The Impact of Dating Apps on Young Adults: Evidence From Tinder *

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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 Tinder, the pioneer and market leader in the dating app space, on a segment of the population that was among the earliest adopters of this technology: college students. For identification, we rely on the fact that Tinder's initial marketing strategy centered on Greek organizations (fraternities and sororities) within college campuses. Using a comprehensive survey containing more than 1.1 million responses, we estimate a difference-in-differences model comparing student outcomes before and after Tinder's full-scale launch and across students' membership in Greek organizations. We show that Tinder's introduction led to a sharp, persistent increase in the frequency of sexual activity, but with no corresponding impact on the likelihood of relationship formation. Inequality in dating outcomes increased among male students but not among female students. Further, we observe a rise in the incidences of sexual assaults and sexually transmitted diseases. However, despite these changes, Tinder's introduction did not worsen students' mental health and may have even led to improvements for female students. We obtain similar estimates using a complementary college-level identification strategy that accounts for spillovers on non-Greek students. Overall, these results suggest that the transformation of dating due to dating apps has far-reaching and nuanced effects on young adults.

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1 Introduction

The past two decades have seen a radical shift in how people form romantic relationships and, by extension, how the dating market operates. The share of U.S. heterosexual couples who met online has skyrocketed, growing fourfold since the early 2000s and reaching over 40% by 2021. In fact, online dating has become the most popular mode of meeting romantic partners (see Figure 1).

The rapid growth of online dating over the past ten years has 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. With their geolocational capabilities and always-on-hand presence, Tinder and other apps that followed have redefined how people meet romantic partners and 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; Ellison and Ellison, 2018). 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] declining mental health and sexual activity among young adults,[2,3] and a more skewed distribution of dating matches.[4]

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.[5] We center our attention on U.S. college students, who were the main target demographic of Tinder at the outset and who belong to the age group most affected by the advent of dating apps.[6]

To identify the causal impact of Tinder, we exploit a key institutional feature of Tinder's launch

[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] A 'failure to launch': why young people are having less sex. *Los Angeles Times*, August 3, 2023.

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

[5] 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).

[6] 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.

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 organizations (fraternities and sororities) operating on college campuses.[7] 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.[8] This strategy was widely documented and attested to contemporaneously by both outside observers and the founders of Tinder themselves.[9] 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.

Using three distinct data sources, we empirically verify that Tinder usage was indeed tightly connected to Greek life on college campuses. First, using data on app usage from over 17 million devices, we show that during the 2017–2018 academic year—the earliest period for which these data are available—Tinder use was significantly higher in colleges with a more pronounced Greek life presence. Second, analyzing the universe of college-newspaper articles from 2013 through 2016 available on LexisNexis, we document that Tinder was consistently more likely to be discussed at colleges with a greater presence of Greek organizations. The articles also reveal personal anecdotes that corroborate the spread of Tinder through Greek systems. Finally, 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 launch period.

Motivated by this pattern of diffusion, we pursue a difference-in-differences research design that exploits the differential spread of Tinder between Greek and non-Greek students following its full-scale 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 their sexual activity, relationships, and physical and mental health.

Applying the difference-in-differences strategy, we compare students before and after the full-scale 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

[7] 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).

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

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

colleges and time, such as college selectivity or countrywide shocks, but also for any time-varying differences within colleges, such as idiosyncratic changes in campus culture. Rich student-level controls further adjust for potential shifts in the composition of respondents. We confirm the absence of pretrends in our estimates, which supports the validity of the parallel-trends assumption.

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 in Antler, Bird, and Fershtman (2022, 2023); namely, that reduced frictions in the dating market can lead to prolonged search and more frequent turnover in romantic couplings. Our results are consistent with these theoretical predictions.

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 Tinder's introduction, Greek-affiliated students (hereafter, "Greek students"), on average, had 0.22 more sex partners and became 3.1 percentage points more likely to have had sex in the previous 12 months, equivalent to 0.07–0.08 standard deviations. At the same time, we find no evidence that Tinder affected the share of students in a cohabiting relationship. Taken together, these results suggest that online dating apps induce greater experimentation and turnover in sexual relationships prior to the establishment of a stable romantic match.

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, implying that Tinder could lead to improvements in average 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 three separate questions that were designed to elicit instances of relationship problems and abuse. We find no evidence that Tinder affects the share of students experiencing relationship difficulties, suggesting that Tinder neither improves nor worsens match quality.

Next, we study the distributional consequences of Tinder in the dating market. Economists have long recognized that technologies facilitating an increase in market scale may exacerbate inequality across the "talent" distribution (Rosen, 1981; Koenig, 2023). In line with this logic, we show that the positive effects on sexual activity and relationship formation are significantly larger

for male 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 those who were already likely successful in dating prior to the new matching technology. For females, this pattern of heterogeneity is completely absent and the impact of online dating apps is largely equalized across groups. These contrasting findings suggest that the distributional effects of Tinder vary significantly by gender, and, for males, the introduction of online dating apps has increased inequality in the dating market.

Having shown the primary effects of Tinder on the dating-market equilibrium, we explore the potential downstream ramifications of increased sexual activity on mental and physical well-being.

In terms of mental health, we find that Tinder's introduction has a positive average impact on the reported mental well-being of students involved in Greek life. The improvement is around 0.03 standard deviations in magnitude and is observed across all components of the index, including severe depression and reported instances of self-harm. The impact is larger and more pronounced for female students. These findings contradict the common view that dating apps may be causing disproportionate mental distress among young adults due to factors such as online harassment (Smith and Duggan, 2013). They also stand 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). We find this explanation to be well-aligned with the narrative evidence from around the time dating apps were introduced.

While our findings suggest that Tinder's introduction has led to improved mental health among Greek students, we also discover that it has been associated with some negative consequences. Specifically, we observe a significant differential increase in the reported incidence of sexual assault by 2 percentage points off the mean of 8.7%. Naturally, we find that mental health improvements are mainly observed among individuals not reporting having experienced sexual assault.

We also find a positive effect on the probability of being diagnosed with sexually transmitted diseases (STDs). The effects are substantial in magnitude, with the probability of being diagnosed with chlamydia growing by 0.5 percentage points off the mean of 2%. This increase in diagnosis likely reflects both the risks associated with increased sexual encounters and also precautionary

responses to those behavioral changes such as increased testing. Consistent with this, we find that students also began to seek out HIV tests at a greater frequency after the introduction of Tinder, indicating awareness of certain risks inherent to casual sex.

Finally, we examine the effects of Tinder's introduction on academic performance. They largely mirror our earlier findings. Specifically, we detect no differential change in the share of students claiming that their academic performance was hindered by relationship difficulties. Similarly, fewer Greek students reported that mental health issues worsened their academic performance, with the improvements again concentrated among female students. However, alarmingly, we note a significant differential increase in the proportion of students who indicated that their academic performance suffered due to experiences of sexual assault.

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 rich set of student characteristics. Our results remain unchanged.

Next, to further account for potential differences between Greek and non-Greek students, we predict the number of sex partners using a LASSO procedure based on a set of student characteristics, their square terms, and first-order interactions, 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. We then repeat this exercise controlling for the LASSO-predicted Greek membership status; the results remain robust. 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 use individually assigned enumerators. Second, the cause for misreporting would have to be convoluted, such that it accounts for increases in the reported numbers of sexual partners and 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 differential smartphone adoption or by administrative crackdowns on Greek activity at various universities during our study period.

Another 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 identification strategy 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, overall Tinder usage should be greater on campuses with a larger Greek presence. This is attested to by our first-stage findings and by Tinder's strategy of targeting Greek students.

With this approach, we estimate Tinder's impact on all students by comparing more-Greek versus less-Greek colleges. We show that the introduction of Tinder led to an increase in the average rate of sexual activity across college campuses with disproportionately more exposure to the app due to higher Greek representation. The effect sizes are somewhat larger than in the individual-level specification, suggesting that, if anything, spillovers attenuate the true effect of Tinder's introduction. By organizing our analysis at the college level, we can tie our estimates to the first-stage college-level results on app usage and offer a better assessment of the magnitude of the effects. A back-of-the-envelope calculation suggests that an increase in the share of Greek students at a college from 0% to 20% is associated with a 0.1 standard deviation higher average daily Tinder usage and a 0.12 rise in the average number of sex partners in the previous year.

With the sole exception of mental health improvement, our other individual-level results also generalize to the overall student population. In particular, we observe no effect on cohabitation rates, but there are increases in reported sexual assaults and sexually transmitted diseases (STDs). The statistically insignificant results on mental health are notable and suggest that the impact on mental health may be heterogeneous across the student population. However, due to the lower precision of the college-level estimates, we cannot definitively rule out improvements in mental health that could be comparable in magnitude to those observed at the individual level.

Overall, our results suggest that the advent of Tinder has significantly reshaped the dating-market equilibrium in line with theoretical predictions, by prolonging search, increasing turnover in romantic relationships, and increasing inequality in dating activity. These changes are consistent with Tinder facilitating the rise of hookup culture on college campuses. At the same time, our find-

ings indicate that online dating apps are not to blame for the worrisome trends in declining sexual activity and worsening mental health among young adults documented by prominent psychologists (Twenge, Cooper, Joiner, Duffy, and Binau, 2019; Twenge and Park, 2019).

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 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 dating apps, causal evidence is lacking. The review article by Bonilla-Zorita et al. (2021) advises 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 the advent of Craigslist is associated with significantly higher asymptomatic HIV counts, especially among African Americans. In contrast, we study Tinder, a platform used solely (and much more often than Craigslist) for online dating, during a time when online dating became normalized (Rosenfeld, Thomas, and Hausen, 2019).[10] We also study various additional outcomes, not only STDs, thus drawing a much more comprehensive picture of the overall effects of online dating technologies.[11]

While our study focuses exclusively on college students, Tinder's targeted promotional strategy within this group offers a causal framework to estimate effects on a wide range of outcomes. Further, understanding the impact of dating apps on outcomes like poor mental health and sex-

[10] For instance, Craiglist has also been used for sex work. E.g., see Cunningham, DeAngelo, and Tripp (2024) who show that the staggered rollout of Craigslist erotic services reduced female homicides and reported rape offences.

[11] A few studies examine how 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 mobile-app creation by online dating sites on users who initially use the online platform 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.

ual assaults is of substantive intrinsic interest given the prevalence of these problems on college campuses and the efforts to ameliorate them (e.g., Fedina, Holmes, and Backes, 2018).

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. We add to this 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 used 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] Meanwhile, Antler et al. (2022, 2023) study the dating market theoretically, suggesting that, by lowering search costs, dating apps may lead to greater experimentation and prolonged search before marriage. Our estimates are in line with these predictions.

This paper also relates to the nascent literature on the causal effects of the internet and, more narrowly, social networking technologies on sexual activity, marriage, and individual well-being. Bhuller, Havnes, Leuven, and Mogstad (2013) find a positive effect 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

[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.

considering outcome variables related to dating or sexual behavior. Braghieri, Levy, and Makarin (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 altered the societal landscape just as much as social media.

2 Background

Tinder is a social networking and online dating application. It soft-launched in 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 allows users to anonymously swipe right or left to indicate whether they like or dislike other users' profiles. Two users are matched and allowed to interact only if they both swiped right on each other's profile. The Android version of Tinder launched in July 2013.

Simply put, Tinder has normalized and popularized online dating, especially among young adults. 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). Many competitors have since launched, but Tinder remains the market leader. As of July 2022, 79% of adults aged 18 to 29 and 46% of all U.S. adults who had ever engaged in online dating had used Tinder at least once. This usage far surpasses that of any other dating app or website among that demographic group (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-based promotion strategy. Search data from Google Trends for 2013 and 2014 corroborate the fact that Tinder targeted the college student population: in the first two years that Tinder became available nationally, most of the top

[13] For a comprehensive overview of the literature on the economics and politics of social media, see Zhuravskaya, Petrova, and Enikolopov (2020) and Aridor, Jiménez Durán, Levy, and Song (2024). See Enikolopov, Makarin, and Petrova (2020) for an example of a study that similarly utilizes the early diffusion patterns of a social networking platform to identify its causal effects.

[14] Note that 53% of adults aged 18 to 29 have reported ever using online dating apps or websites (McClain and Gelles-Watnick, 2023). As such, 42% (0.53×0.79) of all adults aged 18 to 29 in the United States had used Tinder at least once as of July 2022.

30 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 (see Table A1).

However, beyond just promoting the app first to college students, Tinder founders honed their strategy by aiming to spread the app through the existing, already dense networks of the Greek system on college campuses. Because fraternities and sororities host numerous parties and organize other social events, they are often the linchpin of social activity on college campuses. As such, they are (or were) socially influential sub-communities with an outsize sway on the overall student body.

Commenting on this strategy, the app's co-founder Justin Mateen told Fortune.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 its 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," said another co-founder, Sean Rad.[17] The strategy paid dividends: every time they visited a sorority or fraternity to pitch Tinder, they would see sign-ups immediately after.

