and then switch to the mobile platform. Using a differences-in-differences strategy, the authors find that mobile-app adoption caused users to view more profiles, log in throughout the day, and be more impulsive and uninhibited.

et al. (2022). We add to this nascent literature by documenting how online dating apps change the equilibrium dating patterns, empirically, in a particular community—in this case, colleges. Much of the work in this line of research has focused on using online interactions to identify mate preferences to better understand current marriage markets and to predict how online dating might shape these markets. This is exemplified by Hitsch et al. (2010a), who use the demographic, physical, and interaction data of 6,000 randomly selected online daters to estimate a model of mate-match preferences. The authors find that actual online matches closely resemble the ideal matches generated by the Gale-Shapley algorithm, suggesting that online dating markets are efficient and have uniquely low search costs, unlike real-world marriage markets.[12]

We also relate to the broader literature on the causal effects of the internet and, more narrowly, social networking technologies on mating behavior and individual well-being. Bhuller, Havnes, Leuven, and Mogstad (2013) find a positive impact of internet use on sex crime, possibly due to increased consumption of pornography (see also Ciacci and Sviatschi, 2022). Bellou (2015) finds that broadband internet has led to higher marriage rates by thickening the marriage market. Allcott et al. (2020), Mosquera et al. (2020), and Allcott, Gentzkow, and Song (2022) document the negative impact of social media on one's well-being broadly defined, although not considering outcome variables related to dating or sex. Braghieri et al. (2022) leverage the staggered introduction of Facebook across U.S. colleges to document its negative effects, specifically on mental health.[13] We contribute to this research agenda by examining the causal impact of a social networking technology—online dating apps—that has so far been overlooked, but that has arguably shifted the societal landscape just as much as social media.

[12]Other studies estimating online partner preferences include Hitsch, Hortaçsu, and Ariely (2010b), who document the quantitative importance of racial preferences; Huber and Malhotra (2017), who find a preference for partners with similar political characteristics; Brech, Vandenbulcke, and Baert (2019) and Egebark, Ekström, Plug, and van Praag (2021), who reveal that women tend to prefer more highly educated partners, while men do not seem to have a preference for higher education, and that both men and women place a similar premium on physical attractiveness. Fisman, Iyengar, Kamenica, and Simonson (2006), Fisman, Iyengar, Kamenica, and Simonson (2008), and Bhargava and Fisman (2014) estimate mating preferences in the context of in-person speed-dating experiments. In the context of arranged marriages in India, Banerjee, Duflo, Ghatak, and Lafortune (2013) study marriage preferences by analyzing matrimonial newspaper advertisements and find a strong preference for within-caste marriage. Bursztyn, Fujiwara, and Pallais (2017) conduct a field experiment showing that single female MBA students reported lower desired salaries and willingness to travel when they expected their classmates to see their preferences.

[13]For other studies that rely on the early deployment patterns of social networking platforms to identify their causal effects, see Armona (2019), Enikolopov, Makarin, and Petrova (2020), Fujiwara, Müller, and Schwarz (2021), and Müller and Schwarz (2023).

# 2 Background

Tinder is a social networking and online dating application. It soft-launched on the Apple App Store in September 2012. In contrast to existing online dating platforms, Tinder was designed from the ground up to be a smartphone-based app. Its biggest innovation was the swipe feature (released in May 2013), which allowed the user to anonymously swipe right and left to indicate like and dislike for other users' profiles. The Android version of Tinder launched in July 2013.

Simply put, Tinder has normalized and popularized online dating. By 2020, Tinder had 75 million monthly active users, and by 2021, Tinder had recorded more than 65 billion matches worldwide (it is available in more than 190 countries). The popular press has credited it with effectively changing the dating culture among young adults in the United States and many other places in the world (Abolfathi and Santamaria, 2020). Many competitors have since launched, but Tinder remains the market leader. As of July 2022, 79% of adults aged 18–29 and 46% of all U.S. adults who have ever engaged in online dating have used Tinder at least once. This usage far surpasses that of any other online dating apps or websites (McClain and Gelles-Watnick, 2023).[14]

Tinder capitalizes on network effects, so gaining early traction was crucial to its success. To accomplish this, Tinder was heavily targeted toward college students in its initial launch. To grow its user base in the first year, the developers followed the college-by-college strategy that Facebook had adopted earlier. Search data from Google Trends corroborate the fact that Tinder targeted the college student population. We present the top cities for the search term "Tinder" for 2013 and 2014 in Table A1. These data reveal that in the first two years that Tinder became available nationally, most of the top 100 cities in terms of Google search intensity for Tinder were college towns, or at least contained a college whose student body was a significant part of the local population.

However, beyond just promoting the app first to college students, Tinder founders took a further step, focusing on the Greek system within college campuses. This strategy aimed to take advantage of the existing and already dense networks in order to spread the app. Because fraternities and sororities often hosted parties and organized other social events, they could function as the linchpin of social activity on college campuses. As such, they are socially influential sub-communities with

[14]Note that 53% of individuals between the ages of 18 and 29 have reported ever using online dating apps or websites (McClain and Gelles-Watnick, 2023). As such, 42% of all young adults aged 18–29 in the United States have used Tinder at least once.

an outsize influence on the overall student body.

Leveraging Greek organizations on college campuses became an important part of Tinder's initial launch strategy. As the app's co-founder Justin Mateen told Forbes.com in 2016: "We penetrated the Greek system. ... The most valuable lesson I learned is the power and influence that the Greek system has on a student body."[15] Mateen himself was a fraternity member at the University of Southern California, where he and his co-founders launched the app through the university's Greek system. He said, "We knew that if it were to resonate with college kids who were already in a very socially charged environment, that other people would find value in the product as well."[16]

To promote the app during the early days, the whole Tinder team would "drive by every fraternity and sorority in Los Angeles, then San Diego, then Orange County, and every school we could cover," according to co-founder Sean Rad. The strategy paid dividends: every time they visited a sorority or fraternity to discuss Tinder, they would see sign-ups immediately after.[17]

Tinder also sent its vice president of marketing at the time, Whitney Wolfe Herd, on a cross-country trip to pitch the app to fraternity and sorority members. Wolfe Herd herself was a sorority member at Southern Methodist University and would go on to found the rival dating app Bumble in December 2014. According to Joe Munoz, who developed Tinder's technical backend, Wolfe would go to sorority chapters, "do her presentation, and have all the girls at the meetings install the app. Then she'd go to the corresponding brother fraternity—they'd open the app and see all these cute girls they knew." Tinder had fewer than 5,000 users before Wolfe's trip; when she returned, there were some 15,000 (Moazed and Johnson, 2016).

Invigorated by the success of this college-by-college marketing campaign, Tinder creators doubled down on this strategy by hiring on-campus representatives across the United States through a campus ambassador program, mostly recruiting them from Greek organizations.[18] For instance, Nick Aull, who served as a brand representative for Tinder at Tufts University in 2013, was a member of the Theta Delta Chi fraternity. Aull organized Tinder-themed fraternity parties where to enter, partygoers had to download the Tinder app on their smartphones. Aull also partnered with fraternity and sorority chapters at nearby schools such as Boston University and Harvard University

[15] How Tinder used Greek life for more than just hookups. *Fortune,* August 9, 2016.
[16] Inside Tinder: meet the guys who turned dating into an addiction. *Time,* February 6, 2014.
[17] Founder of $3 billion Tinder reveals the clever marketing tricks. *Business Insider,* February 15, 2017.
[18] How Tinder acquired 50 million users. *Hackernoon,* July 1, 2021.

to organize events there.[19]

To further investigate the prevalence of Greek students among Tinder representatives, in October 2022, we conducted a thorough search for "Tinder Campus Ambassador" on the professional social networking website LinkedIn. We identified 47 such ambassadors, most of whom served in the position during 2018 to 2020. Importantly, 33 of these 47 individuals indicated on their profiles that they were involved in Greek life during college, many in leadership positions.

Because of these strategies, fraternity and sorority members became the earliest adopters of Tinder on college campuses. In 2013, Aull estimated that only 40% of undergraduate students at Tufts had downloaded the Tinder app, but 80% of the school's Greek population used the service. In a 2016 interview, Rad stated that the fraternity and sorority demographic group remained one of Tinder's most active user cohorts at the time.[20]

Fraternities and sororities continued to be important for Tinder long past the initial rollout. For instance, in 2019, it came to light that Tinder has been signing exclusive partnerships with Greek organizations to prevent them from partnering with competitors—most notably, Bumble.[21]

We also note that the early expansion of Bumble—the second most popular online dating app among young adults: 51% of 18-29 year-olds who have engaged in online dating have used the app (McClain and Gelles-Watnick, 2023)—bore striking similarities to that of Tinder, with a heavy reliance on sororities and fraternities. Early on, in 2015, Bumble's founder and the former Tinder employee, Whitney Wolfe Herd, spent weekends "traveling to Texas campuses, bringing free yellow Hanky Panky underwear to the sororities and free beer to the fraternities, telling the fraternity brothers that all the girls were looking for their next formal dates on Bumble."[22] Similarly, in 2021, Bumble employed 420 brand ambassadors across more than 100 college campuses.[23]

[19] Here's one of the college kids helping Tinder take over campuses. *Huffington Post,* July 2, 2013.
[20] How this college junior scored a scholarship ... from Tinder. *Refinery 29,* April 18, 2016.
[21] Frats are signing "exclusive contracts" to use Tinder or Bumble. *Futurism,* August 14, 2019.
[22] How Whitney Wolfe Herd turned a vision of a better internet into a billion-dollar brand. *Time,* March 19, 2021.
[23] In our LexisNexis search of college newspapers, we found three articles from 2015 that mention Bumble. The number increases to ten in 2016. Of these 13 articles, 11 came from schools with Greek life on campus.

# 3 Data

Throughout the majority of our study, we use two primary sources of data: the National College Health Assessment (NCHA) survey and the LexisNexis data on college newspapers.

## 3.1 National College Health Assessment Survey Data

The main dependent and independent variables in our empirical analysis are derived from the NCHA survey. The NCHA was launched in 1998 to gather detailed data on the physical and mental health of college students.

The survey is conducted each semester across a large number of colleges. From 2008 through 2019, the survey data contains close to 1.3 million individual student responses. To ensure more consistent comparisons, we restrict our attention only to full-time undergraduate students, reducing our sample to approximately 1.1 million student responses. Since the survey employs a rotating panel of colleges, the resulting dataset is an unbalanced panel, meaning that some of the colleges included in one semester may not be present in another.

The rich nature of the NCHA survey allows us to conduct a comprehensive, multi-faceted analysis of the impact of dating apps, specifically Tinder, on the behavior and health of young adults. The survey contains information about sexual activity, relationship outcomes, potential negative consequences of sexual activity, mental health questions, and academic performance.

For sex-related outcomes, we use measures of recent sexual activity (i.e., the number of sex partners a student had in the previous year and whether a student had sex in the previous 30 days), and cohabitation status (i.e., whether a student was in a romantic relationship with cohabitation at the time of the survey). We also examine questions related to relationship quality, such as whether a student had been in an abusive relationship, been in a difficult relationship, or experienced relationship problems in the previous year. To explore negative outcomes associated with sexual activity, we examine whether a student had experienced sexual assault, had been diagnosed or treated with chlamydia in the previous year, or had ever tested for HIV.

To examine mental health outcomes, we use a comprehensive set of questions that assesses whether a student felt hopeless, overwhelmed, exhausted (not physically), very lonely, very sad, severely depressed, experienced overwhelming anxiety or overwhelming anger, engaged in inten-

tional self-harm, or even considered suicide. Respective outcomes were defined based on experiencing these mental health issues over the period of the preceding 12 months. In order to aggregate the responses and reduce data dimensionality, we follow Braghieri et al. (2022) and construct an index of poor mental health by standardizing all the variables based on the questions mentioned above to have a mean of zero and a standard deviation of one, summing the resulting variables, then standardizing the sum to also have a mean of zero and a standard deviation of one.

In addition to the previously mentioned variables, our analysis also uses students' membership status at fraternities and sororities on campus. This information is crucial to our empirical strategy: it allows us to compare a group of students who had been specifically targeted by Tinder to encourage app adoption with students who were less likely to have faced such pressure. Furthermore, we calculate the proportion of Greek students in each college to use in an alternative specification.

For a detailed description of variable definitions with the precise question formulations and coding, see Table A2.

### 3.1.1 Descriptive Statistics and Trends in Sexual Activity

Table 1 presents descriptive statistics for individual students and colleges included in the survey. Panel A of Table 1 indicates that the majority of survey respondents are White (70%), while Black and Asian students comprise 6% and 12% of the sample, respectively. About 10% of surveyed students are a part of Greek life. The median college student who responded to the survey was a sophomore, as indicated by the college grade variable, and was 20 years old.

The remaining panels of the table provide insight into survey respondents' sexual behavior, relationship information, health, and experiences with sexual assault. Panel B shows that the average number of sexual partners in the survey sample was 1.5, and almost 10% of the students were in a romantic relationship with cohabiting. Panel C reveals that the percentage of students who experienced abusive relationships in the previous year was relatively low (11%), but a high percentage reported having been in a difficult relationship or experiencing relationship problems (32% and 31%, respectively). Panel D reveals that a non-negligible portion of students reported negative consequences related to sexual activity, with 9% reporting having experienced sexual assault and 2% reporting being diagnosed with or treated for chlamydia. Additionally, about 26% reported having ever been tested for HIV. Finally, Panel E indicates that a striking number of students reported ex-

periencing mental health issues, with 35% having felt so depressed that it was difficult to function at least once in the previous 12 months.

Because our study explores the impact of a dating app on college students, we pay special attention to the overall trend in sexual activity amongst individuals in the sample. This is particularly pertinent given the numerous studies and surveys that indicate that the percentage of young adults who engage in sexual intercourse has been declining in recent years (Twenge, Cooper, Joiner, Duffy, and Binau, 2019). We investigate whether this is evident in our data as this may lead to mechanical relationships and spurious correlations.

In Figure XXX, we plot the average number of sex partners for individual students over time separately for Greek and non-Greek students. We distinguish between the two groups of students given the rationale of our identification strategy. Reassuringly, we observe that the frequency of sexual activity for non-Greek students is fairly stable and shows no discernible trend, but for seasonal fluctuations, throughout the entire sample period. By contrast, for Greek students, there appears to be a dramatic rise in sexual activity that coincides with the launch of Tinder. These twin sets of observations form the foundation of our empirical strategy and we explore these patterns more systematically in the following sections.

## 3.2 LexisNexis Newspaper Data

Our secondary source of data is the universe of college newspaper articles available on the LexisNexis platform during the 2013–2016 period. At the time of our search, this resulted in a total of 796,612 articles from 600 newspapers across 574 college campuses.

We analyzed the headlines and full-text of these articles—searching for the keyword *Tinder*—to ascertain the use and popularity of the app on individual college campuses. We identified the number of articles pertaining to Tinder written by students at each college, which serves as a proxy for the college-specific popularity of Tinder during its initial expansion period.

Additionally, to examine whether reporting and coverage of Tinder varied between college campuses with and without Greek activity, we further supplement the newspaper data with additional college-level characteristics. For each college present in the LexisNexis database, we collect information from the college's Common Data Set (CDS) on whether that college has fraternity or sorority housing, and the percentage of undergraduate students participating in Greek life. For

each college, we attempt to find this information for the 2012–2013 academic year, which is the year just prior to the public release of Tinder. For the colleges where the 2012–2013 CDS data are not available, we use information from the earliest available year. Ultimately, we are able to collect Greek-life information for 540 colleges from the LexisNexis sample.

