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Abstract

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JEL Classification: D74, D91, K42, Z13

Keywords: Social norms, Violence, sexual assault, rape, Alcohol

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Alcohol, Behavioral Norms and Sexual Violence on U.S. College Campuses

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March 24, 2022

Abstract

This paper explores the role of social norms in influencing the incidence of sexual assault, and the contribution of alcohol to such events. We build a decision theoretic model where agents may use alcohol as a "disinhibitor" to undermine social norms discouraging consensual sexual encounters outside marriage. This makes non-consensual encounters more likely. Stronger norms against consensual sex might therefore increase the incidence of non-consensual sex. We test the theory on data from US college campuses, using the presence of Planned Parenthood clinics in the county as an indicator of norms more accepting of consensual sex. Controlling for other factors, colleges in counties with fewer clinics have more incidents of rape and sexual assault in which alcohol is implicated. Colleges affiliated to the National Collegiate Athletic Association also have more such incidents, suggesting that sporting institutions also act as facilitators of a culture of sexual aggression. We provide suggestive evidence from attitudinal surveys and from campus religious affiliation that disapproval of consensual sex may indeed be involved. We explore rival explanations such as reporting and selection biases.

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1 Introduction

What is the role of cultural factors, including social norms, in determining the incidence of sexual assault? The #MeToo movement has brought to the fore questions about the extent to which presuppositions about the acceptability or unacceptability of certain patterns of behavior shape the risks of sexual assault. It is not enough to consider legal rules and the resources invested in enforcement of the law: the expectations of actual and potential victims, perpetrators and enforcement authorities also have a large impact on the probability that individuals will face assaults in any given social and physical environment.

In this paper we examine the interaction between norms against consensual and non-consensual sex. We do so in the context of US college campuses, where there is evidence of a serious and widespread problem of sexual assault. An estimated 20-25% of college-age women are at risk of victimisation over the course of their degree [14] [18]. Female college students are three times more likely to experience sexual assault compared to the general population of women, and sexual violence is especially prevalent in colleges, compared to other crimes [1].

A widely held view is that lax norms concerning consensual sex contribute to the weakening of norms against non-consensual sex. For instance, the *New York Times* columnist Ross Douthat, writing in 2014, blamed rape and sexual assault on college campuses on "a fun, even bacchanalian lifestyle... where teens and early-twentysomethings are barely supervised and held to no standard higher than consent... a hard-drinking, sexually permissive culture" [9]. Similarly, retired Pope Benedict XVI has drawn fire for blaming sexual assault within the Catholic church on the "swinging sixties" [3][1]. However, the absence of strong norms against consensual sex is not the same thing as the absence of strong norms against sexual assault, and it is an open question whether the absence of the former has any impact on the presence and strength of the latter. Answering this question is the purpose of our paper.

We find evidence that the relation between norms governing consensual and non-consensual sex is not as predicted by the "permissiveness" hypothesis, and may even be the opposite. Controlling for other relevant factors, stronger norms against consensual sex are statistically associated with a *higher* incidence of sexual assault in the presence of alcohol. We find no robust association with incidents not involving alcohol, which would imply a likely increase in overall incidence, though our data are too noisy to support that overall conclusion. While we must be careful in inferring causality, it seems likely that such norms do in fact lead to an increased risk of assault in which alcohol is involved. Why?

The answer appears to lie in the role of alcohol as a "disinhibitor". It is well

[1] see https://www.theguardian.com/world/2019/apr/11/ex-pope-benedict-xvi-blames-sexual-abuse-on-swinging-sixties

known that high alcohol consumption is associated with increased incidence of assault in a wide range of contexts, although the nature of the causal mechanism is far from settled. However, alcohol consumption does not strike individuals at random, like the weather. It is a choice, and one reason individuals choose to consume alcohol may be that they wish to weaken the hold that certain norms have over them, especially norms that might lessen their enjoyment of activities such as consensual sex. But weakening the hold of norms is risky - it may not weaken only the norms intended. A predictable consequence of alcohol consumption is to weaken norms against assault.