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 a sorority member at Southern Methodist University, would go on to found the rival dating app Bumble. According to Joe Munoz, who developed Tinder's technical backend, Wolfe Herd 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 Herd's trip; when she returned, there were some 15,000 (Moazed and Johnson, 2016).[18]

[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] Despite Tinder's team first promoting the app at select schools, it is infeasible to use the promotion timing patterns in a staggered difference-in-differences strategy. Detailed information on which colleges Tinder first promoted at and at what time proved to be inaccessible. Furthermore, unlike platforms such as Facebook, which had a sharp phased school-by-school launch, Tinder became instantly accessible to everyone with a smartphone, at every college, once it

Invigorated by the success of this Greek-based marketing campaign, Tinder's creators doubled down by hiring on-campus representatives across the United States through a campus ambassador program, recruiting mostly from Greek organizations.[19] For example, in 2013, a Tinder brand ambassador at Tufts University, Nick Aull, himself a member of the Theta Delta Chi fraternity, organized Tinder-themed fraternity parties where to enter, partygoers had to download the Tinder app on their smartphones.[20] Aull also partnered with fraternity and sorority chapters at nearby schools, including Boston University and Harvard University, to organize events there.

To further investigate the prevalence of Greek students among Tinder representatives, in October 2022 we conducted a search for "Tinder Campus Ambassador" on LinkedIn. We identified 47 such ambassadors, most of whom served in the position between 2018 and 2020. Importantly, 33 of the 47 indicated 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 that 80% of the school's Greek population used it. In a 2016 interview, a Tinder spokesperson stated that the fraternity and sorority demographic group remained one of Tinder's most active user cohorts at the time.[21]

Fraternities and sororities continued to be important for Tinder long past the initial launch. 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.[22]

We also note that the early expansion of Bumble—the second most popular online dating app among young adults: 51% of 18- to 29-year-olds who have engaged in online dating have used it (McClain and Gelles-Watnick, 2023)—bore striking similarities to Tinder, with a heavy reliance on sororities and fraternities. Early on, in 2015, Bumble founder (and former Tinder marketing executive) 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

launched in the App Store. Therefore, it is more logical and feasible to base the identification strategy on the timing of Tinder's full-scale launch in the summer of 2013 and its decision to target a certain subset of the student body within schools rather than tracing the differences in promotion timing across schools.

[19] How Tinder acquired 50 million users. *Hackernoon,* July 1, 2021.

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

[21] How this college junior scored a scholarship ... from Tinder. *Refinery 29,* April 18, 2016.

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

brothers that all the girls were looking for their next formal dates on Bumble."[23] And, in 2021, Bumble employed 420 brand ambassadors across more than 100 college campuses.[24]

To the very best of our knowledge, no other major social media website or application pursued a similar strategy of targeting Greek students on college campuses. This Greek-centered approach was unique to the dating apps Tinder and Bumble. This fact is critical to our research design.

Did Tinder normalize online dating among college students and young adults? Following the advent of Tinder, online dating became a much more common and pronounced feature of college social life. This is evident not only anecdotally but also in survey data.

We examine several waves of surveys conducted by the Pew Research Center (Pew) and the Online College Social Life Survey series, both of which asked questions regarding online dating and dating apps. Table A3 shows that the number of college-age respondents who indicated they used online dating services ranged from 0% to 10% from 2005 through 2013, depending on the survey source and the specific question asked. However, after Tinder became widely adopted, the number jumped to 29% in 2015 and 50% in 2019, underscoring the remarkable normalization of online dating for this demographic group within a relatively short period.

Figure A1 illustrates similar trends for all young adults, without restricting the sample to college students and using data from two surveys conducted by Pew in April–May 2013 and June–July 2015, just before and soon after Tinder's full-scale launch. The data show that in the spring of 2013, young adults were much less inclined to use dating websites or apps compared to other age cohorts. However, two years after, the percentage of young adults using dating websites and apps increased dramatically, from 10% to 27%, whereas usage among other age groups remained stable.

3 Data

Throughout most of our study, we use the National College Health Assessment (NCHA) survey as our primary data source. For the first-stage results, we also use LexisNexis data on college

[23] How Whitney Wolfe Herd turned a vision of a better internet into a billion-dollar brand. *Time,* March 19, 2021.

[24] In our search of college newspapers on LexisNexis mentioning Bumble, we found only three such articles from 2015 and ten such articles from 2016. Of these 13 articles, 11 were published in schools with Greek life on campus, indicating a tight relationship between Bumble and Greek life, similar to that of Tinder. These numbers also suggest that Bumble was not a significant topic in our college newspaper data before 2017. Despite this, our post-2016 findings could reflect the combined influence of both Bumble and Tinder on college campuses.

newspapers and app-usage data from Complementics.

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 by the American College Health Association (ACHA) in 1998 to gather detailed data on the physical and mental health of college students.

The survey is conducted each semester across hundreds of colleges and universities.[25] From 2008 through 2019, the survey data contain close to 1.3 million individual student responses. To ensure consistent comparisons, we restrict our attention only to full-time undergraduate students, reducing our sample to approximately 1.1 million 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 be absent in another. Throughout our analysis, we will account for these sample composition changes by including college fixed effects based on anonymized college identifiers available in the NCHA data.

This rich survey allows us to conduct a uniquely comprehensive and multifaceted analysis of the impact of dating apps, specifically Tinder, on the behavior and health of young adults. It contains information about sexual activity, relationship outcomes, potential negative consequences of sexual activity, mental health, 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), relationship status (i.e., whether a student was in a romantic relationship at the time of the survey), and cohabitation status (i.e., whether a student was in a cohabitating romantic relationship at the time of the survey). We also examine questions pertaining 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 in the previous year, had been diagnosed with or treated for 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, mentally exhausted, very lonely, very sad, or severely

[25] For brevity, we refer to all academic institutions in the NCHA as "colleges" throughout the paper.

depressed; experienced overwhelming anxiety or overwhelming anger; engaged in intentional self-harm; or even considered suicide. Respective outcomes were defined based on experiencing these mental health issues over the preceding 30 days. 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 resulting sum.

In addition to using the variables previously mentioned, 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 students whom Tinder had specifically targeted to encourage app adoption with students who were less likely to have faced such targeting. We also calculate the proportion of Greek students in each college to use in an alternative college-level 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 our analysis. Panel A of Table 1 indicates that 70% of survey respondents are White, 6% are Black, and 12% are Asian. About 11% of the students are a part of Greek life. The median full-time undergraduate college student who responded to the survey was a sophomore, as indicated by the college-grade variable, and was 20 years old.

Panel B shows that the average number of sexual partners in the survey sample was 1.5, that 47% of the students were in a romantic relationship, and that 11% were cohabiting. Panel C reveals that about 11% of students experienced abusive relationships in the previous year and that 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: 9% reported having experienced sexual assault and 2% reported being diagnosed with or treated for chlamydia. In addition, about 26% reported having ever been tested for HIV. Finally, Panel E indicates that a striking number of students reported experiencing mental health issues: 35% have felt overwhelming anxiety and 18% have felt severely depressed at least once in the previous 30 days.

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

In Figure 2, 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 (except for seasonal fluctuations) throughout the entire sample period. By contrast, for Greek students, the figure depicts a dramatic rise in sexual activity that coincides with Tinder's full-scale launch. These twin sets of observations form the foundation of our empirical strategy; we explore these patterns more systematically in the following sections.[26]

3.2 LexisNexis Newspaper Data

Our secondary source of data is the universe of college newspaper articles available on LexisNexis during the 2013–2016 period. Our search yielded 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 campuses. We calculated 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 campuses with and without Greek activity, we supplement the newspaper data with additional college-level

[26] In Figure A3, we further break down the trend for the non-Greek students by whether they attended schools with large Greek presence or not. The figure shows that non-Greek students at schools with heavy Greek life activity also experienced a (smaller) uptick in sexual activity following Tinder's introduction. Non-Greek students at non-Greek colleges exhibited no such change. The totality of these patterns is consistent with the narrative evidence surrounding the launch of Tinder. Specifically, Greek students were the earliest and biggest adopters of this technology and there were positive spillovers in usage from Greek students onto the rest of the student body. In schools with less Greek life activity, the degree of this spillover would be lower and, consequently, the use (or lack thereof) of Tinder is not sufficient to generate an observable increase in the average number of sex partners. We conduct a more detailed examination of the potential effects of Tinder on all (including non-Greek) students in Section 7.2.

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, just prior to the full-scale launch of Tinder. For the colleges where the 2012–2013 CDS data are not available, we use information from the earliest available year. Ultimately, we collected Greek-life information for 540 colleges.

3.3 App-Usage Data

To further validate our first stage, we use the actual app-usage data from Complementics, a data-exchange platform that consolidates device-level information regarding the location and timing of mobile app usage. We obtain this data for the earliest available period, from September 21, 2017, to May 15, 2018. For each day within this period, we have two datasets, one for location and one for app usage. The location dataset captures the zip code of a series of "pings" from 17.1 million devices in the United States, each identified by a 64-digit device hash. The app-usage dataset documents the app name and device hash for each unique app-usage session each day. We exclusively retain data related to Tinder app usage. For each day, we determined the primary zip code of a device by calculating the modal location of its pings, enabling us to count the number of unique devices within a zip code. We then merge this device-level location data with the app-usage dataset using the device hash. We measure the average daily usage rate of Tinder within a zip code during the 2017–2018 academic year by dividing the daily number of devices using Tinder by the daily number of unique devices, then taking an average across days. We then merge these data with the Greek-life indicators from the CDS introduced above based on colleges' zip codes.

4 Empirical Strategy

To identify Tinder's impact on student dating behavior and health, 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 Greek and non-Greek student outcomes within each college-semester pair before and after Tinder's full-scale launch.

Our 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; $Greek_i$ takes the value of 1 if a student i is a fraternity or sorority member and 0 otherwise; $Post_t$ refers to the period after Tinder's full-scale launch in the summer of 2013, a timing choice that we discuss in detail below; α_{ct} represents a set of college-semester fixed effects; and X_i is a vector of individual-level student characteristics (including standalone $Greek_i$).

Though Tinder soft-launched in the Apple App Store in September 2012, we consider Spring 2013 as the last academic semester prior to treatment, for two reasons. First, Tinder did not develop its innovative swipe feature until May 2013, after which it experienced rapid growth in popularity. 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.[27]

Because of these two factors, the adoption and usage of Tinder did not reach critical mass until after the summer of 2013. This is corroborated and attested to across a wide array of sources and data. For instance, using a panel of millions of American mobile phone users, Abolfathi and Santamaria (2020) shows that Tinder downloads did not start taking off until July 2013. Google Trends data display a similar pattern. As shown in Figure A2, the search intensity for Tinder began growing exponentially after May 2013 and plateaued shortly after the mid-point of 2014, signifying the increasing and eventual levelling off of adoption. This timeline is also consistent with evidence from college newspapers. As discussed below in Section 5, reporting of Tinder in college newspapers did not start until the fall of 2013. On account of these factors, throughout this paper, we treat Spring 2013 as the last academic semester before Tinder's full-scale launch.

The coefficient of interest in Equation (1), β, identifies the causal effect associated with differential exposure to and adoption of Tinder between Greek and non-Greek students under the assumption that the outcomes for Greek-life students would have evolved along parallel trends relative to their non-Greek peers within the same college and semester in the absence of Tinder. We

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

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 variables prior to Tinder's full-scale launch.

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. To reduce the possibility of our estimates being driven by the survey compositional changes, in nondynamic specifications, we control for a rich set of student-level controls such as age, gender, race, international student status, height, BMI, and sexual orientation.

We address concerns related to potential spillovers and SUTVA violations by employing a complementary college-level identification strategy. In this alternative approach, we compare colleges with a higher share of Greek students to those with a lower share, before and after Tinder's full-scale launch, thus accounting for potential effects among non-Greek students. With this approach, we obtain similar results for almost all outcomes. For more details, see Section 7.2.

It is worth noting that because we do not utilize variation in treatment timing, our research design approximates the canonical 2×2 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 (Callaway and Sant'Anna, 2021; Goodman-Bacon, 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, we face a possible concern that the composition of Greek organizations is changing over time. Specifically, if the characteristics of Greek students were 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 full-scale launch.

To address this issue, we perform two exercises. First, we show in Figure A4 that the share

of undergraduate students active in Greek organizations remains fairly static before and after the summer of 2013. This is reassuring, as it demonstrates that the popularity of Greek life did not systematically change after Tinder's full-scale launch.

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 advent of Tinder. As shown in Table A4, the difference between Greek and non-Greek students across a wide array of characteristics was fairly balanced between the pre- and post-Tinder-introduction periods. With the notable exception that Greek students became less international relative to the rest of the student population, none of the other changes is statistically significant.[28]

These patterns suggest that differential selection into Greek organizations is unlikely to drive any potential findings. Nevertheless, to further assuage this concern, we will include the aforementioned student-level controls in most of our analysis and will present robustness checks for interacting these characteristics with the post-Tinder-introduction indicator.