## 3.3 Additional Survey Data

We also utilize data from a number of survey sources in order to establish the baseline usage of online dating among our study population—college students—and to show how their dating habits have changed over time. Specifically, we examine several waves of surveys conducted by the Pew Research Center and the Online College Social Life Survey series that asked questions regarding online dating and dating apps. For each survey, we tabulate the number of respondents belonging to the 18–24 age group (or the nearest approximate age group available) who were full-time students or received a college degree. We then compute the share of these respondents who reported having used online dating websites or services.

The full list of surveys as well as their sample sizes and time coverage are presented in Table A3. We observe that for surveys conducted from 2005 through 2013, the number of college-age respondents who indicated they used online dating services ranged from 0% to 10%, depending on the survey source and the specific question asked. After Tinder became widely adopted, the number jumped to 29% in 2015 and 50% in 2019.

Figure A1 delves deeper into the data from two surveys conducted by PEW in April–May 2013 and June–July 2015, just before and soon after Tinder became a dominant player in the market, but this time without restricting the sample to college students. The data shows that in the spring of 2013, young adults were much less inclined to use online dating websites or apps compared to other age cohorts. However, two years after Tinder was introduced, the percentage of young adults utilizing online dating websites and apps increased dramatically, from 10% to 27%, whereas usage among other age groups did not experience such a significant change.

The trends in Table A3 and Figure A1 confirm that online dating became a much more common and pronounced feature of college social life following the release of Tinder. This further motivates our examination of the impact of Tinder specifically on college students as opposed to on other demographic groups.

# 4 Empirical Strategy

To identify the impact of Tinder on college students, we employ a difference-in-differences strategy that exploits the fact that students involved in Greek life were more likely to adopt and use the app. That is, we compare student outcomes before and after the release of Tinder between Greek and non-Greek students.

This approach is summarized in the following regression specification:

$$y_{ict} = \alpha_{ct} + \beta \times Greek_i \times Post_t + \gamma X_i + \varepsilon_{it} \tag{1}$$

where $y_{ict}$ is the outcome of student $i$ attending college $c$ surveyed during semester $t$; $Greek_i$ equals one if a student $i$ is a member of a Greek organization (fraternity or sorority) and zero otherwise; $Post_t$ refers to the period after Spring 2013; $\alpha_{ct}$ represent a set of college-semester fixed effects; and $X_i$ is a vector of individual-level student characteristics (including standalone $Greek_i$).

The coefficient of interest, $\beta$, identifies the average treatment effect on the treated (ATT) of Tinder under the assumption that the sexual or health outcomes of Greek-life students would have evolved along similar trends as their non-Greek peers within the same college in the absence of Tinder. We assess the viability of this assumption by estimating a fully dynamic version of Equation (1) that allows us to check for pretrends and visualize the evolution of the outcome variable prior to the release of Tinder.

We utilize a rich set of fixed effects to address competing explanations. Specifically, college-semester fixed effects account for any time-invariant differences across colleges (e.g., certain colleges may have a reputation as "party schools"), any shocks that affect students across all colleges at the same time (e.g., one could expect greater dating activity after the spring break), and, most rigorously, any college-semester-specific shocks, addressing all alternative interpretations that have to do with college-specific shocks, such as fluctuations in college-specific norms surrounding romantic and sexual activity.

While Tinder soft-launched in the Apple App Store in September 2012, in terms of timing, we consider Spring 2013 as the last academic semester prior to treatment. We do so for four reasons. First, Tinder did not develop its innovative swipe feature until May 2013. Second, Tinder did not launch on the Android platform until July 2013. With Android accounting for 51.5% of the U.S.

smartphone market share in 2013, Tinder was effectively unavailable to half of the mobile-phone-using population until the fall 2013 semester.[24] Third, using a panel of millions of American mobile phone users, Abolfathi and Santamaria (2020) show that Tinder downloads did not start taking off until in July 2013. Fourth, as displayed below, consistent discussion of Tinder in college newspapers did not start until the fall of 2013. Therefore, 2013 marks the last year prior to the to the widespread campus adoption of Tinder.

It is worth noting that because we do not utilize variation in treatment timing, our research design approximates the canonical $2 \times 2$ difference-in-differences framework and eludes some of the potential limitations with two-way fixed-effects models that have been raised in recent econometrics literature (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021). As a result, we estimate Equation (1) using OLS, with the standard errors clustered at the college level.

## 4.1 Selection Into Greek Organizations

Because our analysis involves repeated cross-sectional data, a possible concern we face is that the treatment group is changing over time. Specifically, if the composition of Greek students was trending in ways that deviate from the rest of the student population, this may bias our difference-in-differences estimates, especially if those changes coincide with the timing of Tinder's release.

To address this, we perform two exercises. First, we show in Figure A2 that the share of undergraduate students active in Greek organizations remains fairly static before and after the introduction of Tinder. This is reassuring, because it demonstrates that the popularity of Greek life did not systematically change after the release of Tinder.

Second, we show that while Greek students have always been different from the overall student population on average, those differences did not widen following the availability of Tinder. As shown in Table A2, the difference between Greek and non-Greek students across a wide array of characteristics was fairly balanced between the pre- and post-Tinder periods. With the notable exception that Greek students became less international relative to the rest of the student population, none of the other changes are statistically significant. This suggests that differential selection into Greek organizations is unlikely to drive any potential findings. Nevertheless, to further assuage this concern, throughout most of our analysis, we will include student-level controls, such as age,

[24] See the press release by Comscore at https://bit.ly/3HbtVQr.

gender, race, international status, and physical attributes.

# 5 First-Stage Relationship

A key assumption that underlies our research design is that fraternity and sorority members were more likely to adopt and use Tinder. While anecdotal evidence in Section 2 does point to the importance of Greek organizations for the early penetration and diffusion of the Tinder dating app on college campuses, in this section, we provide some empirical evidence in support of this idea.

Our main challenge is that we lack exact data on Tinder usage across colleges. To overcome this limitation, we utilize information from college newspapers and Google Trends.

## 5.1 Evidence From College Newspapers

First, we use LexisNexis to collect all articles containing the word *Tinder* that appeared in college newspapers around the time of Tinder's launch (2013–2016).

We consider the discussion of Tinder in news articles a proxy for the popularity of the dating app on college campuses. This presumption is reasonable because these newspaper articles are written by students and should reflect trends or development pertinent to student life on campus.

With this data, we test whether colleges with greater fraternity and sorority presence had more articles written about Tinder following the app's introduction. These results are visually summarized in Figure A3. Prior to 2013, no articles regarding Tinder were published in college newspapers. However, from Fall 2013 onward, colleges with Greek life became disproportionately likely to publish articles related to Tinder—the share of colleges with Greek life or greater Greek presence that published Tinder-related articles far exceeded that of their non-Greek/less-Greek counterparts.

To ensure that this result is not driven by a differential propensity for news production between Greek and non-Greek colleges, we regress the incidence and number of college newspaper articles published about Tinder between 2013–2016 on measures of Greek life participation, controlling for the total number of articles published. These results are presented in Table A4. Our analysis reveals a strong positive correlation between Greek life at a college and Tinder coverage. Specifically, colleges with Greek life had a 14.5-percentage-point higher likelihood of publishing at least one article about Tinder in their newspapers from 2013 to 2016, and, on average, published one more

Tinder-related article during that period compared to colleges without Greek life. The extent of news coverage is also increasing in the share of students involved in Greek life.

Because college newspapers often feature interviews or commentary from current students, we investigate the content of the articles for additional context. In the text of these articles, we find numerous direct references to the influence of Greek organizations on the early diffusion of Tinder.

For instance, in fall semester of 2013, when Tinder started gaining traction, a sophomore student at the University of Nebraska-Lincoln told the *Daily Nebraskan* that "he had heard of Tinder from his fraternity brothers."[25] Similarly, the *Daily Emerald* of the University of Oregon published a story that included accounts from two sorority students who described meeting their boyfriends on Tinder.[26] During the same semester, a second-year student at UC Davis said she created a Tinder profile after one of her sorority sisters recommended the app.[27]

We also discovered similar anecdotes in articles published by newspapers at UCLA, Arizona State University, and Yale University in the fall of 2013. Altogether, from 2013 through 2016, 105 Tinder-related articles were published by newspapers at colleges with Greek life that included specific references to fraternities or sororities or featured interviews with fraternity or sorority members. This textual evidence further substantiates the intricate link between Greek organizations and Tinder in the early days of its launch.

## 5.2 Evidence From Google Search Intensity

We conduct an additional test of the first-stage relationship using data from Google Trends. Specifically, we focus on the 540 colleges sourced from LexisNexis and examine whether the cities or towns of those colleges rank among the top 100 cities in the United States in terms of Google search intensity for *Tinder* during the period from 2013 through 2014. We explore how the likelihood of ranking higher in Google search intensity varies as a function of participation in Greek life at those colleges. We adopt the same metrics of Greek life activity as employed in the newspaper exercise, namely, the presence of Greek organizations at a college and the proportion of undergraduate students involved in fraternities or sororities.

[25] Dating app Tinder connects users through Facebook proximity. *Daily Nebraskan,* October 3, 2013.
[26] Wanna hook up? There's an app for that! *The Daily Emerald,* October 15, 2013.
[27] Tinder sweeps through UC Davis. *The California Aggie,* October 17, 2013.

Table A4 presents the results. College towns with colleges that have Greek organizations are 5.2 percentage points more likely to rank among the top 100 cities in terms of Google search intensity for *Tinder* from 2013 through 2014, compared to college towns where colleges have no Greek organizations. The likelihood of appearing in this top 100 list is also significantly higher for colleges with a larger share of students involved in fraternities or sororities.

# 6 Main Results

Encouraged by the first-stage evidence in Section 5, we estimate the impact of Tinder using the difference-in-differences strategy introduced in Section 4. To start, we investigate how Tinder altered the dating market equilibrium on college campuses by focusing on variables related to sexual activity, relationship formation, and relationship quality.

Then we consider the distributional consequences of Tinder in terms of its differential effects across the student population. Finally, we explore the downstream impact of Tinder on a wider array of outcomes that may be related to romantic encounters such as sexually transmitted diseases, mental health, and physical well-being.

## 6.1 Impact of Tinder on Dating Market

We characterize the effect of Tinder on dating market behavior and outcomes among college-age students. Our analysis is guided by theoretical predictions from Antler et al. (2022). The authors of Antler et al. (2022) develop a matching model of the marriage market with search and learning frictions. In the model, advances in search technologies that facilitate meeting potential partners (such as the emergence of dating applications) will reduce the amount of time individuals spend dating each partner and increase the number of partners whom they date prior to marriage. We attempt to provide empirical evidence for this hypothesis by examining the effect of Tinder on sexual activity and relationship formation.

We start by analyzing the impact of Tinder on variables related to sex activities constructed from the NCHA survey: the number of sexual partners within the previous 12 months and whether a respondent had sex within the previous 30 days. These two variables are informative of a student's frequency of sexual activity, which is indicative of search duration or turnover in the dating market.

For each outcome, we first estimate Equation (1) using a model with only the college-semester fixed effects, then enriching the model by including a set of controls, such as age, gender, race, grade, height, BMI, and an international student indicator.

Table 2 presents the results. Through the lens of our difference-in-differences model, we find that the introduction of Tinder led to a significant increase in sexual activity. Specifically, we show that in comparison to non-Greek students, students belonging to Greek organizations (fraternities or sororities) specifically targeted by the app increased the average number of sexual partners they had in the previous year by 0.21. They also became 3 to 4 percentage points more likely to have engaged in sexual activity in the previous thirty days and in the previous year. Finally, we find an increase in sexual activity at the intensive margin, as Greek students start to have 0.13–0.15 more sexual partners even conditional on having engaged in sexual activity in the past year.

The baseline effect of 0.21 on the number of sexual partners amounts to a magnitude of 0.07 standard deviations. To provide further points of reference, this increase is 36% of the difference between Greek and non-Greek students in the pre-Tinder period and 32% of the difference in sexual activity between short males (below 25th percentile, or 167 cm) and tall males (above 75th percentile, or 189 cm) within our sample.

To explore the dynamics of the effects and assess the plausibility of the common-trends assumption, we produce event-study figures for the two outcomes pertaining to sexual activity.[28] Reassuringly, Figure 3 displays an absence of pretrends and an abrupt trend-break for all four outcomes following 2013, the year Tinder started going viral. The coefficient patterns support the identifying assumption that the sexual activity of Greek-affiliated and non-Greek-affiliated students would have evolved along parallel trends in the absence of Tinder's launch.

Another takeaway from these event-study figures is that the impact on Greek students does not dissipate more than four years after the launch of Tinder. This non-convergence is perhaps

[28] We estimate the following specification:

$$Y_{ict} = \alpha_{ct} + \sum_{t=2008}^{2018} \beta_t \times Greek_i + \gamma \times Greek_i + \varepsilon_{ict} \tag{2}$$

where $Y_{ict}$ includes sexual behavior, relationship, negative outcomes associated with sexual activity, and mental health indices; $Greek_i$ takes the value of 1 if the student $i$ is a fraternity or sorority member; and $\alpha_{ct}$ and $\beta_t$ are the college-semester and year fixed effects, respectively. Figure 3 displays the $\beta_t$ coefficients, with the year 2013 as an omitted category. The patterns also exhibit no pretrends and show a clear trend break in Fall 2013, coinciding with the semester when Tinder use became widespread based on the college newspaper data (Figure A3). We also note that the slight lag in effects could be due to the cumulative nature of our outcomes.

surprising at the outset because one may expect the differences in usage of Tinder between Greek and non-Greek students to diminish over time as the app becomes more widespread.

However, we argue that such nonconvergence is plausible for two reasons. First, as we discuss in Section 2, Tinder's focus on college Greek organizations was not limited to the initial rollout. According to co-founder Sean Rad, Greek students were still one of Tinder's most active user groups in 2016, three years after the app's release. In 2019, several media outlets reported that Tinder had been signing exclusive partnerships with fraternities and sororities across the United States.[29] Furthermore, 33 of the 47 Tinder college ambassadors we found on LinkedIn in October 2022 listed fraternity or sorority membership in their profiles. This suggests persistence in Tinder's strategy of promoting to Greek students on college campuses.[30]

Second, our data is a repeated cross-section rather than a longitudinal panel. Therefore, our dynamic estimates do not follow the same cohort over time; rather, they represent different cohorts of individuals while they are in college. Because the minimum age to use Tinder is 18, our college-student sample is comprised of individuals with their first opportunity to use the app. As a result, if there is a difference in the initial take-up of Tinder between Greek and non-Greek students when they first enter college or simply a difference in the speed of adoption—which is plausible given Tinder's continual attention to fraternities and sororities—then our estimates would reflect that, even if the discrepancy in Tinder usage disappears as these students age out of our sample.

### 6.1.1 Relationship Formation and Assortative Matching

The substantial gains in sexual activity are consistent with the notion that the reduction in search costs and alleviation of information asymmetries associated with technologies such as Tinder lead to greater experimentation in the dating market. However, the implications of such increased search frequency for the formation of stable relationships are less straightforward. While Tinder may make it easier to find the "right" partner, it also reduces the cost of continued searching, potentially undercutting the need to invest in any given relationship (Antler et al., 2022). Similarly, the resulting impact on relationship quality could also be theoretically ambiguous.