Our approach is as follows. First, we develop a decision-theoretic model of interactions between potential perpetrators and potential victims of sexual assault. These interactions are governed by an assessment of costs and benefits, and among these costs are the costs of violating various norms, including those governing consensual and non-consensual sex. However, these costs are not immutable; they can be subjectively manipulated by the use of various disinhibiting technologies - most obviously the consumption of alcohol. We assume that perpetrators would prefer to have consensual sex, and it is when their overtures are refused that they are tempted to resort to assault. In the presence of stronger norms against consensual sex there will be greater resort to alcohol as a disinhibitor, and this will lead to an increased incidence of assault.

We then test the model on a comprehensive dataset of sexual assaults and rapes on US college campuses from 1997 to 2019. An important feature of this dataset is that it records whether the victim believed that the perpetrator was under the influence of alcohol at the time of the assault. We find that, controlling for other relevant factors, colleges located in counties with a presence of Planned Parenthood clinics, which are likely to have weaker norms against consensual sex, have lower frequency of both rape and sexual assault in the presence of alcohol. There is suggestive but statistically weaker evidence that the opposite is true of campuses with a religious affiliation, which are likely to have stronger norms against consensual sex. As predicted by the model, these associations are strong for assaults where alcohol is recorded as a contributing factor, and absent or weakly negative for incidents without the involvement of alcohol. Restrictions on campus availability of alcohol do not appear effective in reducing incidents, though endogeneity may be a factor, as campuses with higher incidents of alcohol-fueled sexual assault may be more likely to ban alcohol in response.

Although our data document the use of alcohol as a disinhibitor, the lessons from the study are much wider. Many societies employ, deliberately or not, various institutional mechanisms for enabling individuals to disinhibit themselves from the influence of social norms the society itself imposes. The saying "what happens in Vegas stays in Vegas" indicates that the city of Las Vegas positions itself not just as a place where the *legal* restrictions on commercial sex and on gambling are looser than elsewhere in the US, but also where the moral norms surrounding such activities are looser as well. As a marketing pitch it invites people to choose strategically to visit the city in order

to overcome the inhibiting effect of norms and not just the practical restrictions of the law. Even after they return home they can feel entitled to consider "what happened in Vegas" as less of a norm violation than it would have been had the same behavior occurred in another place.

In a different vein, the controversy surrounding the nomination of Brett Kavanaugh to the US Supreme Court in September 2018 cast a less than flattering light on the role of fraternities in many US universities, particularly as an environment in which young men could pursue sexual conquests with many fewer of the inhibiting norms they would encounter during interactions with women in other contexts. Similar things may be true of certain sporting associations on college campuses; we report evidence to that effect below. Many institutions in many countries have historically played such a disinhibiting role, including hazing rituals for newcomers, Hallowe'en and other festivals, and rituals permitting gestures of disrespect for figures of authority that would not be permitted at other times. Our analysis suggests that the effect of strengthening norms cannot be considered in isolation from technologies and institutions that permit people to circumvent those norms. This links to a more general literature on circumstances in which individuals strategically adjust their behavior to take account of the way in which norms will constrain their actions in the future [11].

The paper is structured as follows. In Section 2 we review the existing literature on the causes of sexual assault. In Section 3 we set out our model and derive the main empirical predictions. Section 4 describes the data and provides basic descriptive statistics; it also discusses questions about the reliability of the data, and considers to what extent reporting biases may generate spurious results. Section 5 tests our model predictions and considers a range of robustness tests, and Section 6 concludes.

2 Literature Review

2.1 The link between alcohol and violence

That a link between alcohol and sexual violence exists has been the subject of extensive documentation. Experimental evidence has shown men to display heightened sexual aggression after consuming alcohol [8]. This is supported by observational data showing that "party culture" and situations where alcohol is involved result in more cases of rape being reported to the police [29]. Further, substance use on the part of the offender is related to higher probability of a completed assault rather than an attempted one, and higher probability of injury to the victim, regardless of whether the victim drank or used drugs themselves [5].