5 First-Stage Relationship

A key assumption that underlies our research design is that fraternity and sorority members were more likely than non-Greeks to adopt and use Tinder. While anecdotal evidence in Section 2 does point to the importance of Greek organizations for Tinder's early diffusion on college campuses, in this section, we provide quantitative evidence to support this idea. To this end, we utilize information from college newspapers and Google Trends around the time of Tinder's full-scale launch. We then complement these sources with the zip-code-level data on relative Tinder usage during the 2017–2018 academic year.

5.1 Evidence From College Newspapers

First, we use LexisNexis to identify all college newspaper articles containing the word *Tinder* around the time of Tinder's full-scale launch (2013–2016). We consider the discussion of Tinder

[28] To a certain extent, BMI and weight can endogenously change as a response to the introduction of dating apps. Thus, the absence of significant differential changes in these variables suggests that students did not increase their efforts in making themselves more attractive on the dating market as a reaction to Tinder's full-scale launch.

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 reflect trends or developments 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 full-scale launch. Figure A5 depicts these results. 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. Figure A6 displays the corresponding dynamic difference-in-differences estimates, confirming that the disparities in the frequency of Tinder-related articles between colleges with varying levels of Greek life are statistically significant for most of the study period.

To ensure that these results are 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 and 2016 on measures of Greek-life participation, controlling for the total number of articles published. Table A5 presents these results. Our analysis reveals a strong positive correlation between Greek life presence and Tinder coverage. Specifically, colleges with Greek life had a 14.5-percentage-point higher likelihood of publishing at least one newspaper article about Tinder 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. We find numerous direct references to the influence of Greek organizations on Tinder's early diffusion.

For instance, in the Fall 2013 semester, when Tinder started gaining traction, a sophomore at the University of Nebraska–Lincoln told the *Daily Nebraskan* that he had heard of Tinder from his fraternity brothers.[29] 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

[29] Dating app Tinder connects users through Facebook proximity. *Daily Nebraskan,* October 3, 2013.

Tinder.[30] 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.[31]

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, especially in the early days of its launch.

5.2 Evidence From Google Search Intensity

We conduct an additional test of the first-stage relationship in the early diffusion of Tinder 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 the relative frequency of Google queries for the app *Tinder* in 2013 and 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 that we employed in the newspaper exercise, namely, the presence of Greek organizations at a college and the indicators for whether the proportion of undergraduate students involved in fraternities or sororities was greater than the median in our sample.

Table A6 presents the results. 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* in 2013 and 2014, compared to towns whose 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.

5.3 Evidence From App-Usage Data

To further confirm the greater adoption of Tinder at colleges with Greek life, we analyze the data on actual Tinder app usage from Complementics, covering the period from September 21, 2017, to

[30] Wanna hook up? There's an app for that! *The Daily Emerald,* October 15, 2013.
[31] Tinder sweeps through UC Davis. *The California Aggie,* October 17, 2013.

May 15, 2018. We calculate the average daily usage of Tinder within the zip codes of each college and, for greater comparability, merge it with the CDS based on the LexisNexis sample of colleges. We then repeat the same correlational exercise that checks whether Tinder usage was higher in the zip codes of colleges with more substantial Greek life.

The results, shown in Table A7, reveal that average daily Tinder usage at colleges with Greek organizations was 0.2 percentage points higher during the 2017–2018 academic year, from a baseline of 1.2%, equating to a magnitude of 0.2 standard deviations. Furthermore, there is a positive association between fraternity and sorority membership and Tinder use.[32] Overall, these results confirm that the patterns observed in the newspaper and Google Trends data are mirrored in the actual app-usage statistics and that Tinder remained consistently more popular at colleges with greater Greek-life presence four years after its full-scale launch.

Taken together, these first-stage results drawn from three distinct data sources confirm the existence of an intricate link between Greek students and the adoption and promotion of Tinder.

6 Main Results

Encouraged by the first-stage evidence in Section 5, we estimate Tinder's impact using the difference-in-differences strategy introduced in Section 4. To start, we investigate how Tinder's introduction 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, such as mental and physical well-being and, ultimately, academic performance.

6.1 Impact of Tinder on the Dating Market

Theoretical Predictions We start by characterizing Tinder's impact on dating-market behavior and outcomes among college-age students. Our analysis is guided by theoretical predictions from Antler et al. (2022, 2023), who develop matching models of the dating and marriage markets with

[32]The results are similar when we consider alternative ways of calculating college-level Tinder usage.

search and learning frictions. In their models, advances in search technologies that facilitate meeting potential partners, such as the emergence of dating apps, are predicted to reduce the amount of time individuals spend dating each partner and increase the number of partners they date before marriage. We empirically test these hypotheses by examining Tinder's effect on sexual activity and relationship formation.

Baseline Results We analyze Tinder's impact on two NCHA survey questions related to sex activities: reported number of sexual partners within the previous 12 months and whether a respondent had sex within the previous 30 days. These two variables shed light on the student's frequency of sexual activity, which is indicative of search duration or turnover in the dating market.

First, we estimate an event-study version of Equation (1) for these two outcomes, which helps us assess the plausibility of the common-trends assumption and, consequently, the viability of our difference-in-differences design. Specifically, we estimate the following specification:

$$Y_{ict} = \alpha_{ct} + \sum_{t=2008F}^{2019S} \beta_t \times Greek_i + \gamma \times Greek_i + \varepsilon_{ict} \tag{2}$$

where Y_{ict} measures behavior of student i in college c at semester t; $Greek_i$ takes the value of 1 if the student i is a fraternity or sorority member and 0 otherwise; and α_{ct} and β_t are the college-semester and semester fixed effects, respectively. Standard errors are clustered at the college level. We visualize the estimates by plotting the β_t coefficients over time, with the spring of 2013 as an omitted category.

Figure 3 presents the results. Through the lens of our difference-in-differences model, it shows that the introduction of Tinder led to a significant increase in sexual activity. Specifically, in comparison to non-Greek students, students belonging to Greek organizations specifically targeted by the app increased the average number of sexual partners and the share of students who had sex in the previous 30 days. For both outcomes, the figures display an absence of pretrends and an upward trend-break following Tinder's full-scale launch. These patterns support the identifying assumption that the sexual activity of Greek and non-Greek students would have evolved along parallel trends in the absence of Tinder's full-scale launch.

Next, to better assess the effects' magnitudes, we present the baseline estimates in a table for-

mat. Specifically, we estimate Equation (1) using a model with only the college-semester fixed effects, then enriching it by including a set of controls, such as age, gender, race, grade, height, BMI, international student status, and sexual orientation. To explore the dating-activity shifts in greater detail, we break down the number of sexual partners in the previous year into the share of students having sex in the previous year (extensive margin) and the number of sexual partners conditional on having engaged in sexual activity in the previous year (intensive margin).

Table 2 presents the results. Compared to non-Greek students, students belonging to Greek organizations increased their average number of sexual partners in the previous year by 0.22. This effect amounts to a magnitude of 0.08 standard deviations.[33] Greek students also became 3 to 4 percentage points more likely to have engaged in sexual activity in the previous 30 days and in the previous year. Finally, we find significant changes along the intensive margin, as Greek students started to have 0.13–0.16 more sexual partners, even conditional on having engaged in sexual activity in the previous year (columns 7–8).

The fact that Tinder led to a substantial increase in sexual activity among Greek students is perhaps surprising given that Greek students are a socially active group with numerous in-person opportunities to meet romantic partners (e.g., parties and mixers). However, we argue this is plausible because Tinder alleviates information asymmetry, reduces search costs, and possibly diminishes the psychological costs of failed match attempts. In particular, by showing users only potential matches that express mutual attraction, Tinder's design features remove uncertainty about whether romantic feelings are reciprocated, which could be a barrier to efficient matching in offline social settings. As a result, the introduction of Tinder can meaningfully increase sexual encounters even for a group of students that have other pre-existing offline outlets and venues for dating.

Effect Persistence Another takeaway from the event-study plots in Figure 3 is that, even four years after the launch of Tinder, the impact on Greek students does not dissipate. This nonconvergence is perhaps surprising at the outset, because one may expect the differences in Tinder use between Greek and non-Greek students to diminish over time as the app became more widespread.

[33] While we lack systematic data on the difference in Tinder usage between Greek and non-Greek students on the same college campus, the 40 percentage point difference indicated by a campus ambassador at Tufts (see Section 2 for further details) implies a 0.2 standard deviation increase in the number of sexual partners for Greek students if the effect is weighted by such differential use of Tinder. Similarly, effects on other outcomes can be adjusted in this manner for a better sense of the magnitude of the average treatment effect on the treated.

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 launch; it persisted well after. Section 5 further shows that the differences in Tinder popularity between colleges with and without Greek life were still present in 2017–2018. 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. Since the minimum age to use Tinder is 18, our college student sample is composed of individuals enjoying their first opportunity to use the app. As a result, if a difference exists 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.

6.2 Relationship Formation and Quality

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 search, potentially undercutting the need to invest in any given relationship (Antler et al., 2022, 2023). Similarly, the resulting impact on relationship quality could also be theoretically ambiguous.

Since marriage was rare among individuals in our study population, we focus on whether students were in a cohabiting relationship with their partner as an instance of a stable match, since cohabitation is often a precursor to a long-term partnership. Although more recent versions of the NCHA directly ask respondents if they are in a committed relationship, this question was not included in the surveys from the years we are analyzing; therefore, cohabitation serves as the best available measure of commitment in our study.

To measure relationship quality, we construct variables based on three separate NCHA questions. Specifically, we examine whether a student had, within the previous 12 months, (i) been in an emotionally or physically abusive relationship, (ii) found intimate relationships traumatic or very

difficult, and (iii) experienced relationship difficulties.

Table 3 displays the difference-in-differences estimates for these outcomes. We find that the introduction of Tinder did not lead to significant changes in the likelihood that students were cohabiting with their relationship partners or that students were in a romantic relationship more generally. 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 who were then in a relationship.

Overall, the results indicate that the introduction of Tinder 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,[34] as well as with student experiences chronicled in college newspapers[35,36] that the introduction of Tinder has widened the pool of potential partners, resulting in commitment problems and greater turnover, possibly contributing to the rise of hookup culture.

6.3 Distributional Consequences

In a seminal article, Rosen (1981) argues that technological change facilitating an increase in market scale may amplify inequality across the talent distribution. Because online dating apps allow people to more efficiently search for romantic partners well beyond the confines of their immediate social networks, they allow them to capitalize on economies of scale and match with large numbers of potential partners. As such, the introduction of online dating apps could have induced distributional changes in dating activity across the student population.

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

We employ a LASSO procedure to predict an individual's propensity for sexual activity based

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

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, 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.[37] This predicted sexual-activity variable is intended to reflect both individuals' preference for dating as well as their suitability or "talent" in the dating market.

We then explore the heterogeneous impact of Tinder along this dimension separately across gender groups. To this end, we define quartiles based on values of the LASSO-predicted sexual-activity variable for each gender and region cell.[38] We then examine how our estimates vary across these quartiles separately for male and female students.

The total effects for each quartile are displayed in Figure 4. While the estimates are positive for both genders for all quartiles, we observe a significant jump in effect size for male students belonging to the top quartile of predicted sex activity. These patterns are confirmed in Table A8, which show 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. For female students, on the other hand, there is no discernible difference across quartiles.

These contrasting patterns of heterogeneity suggest that the distributional impact of Tinder may differ across gender groups and, in particular, that Tinder may facilitate the emergence of "superstar" effects for males in the dating market. These results are consistent with existing evidence that female dating app users tend to be more selective in their likes and interactions (Tyson, Perta, Haddadi, and Seto, 2016).

6.4 Downstream Effects

Having shown that Tinder affects sexual and romantic behavior among college students, we now turn to examine the potential downstream implications of the app's introduction on a broader set of

[37] We train the LASSO model based on students' age, gender, race, BMI categories, sexual orientation, and international status. However, our results remain similar if we include other variables and exclude some of the ones mentioned here. Figure A7 shows that the LASSO model performs well both on the pre-Tinder and post-Tinder data, providing fair explanatory power in both in-sample and out-of-sample predictions.

[38] The four regions in the NCHA are Northeast, South, West, and Midwest. We estimate separate distributions for each region to account for spatial heterogeneity in sexual norms and population composition. Due to issues of privacy, region is the finest geographical variable available in the NCHA survey.

outcomes related to physical and mental well-being, as well as academic performance.

6.4.1 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: (i) whether a student had been subject to sexual abuse within the previous 12 months, (ii) whether a student had been diagnosed or treated by any professional for chlamydia, and (iii) whether a student had ever been tested for HIV infection.