[29] Frats are signing "exclusive contracts" to use Tinder or Bumble. *Futurism,* August 14, 2019.

[30] It is worth noting that Tinder competitor, Bumble, pursued a similar strategy of promoting the app to Greek students. As a result, our results may reflect the cumulative impact of both apps from 2015 onward. However, Tinder had a significantly larger market share at the time—as evidenced by Bumble receiving much less coverage in college newspapers—so it is natural to attribute most of the effect to Tinder.

Because marriage is a very rare occurrence amongst individuals in our study population, we focus on whether students are in a cohabiting relationship with their partner as an instance of a stable match. Cohabitation is often a precursor to marriage, therefore it is a natural outcome to consider.

To measure relationship quality, we construct variables based on the available NCHA questions. Specifically, we examine whether a student had been in an emotionally or physically abusive relationship within the previous 12 months; whether a student had found intimate relationships traumatic or very difficult within the previous 12 months; and whether they had experienced relationship difficulties within the previous year.

Table 3 displays the difference-in-differences estimates for these four outcomes. We find that the introduction of Tinder does not appear to be associated with significant changes in the likelihood that students are cohabiting with their relationship partners. We also do not observe consistent change in reports of relationship problems, either in a sample of all respondents or in a subsample of students currently in a (cohabiting) relationship.

Overall, the results indicate that the introduction of Tinder has led to a sizeable increase in sexual activity among students in fraternities and sororities—the communities specifically targeted by Tinder—compared to other students on campus. In contrast, the effect on relationship formation is small. Despite Tinder's innovative matching system reducing the costs of finding a partner, we also find little evidence that the app has any significant impact on relationship quality. These effects are consistent with the general perception[31] as well as with student experiences found in college newspapers[32,33] that the introduction of Tinder has widened the pool of potential partners, resulting in commitment problems, greater turnover, and the rise of hookup culture.

## 6.2 Distributional Consequences

In a seminal article, Rosen (1981) argues that technical change facilitating an increase in market scale may amplify inequality across the talent distribution (Koenig, 2023). Because Tinder allows individuals to more efficiently search for romantic partners well beyond the confines of their imme-

[31] You up? College in the Age of Tinder. *The New York Times,* February 14, 2018.
[32] Looking for love: Tulane students cope with new dating culture. *The Tulane Hullabaloo,* February 16, 2017.
[33] Online dating app Tinder gains popularity among college students. *The Daily Bruin,* February 15, 2014.

diate social networks, it allows individuals to capitalize on economies of scale and match with large numbers of potential partners. As a result, there are possible distributional consequences across the user population.

In this section, we explore whether Tinder contributes to the rise of "superstars" in the dating market. We examine whether the increase in sexual activity is equalized across all students or concentrated among certain sub-populations. To approximate "talent" in this particular market, we consider students' level of activity in the dating market as predicted by observable characteristics.

Specifically, we employ a LASSO procedure to predict an individual's propensity for sexual activity based on their characteristics. Specifically, we leverage the individual-level controls, their second-order polynomials, and all two-way interactions between these attributes to train a LASSO model on the pre-Tinder data, and then we use the resulting model to predict each student's number of sexual partners in the previous 12 months as a function of these complex interactions.[34] This predicted sexual activity variable is intended to reflect both individuals' preference for dating as well as their suitability or "attractiveness" in the dating market.

We explore the heterogeneous impact of Tinder along this dimension separately across gender groups. First, we define quartiles based on values of the LASSO-predicted sexual activity variable for each gender and region cell.[35] We examine how our estimates vary across these quartiles separately for male and non-male students. The total effects for each quartile are displayed in Figure 4. While the estimates are positive and statistically significant for both genders in all quartiles, we observe a noticeable jump in effect size for male students belonging to the top quartile of predicted sex activity. For female students, on the other hand, there is no discernible difference across quartiles.

These patterns are confirmed in columns 1 and 2 Table 4 which shows that, for male students, the difference in effect on the number of sex partners between the upper and lower quartiles of LASSO-predicted sexual activity is statistically significant. While for female students, the point estimates across quartiles are virtually identical.

Motivated by this, we also re-examine the impact on cohabitation status by gender across the same distribution. This time we divide students into above and below median predicted sex activity by gender and region in order to maximize statistical power. Figure 4 shows similar skewed effects

[34]To make LASSO feasible, we use a subset of our usual controls: age, gender, race, and BMI categories. However, our results remain similar if we include other variables and exclude some of the ones mentioned above.

[35]Regions refer to Northeast, South, West, and Midwest.

for cohabitation. Namely, for male students who are above the median in terms of predicted sex activity, there is a positive and significant effect on cohabitation rates. On the other hand, for below-median male students, the confidence intervals are centered around zero. For female students, this pattern is completely absent and the effects are approximately equal for students belonging to those two groups.

Altogether, our results suggest that, for male students, Tinder may lead to a greater concentration of dating activity at the top of the "attractiveness" distribution. For female students, the gains from Tinder were equalized across the same distribution. These contrasting patterns of heterogeneity suggest that the distributional impact of Tinder may be different across gender groups and, in particular, Tinder may facilitate the emergence of "superstar" effects for male students in the dating market.

## 6.3 Additional Results

Having shown that Tinder affects sexual and romantic behavior among college students, we now turn to examine the potential implications of increased sexual activity associated with the app's introduction on a broader set of outcomes related to the physical well-being and mental health of students.

### 6.3.1 Physical Well-Being

First, we explore the downstream effects of increased sexual activity on possible risks associated with increased sexual activity. To this end, we construct three variables based on the NCHA survey questions related to sexual violence and STDs: whether a student had been subject to sexual abuse within the previous 12 months; whether a student had been diagnosed or treated by any professional for chlamydia; and whether a student had ever been tested for HIV infection.

Table 5 reports the difference-in-differences estimates for these outcomes. Following the release of Tinder, the incidence of sexual assault among Greek students increased by 1.9 percentage points, which is substantial given that the average incidence of sexual assault in our sample is 8.7%. The effect's magnitude corresponds to 0.07 standard deviations. Columns (3) through (6) also show a statistically significant increase in the incidence of STDs and HIV tests among Greek students, by

0.6 and 1.5 percentage points, respectively. The magnitudes are also of meaningful size when compared to the sample averages; they correspond to 0.04 standard deviations.[36] To further visualize the findings, we present event-study plots for these three outcomes in Figure 6. The figures display no pretrends and a clear trend break in the outcomes' evolution following the launch of Tinder.

Overall, these results suggest that by increasing sexual activity among college students, Tinder also had possible negative consequences in terms of the risks associated with increased sexual activity, such as increased reports of sexual assault and STDs.

### 6.3.2 Mental Health

Next, motivated by recent studies on the causal link between the introduction of social media and the deterioration of mental health (Braghieri et al., 2022), we investigate whether the availability of Tinder had an impact on student's mental well-being.

Conveniently, the NCHA survey contains a wealth of questions covering a wide spectrum of mental-health-related issues: feeling hopeless, feeling overwhelmed, feeling exhausted (not physically), feeling very lonely, feeling very sad, feeling so depressed it was difficult to function, feeling overwhelming anxiety, feeling overwhelming anger, intentionally injuring oneself, and even seriously considering suicide. We define respective outcomes based on the incidence of these mental health issues in the previous 12 months. To reduce dimensionality and assuage the concern of multiple hypothesis testing, we follow Braghieri et al. (2022) and create an index for experiencing poor mental health within the last 12 months; specifically, we first sum up the standardized versions of the individual mental health variables, then we standardize the resulting variable.

The results are shown in Table 6. In contrast to prior studies documenting the negative effect of social networking technologies on mental health, we find that Greek students, who were disproportionately targeted by Tinder, reported better mental health conditions in the semesters following Tinder's release. This pattern of relative improvement is present across all mental health conditions. On average, Greek students saw a 0.044-standard-deviation improvement in their mental health index. This pattern is also corroborated when we turn to the graphical evidence from an event-study

[36] One caveat to a straightforward interpretation of the results on STDs, however, is that they could also reflect an increase in testing, as individuals engaging in casual or unprotected sex may take precautionary steps in seeking out tests for sexually transmitted diseases. Therefore our estimates may reflect an actual increase in STDs incidence as well as a behavioral response to the increased risk associated with casual sex activity.

plot for the mental health index (Figure 7). While the pre-Tinder coefficients are mostly nearing zero, the post-Tinder point estimates are consistently negative and statistically significant.

When separated by gender, the results in Table 6 display a stronger decline in reported mental health problems for female students. For male students, the effect appears to oscillate depending on the specific mental health issue. Whereas, for female students, the effect is consistently significant throughout all reported mental health problems.

Given the results from the previous section showing an increase in sexual assault, the improvement in mental health could be especially surprising. Because sexual assault is relatively rare in our sample, we hypothesize that the improvement in mental health is driven by individuals other than those who experienced sexual assault. Table A5 corroborates this hypothesis by showing that the positive effects become stronger when we exclude the victims of sexual assault from the sample.

We further examine the channels behind these effects on mental health by investigating whether they are driven directly by the increase in sexual activity. To do so, we add the number of sex partners in the previous year and sex incidence in the previous 30 days as additional controls. The results, displayed in Table A6, show that the effects on mental health remain unchanged after controlling for sexual activity and, if anything, the point estimates become larger in magnitude. This suggests that the chief channel through which Tinder is improving mental health may not be through increased sexual activity. Instead, we speculate that the relative gains in mental health could be, in part, a result of improved self-image or morale due to more sexual/romantic attention received after Tinder's introduction (Jung et al., 2019). For instance, a student from Elon College said the following about her experience using Tinder in 2014: "It is a huge ego boost. You get complimented a lot. You get matched a lot. I have a lot of matches and that's really fun."[37]

In summary, our findings indicate that the introduction of Tinder had a positive impact on the mental health of Greek-affiliated students, in comparison to their non-Greek peers within the same college and semester. The estimates appear to be more robust for female (non-male) students as compared to male students. The estimates also suggest that this effect is not driven by increased sexual activity and instead aligns more with the possibility of Tinder enhancing students' self-image.

[37] See: jpetrocchi.wordpress.com/2014/04/09/the-growing-popularity-of-tinder-on-college-campuses/

# 7 Robustness and College-Level Results

We now present a battery of exercises that probe the robustness of our baseline results. Specifically, we first address potential concerns related to (i) selection into the Greek system; (ii) issues of misreporting; and (iii) any crackdowns on Greek organizations occurring around the release of Tinder. Following that, we present estimates derived from an alternative college-level specification, which serves to tackle the concerns of within-college spillovers and the potential non-representativeness of Greek students compared to the overall student population.

## 7.1 Robustness Checks

### 7.1.1 Selection

Our identification strategy relies on comparing Greek and non-Greek students, which raises the concern that our results could be driven by certain characteristics or traits of Greek students that lead to increased sexual activity in the post-Tinder environment, rather than by their differential usage of Tinder. To address this concern, we conduct two sets of robustness tests.

First, we control for interaction terms between all our baseline student-level controls and a post-Tinder-introduction indicator. This allows for the possibility that the influence of individual student characteristics on sexual activity might change following the release of the app. Table A7 replicates our main results with these additional controls, suggesting that the varying importance of students' personal attributes does not explain our findings.

However, although the above exercise uses a rich set of individual characteristics, one may still be worried that a non-linear combination of these factors could jointly affect sexual behavior and contaminate our estimates. To assuage these concerns, we employ a LASSO procedure to predict an individual's propensity for sexual activity based on their characteristics and then control for the interaction between the post-Tinder indicator and the LASSO-predicted sexual activity instead. Specifically, we leverage the individual-level controls, their second-order polynomials, and all two-way interactions between these attributes to train a LASSO model on the pre-Tinder data, then we use the resulting model to predict each student's number of sexual partners in the previous 12 months as a function of these complex interactions.[38]

[38]To make LASSO feasible, we use a subset of our usual controls: age, gender, race, and BMI categories. However,

As shown in Table A8, our baseline estimates remain robust to controlling for the resulting LASSO-predicted number of sex partners interacted with the post-Tinder indicator. In fact, our estimates remain remarkably consistent in magnitude as compared to our baseline specification. This may be surprising if we thought Tinder penetration would be wider among non-Greek students with higher LASSO predictions relative to non-Greek students with lower LASSO predicted values. The estimates' stability suggests that the LASSO-predicted number of sex partners does not seem to serve as a good proxy for Tinder use.[39] In other words, it is Greek students that used the app more, and not attractive students more broadly.

Collectively, these two checks alleviate the concern that the differential outcomes of Greek and non-Greek students to Tinder could be driven by their differences in observable characteristics.

### 7.1.2 Misreporting

Misreporting is a critical issue shared by studies that rely on self-reported survey data. However, we argue that reporting bias is unlikely to drive the results in this paper, for several reasons.

First, the NCHA survey is administered anonymously, considerably reducing any incentive for respondents to lie due to concerns of stigma or reprisal. There were no individually assigned enumerators, and students typically completed the survey in a large classroom or on their own (ACHA, 2019). Moreover, because we use student-level variation in treatment, any changes in campus culture related to the willingness to discuss certain topics at a specific college during a specific semester would be absorbed by the college-semester fixed effects and would need to affect Greek students disproportionately in order to impact our estimates.

Second, our results are cross-validated between distinct sets of questions. For instance, one may be concerned that respondents may lie about having a greater frequency of sex in order to improve their self-image. However, it is unlikely that the same group of respondents would also lie about having STDs if self-image were the cause of misreporting. The conjunction of the positive results on sexual activity as well as the increase in negative consequences associated with sex suggest that the relationship is genuine.

Finally, we also show that nonresponse rates on questions related to our outcomes remain qual-

our results remain similar if we include other variables and exclude some of the ones mentioned above.

[39] One possibility is that highly "attractive" students had less incentive to use Tinder because they already had a satisfactory romantic life.

itatively unchanged following the rollout of Tinder. Specifically, Table A9 presents the difference-in-differences estimates using nonresponse rates as outcomes. We observe that point estimates are nearing zero and, while two of the coefficients are statistically significant, the effect sizes are minuscule and cannot explain our main findings. The coefficient signs also point in different directions, contradicting the narrative of an overall shift in levels of stigma.

### 7.1.3 Smartphone Adoption & Usage

Unobserved heterogeneity in overall smartphone usage across college students might pose a problem for our analysis. For instance, if Greek students were more likely to possess and use smartphones than non-Greek students, then it is feasible that our results could be driven by other apps or features of smartphones rather than dating apps in particular.

However, we argue that this is unlikely because by the time period we study, smartphone adoption was very high among college-age population, with 79% of 18 to 24-year-old adults using smartphones.[40]

Nevertheless, to take this possibility into account, we incorporate additional controls, which are informative about the socioeconomic status of students. Because smartphones are more expensive than non-smartphones, financial backgrounds of students can serve as a reasonable proxy for smartphone adoption. Specifically we include variables related to feelings of financial stress and hours worked for paid as well as volunteer work.

When added to the regression, the coefficients in Table A13 are similar to the previous specifications, showing that differences in socioeconomic statuses between Greek and non-Greek students do not drive our results. This, in turn, maybe indicative of lack of significant differences due to smartphone adoption or usage.