Several theories have been put forward to explain the exact mechanism by which alcohol results in heightened aggression. Apart from the fact that alcohol is a depres-

sant, and therefore diminishes subjects' general sensitivity to external stimuli, there is evidence that alcohol differentially diminishes sensitivity to pains, including future pains [21, Chapter 4]. This provides clinical support for a key feature of our model, which is that alcohol leads individuals to discount future psychological and social costs of their actions, more than it leads them to discount future *benefits* of their actions.

Expectations matter too. The alcohol expectancy theory suggests that the mere fact that individuals *expect* alcohol consumption to result in more aggression is enough for it to do so. Stappenbeck and Fromme [42] hypothesize that alcohol contributes to aggression by a) narrowing focus to most salient cues, b) lowering inhibitions, and c) interfering with the ability to regulate one's emotions. They find that alcohol is indeed significantly related to heightened intentions of physical and verbal aggression, but are unable to untangle to what extent (if any) expectations play a role. However, a key result of the study is that, in the presence of alcohol, cognitive reappraisal[2] was effective at reducing intentions of verbal and physical aggression.

Exploring the mechanisms involved matters for understanding the clear statistical link between the availability of alcohol and the incidence of assaults. To echo an argument made in a different context, alcohol does not rape people - rapists do. But this observation does not imply that the ease with which alcohol is available has no impact on the choices made by rapists. In the case of firearms, there is growing awareness that an increase in the incidence of firearms in the population can make it more likely that a particular owner of a firearm will use it to kill someone. As O'Flaherty and Sethi [33] put it: "People sometimes kill simply to avoid being killed". Similarly, even if sexual assault results from choice rather than a purely mechanical process, an increase in the ease with which alcohol can be obtained will affect the choices that potential sexual aggressors make.

2.2 Other factors affecting the incidence of sexual violence on college campuses

Institutional policy and campus characteristics play a crucial role in the overall incidence of sexual assault. Among the most influential factors documented to date are the proportion of the student body living on campus, membership of the National Collegiate Athletic Association (NCAA), and campus alcohol policy [43]. Empirical analyses have also provided some support for the idea that all-male peer groups such as fraternities serve as a disinhibitor, facilitating sexual assault in much the same way as alcohol, and often in conjunction with it [19]. Beyond this, colleges often do not provide adequate protection for victims or measures of redress, which are especially crucial given that, of men who self-report acts of rape, a majority report multiple such acts, with an average of around fourteen rapes per offender. Furthermore, "[t]he rate

[2] An emotional regulation technique that modifies an emotional response by reinterpreting the event that elicited it, e.g. by reinterpreting a disappointing exam result as an opportunity to challenge or better oneself.

of campus peer sexual violence and the high non-reporting rate perpetuate a cycle whereby perpetrators commit sexual violence because they think they will not get caught or because they actually have not been caught." [7].

There is also evidence documenting attitudes towards casual sex in the U.S. in general, and among U.S. university students in particular. While the proportion of Americans who believe casual sex is "not wrong at all" has been steadily rising – from under 30% in the 80s to almost 50% and in the 2000s, and finally near 60% from 2010 [45], a substantial portion remains which does not approve of "hookup culture". A significant double-standard among college students also exists, with men reporting more openness to casual sex than women, but also more judgmental attitudes toward women than toward men who have casual sex [12]. However, more permissive attitudes towards casual sex may not result in more casual sex overall: a study of the 1988-1996 and 2004-2012 waves of the General Social Survey (GSS) found that college students interviewed in the latter wave did not report having more sexual partners, despite this greater permissiveness [31].

2.3 Reporting Sexual Violence to Police

Although sexual violence is widespread, it is widely regarded as the most underreported crime of all, with estimates of reporting rates generally falling in the 25 - 35% range, even for recent years. Most rapes go unreported; in general, victims of sexual crimes do not report their victimisation via formal channels, and instead disclose to informal support networks, most usually female friends [34] [**?**] [35]. Past research has found that rates of reporting to the police are substantially lower when alcohol or drugs were involved [37]. Conversely, there is a clear and positive association between injury to the victim and whether the incident is reported to the police [10].