Table 4 reports the difference-in-differences estimates for these outcomes. Following Tinder's full-scale launch, 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 chlamydia and HIV tests among Greek students, by 0.6 and 1.6 percentage points, respectively. The magnitudes are also nonnegligible when compared to the sample averages; they correspond to 0.04 standard deviations. To further visualize the findings, we present event-study plots for these three outcomes in Figure 5. These plots display no pretrends, but then there's a clear trend break in the outcomes' evolution following Tinder's full-scale launch. 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.[39]

6.4.2 Mental Health

Next, motivated by discussions in the popular press about the potential harmful effects of online dating apps for mental health[40] as well as existing correlational evidence (Holtzhausen et al., 2020), 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

[39] One caveat to a straightforward interpretation of the result on STDs, however, is that it could also reflect an increase in testing—people engaging in casual or unprotected sex may take precautionary steps by seeking out tests for sexually transmitted diseases. Therefore, our estimates may reflect both an actual increase in chlamydia incidence and a behavioral response to the increased risk associated with casual sex activity. This interpretation is consistent with the observed increase in HIV testing as well.

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

mental-health-related issues: feeling hopeless, overwhelmed, mentally exhausted, very lonely, very sad, so depressed that it was difficult to function, overwhelming anxiety, or 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 previous 12 months. Specifically, we first sum up the standardized versions of the individual mental health variables, then we standardize the resulting variable.

Table 5 shows the results. In contrast to both the press and the existing correlational studies, 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 0.033-standard-deviation improvement in their mental health index.

When separated by gender, the results in Table 5 display a stronger improvement in reported mental health 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 issues. Figure 6 illustrates the sharp nature of this effect by presenting an event-study plot for the mental health index among female students. While the pre-Tinder coefficients are mostly nearing zero, the point estimates after the full launch of Tinder are consistently negative and statistically significant.

Given the results from the previous section showing an increase in sexual assault, the improvement in average mental health could be 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 A9 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 A10, 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 receiving more sexual/romantic attention 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."[41] Another possibility is that Tinder may induce substitution away from other more harmful online activities.

In summary, our findings indicate that the introduction of Tinder had a positive impact on the relative mental health of Greek students, in comparison to their non-Greek peers within the same college and semester. The estimates appear to be more robust for female 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.

6.4.3 Academic Performance

Next, we examine the potential downstream effects of Tinder on academic performance through the outcomes we have studied so far. Specifically, based on a remarkably suitable NCHA question, we construct a series of indicator variables for whether a student reported that their academic performance was negatively affected by relationship difficulties, sexual assault, STDs, depression, anxiety, stress, ADHD, or an eating disorder. We then use these variables as outcomes in our individual-level difference-in-differences model in order to investigate Tinder's potential downstream impact on human-capital accumulation.

The results, presented in Table 6, largely corroborate our earlier findings. For instance, consistent with the absence of an impact from Tinder on relationship formation or problems, we detect no differential change in the share of students claiming that their academic performance was affected negatively by relationship difficulties following Tinder's release. Similarly, consistent with our findings on mental health, fewer Greek students reported that health issues such as depression, anxiety, stress, or eating disorders had an adverse effect on their academic performance, with the improvements concentrated among female students (Panel C of Table 6). Nevertheless, column 2 shows a significant increase in the proportion of both male and female students indicating that

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

their academic performance suffered due to experiences of sexual assault. Overall, these results suggest that, through its impact on mental health and the incidence of sexual assault, Tinder has a meaningful, although potentially offsetting, downstream impact on student academic performance.

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 concerns related to (i) selection into the Greek system, (ii) issues of misreporting, (iii) differential smartphone adoption, and (iv) 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 led to increased sexual activity in the post-Tinder-introduction environment, rather than by their differential usage of Tinder. We have already established that there was no significant aggregate shift in the proportion of Greek students, nor were there changes in their demographic composition following Tinder's full-scale launch (see Figure A4 and Table A4). Nevertheless, to further address the concern of selection, we conduct three additional 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 have changed following the release of the app. Because Greek students are more likely to partake in alcohol use and live on campus, we also include controls for the interactions between the post indicator and students' estimated blood alcohol content at the time of the survey and between the post indicator and an indicator for on-campus living. Table A11 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 use the LASSO procedure introduced earlier in Section 6.3 to predict an individual's propensity for sexual activity based on their characteristics, then we control for the interaction between the post-Tinder-introduction indicator and the LASSO-predicted sexual activity instead. As shown in Table A12, our baseline estimates remain robust to controlling for the resulting LASSO-predicted number of sex partners interacted with the post-Tinder-introduction indicator. In fact, our estimates remain remarkably consistent in magnitude as compared to our baseline specification.[42]

Finally, we use our LASSO procedure to predict whether students were members of Greek organizations based on their observable characteristics. We then control for the interaction between the post indicator and the LASSO-predicted Greek status. Table A13 presents the result; our findings remain robust to this exercise as well.

Collectively, these checks alleviate the concern that the differential outcomes of Greek and non-Greek students to Tinder could be driven by differences in individual characteristics that *correlate* with Greek membership rather than Greek membership per se.

7.1.2 Misreporting

Misreporting is a critical issue shared by studies that rely on self-reported survey data. For instance, in our case, one may be concerned that respondents may have lied about having more sex in order to improve their self-image. 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, thus reducing any incentive for respondents to lie due to concerns of stigma. There were no individually assigned enumerators, and students typically completed the survey in a large classroom or on their own (ACHA, 2019).

Second, because we use student-level variation in treatment, any changes in campus culture

[42]This result may be surprising if we thought Tinder usage 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. One possibility is that highly "attractive" students had less incentive to use Tinder because they already had a satisfactory romantic life. In other words, it is Greek students who used the app more, and not "attractive" students more broadly.

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.

Third, our results are cross-validated between distinct sets of questions. For instance, if the Greek students had started to differentially inflate their responses regarding sexual activity, it is unlikely that the same group of respondents would also have started to wrongfully claim to have had STDs or experienced sexual assault 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 suggests that the relationship is genuine.

Finally, we also show that nonresponse rates on questions related to our outcomes remain qualitatively unchanged following Tinder's full-scale launch. Specifically, Table A14 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 and Socioeconomic Status

Time-varying heterogeneity in overall smartphone usage among students might pose a problem for our analysis. If Greek students were more likely to possess smartphones than non-Greek students and if they started purchasing them around Tinder's full-scale launch, then it is feasible that our results could be driven by differential smartphone adoption rather than by dating apps.

We argue that this is unlikely, for three reasons. First, by the time of Tinder's full-scale launch, smartphone adoption was already exceedingly high among the college-age population: 79% of 18- to 24-year-old adults were using smartphones by the fall of 2013.[43]

Second, this explanation fails to explain the effects' persistence, as smartphone use would likely quickly equalize across demographic groups.

Third, we quantitatively account for this possibility by incorporating additional controls that shed light on the students' socioeconomic status. Because smartphones are more expensive than other phone types, the financial backgrounds of students serve as a reasonable proxy for smartphone

[43] Majority of mobile users now use smartphones, blame those pesky teens Engadget, October 30, 2013.

adoption. Following this logic, we include variables related to feelings of financial stress, as well as paid and volunteer work hours. When added to the regression, the coefficients in Table A15 are similar to the previous specifications, showing that differences in socioeconomic status between Greek and non-Greek students do not drive our results. In turn, this result may indicate a 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 cracking down on Greek life, even suspending some Greek organizations altogether.[44] To the extent that these actions altered the share and composition of fraternity and sorority membership, they could have separately affected Greek students' dating activity and romantic endeavors. We find no evidence of an aggregate shift in the share of Greek students or changes in their demographic composition (see Figure A4 and Table A4); still, 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 launch, then we calculate the difference between the two measures, then we estimate our baseline results for colleges that experienced neither a large drop in Greek share (below 2.8 percentage points, or the 5th percentile of the change distribution) nor *any* reduction in Greek share. The results, presented in Table A16, stay robust in both cases, indicating that crackdowns on Greek life are unlikely to drive our estimates.

7.2 College-Level Results

Our difference-in-differences strategy allows us to estimate the causal effect of Tinder's introduction on fraternity and sorority students associated with greater adoption and use of the app. However, to the extent that Greek students may differ from other students in ways that are either observable or unobservable to the econometrician, it remains an open question whether our estimates generalize to the overall student population. In other words, even in a counterfactual world where Tinder had been as widely diffused among non-Greek students as among Greek students, we cannot be certain that non-Greek students would have derived the same benefits.

[44] Fraternity crackdown: universities are clamping down hard, but do bans work? NBC News, March 10, 2015.

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 usage by Greek students had meaningful effects on non-Greek students in the same college. 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 contaminate 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 underlying logic of this design is 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, and with our first-stage results in Section 5.

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 α_c and δ_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, β, 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 gained 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, β reflects the causal effect of Tinder's introduction on U.S. colleges. Since many American colleges are located in remote, isolated college towns, spillovers across units in this specification should be negligible.

The results, presented in Table 7, demonstrate that, with the sole exception of mental health, 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 Tinder's full-scale launch. Column 3 corroborates the absence of a significant impact on cohabitation incidence. Columns 5–7 show that the effects of Tinder on the incidence of sexual assault and chlamydia 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 other students.

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 Tinder's introduction, 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 on sexual activity among non-Greek students being positive and our baseline results serving as a lower bound for the true impact.

Combining the estimates from Table 7 with the app-usage patterns in Table A7, we offer a back-of-the-envelope calculation for the magnitude of Tinder's impact: an increase in the share of Greek students at a college from 0% to 20% is associated with a 0.1 standard deviations higher average daily Tinder usage and a 0.12 rise in average number of sex partners in the previous year.

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

8 Conclusion

Choosing a suitable partner is one of the most consequential decisions a person can make in their life. For more than half a century, since Becker's seminal paper (Becker, 1973), economists have held an interest in the workings and operations of the marriage market. Dating, as the precursor

to long-term relationships and marriage, is fundamental to this process. The sweeping changes to the dating landscape brought about by the growing popularity of online dating, and of dating apps in particular, raise important theoretical and empirical questions. In recent years, possible sociological and psychological effects associated with the mass adoption of dating apps have been heavily speculated on in the popular press.[45] Yet, despite the substantial attention paid to this topic, credible evidence on the causal impact of dating apps remains scarce.

We provide the first estimates for the causal effects of online dating apps by studying the impact of Tinder, the world's most popular dating app, on college students.[46] We focus on this particular age group for two primary reasons. First, thanks to Tinder's unique launch strategy—targeting students involved in Greek life—we can devise a credible identification strategy that allows us to estimate Tinder's impact on this population. Second, college-age adults were, more broadly, the demographic directly targeted by Tinder; 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 critical, well-documented feature of Tinder's launch campaign, which involved targeting college campuses and, more specifically, fraternity or sorority members. We provide both anecdotal and quantitative evidence to verify the fact that Tinder was more commonly used by Greek students and in colleges with high Greek-life participation. These twin facts motivate the empirical strategy we pursue, which is a difference-in-differences design that considers Greek students and colleges with large Greek presence as treated units.

We find that Tinder's introduction substantially altered the dating-market equilibrium on college campuses. The use of Tinder increased the frequency of sexual activity but without any corresponding increase in the formation of long-term relationships. These results are consistent with theoretical predictions suggesting that, by reducing search costs, online dating apps would increase search duration and turnover in romantic couplings (Antler et al., 2022, 2023).

We show that the distributional consequences of Tinder vary significantly by gender. For male

[45] See, e.g., Tinder and the Dawn of the "Dating Apocalypse," *Vanity Fair,* August 6, 2015, and How online dating has changed the way we fall in love, *The Guardian,* February 13, 2022.

[46] 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 in the medium-to-long run. Also, to the extent that all dating apps reduce search costs and alleviate information friction and to the extent that these core features are what's driving our estimates, our results are likely to generalize to other dating apps.

students, the gains in sexual activity are largest among students who, based on observable characteristics, were most likely to engage in sexual activity. This pattern is completely absent for female students, for whom the impact of Tinder is equalized along the same dimension.

We characterize the downstream impact of these changes in terms of students' mental and physical health. Intriguingly, we find that Tinder did not worsen students' average mental health status, and may even have had a positive impact on mental health for some students. At the same time, the changes to dating norms associated with the introduction of Tinder also led to both greater incidences of sexually transmitted diseases as well as the increased prevalence of sexual assault.

We conclude with some important caveats. First, our results speak to the short-term effects of Tinder on a particular demographic—college-age students—following the initial release of the app. Focusing on this subgroup and Tinder's targeted promotional strategy provides a causal lens to estimate effects on a wide range of outcomes. Further, understanding the impact of dating apps on issues such as poor mental health and sexual assaults among college students is of substantive intrinsic interest given the prevalence of these problems on college campuses and the efforts to mitigate them. Nevertheless, understanding the longer-run impact of dating apps across the entire age distribution represents a promising direction for future research.