### 7.1.4 Crackdown on Greek Organizations

Another concern could be that, in the latter half of our sample, certain colleges started a process of cracking down on Greek life, including suspending some Greek organizations altogether.[41] To the extent that these actions altered the share and composition of fraternity and sorority membership,

[40] Majority of mobile users now use smartphones, blame those pesky teens Engadget, October 30, 2013.
[41] Fraternity crackdown: universities are clamping down hard, but do bans work? NBC News, March 10, 2015.

they could have separately affected Greek members' dating activity and romantic endeavors. While we do not find evidence of an aggregate shift in the share of Greek-affiliated students or changes in their demographic composition (see Figure A2 and Table A11), we conduct an additional check to assuage this concern. Specifically, we calculate the average share of Greeks in each college before and after Tinder's rollout, then calculate the difference between the two measures, and then estimate our baseline results for colleges that did not experience a large drop in Greek share (below 2.8 percentage points, or the 5th percentile of the change distribution) or did not experience *any* reduction in Greek share. The results, presented in Table A12, stay robust in both cases, indicating that crackdowns on Greek life are unlikely to drive our estimates.

## 7.2 Spillovers and College-Level Results

Our difference-in-differences strategy allows us to estimate the average treatment effect on the treated (ATT) of Tinder on fraternity and sorority students. However, to the extent that Greek students may differ from other students in ways that are observable and unobservable to the econometrician, it remains an open question whether our estimates generalize to the overall student population. In other words, the ATT that we estimate may systematically differ from the average treatment effect (ATE) in this case.

Moreover, the identification of causal estimates in the difference-in-differences framework requires the Stable Unit Treatment Value Assumption (SUTVA), which precludes spillovers. This assumption can be violated in our setting if Tinder had meaningful effects on non-Greek students on college campuses. If these spillovers align with our main estimates, it merely suggests that our calculations provide a lower bound for Tinder's impact. However, if the spillovers go in the opposite direction, this could seriously confound our estimates.

To overcome these empirical challenges and better approximate what may be the true treatment effect for the general student population, we devise a secondary research design. Specifically, we utilize a college-level treatment based on the share of undergraduate students involved in Greek life. The logic is that because of the strong network effects of Tinder adoption, the greater the share of students active on the app, the greater the incentive for other students to join. This is consistent with the rationale behind Tinder's launch strategy described in Section 2, which was to take advantage of possible spillover effects from socially influential Greek students onto the rest of

the student body.

Formally, we estimate the following equation:

$$y_{ct} = \beta \times Post_t \times Greek\ Share_c + \gamma X_{ct} + \alpha_c + \delta_t + \varepsilon_{ct} \tag{3}$$

where $\alpha_c$ and $\delta_t$ represent the college and survey-wave (semester) fixed effects, respectively, and $Greek\ Share_c$ is the share of undergraduate students at college $c$ who participated in Greek life across all survey waves in the NCHA. Here, we organize our analysis at the college-semester level and, thus, consider the college-level analogs of the student-level outcomes. Specifically, for each college and survey-wave pair, we compute the average number of sex partners per student and the share of students engaged in sexual activity, then we similarly aggregate all other main outcomes. We also include a vector of college-semester level controls, $X_{ct}$, which is again constructed based on aggregated student-level characteristics.

The coefficient of interest, $\beta$, captures the difference in average student outcomes before and after the release of Tinder and across colleges with high and low Greek life participation. To the extent that students at colleges with greater Greek life activity gain more exposure to Tinder due to Tinder's targeted marketing toward Greek students, and to the extent that their outcomes would have evolved along parallel trends otherwise, $\beta$ reflects the causal effect of Tinder on U.S. colleges. Since many American colleges are located in remote and isolated college towns, spillovers between units in this specification should be negligible.

The results, presented in Table 8, demonstrate that, with the exception of mental health issues, all of our findings generalize to the overall student population. Columns 1 and 2 report a differential increase in sexual activity in colleges with a greater Greek presence following the release of Tinder. Column 3 corroborates the absence of a significant impact on relationship incidence. Columns 5–7 show that the effects of Tinder on the incidence of sexual assault and STDs also hold at the college level. However, column 4 shows that the relative decline in mental health issues is absent for the overall student body. This suggests that the mental health benefits of Tinder might be specific to Greek students and could be offset by the app's adverse impact on the rest of the student population.

To put the college-level results in perspective, increasing the share of Greek students at a college by one standard deviation implies a 0.1-standard-deviation larger increase in the average number

of sex partners following the introduction of Tinder, as well as a 0.07-standard-deviation rise in the share of students engaged in sexual activity within the previous 30 days. These estimates, if anything, appear larger than the individual-level estimates presented in Section 6.1, consistent with the spillovers being positive and our baseline effects serving as a lower bound for the true impact.

Overall, the college-level results appear similar to our individual-level estimates, alleviating the concern that spillovers are driving those findings.

# 8 Conclusion

The growing popularity of online dating, and of dating apps in particular, has spurred concerns about the possible ramifications of its mainstream use.[42] In recent years, popular media paid substantial attention to the possible sociological and psychological effects of the mass adoption of dating apps.[43] Despite this, credible evidence on the causal impact of dating apps remains scarce.

In this paper, we study the causal effects of the world's most popular mobile dating app, Tinder, on college students.[44] We focus on this particular age group for two primary reasons. First, because of Tinder's unique launch strategy—targeting students involved in Greek life—we are able to devise a credible identification strategy that allows us to estimate the impact of Tinder on this population. Second, college-age adults more broadly were the demographic directly targeted by Tinder, and we show that, based on survey evidence, Tinder can indeed be credited for normalizing online dating specifically for this age group.

Our identification strategy exploits a well-documented and critical key feature of Tinder's launch campaign which, as with Facebook, involved targeting college campuses. However, Tinder also took advantage of dense social networks on college campuses and marketed its app to influential members of those networks, which, in practice, translated into targeting fraternity or sorority members. We provide both anecdotal and quantitative evidence to verify the fact that Tinder was

[42] *How online dating has changed the way we fall in love* (The Guardian, 02-13-2022)

[43] *Tinder and the Dawn of the "Dating Apocalypse"* (Vanity Fair, 08-06-2015)

[44] One potential limitation of our study is that we study only Tinder, rather than the universe of all dating apps. However, according to any measure, Tinder has been the dominant leader in this market. Also, Tinder's closest competitor, Bumble, pursued a strategy similar to Tinder's vis-a-vis Greek students; therefore our estimate may be capturing the combined impact of both apps post-2015. Finally, to the extent that all dating apps reduce search costs and alleviate information frictions and to the extent that these core features are what's driving our estimates, our results are likely to generalize to other dating apps.

more commonly used by Greek students and in colleges with high Greek-life participation. These twin sets of facts motivate the empirical strategy we pursue, which is a difference-in-differences design that considers Greek students and colleges with large Greek representation as treated units.

We find that the introduction of Tinder increased sexual and romantic activity among college students and also improved the reported mental health status of its users. However, these come at the cost of certain negative outcomes associated with sexual activity: increased prevalence of sexual assault and sexually transmitted diseases. We do not observe any increase in relationship incidence or improvement in relationship quality. Altogether, our results are consistent with Tinder facilitating the rise of hookup culture on college campuses.

Our results on mental health contrast starkly with academic writings and articles in the popular press that have attempted to link dating apps to worsening mental health.[45] However, an important caveat to the conclusions we draw is that our results speak to the short-term effects of Tinder on a particular population—college-age students—following the initial release of the app. Understanding the longer-run impact of Tinder across the entire age distribution represents a promising direction for future research.

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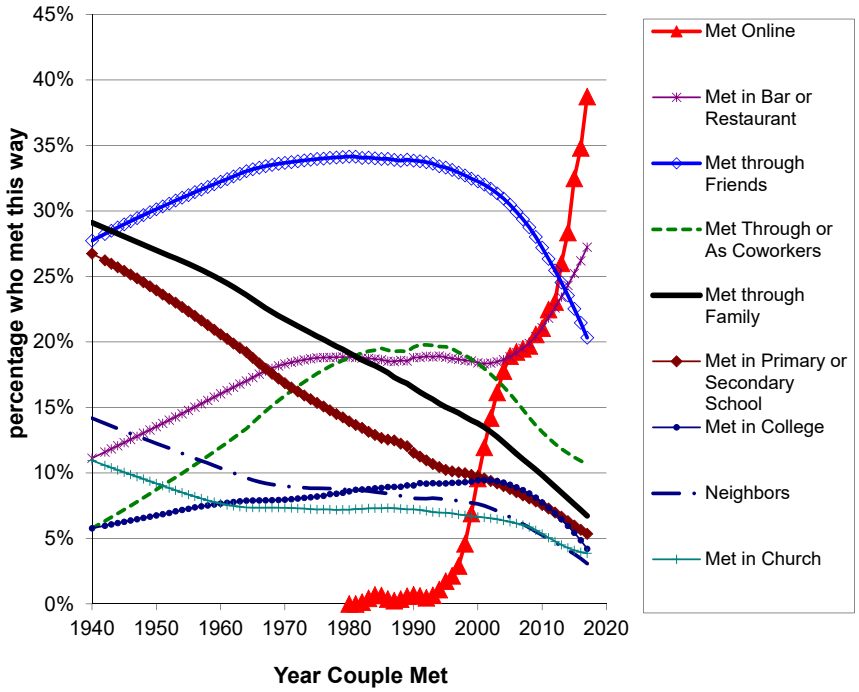
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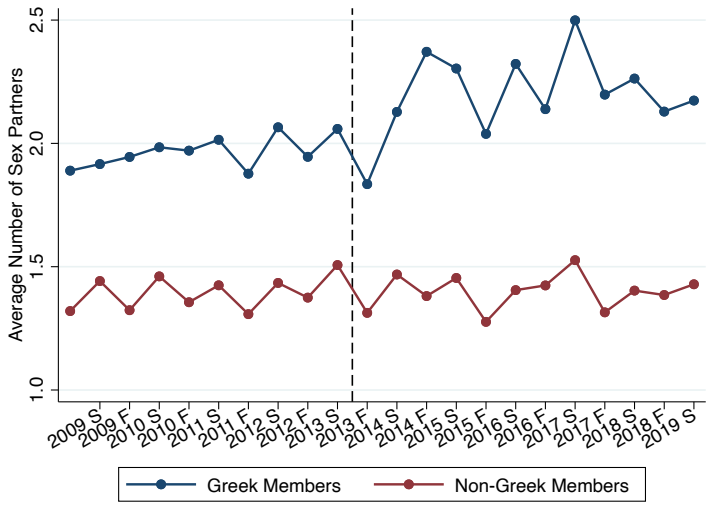
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Figure 1: Share of Couples by When and How They Met



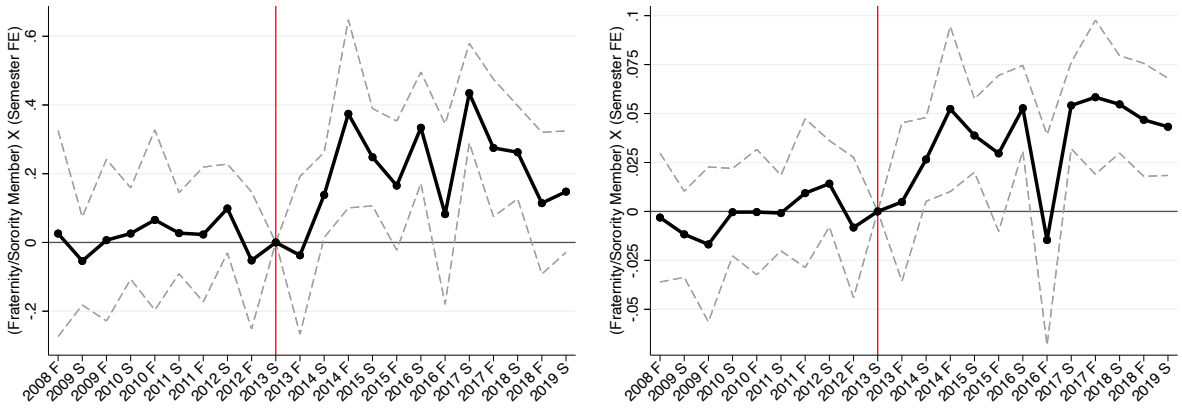

*Notes:* The figure is reprinted from Rosenfeld et al. (2019), who surveyed couples about when and how they met each other. The ways of meeting each other are not exclusive and, thus, need not add up to 100%.

Figure 2: The Average Number of Sex Partners between Greek and Non-Greek Members




*Notes:* This figure presents the evolution of the average number of sexual partners for Greek and non-Greek members across semesters.

Figure 3: Effect of Tinder's Introduction on Student Sexual Activity

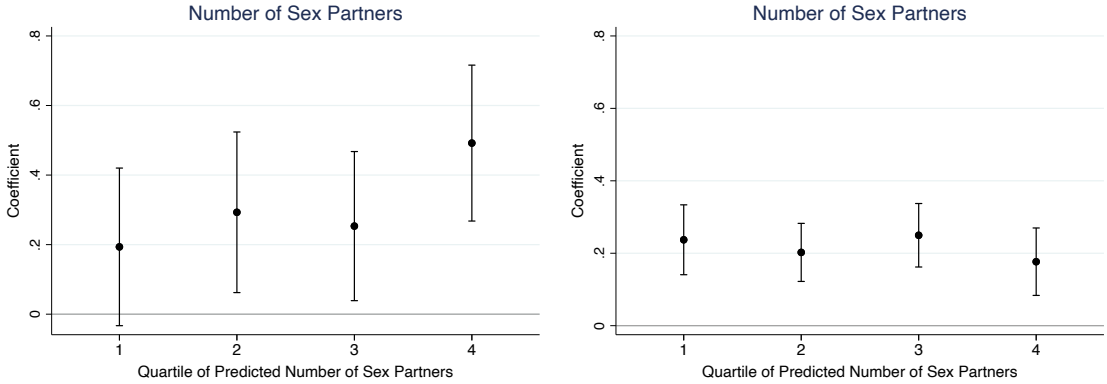



(a) Number of sex partners in the previous year

(b) Had sex in the previous month

*Notes:* These event-study figures plot the coefficients for Greek membership interacted with semester indicators estimated using Equation (2). They illustrate the evolution of sexual activity for Greek life members relative to their peers within the same school and semester. The outcomes are: (a) the number of sex partners a student had within the previous 12 months, (b) the number of sex partners a student had within the last 12 months conditional on having sex with at least one partner, (c) an indicator for whether a student had sex within the previous 12 months, and (d) an indicator for whether a student had sex in the previous 30 days. The event-study regressions do not contain any controls. For detailed constructions of the outcome, treatment, and control variables, see Appendix Table A2. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

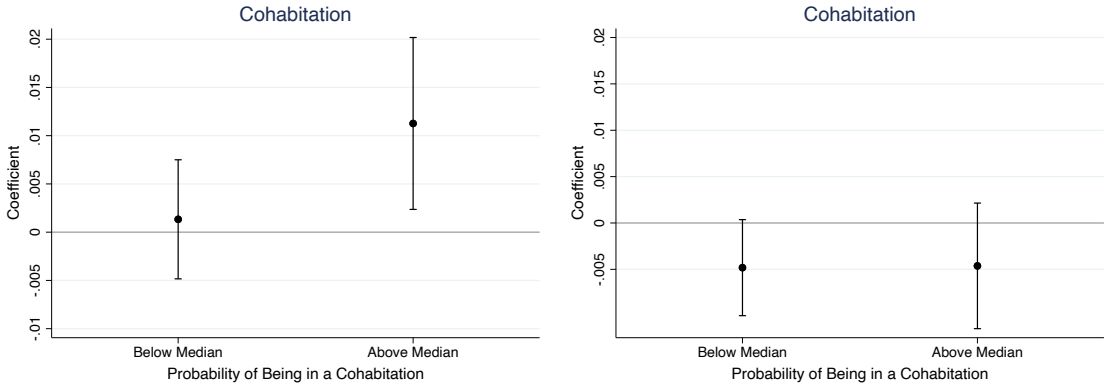
Figure 4: Distributional Effect on Number of Sex Partners By Respondent Gender