Second, since Tinder's launch, numerous other online dating apps have emerged, seeking to capitalize on the growth of this new market. These entrants may differ significantly from Tinder in terms of design, user interfaces, and target demographics. For example, some apps emphasize serious relationships over casual hookups. As such, it may be natural to question whether our findings on Tinder's impact generalize to all other dating apps. However, ever since its full-scale launch, Tinder has consistently remained the most popular dating app among young adults, making it valuable to document the unique impact of this particular app. Moreover, insofar as the hypothetical impact of any dating app stems from the reduction in search costs and learning frictions, our results remain informative of those broader effects. Nevertheless, further research is necessary to determine the precise external validity of our findings with respect to other dating apps.

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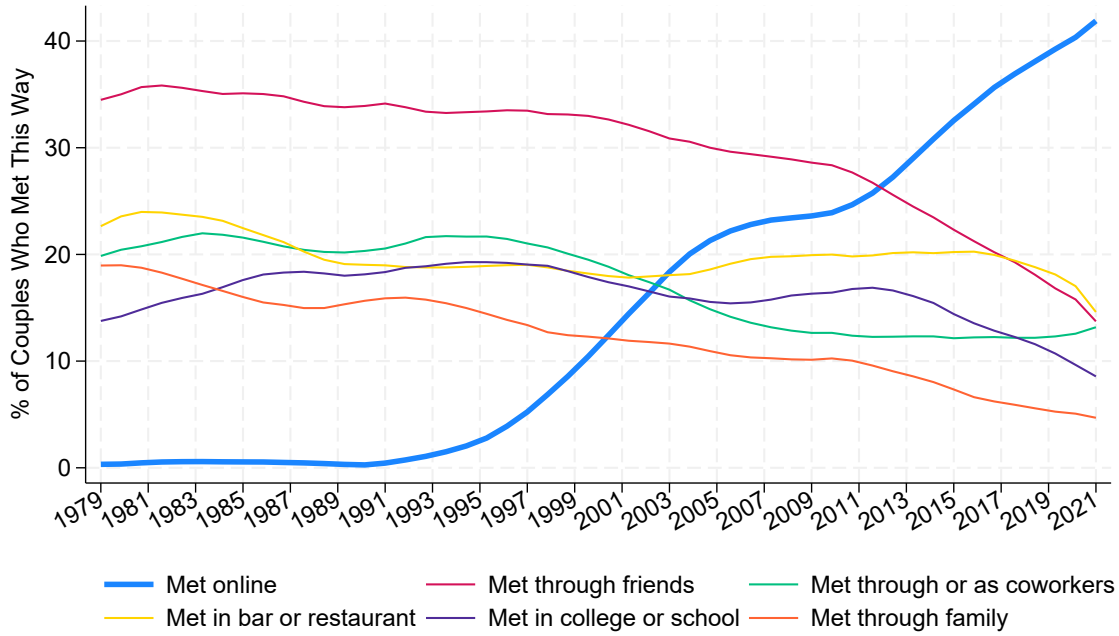
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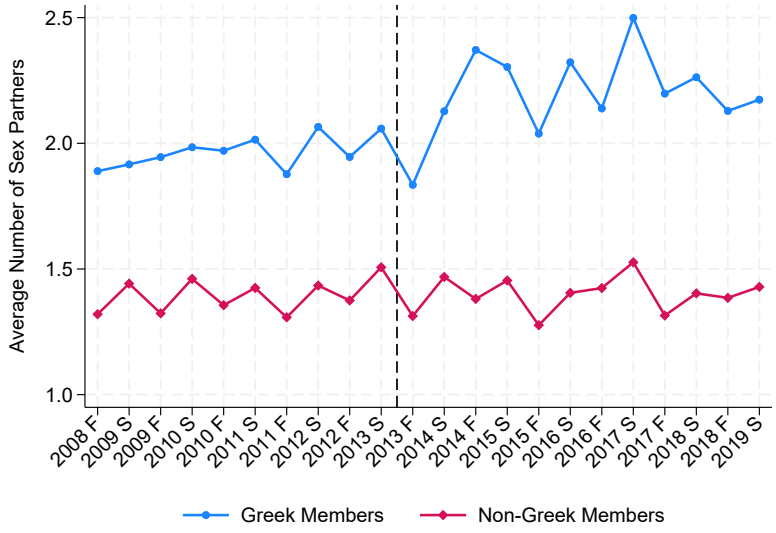
Zhuravskaya, E., M. Petrova, and R. Enikolopov (2020). Political effects of the internet and social media. *Annual Review of Economics 12*, 415–438.

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



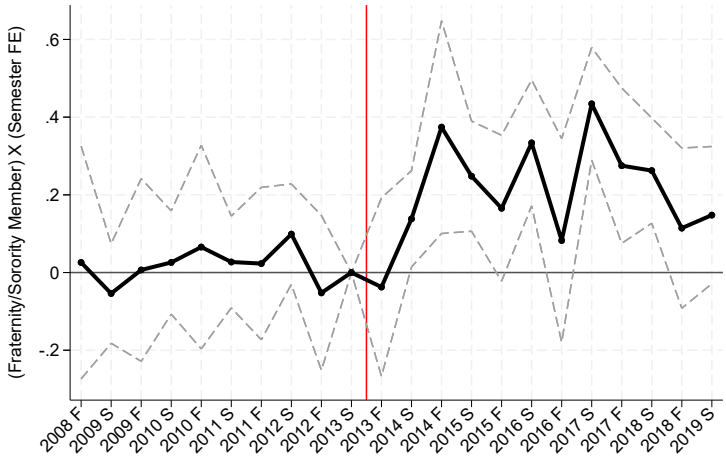
Notes: The figure is based on data from the How Couples Meet and Stay Together (HCMST) project, which surveys couples on when and how they met each other (Rosenfeld et al., 2019). We combine the datasets from the two main surveys (2009 and 2017–2022) and transform them to represent each relationship as a unique observation. A variable indicating meeting through a friend (or family) is assigned a value of 1 if the couple met through a friend (or family member) of either the respondent or their partner. 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

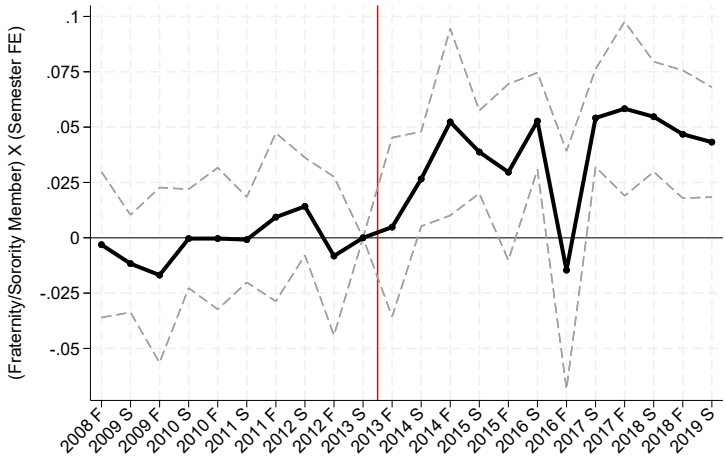


Notes: This figure presents the evolution of the average number of sexual partners in the previous 12 months for Greek and non-Greek members across semesters. The data source is the NCHA survey; the sample is restricted to undergraduate students.

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



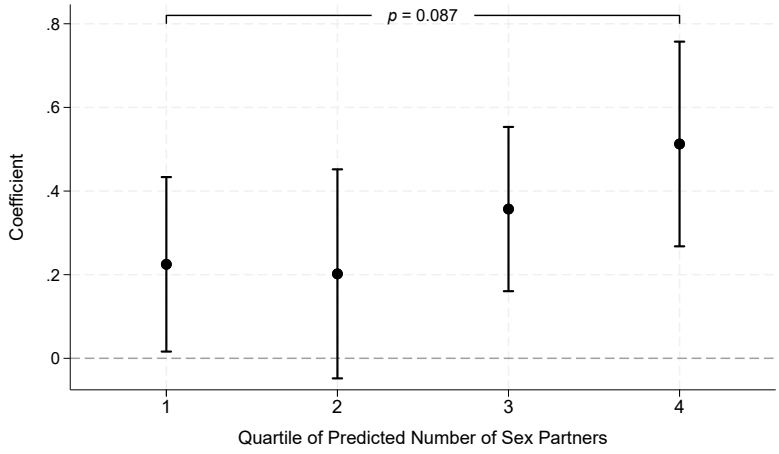
(a) Number of Sex Partners in the Previous Year



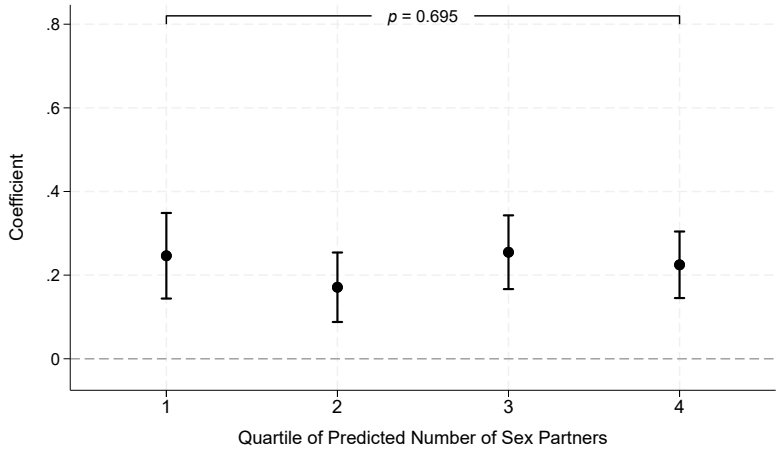
(b) Had Sex in the Previous Month

Notes: These event-study figures plot the coefficients for student 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 and (b) an indicator for whether a student had sex in the previous 30 days. The event-study regressions do not contain any controls except for the school and semester fixed effects. Spring 2013 is the baseline period. For detailed variable definitions, 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



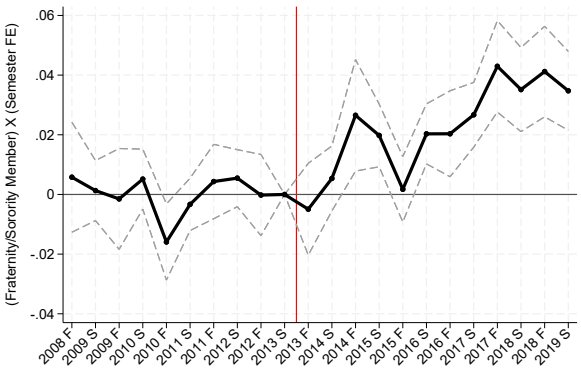
(a) Males



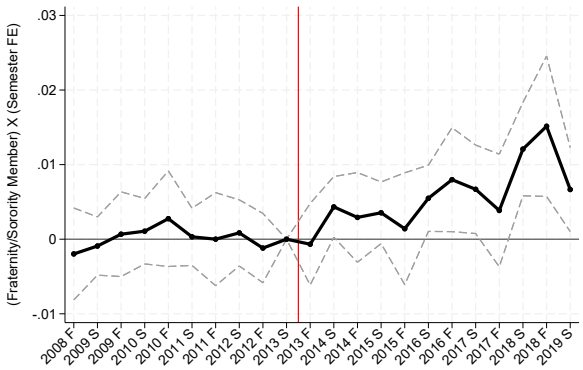
(b) Females

Notes: This figure explores the heterogeneity of Tinder's impact on student sexual activity depending on students' LASSO-predicted number of sex partners. The quartiles are based on values of the LASSO-predicted sexual activity variable for each gender and region cell. For prediction, we use age, gender, race, BMI categories, sexual orientation, and international student status, as well as their square terms and interaction terms, and we train the model only using pre-Tinder data. The p-value at the top of each plot refers to the results of a statistical test for the equality between the top-quartile and the bottom-quartile coefficients; for more details, see Table A8. The upper and lower lines represent 95% confidence intervals. Standard errors are clustered at the college level.

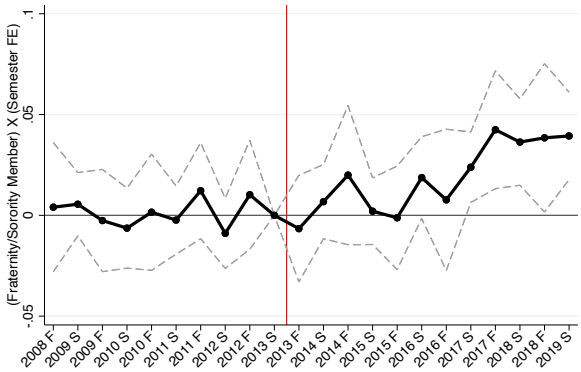
Figure 5: Effect of Tinder's Introduction on Negative Consequences of Sexual Activity



(a) Sexual Assault



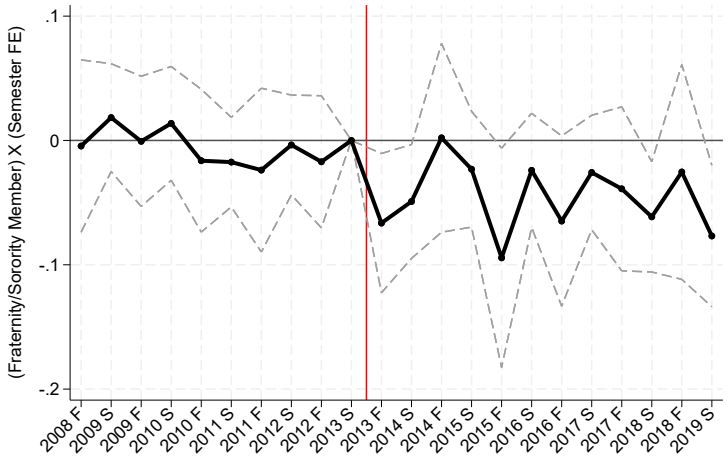
(b) Chlamydia



(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 with or treated for 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 except for the school and semester fixed effects. Spring 2013 is the baseline period. For detailed variable definitions, see Appendix Table A2. 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 the Index of Poor Mental Health for Female Students



Notes: This event-study figure plots the coefficients for Greek membership interacted with semester indicators estimated using Equation (2). It illustrates the evolution of mental health issues for female Greek-life members relative to their female 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 standardized variables related to having experienced various mental health issues within the previous 30 days available in the NCHA survey and standardizing the obtained variable to have a mean of zero and a standard deviation of one in the pre period. Spring 2013 is the baseline period. For detailed variable definitions, see Appendix Table A2. The event-study regression does not contain any controls except for the school and semester fixed effects. 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
Gay/Lesbian	0.03	0.16	0	0	0	1,072,346
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
In relationship	0.47	0.50	0	0	1	1,076,544
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 (previous 30 days)	0.46	0.50	0	0	1	1,098,765
Overwhelmed (previous 30 days)	0.68	0.47	1	1	1	1,098,765
Exhausted (not physically, previous 30 days)	0.66	0.48	1	1	1	1,068,836
Very lonely (previous 30 days)	0.38	0.49	0	1	1	1,098,765
Very sad (previous 30 days)	0.40	0.49	0	1	1	1,098,765
Severely depressed (previous 30 days)	0.18	0.39	0	0	1	1,098,765
Overwhelming anxiety (previous 30 days)	0.35	0.48	0	1	1	1,098,765
Overwhelming anger (previous 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 (previous 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. For the breakdown by Greek membership and post-Tinder-introduction indicator, see Appendix Table A4.

Table 2: Sexual Behavior and Activity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	# of Sex Partners Previous 12 Months		Sex Previous 30 Days		Sex Previous 12 Months		# of Sex Partners (Intensive Margin)	
Fraternity/Sorority × Post	0.220***	0.224***	0.039***	0.029***	0.040***	0.031***	0.134***	0.165***
	(0.029)	(0.029)	(0.005)	(0.004)	(0.005)	(0.004)	(0.031)	(0.031)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓	✓
Has Controls		✓		✓		✓		✓
Observations	1,011,613	1,011,613	1,017,813	1,017,813	1,011,613	1,011,613	681,898	681,898
Mean of dep. var.	1.492	1.492	0.520	0.520	0.674	0.674	2.214	2.214
SD of dep. var.	2.912	2.912	0.500	0.500	0.469	0.469	3.313	3.313

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 after Tinder's full-scale launch. All columns include college-semester fixed effects. Columns (2), (4), (6), and (8) include controls for age, gender, race, grade level, international student status, sexual orientation, 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) Cohabiting	(2) In Relationship	(3) Abusive Relationship	(4) Difficult Relationship	(5) Relationship Problems	(6) Abusive Relationship	(7) Difficult Relationship	(8) Relationship Problems
						Conditional on Being In a Relationship		
Fraternity/Sorority × Post	-0.003	0.004	0.000	-0.000	-0.005	0.002	-0.006	-0.002
	(0.002)	(0.004)	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,021,665	1,021,665	1,020,889	1,018,725	1,013,866	482,206	481,090	478,814
Mean of dep. var.	0.114	0.473	0.105	0.320	0.316	0.115	0.350	0.377
SD of dep. var.	0.318	0.499	0.307	0.467	0.465	0.320	0.477	0.485

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 cohabitating relationship, whether the student was in a relationship (not necessarily cohabiting), 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 for semesters after Tinder's full-scale launch. All columns include college-semester fixed effects and controls (age, gender, race, grade level, international student status, sexual orientation, 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. The results are similar if we estimate these regressions on a subset of students in a relationship (not necessarily cohabiting) instead. 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: 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***	0.016***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.003)
College-semester FE	✓	✓	✓	✓	✓	✓
Has controls		✓		✓		✓
Observations	1,021,581	1,021,581	1,017,685	1,017,685	966,806	966,806
Mean of dep. var.	0.087	0.087	0.013	0.013	0.257	0.257
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 with 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 for semesters after Tinder's full-scale launch. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, sexual orientation, 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: Mental Health

	(1) Hopeless	(2) Over-whelmed	(3) Mentally Exhausted	(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	-0.007**	-0.013***	-0.012***	-0.009**	-0.006*	-0.010***	-0.009***	-0.007**	-0.002*	-0.004***	-0.033***
	(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	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379
Mean of dep. var.	0.463	0.692	0.667	0.388	0.406	0.186	0.354	0.213	0.027	0.032	0.095
SD of dep. var.	0.499	0.462	0.471	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**	-0.016***	-0.016**	-0.006	-0.005	-0.004	-0.007	0.001	-0.001	-0.026**
	(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	334,472	334,472	334,472	334,472	334,472	334,472	334,472	334,472	334,472	334,472	334,472
Mean of dep. var.	0.413	0.571	0.563	0.324	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	0.142	0.174	1.018
Panel C: Females											
Fraternity/Sorority × Post	-0.008*	-0.013***	-0.011***	-0.008*	-0.007*	-0.012***	-0.015***	-0.006	-0.002**	-0.005***	-0.038***
	(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	687,277	687,277	687,277	687,277	687,277	687,277	687,277	687,277	687,277	687,277	687,277
Mean of dep. var.	0.488	0.750	0.717	0.419	0.451	0.202	0.402	0.226	0.030	0.033	0.199
SD of dep. var.	0.500	0.433	0.450	0.493	0.498	0.401	0.490	0.418	0.171	0.178	1.041

Notes: This table presents the estimates of the impact of Tinder's introduction on student mental health. The outcome variables are feeling hopeless, overwhelmed, mentally exhausted, very lonely, very sad, severely depressed (such that it was difficult to function), overwhelming anxiety, overwhelming anger, self-harm, and considering suicide within the previous 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 for semesters after Tinder's full-scale launch. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, sexual orientation, 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: 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	1,013,866	1,012,271	1,013,627	1,011,962	1,013,315	1,014,217	1,013,647	1,013,927
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
Panel B: Males								
Fraternity/Sorority × Post	0.005	0.003***	0.002	0.005	0.002	-0.003	0.002	0.001
	(0.004)	(0.001)	(0.001)	(0.004)	(0.004)	(0.005)	(0.004)	(0.001)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	330,441	330,062	330,691	330,100	330,440	330,698	330,728	330,621
R^2	0.092	0.005	0.005	0.117	0.165	0.251	0.064	0.008
Mean of dep. var.	0.289	0.071	0.068	0.322	0.371	0.434	0.245	0.092
Panel C: Females								
Fraternity/Sorority × Post	-0.002	0.003**	0.000	-0.012***	-0.010***	-0.008*	0.001	-0.002*
	(0.003)	(0.001)	(0.001)	(0.003)	(0.004)	(0.004)	(0.002)	(0.001)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	681,814	680,598	681,323	680,255	681,268	681,909	681,306	681,695
R^2	0.108	0.015	0.004	0.159	0.256	0.348	0.051	0.016
Mean of dep. var.	0.311	0.121	0.062	0.366	0.437	0.476	0.220	0.124

Notes: This table presents the estimates for whether the issues affected by the introduction of Tinder had any downstream implications for 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 for semesters after Tinder's full-scale launch. All columns include college-semester fixed effects and controls (age, gender, race, grade, international student status, sexual orientation, 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.

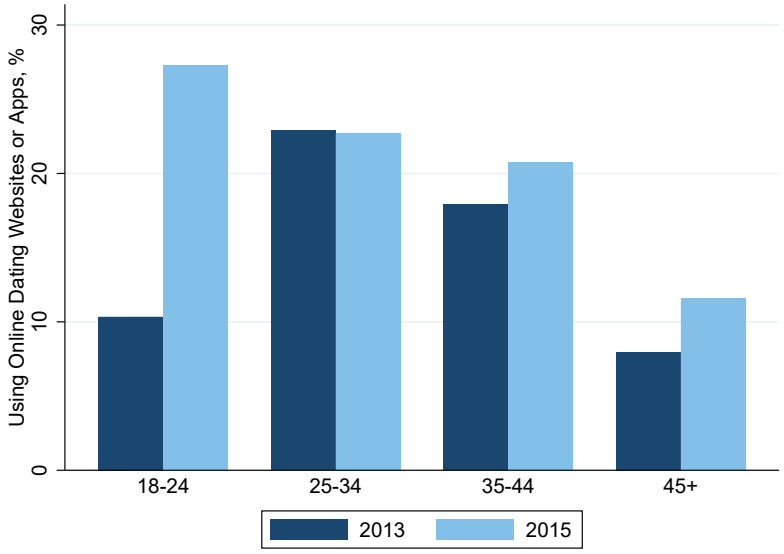
Table 7: Alternative College-Level Specification

		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 cohabiting relationship, (4) the average value of the index of poor mental health among students, (5) the share of students who had been diagnosed with or treated for chlamydia within the previous 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 were a part of Greek-life organizations and an indicator for semesters after Tinder's full-scale launch. All specifications include college and survey-wave fixed effects. College-level controls are created by taking the mean value of individual-level indicator controls (gender, race, grade, international student status, and sexual orientation) and the median value of individual-level continuous controls (age, 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.

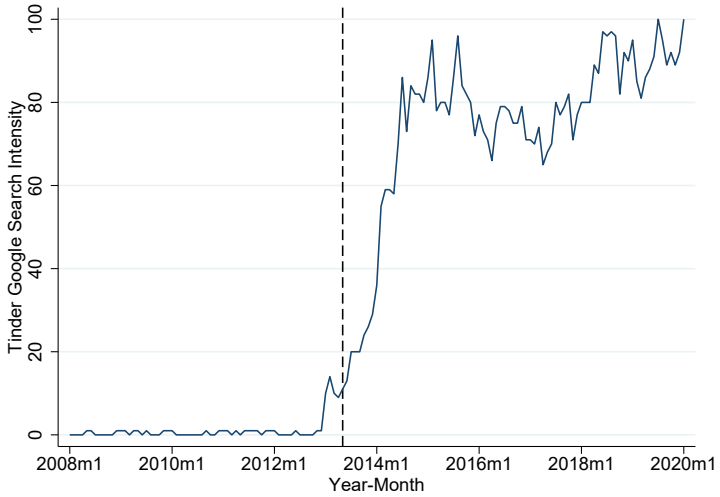
Online Appendix

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



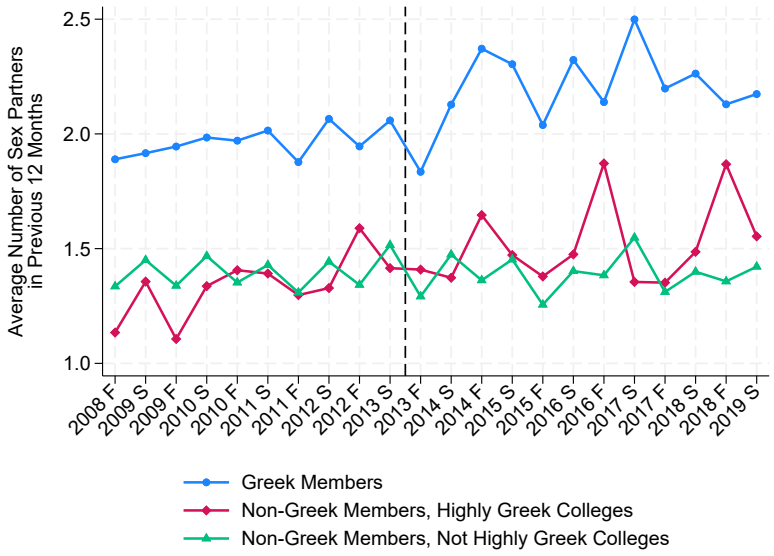
Notes: The figure illustrates the rapid, disproportionate growth in the share of young adults using dating websites or apps following Tinder's full-scale launch in the summer of 2013. The data come from the Pew Internet and American Life Survey conducted April 17 to May 19, 2013, and from the Pew Tracking Survey conducted June 10 to July 12, 2015.