(a) Males (b) Non-Males

*Notes:* This figure explores the heterogeneity of the impact of Tinder on student sexual activity depending on students' LASSO-predicted number of sex partners. For prediction, we use age indicators, gender, race indicators, and BMI categories, as well as their square terms and interaction terms, and we train the model only using pre-Tinder data. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

Figure 5: Distributional Effect on Cohabitation Status by Respondent Gender



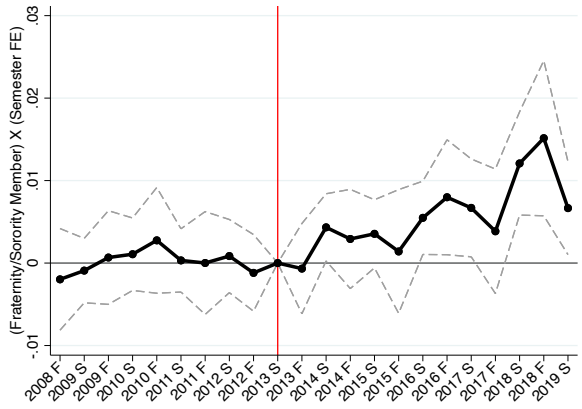

(a) Males (b) Non-males

*Notes:* This figure explores the heterogeneity of the impact of Tinder on the probability of being a cohabitation depending on students' LASSO-predicted number of sex partners (below/above median). For prediction, we use age indicators, gender, race indicators, and BMI categories, as well as their square terms and interaction terms, and we train the model only using pre-Tinder data. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

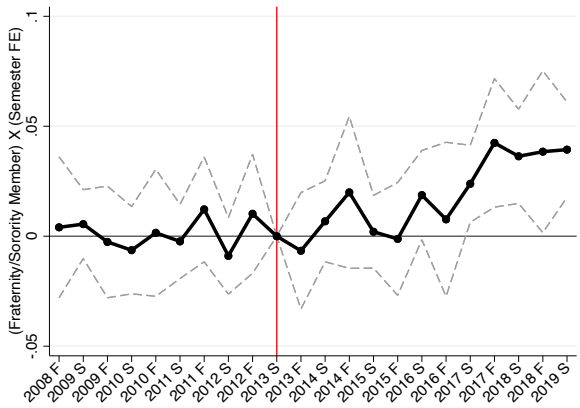
Figure 6: Effect of Tinder's Introduction on Negative Consequences of Sexual Activity




(a) Sexual assault



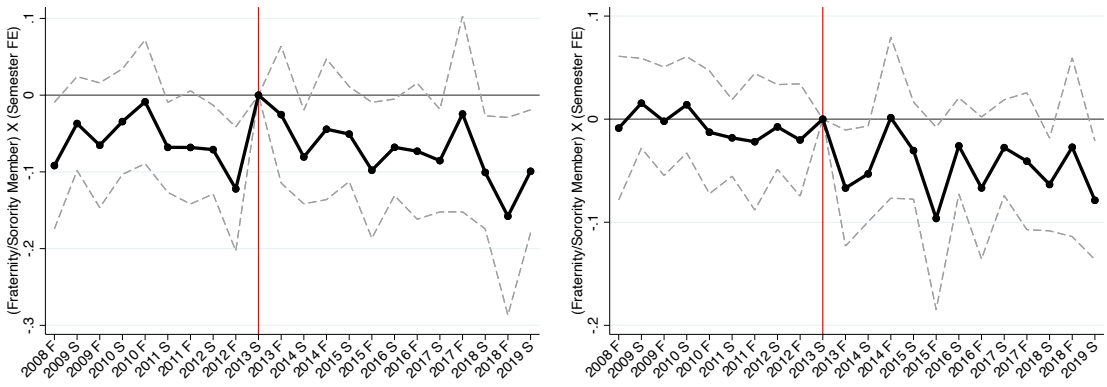

(b) Chlamydia




(c) HIV test

*Notes:* These event-study figures plot the coefficients for Greek membership interacted with semester indicators estimated using Equation (2). They illustrate the evolution of negative consequences of sexual activity for Greek life members relative to their peers within the same school and semester. The outcomes are (a) an indicator for whether a student reported being sexually abused within the previous 12 months, (b) an indicator for whether a student was diagnosed or treated with chlamydia within the previous 12 months, and (c) an indicator for a student ever having tested for HIV. The event-study regressions do not contain any controls. For details on constructions of the outcome, treatment, and control variables, see Appendix Table A2. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

Figure 7: Effect of Tinder's Introduction on the Index of Poor Mental Health by Respondent Gender




(a) Mental health index for males, last 30 days




(b) Mental health index for non-males, last 30 days

*Notes:* These event-study figures plot the coefficients for Greek membership interacted with semester indicators estimated using Equation (2). It illustrates the evolution of mental health issues for Greek life members relative to their peers within the same school and semester. The outcome variable is the overall index of poor mental health, which is constructed by adding up all the variables related to having experienced various mental health issues within the last 30 days—available in the NCHA; described in Appendix Table A2—and standardizing the obtained variable to have a mean of zero and a standard deviation of one in the pre-period. The event-study regression does not contain any controls. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

Table 1: NCHA Summary Statistics

| | Mean | Std. Dev. | 25th Percentile | Median | 75th Percentile | # of Obs |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Panel A: Student Characteristics** | | | | | | |
| White | 0.70 | 0.46 | 0 | 1 | 1 | 1,097,961 |
| Black | 0.06 | 0.24 | 0 | 0 | 0 | 1,096,858 |
| Asian | 0.12 | 0.32 | 0 | 0 | 0 | 1,096,645 |
| Male | 0.33 | 0.47 | 0 | 0 | 1 | 1,076,700 |
| Greek involvement | 0.11 | 0.31 | 0 | 0 | 0 | 1,072,732 |
| Fraternity (Greek and male) | 0.03 | 0.18 | 0 | 0 | 0 | 1,065,776 |
| Sorority (Greek and female) | 0.07 | 0.26 | 0 | 0 | 0 | 1,065,776 |
| College grade | 2.52 | 1.25 | 1 | 2 | 4 | 1,071,284 |
| Age | 21.27 | 4.93 | 19 | 20 | 22 | 1,073,659 |
| BMI | 24.48 | 5.45 | 20.98 | 23.18 | 26.57 | 1,061,744 |
| Height | 66.72 | 4.08 | 64 | 66 | 70 | 1,069,588 |
| **Panel B: Sexual Characteristics** | | | | | | |
| Number of sex partners (previous 12 months) | 1.50 | 3.03 | 0 | 1 | 2 | 1,076,006 |
| Sex previous 12 months | 0.67 | 0.47 | 0 | 1 | 1 | 1,076,006 |
| Sex previous 30 days | 0.52 | 0.50 | 0 | 1 | 1 | 1,082,882 |
| Cohabiting | 0.11 | 0.32 | 0 | 0 | 0 | 1,076,544 |
| **Panel C: Relationship Quality** | | | | | | |
| Abusive relationship | 0.11 | 0.31 | 0 | 0 | 0 | 1,092,342 |
| Difficult relationship | 0.32 | 0.47 | 0 | 0 | 1 | 1,081,307 |
| Relationship problems | 0.31 | 0.46 | 0 | 0 | 1 | 1,069,588 |
| **Panel D: Negative Consequences** | | | | | | |
| Sexual assault | 0.09 | 0.28 | 0 | 0 | 0 | 1,093,523 |
| Chlamydia | 0.01 | 0.11 | 0 | 0 | 0 | 1,077,696 |
| HIV test | 0.26 | 0.44 | 0 | 0 | 1 | 1,024,991 |
| **Panel E: Mental Health Characteristics** | | | | | | |
| Hopeless (last 30 days) | 0.46 | 0.50 | 0 | 0 | 1 | 1,098,765 |
| Overwhelmed (last 30 days) | 0.68 | 0.47 | 1 | 1 | 1 | 1,098,765 |
| Exhausted (not physically, last 30 days) | 0.66 | 0.48 | 1 | 1 | 1 | 1,068,836 |
| Very lonely (last 30 days) | 0.38 | 0.49 | 0 | 1 | 1 | 1,098,765 |
| Very sad (last 30 days) | 0.40 | 0.49 | 0 | 1 | 1 | 1,098,765 |
| Severely depressed (last 30 days) | 0.18 | 0.39 | 0 | 0 | 1 | 1,098,765 |
| Overwhelming anxiety (last 30 days) | 0.35 | 0.48 | 0 | 1 | 1 | 1,098,765 |
| Overwhelming anger (last 30 days) | 0.21 | 0.41 | 0 | 0 | 1 | 1,098,765 |
| Self-harm (last 30 days) | 0.03 | 0.16 | 0 | 0 | 0 | 1,098,765 |
| Considered suicide (last 30 days) | 0.03 | 0.18 | 0 | 0 | 0 | 1,098,765 |

*Notes*: This table presents the summary statistics for our analytical sample of the NCHA survey between Fall 2008 and Spring 2019. The sample is restricted to undergraduate students. Height is measured in inches. For detailed variable definitions, see Appendix Table A2.

Table 2: Sexual Behavior and Activity

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | # of Sex Partners Previous 12 Months | | # of Sex Partners (Intensive Margin) | | Sex Previous 12 Months | | Sex Previous 30 Days | |
| Fraternity/Sorority × Post | 0.219*** | 0.217*** | 0.132*** | 0.156*** | 0.040*** | 0.031*** | 0.039*** | 0.029*** |
| | (0.029) | (0.028) | (0.031) | (0.030) | (0.005) | (0.004) | (0.005) | (0.004) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | | ✓ | | ✓ | | ✓ | | ✓ |
| Observations | 1,017,084 | 1,017,084 | 685,070 | 685,070 | 1,017,084 | 1,017,084 | 1,023,299 | 1,023,299 |
| Mean of dep. var. | 1.492 | 1.492 | 2.215 | 2.215 | 0.674 | 0.674 | 0.520 | 0.520 |
| SD of dep. var. | 2.918 | 2.918 | 3.322 | 3.322 | 0.469 | 0.469 | 0.500 | 0.500 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on student sexual activity. The outcome variables are the number of sexual partners that a student had within the previous 12 months, the number of sexual partners that a student had within the previous 12 months conditional on having at least one, an indicator for whether a student had sex within the previous 12 months, and an indicator for whether a student had sex in the previous 30 days. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator for semesters post-introduction of Tinder. All columns include college-semester fixed effects. Columns (2), (4), (6), and (8) include controls for age, gender, race, grade, international student status, height, and BMI. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table 3: Relationship Status and Relationship Quality

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Cohabiting | Abusive Relationship | Difficult Relationship | Relationship Problems | Abusive Relationship | Difficult Relationship | Relationship Problems |
| | | | | | *Conditional on Being in Cohabitation* | | |
| Fraternity/Sorority × Post | -0.003 | 0.000 | -0.000 | -0.005* | 0.013 | -0.011 | 0.003 |
| | (0.002) | (0.002) | (0.004) | (0.003) | (0.009) | (0.014) | (0.014) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,027,344 | 1,026,570 | 1,024,314 | 1,019,315 | 116,712 | 116,369 | 115,826 |
| Mean of dep. var. | 0.114 | 0.105 | 0.320 | 0.316 | 0.125 | 0.313 | 0.319 |
| SD of dep. var. | 0.318 | 0.307 | 0.466 | 0.465 | 0.331 | 0.464 | 0.466 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on relationship incidence and quality. The outcome variables are whether the student was in a relationship, whether a student had been in an emotionally or physically abusive relationship within the previous 12 months, whether a student had a difficult romantic relationship that was traumatic or very difficult to handle within the previous 12 months, and whether a student experienced any problems in their romantic relationships within the previous 12 months. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). The last three columns present the regressions for a subset of students who were in a relationship at the moment of the survey. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Heterogeneity By Predicted Sexual Activity and Respondent Gender

| | Number of Partners (Previous 12 Months) | | Cohabitation | |
|---|---|---|---|---|
| Sample: | Male | Non-Male | Male | Non-Male |
| Fraternity/Sorority × Post | 0.196* | 0.236*** | 0.001 | -0.005* |
| | (0.115) | (0.049) | (0.003) | (0.003) |
| Fraternity/Sorority × Post × 2nd Quartile Predicted Sexual Activity | 0.098 | -0.035 | | |
| | (0.149) | (0.057) | | |
| Fraternity/Sorority × Post × 3rd Quartile Predicted Sexual Activity | 0.059 | 0.013 | | |
| | (0.154) | (0.062) | | |
| Fraternity/Sorority × Post × Upper Quartile Predicted Sexual Activity | 0.299* | -0.063 | | |
| | (0.166) | (0.068) | | |
| Fraternity/Sorority × Post × Above Median Predicted Sexual Activity | | | 0.010* | 0.000 |
| | | | (0.005) | (0.004) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ |
| Observations | 331,701 | 685,370 | 335,907 | 691,424 |
| $R^2$ | 0.037 | 0.028 | 0.246 | 0.232 |
| Mean of dep. var. | 1.760 | 1.362 | 0.100 | 0.121 |
| SD of dep. var. | 3.872 | 2.308 | 0.300 | 0.326 |

*Notes*: This table explores the heterogeneity of the baseline estimates for the impact of Tinder's introduction along LASSO-predicted level of sexual activity (which serves as a proxy for baseline dating-market appeal) and gender. Each column presents the results of a triple-difference specification where we interact the *Post Tinder* indicator with the *Greek* indicator and the variable indicated in each column. Columns 1, and 3 present the results for male students; and columns 2 and 4 are for non-males. For the LASSO prediction, we use age indicators, gender, race indicators, and BMI categories, as well as their square terms and interaction terms, and we train the model using only pre-Tinder data. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table 5: Negative Outcomes Related to Sexual Activity

| | Sexual Assault | | Chlamydia | | HIV Test | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Fraternity/Sorority × Post | 0.021*** | 0.019*** | 0.006*** | 0.006*** | 0.020*** | 0.015*** |
| | (0.002) | (0.002) | (0.001) | (0.001) | (0.004) | (0.003) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | | ✓ | | ✓ | | ✓ |
| Observations | 1,027,277 | 1,027,277 | 1,023,250 | 1,023,250 | 972,120 | 972,120 |
| Mean of dep. var. | 0.087 | 0.087 | 0.013 | 0.013 | 0.256 | 0.256 |
| SD of dep. var. | 0.282 | 0.282 | 0.113 | 0.113 | 0.437 | 0.437 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on negative outcomes related to sexual activity. The outcome variables are reported experiences of sexual abuse within the previous 12 months, having been diagnosed or treated for chlamydia within the previous 12 months, and having ever tested for HIV. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 6: Mental Health

| | (1) Hopeless | (2) Over-whelmed | (3) Exhausted (Not Physically) | (4) Very Lonely | (5) Very Sad | (6) Severely Depressed | (7) Over-whelming Anxiety | (8) Over-whelming Anger | (9) Self-Harm | (10) Considered Suicide | (11) Index Poor Mental Health (30 Days) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Panel A: All* | | | | | | | | | | | |
| Fraternity/Sorority × Post | -0.008** | -0.013*** | -0.012*** | -0.010*** | -0.007* | -0.010*** | -0.010*** | -0.008** | -0.002** | -0.004*** | -0.035*** |
| | (0.004) | (0.003) | (0.003) | (0.004) | (0.004) | (0.003) | (0.003) | (0.003) | (0.001) | (0.001) | (0.008) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 |
| Mean of dep. var. | 0.463 | 0.691 | 0.666 | 0.388 | 0.406 | 0.186 | 0.354 | 0.213 | 0.027 | 0.032 | 0.094 |
| SD of dep. var. | 0.499 | 0.462 | 0.472 | 0.487 | 0.491 | 0.389 | 0.478 | 0.410 | 0.163 | 0.177 | 1.046 |
| *Panel B: Males* | | | | | | | | | | | |
| Fraternity/Sorority × Post | -0.006 | -0.014** | -0.017*** | -0.016*** | -0.006 | -0.005 | -0.004 | -0.008 | 0.001 | -0.001 | -0.027** |
| | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.004) | (0.005) | (0.005) | (0.002) | (0.002) | (0.013) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 | 336,565 |
| Mean of dep. var. | 0.412 | 0.570 | 0.563 | 0.323 | 0.314 | 0.152 | 0.255 | 0.188 | 0.021 | 0.031 | -0.124 |
| SD of dep. var. | 0.492 | 0.495 | 0.496 | 0.468 | 0.464 | 0.359 | 0.436 | 0.390 | 0.143 | 0.174 | 1.019 |
| *Panel C: Non-Males* | | | | | | | | | | | |
| Fraternity/Sorority × Post | -0.009** | -0.013*** | -0.011*** | -0.009** | -0.008* | -0.013*** | -0.015*** | -0.006* | -0.003*** | -0.006*** | -0.041*** |
| | (0.005) | (0.003) | (0.004) | (0.004) | (0.004) | (0.003) | (0.004) | (0.003) | (0.001) | (0.002) | (0.009) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 | 692,544 |
| Mean of dep. var. | 0.488 | 0.750 | 0.716 | 0.419 | 0.451 | 0.202 | 0.402 | 0.226 | 0.031 | 0.033 | 0.200 |
| SD of dep. var. | 0.500 | 0.433 | 0.451 | 0.493 | 0.498 | 0.402 | 0.490 | 0.418 | 0.172 | 0.178 | 1.043 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on student mental health. The outcome variables are feeling hopeless, overwhelmed, exhausted (not from physical activity), very lonely, very sad, severely depressed (such that it was difficult to function), overwhelming anxiety, overwhelming anger, self-harm, and considering suicide within the last 30 days. The index of poor mental health is obtained by adding the standardized versions of all of the variables above and standardizing the resulting variable. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 7: Academic Performance

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Did This Issue Negatively Affect Student's Academic Performance In The Previous Year? | | | | | | | |
| | Relationship Difficulties | Sexual Assault | STD | Depression | Anxiety | Stress | ADHD | Eating Disorder |
| Fraternity/Sorority × Post | -0.000 | 0.003*** | 0.000 | -0.006** | -0.005** | -0.006* | 0.000 | -0.002* |
| | (0.002) | (0.001) | (0.001) | (0.003) | (0.003) | (0.003) | (0.002) | (0.001) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,019,315 | 1,017,737 | 1,019,094 | 1,017,427 | 1,018,808 | 1,019,695 | 1,019,127 | 1,019,413 |
| Mean of dep. var. | 0.103 | 0.012 | 0.004 | 0.146 | 0.227 | 0.316 | 0.055 | 0.013 |
| SD of dep. var. | 0.304 | 0.108 | 0.065 | 0.353 | 0.419 | 0.465 | 0.229 | 0.115 |

*Notes*: This table presents the estimates for whether the issues affected by the introduction of Tinder had any meaningful effects on students' academic performance. The outcome variables are indicators for whether a student reported that any of the following issues had negatively affected their academic performance within the previous 12 months: relationship difficulties, sexual assault, STDs, depression, anxiety, stress, ADHD, and eating disorders. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

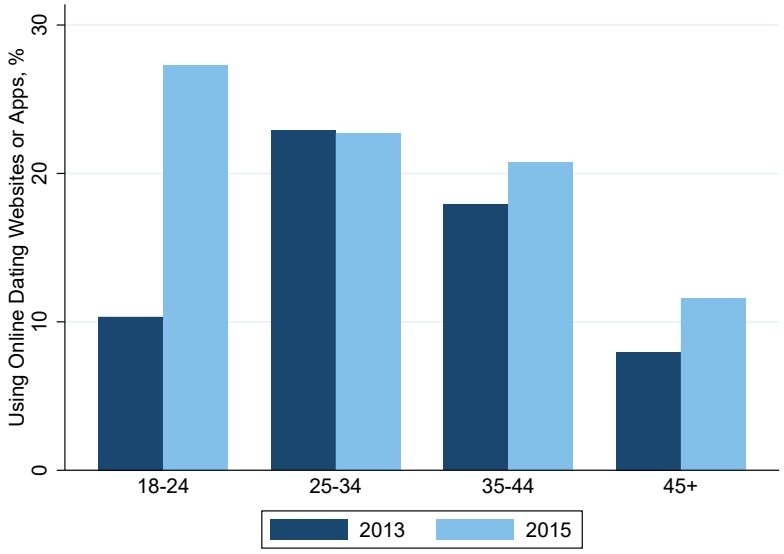
Table 8: Effects of Tinder's Introduction, College Level Treatment

| | | Share of Students: | | | Share of Students: | | |
|---|---|---|---|---|---|---|---|
| | Average # of Sex Partners | Sex Previous 30 Days | Cohabiting | Average Index Poor Mental Health | Chlamydia | HIV Test | Sexual Assault |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Greek Share × Post | 0.590*** | 0.073*** | 0.018 | 0.028 | 0.014*** | 0.036** | 0.027* |
| | (0.110) | (0.019) | (0.012) | (0.062) | (0.004) | (0.017) | (0.014) |
| College FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| College-Level Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,644 | 1,644 | 1,644 | 1,644 | 1,644 | 1,644 | 1,644 |
| Mean of dep. var. | 1.482 | 0.512 | 0.113 | 0.073 | 0.013 | 0.238 | 0.086 |
| SD of dep. var. | 0.341 | 0.084 | 0.086 | 0.169 | 0.008 | 0.071 | 0.033 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on main outcomes using a college-wide share of Greek students as a treatment intensity. Each observation is a college and survey-wave pair. The outcome variables are (1) the average number of sexual partners per student within the previous 12 months, (2) the share of students who had sex within the previous 30 days, (3) the share of students in a relationship, (4) the average value of the index of poor mental health among students, (5) the share of students who have been diagnosed or treated with chlamydia within the last 12 months, (6) the share of students who ever tested for HIV, and (7) the share of students who reported experiencing sexual assault within the previous 12 months. The coefficient of interest is the interaction of the percentage of students who are a part of Greek life organizations and an indicator post-introduction of Tinder. All specifications include college and survey-wave fixed effects. College-level controls are created by taking the median value of individual-level controls. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

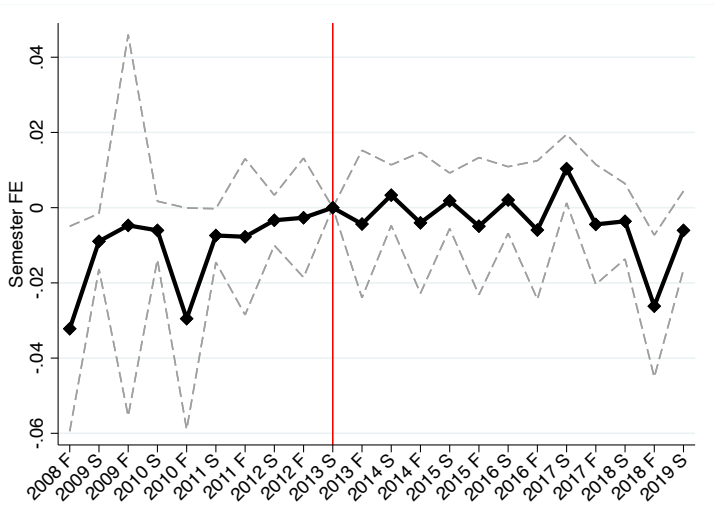
# Online Appendix

Figure A1: Online and Mobile Dating by Age Group, 2013 and 2015



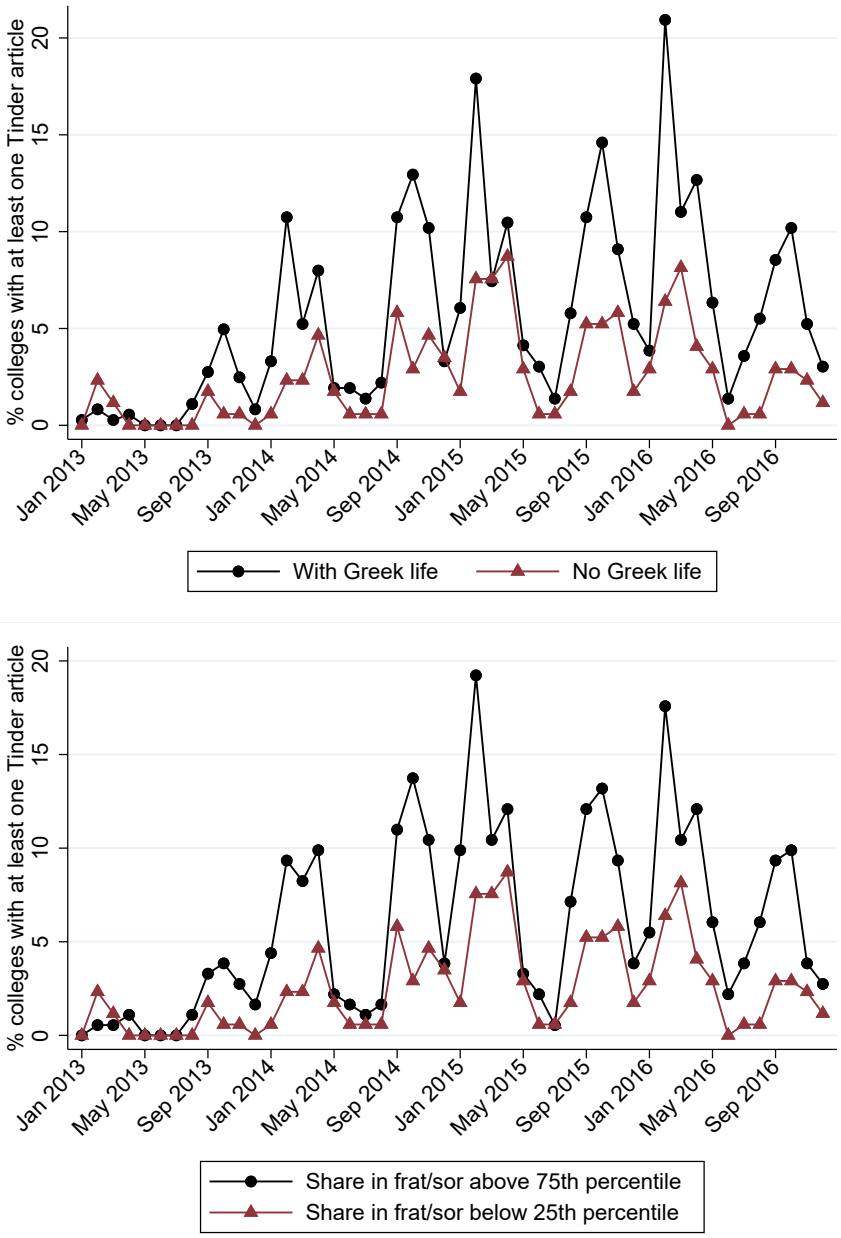

*Notes*: The figure illustrates the rapid and disproportionate growth in the share of young adults using online dating websites or apps following the rise of Tinder starting in the fall of 2013. The data come from the Pew Internet and American Life Survey conducted April 17 to May 19, 2013, and from the Pew Tracking Survey conducted on June 10 to July 12, 2015.

Figure A2: Evolution of the Share of Undergraduate Students Involved in Greek Life




*Notes*: This figure presents the evolution of the share of undergraduate students who were involved in Greek life. It presents the estimates of a college-semester-level specification, regressing the share of students in Greek organizations on the semester fixed effects. The upper and lower lines represent 95% confidence intervals.

Figure A3: College Newspaper Articles Mentioning Tinder




*Notes*: The top figure illustrates the evolution of the share of colleges with at least one article containing the keyword '*Tinder*' in a given month, separately for colleges with and without Greek life, from January 2013 through December 2016. The bottom figure shows the same trend for colleges in the bottom quartile in terms of Greek life participation versus colleges in the top quartile. Data on the college newspapers come from LexisNexis; data on Greek organizations are from the Common Data Set.

Table A1: Top Cities in Terms of Google Search Intensity for Tinder: 2013 and 2014

| 2013 | | | | 2014 | | | |
|---|---|---|---|---|---|---|---|
| City | Nearby Colleges | Student Pop. | Total Pop. | City | Nearby Colleges | Student Pop. | Total Pop. |
| Provo, UT | BYU | 35k | 116k | Brookline, MA | Northeastern, BU, BC | 62k | 63k |
| Somerville, MA | Tufts, Harvard | 31k | 81k | Santa Monica, CA | UCLA, LMU | 56k | 93k |
| Amherst, MA | UMass Amherst | 32k | 39k | Berkeley, CA | UC Berkeley | 45k | 124k |
| Boulder, CO | CU Boulder | 36k | 108k | Somerville, MA | Tufts, Harvard | 31k | 81k |
| Beverly Hills, CA | UCLA | 46k | 33k | Morro Bay, CA | – | – | 11k |
| Brookline, MA | Northeastern, BU, BC | 62k | 63k | Bloomington, IN | IU Bloomington | 45k | 88k |
| Superior, WI | UW-Superior | 3k | 26k | Hoboken, NJ | Stevens IT | 8k | 60k |
| Santa Monica, CA | UCLA, LMU | 56k | 93k | East Lansing, MI | MSU | 50k | 49k |
| East Lansing, MI | MSU | 50k | 49k | State College, PA | Penn State | 47k | 42k |
| Stanford, CA | Stanford | 19k | 21k | Mount Pleasant, MI | Central Michigan | 12k | 89k |
| Wellesley, MA | Wellesley College | 2k | 29k | Provo, UT | BYU | 35k | 116k |
| Athens, GA | U of Georgia | 40k | 215k | Cheswold, DE | – | – | 1k |
| Blacksburg, VA | Virginia Tech | 37k | 45k | Santa Barbara, CA | UCSB | 26k | 90k |
| Cambridge, MA | Harvard, MIT | 31k | 117k | Wilmington, NC | UNC Wilmington | 19k | 116k |
| State College, PA | Penn State | 47k | 42k | Davis, CA | UC Davis | 39k | 69k |
| Harrisonburg, VA | James Madison | 22k | 52k | Carrboro, NC | UNC Chapel Hill | 32k | 21k |
| Fairfield, CT | Fairfield | 6k | 62k | Iowa City, IA | U of Iowa | 28k | 75k |
| Waltham, MA | Brandeis | 6k | 65k | Arlington, TX | UT Arlington | 46k | 401k |
| College Park, MD | U of Maryland | 41k | 35k | Gainesville, FL | U of Florida | 54k | 135k |
| Hoboken, NJ | Stevens IT | 8k | 60k | Troy, MI | – | – | 84k |
| Annapolis, MD | Naval Academy | 5k | 41k | Superior, WI | UW-Superior | 3k | 26k |
| Bloomington, IN | IU Bloomington | 45k | 88k | SeaTac, WA | – | – | 29k |
| Columbia, MO | U of Missouri | 31k | 126k | Cambridge, MA | Harvard, MIT | 31k | 117k |
| College Station, TX | Texas A&M | 73k | 124k | Goldsby, OK | – | – | 3k |
| Evanston, IL | Northwestern | 22k | 75k | Brighton, MI | – | – | 8k |
| Burlington, VT | U of Vermont | 13k | 45k | Ann Arbor, MI | UMich | 47k | 124k |
| Boston, MA | Northeastern, BU | 50k | 676k | Boston, MA | Northeastern, BU | 50k | 676k |
| Fort Collins, CO | Colorado State | 33k | 176k | Fullerton, CA | CSU Fullerton | 40k | 141k |
| Tempe, AZ | ASU | 135k | 192k | Carlsbad, CA | – | – | 115k |
| Arlington, TX | UT Arlington | 46k | 401k | Roseville, CA | – | – | 149k |

*Notes*: This table lists the 30 cities with the highest Google search intensity for the app Tinder in 2013 and 2014. The data source is Google Trends. The student population and total population columns are in thousands. The cities that don't have colleges nearby are denoted with "–".