Figure A2: Google Trends for "Tinder" in the United States from 2008 to 2020



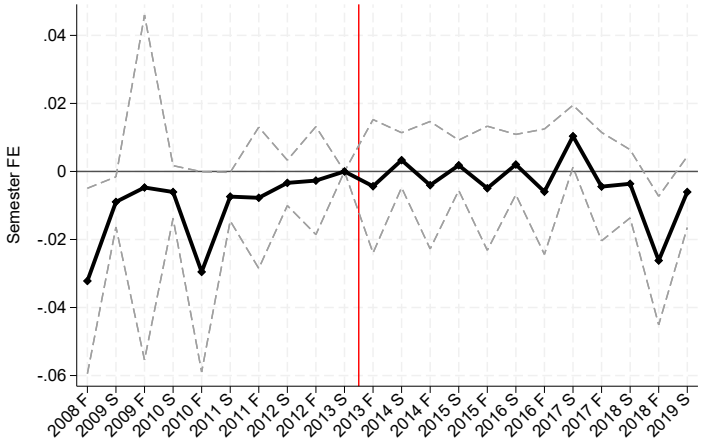
Notes: This figure shows the search intensity for the app "Tinder" on Google from January 2008 to January 2020 (roughly matching the time coverage of the NCHA data). The black dashed line indicates the release of the swipe feature on the app.

Figure A3: The Average Number of Sex Partners Between Greek and Non-Greek Members



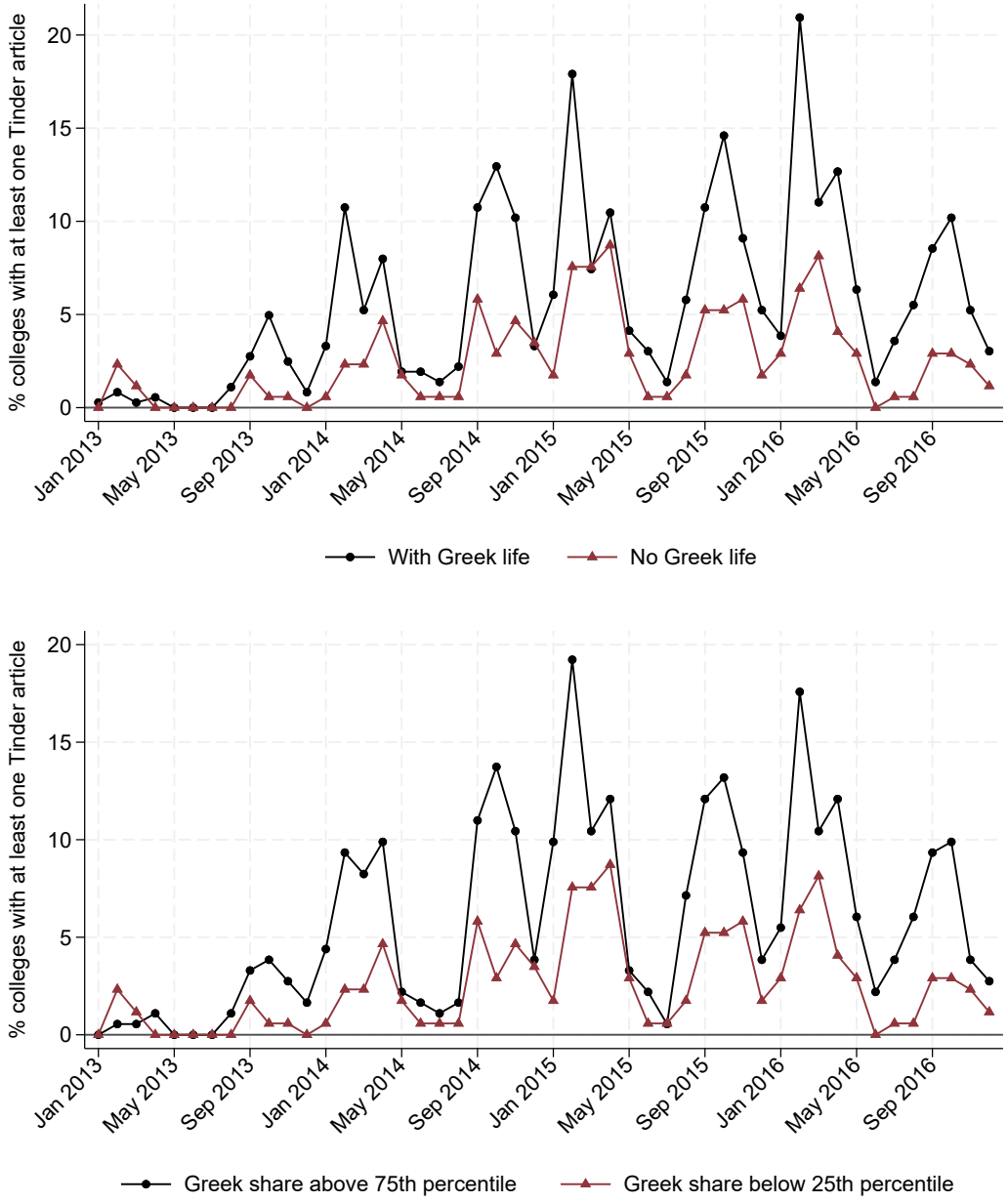
Notes: This figure presents the evolution of the average number of sexual partners in the previous 12 months for Greek and non-Greek members across semesters, with the latter group split by whether a non-Greek member is at a college with the share of Greek students above the 90th percentile in the sample. The data source is the NCHA survey; the sample is restricted to undergraduate students.

Figure A4: Evolution of the Share of Undergraduate Students Involved in Greek Life



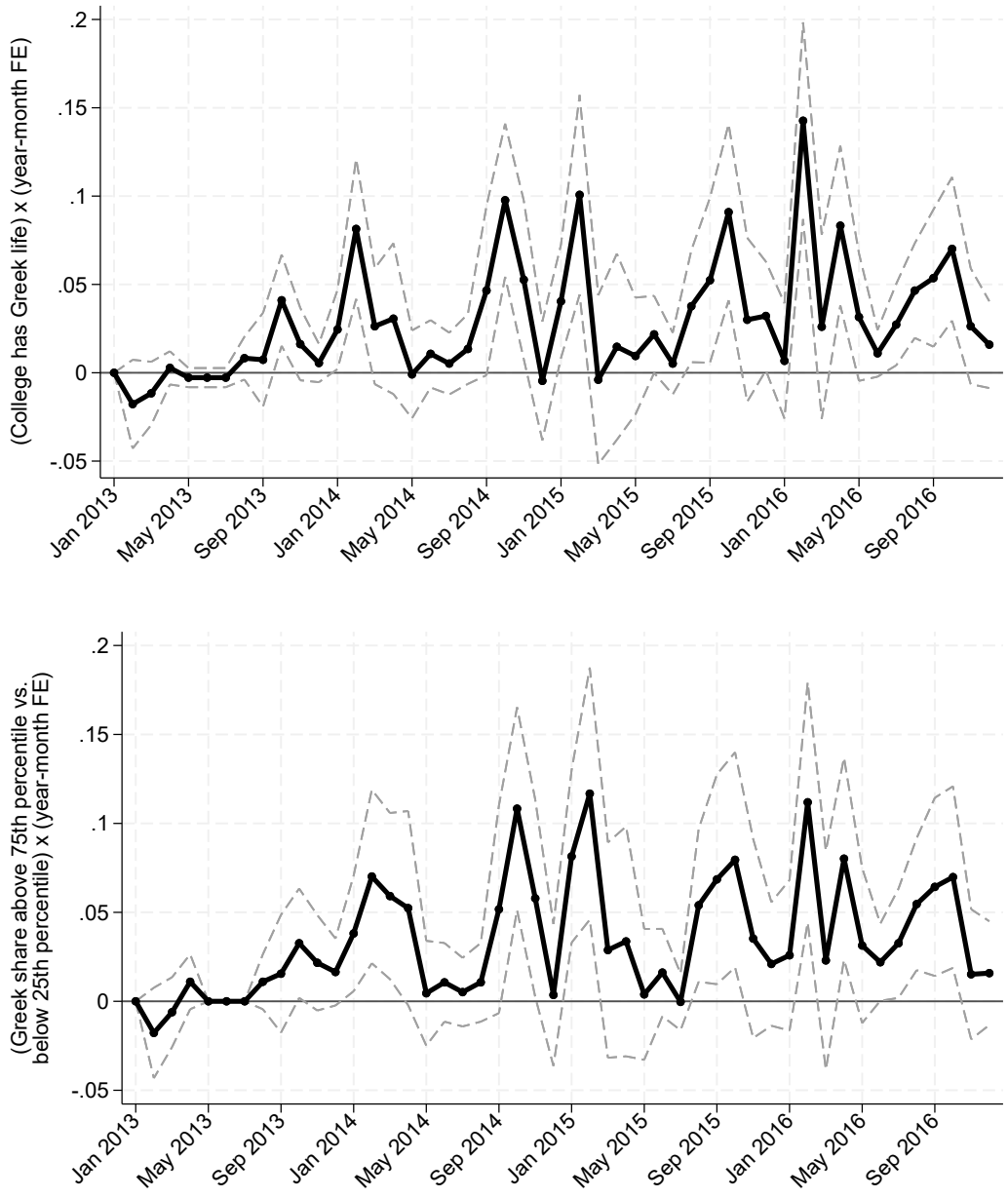
Notes: This figure presents the evolution of the share of undergraduate students who were involved in Greek life. It presents the estimates of a college-semester-level specification, regressing the share of students in Greek organizations on the semester fixed effects, taking Spring 2013 as the baseline period. The upper and lower lines represent 95% confidence intervals.

Figure A5: Share of Colleges With Newspaper Articles Mentioning Tinder



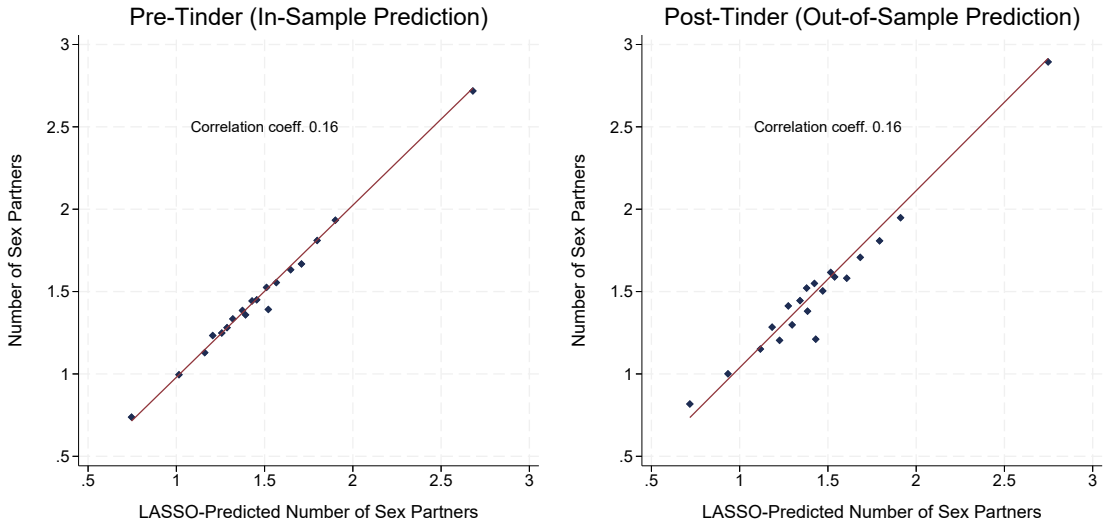
Notes: The top figure illustrates the evolution of the share of colleges with at least one article containing the keyword *Tinder* in a given month, separately for colleges with and without Greek life, from January 2013 through December 2016. The bottom figure shows the same trend for colleges in the bottom quartile 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.

Figure A6: Colleges With Newspaper Articles Mentioning Tinder, Difference-in-Differences Estimates



Notes: The figures present the difference-in-differences equivalents of the data patterns presented in Figure A5, illustrating that colleges with more active Greek life were more likely to have newspapers publish articles mentioning Tinder. Specifically, we estimate $Y_{ct} = \alpha_c + \sum_{t=Jan2013}^{Dec2016} \beta_t \times Greek_c + \varepsilon_{ict}$ where Y_{ct} stands for the indicator of whether newspapers in college c had at least one article containing the keyword *Tinder* in a given month t, and α_c and β_t are the college and year-month fixed effects, respectively. For the top figure, $Greek_c$ takes the value of 1 if college c has Greek life and 0 otherwise. For the bottom figure, $Greek_c$ takes the value of 1 if the share of Greek students at college c is in the top quartile and takes the value of 0 if it is in the bottom quartile. The figures display the coefficients β_t. January 2013 is the baseline period. Standard errors are clustered at the college level. Data on the college newspapers come from LexisNexis; data on Greek organizations are from the Common Data Set.

Figure A7: Relationship Between the LASSO-Predicted and Actual Number of Sex Partners



Notes: This figure explores the relationship between our LASSO-predicted number of sex partners and the actual number of sex partners a student reported having in the previous year. Specifically, for each ventile of our LASSO-predicted number of sex partners, the figure plots the average predicted number of sex partners against the average actual number of sex partners. See Section 7.1.1 for details of the LASSO procedure. The left panel presents data from the period before the Tinder's full-scale launch; the right panel presents data from the period after Tinder's full-scale launch. Since the LASSO algorithm is trained on pre-period data, the left figure shows in-sample predictions, whereas the right figure shows out-of-sample predictions. The figure also displays correlation coefficients between LASSO-predicted and actual number of sex partners.

Table A1: Top 30 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 fully launched by the time the respondent took the survey (after the summer of 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}.
In relationship	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 = {2,3}; 0 = {1}.
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 A2: 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 A2: Variables: Definitions, Constructions, and Associated NCHA Survey Questions (cont.)

Variable	Description
Control Variables	
Female	Question: "What is your gender?"; Coding: 1 = female; 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%.
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.
Body Mass Index (BMI)	Calculated by the ACHA following the standardized formula, weight (in kg) per height (in m) squared.
High Blood Alcohol Content (BAC)	Estimated blood alcohol content at the time of the survey is above 0.08. Estimated by ACHA based on the reported number of drinks and number of hours for the last time students partied/socialized, weight, as well as estimates for total body water weight and the average rate of alcohol metabolism. Follows the formula provided by the U.S. Department of Transportation.
On-campus living	Question: "Where do you currently live?"; Scale: 1 = Campus residence hall; 2 = Fraternity or sorority house; 3 = Other college/university housing; 4 = Parent/guardian's home; 5 = Other off-campus housing; 6 = Other. Coding: 1 = {1,2,3}; 0 = {4,5,6}.
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	
Region	The region where the campus is located; 1 = Northeast, 2 = Midwest, 3 = South, 4 = West.

Table A3: Online Dating Patterns Among the 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 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 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 1 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 contained one or more of the following strings: *internet, online, Facebook, Myspace, Craigslist, eHarmony, .com*; otherwise, the indicator is equal to 0.
4: The variable is constructed as equal to 1 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 of users of mobile phone 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: 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)	
Gay/Lesbian	506	0.03	503	0.02	538	0.03	527	0.02	0.372
		(0.00)		(0.00)		(0.00)		(0.00)	
Living on campus	506	0.47	503	0.52	538	0.51	527	0.53	0.401
		(0.01)		(0.01)		(0.01)		(0.01)	

Notes: This table presents the average characteristics of Greek and non-Greek students across colleges before and after Tinder's full-scale launch. 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 A5: 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***		
	(0.046)			(0.378)		
Share of Students in Fraternities Above Median		0.119***			1.257**	
		(0.045)			(0.579)	
Share of Students in Sororities Above Median			0.117***			1.497***
			(0.045)			(0.565)
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 Tinder mentions in associated college newspapers. 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. Robust standard errors are in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A6: Google Trends—First-Stage Results

	Google Top 100 "Tinder" Search Intensity		
	(1)	(2)	(3)
College Has Greek Life	0.052**		
	(0.021)		
Share of Students in Fraternities Above Median		0.042*	
		(0.022)	
Share of Students in Sororities Above Median			0.060***
			(0.022)
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 where the college is located ranks in the top 100 in terms of Google search intensity for *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. Robust standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table A7: App-Usage Data—First-Stage Results

	Average Daily Use of Tinder During AY 2017–2018		
	(1)	(2)	(3)
College Has Greek Life	0.002***		
	(0.001)		
Share of Students in Fraternities Above Median		0.003***	
		(0.001)	
Share of Students in Sororities Above Median			0.003***
			(0.001)
Observations	466	458	458
Mean of dep. var.	0.012	0.012	0.012
SD of dep. var.	0.010	0.010	0.010

Notes: This table presents the relationship between the presence of Greek life at a college and and the average daily usage rate of Tinder within the college's zip codes. The daily usage rate is calculated as the number of devices using Tinder in a given day divided by the total number of devices for which one of college's zip codes is the most frequently appearing location during that day. We analyze this relationship for the earliest academic year that the data on Tinder use became available, from September 21, 2017, through May 15, 2018. Each observation is a college. Data on app usage and device location come from Complementics; data on Greek organizations are from the Common Data Set. Observations are weighted by the logarithm of the total number of devices most frequently appearing in the college's main zip code. Robust standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table A8: Heterogeneity By Predicted Sexual Activity and Respondent Gender

	(1)	(2)
	# of Sex Partners Previous 12 Months	
Subsample:	Male	Female
Fraternity/Sorority × Post	0.232**	0.246***
	(0.107)	(0.052)
Fraternity/Sorority × Post × 2nd Quartile Predicted Sexual Activity	-0.030	-0.075
	(0.144)	(0.062)
Fraternity/Sorority × Post × 3rd Quartile Predicted Sexual Activity	0.124	0.008
	(0.140)	(0.063)
Fraternity/Sorority × Post × Upper Quartile Predicted Sexual Activity	0.292*	-0.025
	(0.170)	(0.064)
College-Semester FE	✓	✓
Has Controls	✓	✓
Observations	329,739	680,290
Mean of dep. var.	1.759	1.357
SD of dep. var.	3.862	2.238

Notes: This table explores the heterogeneity of the baseline estimates for the impact of Tinder's introduction on sexual activity by 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 modified baseline specification where we interact the indicator for semesters after Tinder's full-scale launch with the indicator for a student's fraternity or sorority membership and with the parts of the distribution of the LASSO-predicted levels of sexual activity. Column (1) presents the results for male students; column (2) presents the results for female students. For the LASSO prediction, we use age, gender, race, BMI categories, sexual orientation, and international status, as well as their square terms and interaction terms, and we train the model using only the data before Tinder's full-scale launch. All columns include college-semester fixed effects and baseline 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.

Table A9: Mental Health (Excluding Sexually Abused Individuals)

	(1) Hopeless	(2) Over-whelmed	(3) Mentally Exhausted	(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**	-0.014***	-0.012***	-0.012***	-0.009**	-0.012***	-0.013***	-0.010***	-0.002**	-0.005***	-0.041***
	(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	932,581	932,581	932,581	932,581	932,581	932,581	932,581	932,581	932,581	932,581	932,581
Mean of dep. var.	0.454	0.683	0.656	0.370	0.389	0.171	0.338	0.202	0.023	0.028	0.045
SD of dep. var.	0.498	0.465	0.475	0.483	0.487	0.377	0.473	0.401	0.150	0.164	1.014

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, mentally exhausted, very lonely, very sad, severely depressed (such 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 for semesters after Tinder's full-scale launch. 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 A10: Mental Health (Controlling for Sexual Activity)

	(1) Hopeless	(2) Over-whelmed	(3) Mentally Exhausted	(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***	-0.011***	-0.010***	-0.013***	-0.014***	-0.012***	-0.003***	-0.005***	-0.044***
	(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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Baseline controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sexual-activity controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	919,105	919,105	919,105	919,105	919,105	919,105	919,105	919,105	919,105	919,105	919,105
Mean of dep. var.	0.454	0.684	0.657	0.371	0.389	0.171	0.338	0.202	0.023	0.028	0.047
SD of dep. var.	0.498	0.465	0.475	0.483	0.488	0.377	0.473	0.401	0.150	0.164	1.013

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 Tinder's impact 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, mentally exhausted, very lonely, very sad, severely depressed (such 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 for semesters after Tinder's full-scale launch. 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 A11: Robustness: Student Characteristics Interacted With the Post 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	0.188***	0.023***	-0.000	-0.038***	0.005***	0.011***	0.012***
	(0.025)	(0.004)	(0.004)	(0.008)	(0.001)	(0.003)	(0.002)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓
Controls × Post	✓	✓	✓	✓	✓	✓	✓
Observations	994,404	999,941	1,003,279	1,004,944	999,763	949,826	1,003,325
Mean of dep. var.	1.482	0.521	0.473	0.088	0.013	0.256	0.086
SD of dep. var.	2.822	0.500	0.499	1.038	0.113	0.437	0.281

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 baseline controls (age, gender, race, grade, international student status, height, and BMI) and the additional controls (living on campus and having high blood alcohol content at the moment of the survey) with the post-Tinder-introduction indicator for semesters after Tinder's full-scale launch. 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 A12: Robustness: LASSO-Predicted Sexual Activity Interacted With the Post 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	0.219***	0.029***	0.003	-0.041***	0.006***	0.016***	0.020***
	(0.028)	(0.004)	(0.004)	(0.008)	(0.001)	(0.003)	(0.002)
College-semester FE	✓	✓	✓	✓	✓	✓	✓
Baseline controls	✓	✓	✓	✓	✓	✓	✓
LASSO # of sex partners × Post	✓	✓	✓	✓	✓	✓	✓
Observations	1,011,613	1,017,813	1,021,665	1,022,509	1,019,154	966,806	1,021,581
Mean of dep. var.	1.492	0.520	0.473	0.086	0.019	0.257	0.087
SD of dep. var.	2.912	0.500	0.499	1.024	0.135	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 post-Tinder-introduction indicator for semesters after Tinder's full-scale launch. For prediction, we use age, gender, race, BMI categories, sexual orientation, and international status, 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 A13: Robustness: LASSO-Predicted Greek Status 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	0.223***	0.030***	0.003	-0.043***	0.006***	0.015***	0.018***
	(0.029)	(0.004)	(0.004)	(0.008)	(0.001)	(0.003)	(0.002)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓	✓
LASSO Greek status × Post	✓	✓	✓	✓	✓	✓	✓
Observations	1,011,613	1,017,813	1,021,665	1,022,509	1,019,154	966,806	1,021,581
Mean of dep. var.	1.492	0.520	0.473	0.086	0.019	0.257	0.087
SD of dep. var.	2.912	0.500	0.499	1.024	0.135	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 Greek status of a respondent with the post-Tinder-introduction indicator for semesters after Tinder's full-scale launch. For prediction, we use age, gender, race, BMI categories, sexual orientation, and international status, 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 A14: 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	0.000	-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	✓	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓	✓
Observations	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379	1,023,379
Mean of dep. var.	0.011	0.005	0.002	0.001	0.004	0.055	0.002
SD of dep. var.	0.107	0.074	0.041	0.029	0.064	0.229	0.042

Notes: This table examines the possible differential changes in misreporting after Tinder's introduction by estimating whether nonresponse rates for our main outcomes change differentially for Greek students and non-Greek students before and after Tinder's full-scale launch. 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 A15: Robustness: Financial Issues

	(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	0.227***	0.028***	-0.002	-0.028***	0.006***	0.016***	0.019***
	(0.027)	(0.004)	(0.002)	(0.007)	(0.001)	(0.003)	(0.002)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓
Baseline Controls	✓	✓	✓	✓	✓	✓	✓
Financial Controls × Post	✓	✓	✓	✓	✓	✓	✓
Observations	996,531	1,002,707	1,005,769	1,007,372	1,003,655	953,218	1,005,808
Mean of dep. var.	1.490	0.520	0.114	0.097	0.013	0.257	0.087
SD of dep. var.	2.895	0.500	0.317	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 including students' financial characteristics. The additional financial controls include whether the student had financial difficulties in the previous 12 months and their working hours per week (paid or volunteer). 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 A16: 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	0.218***	0.033***	0.007*	-0.037***	0.006***	0.017***	0.019***
	(0.033)	(0.005)	(0.004)	(0.008)	(0.001)	(0.004)	(0.003)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓
Observations	760,464	765,016	767,895	769,139	764,923	727,448	767,842
Mean of dep. var.	1.506	0.522	0.472	0.092	0.013	0.256	0.087
SD of dep. var.	2.949	0.500	0.499	1.042	0.113	0.436	0.281
Panel B: Omit Colleges With Any Decline in Greek Share Pre/Post Fall 2013							
Fraternity/Sorority × Post	0.210***	0.029***	0.008*	-0.040***	0.007***	0.017***	0.019***
	(0.039)	(0.006)	(0.004)	(0.009)	(0.001)	(0.004)	(0.003)
College-Semester FE	✓	✓	✓	✓	✓	✓	✓
Has Controls	✓	✓	✓	✓	✓	✓	✓
Observations	395,072	397,111	398,573	399,194	396,991	377,245	398,531
Mean of dep. var.	1.577	0.521	0.457	0.079	0.013	0.241	0.091
SD of dep. var.	3.013	0.500	0.498	1.026	0.112	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 students had declined. This addresses a potential concern about certain colleges concurrently cracking down on Greek life. The estimates in Panel A omit colleges for which the share of Greek students had 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 had 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.