Table A2: Variables: Definitions, Constructions, and Associated NCHA Survey Questions

| Variable | Description |
|---|---|
| **Treatment Variables** | |
| Post Tinder introduction | Coding: 1 = Tinder had already been introduced by the time the respondent took the survey (after Spring 2013); 0 = Tinder had not been introduced by the time the respondent took the survey. |
| Greek-life involvement (individual) | Question: "Are you a member of a social fraternity or sorority?"; Coding: 1 = Yes; 0 = No. |
| Greek-life involvement (college-level) | The share is the ratio of students who are part of Greek life over all students. |
| **Sexual Outcomes** | |
| Number of sex partners | Question: "Within the last 12 months, with how many partners have you had oral sex/vaginal intercourse/anal intercourse?"; Numeric open response. |
| Number of sex partners (intensive margin) | Question: "Within the last 12 months, with how many partners have you had oral sex/vaginal intercourse/anal intercourse?"; Numeric open response. Coding: replace zeroes with missing values. |
| Sex previous 12 months | Question: "Within the last 12 months, with how many partners have you had oral sex/vaginal intercourse/anal intercourse?"; Numeric open response. Coding: 1 = {any number above zero}; 0 = {zero}. |
| Sex previous 30 days | Question: "Within the last 30 days, did you have: Oral sex/Vaginal intercourse/Anal intercourse?" Scale: 1 = No, never done; 2 = Have done, not last 30 days; 3 = Yes. Coding: 1 = {3}; 0 = {1,2}. |
| **Relationship-Quality Outcomes** | |
| Cohabiting | Question: "What is your relationship status?"; Scale: 1 = Not in a relationship; 2 = In a relationship but not living together; 3 = In a relationship and living together. Coding: 1 = {3}; 0 = {1,2}. |
| Abusive relationship | Question: "Within the last 12 months, have you been in an intimate (coupled/partnered) relationship that was emotionally/physically or sexually abusive?"; Coding: 1 = Yes; 0 = No. |
| Difficult relationship | Question: "Within the last 12 months, have any of the following been traumatic or very difficult for you to handle?: Intimate Relationships"; Coding: 1 = Yes; 0 = No. |
| Relationship problems | Question: "Within the last 12 months, have any of the following affected your academic performance? Scale: 1 = Not happened to me, not applicable; 2 = Experienced but academics not negatively affected; 3 = Lower grade on exam/project; 4 = Lower grade in course; 5 = Incomplete or dropped course; 6 = Significant disruption in thesis, dissertation, research, or practicum work. Coding: 1 = {2,3,4,5,6}; 0 = {1}. |
| **Negative Sex-Related Outcomes** | |
| Sexual assault | Question: "Within the last 12 months, have you been subject to sexual abuse (sexually touched without consent/sexual penetration attempted without consent/sexually penetrated without consent)?"; Coding: 1 = Yes; 0 = No. |
| Chlamydia | Question: "Within the 12 months, have you been diagnosed or treated by any professional for Chlamydia?"; Coding: 1 = Yes; 0 = No. |
| HIV test | Question: "Have you ever been tested for Human Immunodeficiency Virus (HIV) infection?"; Scale: 1 = No; 2 = Yes; 3 = Don't know. Coding: 1 = {2}; 0 = {1,3}. |

Table A1: Variables: Definitions, Constructions, and Associated NCHA Survey Questions (cont.)

| Variable | Description |
|---|---|
| **Poor Mental Health Symptoms** | |
| Hopeless | Question: "Have you ever: Felt things were hopeless?"; Scale: 1 = Never; 2 = No, not in last 12 months; 3 = In the last 2 weeks; 4 = In the last 30 days; 5 = In the last 12 months. Coding: 1 = {3,4}; 0 = {1,2,5} |
| Overwhelmed | Question: "Have you ever: Felt overwhelmed by all you had to do?"; Scale and coding: same as above. |
| Exhausted (not physically) | Question: "Have you ever: Felt exhausted (not from physical activity)?"; Scale and coding: same as above. |
| Very lonely | Question: "Have you ever: Felt very lonely?"; Scale and coding: same as above. |
| Very sad | Question: "Have you ever: Felt very sad?"; Scale and coding: same as above. |
| Severely depressed | Question: "Have you ever: Felt so depressed that it was difficult to function?"; Scale and coding: same as above. |
| Overwhelming anxiety | Question: "Have you ever: Felt overwhelming anxiety?"; Scale and coding: same as above. |
| Overwhelming anger | Question: "Have you ever: Felt overwhelming anger?"; Scale and coding: same as above. |
| Self-harm | Question: "Have you ever: Intentionally cut, burned, bruised or otherwise injured yourself?"; Scale and coding: same as above. |
| Considered suicide | Question: "Have you ever: Seriously considered suicide?"; Scale and coding: same as above. |
| **Index for Mental Health Variables** | |
| Index poor mental health | The index is constructed in the following way: (i) For the pretreatment period, all *symptoms of poor mental health* variables have been standardized to have a mean equal to 0 and a standard deviation equal to 1; (ii) An equally weighted average of the standardized variables has been derived; (iii) For the pretreatment period, the equally-weighted average is standardized again to have a mean equal to 0 and a standard deviation equal to 1. |
| **Downstream Academic Performance** | |
| Relationship difficulties (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Relationship Difficulties"; Scale: 1 = Not happened to me, 2 = Experienced but academics not negatively affected, 3 = Lower grade on exam/project, 4 = Lower grade in course, 5 = Incomplete or dropped course, 6 = Significant disruption in thesis, dissertation, research, or practicum work; Coding: 1 = {3,4,5,6}; 0 = {1,2}. |
| Sexual assault (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Assault (sexual)." Scale and coding as above. |
| STD (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Sexually transmitted disease/infection (STD/I)." Scale and coding as above. |
| Depression (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Depression." Scale and coding as above. |
| Anxiety (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Anxiety." Scale and coding as above. |
| Stress (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Stress." Scale and coding as above. |
| ADHD (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Attention Deficit and Hyperactivity Disorder (ADHD)." Scale and coding as above. |
| Eating disorder (academic) | Question: "Within the last 12 months, have any of the following affected your academic performance?: Eating disorder/problem." Scale and coding as above. |

Table A1: Variables: Definitions, Constructions, and Associated NCHA Survey Questions (cont.)

| Variable | Description |
|---|---|
| **Control Variables** | |
| Nonmale | Question: "What is your gender?"; Coding: 1 = female, transgender; 0 = male. |
| Height | Question: "What is your height in feet and inches?". This variable has been winsorized by cutting off 0.5% |
| Weight | Question: "What is your weight in pounds?". This variable has been winsorized by cutting off 0.5%. |
| Body Mass Index (BMI) | Question: "What is your body mass index (BMI)?"; Constructed by the ACHA as BMI = kg/$m^2$; |
| White | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "White"; 0 otherwise. |
| Black | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "Black or African American"; 0 otherwise. |
| Hispanic | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "Hispanic or Latino/a"; 0 otherwise. |
| Asian | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "Asian or Pacific Islander"; 0 otherwise. |
| Native American | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "American Indian, Alaskan Native, or Native Hawaiian"; 0 otherwise. |
| Other race | Question: "How do you usually describe yourself? (Mark all that apply)"; Coding: 1 if chose "Other"; 0 otherwise. |
| International | Question: "Are you an international student?"; Scale: 1 = Yes; 0 = No. |
| Age | Question: "How old are you?" This variable has been winsorized by cutting off 0.5% at the right tail. This has been used within regressions as separate indicators. |
| College grade | Question: "What is your year in school?"; Scale: 1 = 1st year undergraduate; 2 = 2nd year undergraduate; 3 = 3rd year undergraduate; 4 = 4th year undergraduate; 5 = 5th year or more undergraduate. We keep only undergraduate students in our sample. |
| Gay/Lesbian | Question: "What is your sexual orientation?;" Scale: 1 = Asexual; 2 = Bisexual; 3 = Gay; 4 = Lesbian; 5 = Pansexual; 6 = Queer; 7 = Questioning; 8 = Same-Gender Loving; 9 = Straight/Heterosexual; 10= Another identity (please specify). Coding: 1 = {2,3,4}; 0 otherwise . We use this variable and coding as opposed to broader categories due to the inconsistency of the available answer options across years. |
| Grade point average (GPA) | Question: "What is your approximate cumulative grade average?" Scale: 1 = A, 2 = B, 3 = C; 4 = D/F; 5 = N/A. |
| Financial Difficulties | Question: "Did you have any financial difficulties in the last 12 months?; Scale: 1 = Yes; 0 = No. |
| Working hours per week | Question: "How many hours a week do you work for pay?;" Scale: 0 hours; 1-9 hours; 10-19 hours; 20-29 hours; 30-39 hours; 40 hours; More than 40 hours. |
| Working (volunteer) hours per week | Question: "How many hours a week do you volunteer?;" Scale: 0 hours; 1-9 hours; 10-19 hours; 20-29 hours; 30-39 hours; 40 hours; More than 40 hours. |
| **Other Variables** | |
| Campus size | Size of campus; Scale: 1 = Less than 2,500 students, 2 = 2,500–4,999 students, 3 = 5,000–9,999 students, 4 = 10,000–19,999 students, 5 = 20,000 or more students. |
| Region | The region where the campus is located; 1 = Northeast, 2 = Midwest, 3 = South, 4 = West. |

Table A3: Online Dating Patterns Among College-Student Population

| Survey | Year(s) | Question | Relevant Respondents | Sample Size | Response |
|---|---|---|---|---|---|
| Pew Internet and American Life Project Polls[1] | 2005 and 2009 | Do you ever use an online dating website? (Yes) | Full-time students aged 18–24 | 33 | 3.1% |
| Pew Research Center Poll: Generation Next[2] | 2006 | Have you ever gone on a date with someone you met online? (Yes) | College undergraduates aged 18–24 | 24 | 8.3% |
| Online College Social Life Survey[3] | 2005–2011 | Where did you first meet your last (romance, hookup, date)? (Personal ad/dating service or "Other response" mentions the internet) | College Undergraduates from 22 different US colleges/universities | 24,131 | 3.58% |
| Pew Internet & American Life Poll[4] | 2013 | Have you ever used an online dating site or a dating app on your cell phone? (Yes) | Adults with a high school or college degree aged 18–24 | 211 | 9.5% |
| Pew Research Center: Tracking[5] | 2015 | Have you ever used an online dating site or a dating app on your cell phone? (Yes) | College undergraduates aged 18–24 | 55 | 29% |
| Pew Research Center: American Trends Panel[6] | 2019 | Have you ever used an online dating site or dating app? (Yes) | Adults with some college or a college degree aged 18–29 | 731 | 49.7% |

*Notes:* This table presents the shares of college-educated young adults who reported using online dating websites or apps from 2005 through 2019. The surveys were identified by searching the Roper Center iPoll database for surveys from the years 2000–2020 containing the keyword "online dating." Surveys that had questions related to the use of online dating, as well as questions on education level and age, were kept.
1: Only internet users were surveyed. The 2009 survey only has only nine respondents who fit the age and education criteria, so their responses are merged with the 2005 survey.
2: Only internet users were surveyed.
3: The indicator for meeting via the internet is equal to one if an individual indicated that they met their most recent romance, hookup, or date through a personal ad/dating service or if they chose the "other" category and their response contains one or more of the following strings: "internet, online, Facebook, Myspace, Craigslist, eHarmony, .com"; otherwise, their indicator is equal to zero.
4: The variable is constructed as equal to one if an individual answered yes to ever using a dating website or app. The former question was put to internet users, and the latter question was asked to users of cellphone apps.
5: The variable is constructed in the same way as for the 2013 survey.
6: The sample is restricted to individuals aged 18–29 (finer age categories are not available) and with the highest education level being either a bachelor's degree or one or more years of college.

Table A4: Newspaper Articles—First-Stage Results

| | College Has Article on Tinder, 2013–2016 | | | Number of Articles on Tinder, 2013–2016 | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| College Has Greek Life | 0.145*** | | | 1.048*** | | |
| | (0.044) | | | (0.393) | | |
| % of Undergraduate Students in Fraternity | | 0.415** | | | 4.551*** | |
| | | (0.193) | | | (1.723) | |
| % of Undergraduate Students in Sorority | | | 0.434*** | | | 3.647** |
| | | | (0.167) | | | (1.498) |
| Total articles | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 540 | 530 | 530 | 540 | 530 | 530 |

*Notes*: This table presents the relationship between the presence of Greek life and the intensity of the use of Tinder at a college. The outcome variables in columns (1)–(3) are indicators for whether a college had at least one article mentioning Tinder published in any of its newspapers from 2013 through 2016; the outcome variables in columns (4)–(6) are the numbers of articles mentioning Tinder in any newspaper at a given college from 2013 through 2016. All estimates control for the total number of articles published by newspapers from 2013 through 2016. Data on the college newspapers come from LexisNexis; data on Greek organizations are from the Common Data Set. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A5: Mental Health (Excluding Sexually Abused Individuals)

| | (1) Hopeless | (2) Over-whelmed | (3) Exhausted (Not Physically) | (4) Very Lonely | (5) Very Sad | (6) Severely Depressed | (7) Over-whelming Anxiety | (8) Over-whelming Anger | (9) Self-Harm | (10) Considered Suicide | (11) Index Poor Mental Health (Last 30 Days) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fraternity/Sorority × Post | -0.010*** | -0.015*** | -0.013*** | -0.012*** | -0.009** | -0.012*** | -0.013*** | -0.011*** | -0.002*** | -0.005*** | -0.043*** |
| | (0.004) | (0.003) | (0.003) | (0.004) | (0.004) | (0.003) | (0.003) | (0.003) | (0.001) | (0.001) | (0.007) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 | 937,888 |
| Mean of dep. var. | 0.453 | 0.682 | 0.655 | 0.370 | 0.388 | 0.171 | 0.338 | 0.202 | 0.023 | 0.028 | 0.045 |
| SD of dep. var. | 0.498 | 0.466 | 0.475 | 0.483 | 0.487 | 0.377 | 0.473 | 0.401 | 0.150 | 0.164 | 1.015 |

*Notes*: This table presents the estimates of the impact of Tinder's introduction on student mental health, excluding individuals who reported being victims of sexual assault in the previous year. The outcome variables are feeling hopeless, overwhelmed, exhausted (not from physical activity), very lonely, very sad, severely depressed (that it was difficult to function), overwhelming anxiety, overwhelming anger, self-harm, and considering suicide in the previous 12 months. The index of poor mental health is obtained by adding the standardized versions of all of the variables above and standardizing the resulting variable. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A6: Mental Health (Controlling for Sexual Activity)

| | (1) Hopeless | (2) Over-whelmed | (3) Exhausted (Not Physically) | (4) Very Lonely | (5) Very Sad | (6) Severely Depressed | (7) Over-whelming Anxiety | (8) Over-whelming Anger | (9) Self-Harm | (10) Considered Suicide | (11) Index Poor Mental Health (Last 30 Days) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fraternity/Sorority × Post | -0.011*** | -0.015*** | -0.013*** | -0.012*** | -0.011*** | -0.014*** | -0.014*** | -0.012*** | -0.003*** | -0.005*** | -0.046*** |
| | (0.004) | (0.003) | (0.003) | (0.004) | (0.004) | (0.003) | (0.003) | (0.003) | (0.001) | (0.001) | (0.008) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Baseline controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sexual-activity controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 | 924,060 |
| Mean of dep. var. | 0.454 | 0.683 | 0.657 | 0.371 | 0.389 | 0.171 | 0.338 | 0.202 | 0.023 | 0.028 | 0.046 |
| SD of dep. var. | 0.498 | 0.465 | 0.475 | 0.483 | 0.488 | 0.377 | 0.473 | 0.401 | 0.150 | 0.164 | 1.014 |

*Notes*: This table investigates whether the average positive impact of Tinder's introduction on mental health is driven by increased sexual activity. Specifically, it displays the estimates of the impact of Tinder on mental health controlling for students' number of sexual partners in the previous 12 months and for whether they had sex in the previous 30 days. The outcome variables are feeling hopeless, overwhelmed, exhausted (not from physical activity), very lonely, very sad, severely depressed (that it was difficult to function), overwhelming anxiety, overwhelming anger, self-harm, and considering suicide in the previous 12 months. The index of poor mental health is obtained by adding the standardized versions of all of the variables above and standardizing the resulting variable. The coefficient of interest is the interaction of a student's fraternity or sorority membership and an indicator post-introduction of Tinder. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, height, and BMI). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A7: Robustness: Student Characteristics Interacted with Post-Tinder Indicator

| | (1) # of Sex Partners | (2) Sex Previous 30 Days | (3) Cohabiting | (4) Index Poor Mental Health (Last 30 Days) | (5) Chlamydia | (6) HIV Test | (7) Sexual Assault |
|---|---|---|---|---|---|---|---|
| Fraternity/Sorority × Post | 0.210*** | 0.029*** | -0.004* | -0.041*** | 0.006*** | 0.013*** | 0.016*** |
| | (0.029) | (0.004) | (0.002) | (0.008) | (0.001) | (0.003) | (0.002) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls × Post | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,017,084 | 1,023,299 | 1,027,344 | 1,029,122 | 1,023,250 | 972,120 | 1,027,277 |
| Mean of dep. var. | 1.492 | 0.520 | 0.114 | 0.094 | 0.013 | 0.256 | 0.087 |
| SD of dep. var. | 2.918 | 0.500 | 0.318 | 1.046 | 0.113 | 0.437 | 0.282 |

*Notes*: This table presents the results of a robustness check for whether the baseline results remain stable after the inclusion of the interactions of all controls (age, gender, race, grade, international student status, height, and BMI) with the post-Tinder-introduction indicator. All columns include college-semester fixed effects. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A8: Robustness: LASSO-Predicted Sexual Activity Interacted with Post-Tinder Indicator

| | (1) # of Sex Partners | (2) Sex Previous 30 Days | (3) Cohabiting | (4) Index Poor Mental Health (Last 30 Days) | (5) Chlamydia | (6) HIV Test | (7) Sexual Assault |
|---|---|---|---|---|---|---|---|
| Fraternity/Sorority × Post | 0.220*** | 0.029*** | -0.003 | -0.034*** | 0.006*** | 0.015*** | 0.020*** |
| | (0.028) | (0.004) | (0.002) | (0.008) | (0.001) | (0.003) | (0.002) |
| College-semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| LASSO # of Sex Partners × Post | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,017,084 | 1,023,299 | 1,027,344 | 1,029,122 | 1,023,250 | 972,120 | 1,027,277 |
| Mean of dep. var. | 1.492 | 0.520 | 0.114 | 0.094 | 0.013 | 0.256 | 0.087 |
| SD of dep. var. | 2.918 | 0.500 | 0.318 | 1.046 | 0.113 | 0.437 | 0.282 |

*Notes*: This table presents the results of a robustness check for whether the baseline results remain stable after the inclusion of the interactions of the LASSO-predicted sexual activity of a respondent with the post-Tinder-introduction indicator. For prediction, we use age indicators, gender, race indicators, and BMI categories, as well as their square terms and interaction terms. All columns include baseline controls and college-semester fixed effects. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A9: Robustness: Survey Nonresponse

| | Missing Response Rate For: | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) # of Sex Partners | (2) Sex Previous 30 Days | (3) Cohabiting | (4) Index Poor Mental Health (Last 30 Days) | (5) Chlamydia | (6) HIV Test | (7) Sexual Assault |
| Fraternity/Sorority × Post | 0.001 | 0.001 | -0.000 | 0.000 | 0.001** | -0.001 | -0.000* |
| | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.000) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 | 1,029,122 |
| Mean of dep. var. | 0.012 | 0.006 | 0.002 | 0.001 | 0.004 | 0.055 | 0.002 |
| SD of dep. var. | 0.108 | 0.075 | 0.042 | 0.030 | 0.065 | 0.229 | 0.042 |

*Notes*: This table examines the possible differential changes in misreporting after the introduction of Tinder by estimating whether nonresponse rates for our main outcomes change differentially for Greek students and non-Greek students before and after the introduction of Tinder. All columns include baseline controls and college-semester fixed effects. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A10: Google Trends First Stage Results

| | Google Top 100 "Tinder" Search Intensity | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| College Has Greek Life | 0.052** | | |
| | (0.021) | | |
| % of Undergraduate Students in Fraternity | | 0.217* | |
| | | (0.118) | |
| % of Undergraduate Students in Sorority | | | 0.226** |
| | | | (0.103) |
| Observations | 540 | 530 | 530 |
| Mean of dep. var. | 0.070 | 0.072 | 0.072 |
| SD of dep. var. | 0.256 | 0.258 | 0.258 |

*Notes*: This table presents the relationship between the presence of Greek life at a college and an indicator for whether a city or town that the college is located in ranks in the top 100 in terms of Google search intensity for the app Tinder in 2013–2014. Each observation is a college. Data on search intensity come from Google Trends; data on Greek organizations are from the Common Data Set.* p<0.1, ** p<0.05, *** p<0.01.

Table A11: Changes in Composition of Greek Students Relative to Overall Student Population

| | Pre-Non-Greek | | Pre-Greek | | Post-Non-Greek | | Post-Greek | | P-value for (Pre-/Post-Greek - Pre-/Post-Non-Greek) |
|---|---|---|---|---|---|---|---|---|---|
| Variable | N | Mean/SD | N | Mean/SD | N | Mean/SD | N | Mean/SD | N |
| Male | 506 | 0.33 | 503 | 0.33 | 538 | 0.30 | 527 | 0.30 | 0.979 |
| | | (0.00) | | (0.01) | | (0.00) | | (0.01) | |
| Age | 506 | 21.57 | 503 | 21.77 | 538 | 21.42 | 527 | 21.83 | 0.402 |
| | | (0.10) | | (0.14) | | (0.09) | | (0.16) | |
| White | 506 | 0.72 | 503 | 0.73 | 538 | 0.71 | 527 | 0.73 | 0.528 |
| | | (0.01) | | (0.01) | | (0.01) | | (0.01) | |
| Black | 506 | 0.08 | 503 | 0.09 | 538 | 0.08 | 527 | 0.07 | 0.152 |
| | | (0.01) | | (0.01) | | (0.00) | | (0.01) | |
| Hispanic | 506 | 0.10 | 503 | 0.10 | 538 | 0.12 | 527 | 0.12 | 0.409 |
| | | (0.01) | | (0.01) | | (0.01) | | (0.01) | |
| Asian | 506 | 0.10 | 503 | 0.08 | 538 | 0.11 | 527 | 0.09 | 0.992 |
| | | (0.01) | | (0.01) | | (0.01) | | (0.01) | |
| Native American | 506 | 0.02 | 503 | 0.03 | 538 | 0.02 | 527 | 0.03 | 0.694 |
| | | (0.00) | | (0.00) | | (0.00) | | (0.00) | |
| Other Race | 506 | 0.03 | 503 | 0.03 | 538 | 0.02 | 527 | 0.03 | 0.705 |
| | | (0.00) | | (0.00) | | (0.00) | | (0.00) | |
| International | 506 | 0.07 | 503 | 0.17 | 538 | 0.05 | 527 | 0.09 | 0.000*** |
| | | (0.00) | | (0.01) | | (0.00) | | (0.01) | |
| GPA | 506 | 1.87 | 503 | 1.85 | 538 | 1.79 | 527 | 1.77 | 0.935 |
| | | (0.01) | | (0.01) | | (0.01) | | (0.01) | |
| Freshman | 506 | 0.30 | 503 | 0.22 | 538 | 0.30 | 527 | 0.22 | 0.694 |
| | | (0.01) | | (0.01) | | (0.01) | | (0.01) | |
| Sophomore | 506 | 0.24 | 503 | 0.26 | 538 | 0.24 | 527 | 0.24 | 0.118 |
| | | (0.00) | | (0.01) | | (0.00) | | (0.01) | |
| Junior | 506 | 0.22 | 503 | 0.24 | 538 | 0.22 | 527 | 0.25 | 0.308 |
| | | (0.00) | | (0.01) | | (0.00) | | (0.01) | |
| Height | 506 | 66.79 | 503 | 66.79 | 538 | 66.48 | 527 | 66.59 | 0.328 |
| | | (0.04) | | (0.06) | | (0.03) | | (0.07) | |
| Weight | 506 | 156.28 | 503 | 158.45 | 538 | 157.60 | 527 | 160.51 | 0.550 |
| | | (0.41) | | (0.64) | | (0.41) | | (0.86) | |
| BMI | 506 | 24.56 | 503 | 24.88 | 538 | 25.04 | 527 | 25.54 | 0.386 |
| | | (0.06) | | (0.10) | | (0.07) | | (0.15) | |
| Lesbian/Gay | 506 | 0.03 | 503 | 0.02 | 538 | 0.03 | 527 | 0.02 | 0.372 |
| | | (0.00) | | (0.00) | | (0.00) | | (0.00) | |

*Notes*: This table presents the average characteristics of Greek and non-Greek students across colleges before and after the introduction of Tinder. The p-values in the last column correspond to the difference-in-differences regressions of each characteristic on Post×Greek using aggregate college-by-post-by-Greek data. * p<0.1, ** p<0.05, *** p<0.01.

Table A12: Robustness: Crackdown on Greek Organizations

| | (1) # of Sex Partners | (2) Sex Previous 30 Days | (3) Cohabiting | (4) Index Poor Mental Health (Last 30 Days) | (5) Chlamydia | (6) HIV Test | (7) Sexual Assault |
|---|---|---|---|---|---|---|---|
| *Panel A: Omit Colleges With Large Decline in Greek Share Pre/Post Fall 2013* | | | | | | | |
| Fraternity/Sorority × Post | 0.213*** | 0.033*** | -0.002 | -0.039*** | 0.006*** | 0.016*** | 0.019*** |
| | (0.033) | (0.005) | (0.002) | (0.008) | (0.001) | (0.004) | (0.002) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 764,310 | 768,873 | 771,885 | 773,166 | 768,831 | 731,181 | 771,835 |
| Mean of dep. var. | 1.506 | 0.521 | 0.114 | 0.091 | 0.013 | 0.256 | 0.086 |
| SD of dep. var. | 2.955 | 0.500 | 0.318 | 1.043 | 0.113 | 0.436 | 0.281 |
| *Panel B: Omit Colleges With Any Decline in Greek Share Pre/Post Fall 2013* | | | | | | | |
| Fraternity/Sorority × Post | 0.207*** | 0.030*** | -0.003 | -0.041*** | 0.007*** | 0.016*** | 0.018*** |
| | (0.039) | (0.006) | (0.003) | (0.009) | (0.001) | (0.004) | (0.003) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 396,775 | 398,822 | 400,331 | 400,974 | 398,718 | 378,904 | 400,295 |
| Mean of dep. var. | 1.576 | 0.520 | 0.092 | 0.078 | 0.013 | 0.241 | 0.090 |
| SD of dep. var. | 3.013 | 0.500 | 0.290 | 1.026 | 0.111 | 0.428 | 0.287 |

*Notes*: This table presents the results of a robustness check for whether the baseline results remain stable after omitting colleges for which the share of Greek-affiliated students has declined. This addresses a potential concern about concurrent crackdown on Greek life by certain colleges. The estimates in Panel A omit colleges for which the share of Greek students has declined by more than 2.8 percentage points before and after the Fall 2013 semester, which is the 5th percentile of the change in Greek student share. The estimates in Panel B omit colleges for which the share of Greek students has declined by any amount. All columns include baseline controls and college-semester fixed effects. For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.

Table A13: Robustness: Financial Issues

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | # of Sex Partners | Sex Last 30 Days | Cohabitation | Mental Health | Chlamydia | HIV Test | Sexual Assault |
| Fraternity/Sorority × Post | 0.222*** | 0.028*** | -0.002 | -0.030*** | 0.006*** | 0.015*** | 0.019*** |
| | (0.027) | (0.004) | (0.002) | (0.007) | (0.001) | (0.003) | (0.002) |
| College-Semester FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Has Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Financial Controls × Post | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,001,782 | 1,007,979 | 1,011,177 | 1,012,830 | 1,009,013 | 958,346 | 1,011,238 |
| Mean of dep. var. | 1.490 | 0.520 | 0.114 | 0.096 | 0.013 | 0.256 | 0.087 |
| SD of dep. var. | 2.901 | 0.500 | 0.318 | 1.045 | 0.113 | 0.437 | 0.282 |

*Notes*: This table presents the results of a robustness check for whether the baseline results remain stable after omitting colleges for which the share of Greek-affiliated students has declined. All columns include baseline controls and college-semester fixed effects. Additional controls include whether the student had financial difficulties in the last 12 months and their working hours per week (paid or voluntarily). For detailed variable definitions, see Appendix Table A2. Standard errors in parentheses are clustered at the college level. * p<0.1, ** p<0.05, *** p<0.01.