The National Crime Victimization Survey (NCVS), a yearly survey conducted by the Bureau of Justice Statistics, sheds some light on victim underreporting; however, it has also been criticised for underestimating the true extent of victimisation, despite ostensibly being designed to do so. Mccauley et al. [30] show that using behaviorally specific questions (as opposed to simply asking individuals if they have been victims of a sexual assault) leads subjects to disclose higher levels of victimisation.

Most surveys of victims of sexual violence who did *not* report the crime to police tend to find similar answers when asking why. One of the most commonly cited reasons is fear of reprisal by the perpetrator if the victim and perpetrator are acquainted; however, two other widespread reasons are that the victim "didn't think it was serious enough" or "handled the incident without police involvement" (e.g. [15]).

One possible theory put forward to explain this phenomenon is that victims "maintain a rape script that defines expectations for the roles, rules, and events that take place in a rape scenario", and any deviations from this 'script' reduce the likelihood

not only of reporting the crime but even of recognizing it as a crime [47]. A study among female inmates who were victims of sexual assault found that, although belief in "rape myths"[3] was low overall, women who reported more belief in these myths were less likely to have reported the crime to police [22]. Denying or trivialising the incident is a psychological self-defense mechanism [46] [47].

Expectations of the process also play an important part in the decision to report [25]. Of reported cases, only around 50% result in positive identification of a suspect [44] [20], and perhaps a third of these result in an arrest [44]. Sexual assault cases have lower odds of clearance by arrest, and higher odds of exceptional clearance, than other cases [40].

Here, too, alcohol plays a significant role. Experimental research has shown that the more intoxicated a (theoretical) victim is, the more likely police officers were to disbelieve the victim's version of events relative to the alleged perpetrator, and the less blame they allocated to the perpetrator [38]. The relationship between victim and perpetrator also matters: though past research has found that acquaintance rape/sexual assault is more likely to lead to a positive identification of the suspect, controlling for a positive identification of the suspect, cases where the victim and offender were strangers were more likely to lead to an arrest [4] [44] [27].[4]

Other factors that influence likelihood of clearance via arrest are injury to the victim (crime seriousness), which is associated with higher likelihood of a successful identification and clearance by arrest [44]; evidentiary strength (including, for example, whether a rape kit test was conducted); and victim cooperation. Consistent with this hypothesis, cases where the victim resisted the offender have been shown to have higher rates of suspect identification [24]. Indeed there is reason to believe victims themselves take evidentiary strength into account when deciding whether to report [17].

3 The Model

3.1 Basic set-up

An individual student on a college campus seeks to encounter possible sexual partners. In keeping with the statistical regularity that the majority of perpetrators of

[3] Such as, for example, the belief that most rape is perpetrated by strangers to the victim.

[4] Past research has also attempted to investigate the sexual stratification hypothesis. This hypothesis regards sexual "access" as a commodity which is distributed according to a group's relative power; it argues that police and prosecutors will respond more severely to sexual assault cases with a white victim and black offender, and least seriously to those with a black victim and white offender. Although past research has provided some limited support for this hypothesis [26] [39] [41]. If indeed the sexual stratification hypothesis was true in the past, its hold appears to have weakened considerably.

sexual assault are male and majority of their victims are female, we will refer to the student as "he" and the potential victim as "she", while acknowledging that assault perpetrators may be females and victims may be males, and that assault is an issue in a homosexual as well as in a heterosexual setting.

In a given time period, the student may be presented with an opportunity to make a sexual proposition to a potential partner. This occurs with some probability p, which may be influenced in various ways by both the student and by third parties, including college authorities. The potential partner may accept the sexual proposition or may refuse. If the partner refuses, the student may choose to accept the refusal, or to override the refusal by assaulting the partner. In this set-up we do not model explicitly the strategic determinants of the partner's decision whether or not to accept the proposition, but assume that this occurs with a certain probability q (which may be affected by a number of factors). Instead we focus on the decision problems of the student, since we are interested in the interaction between the student's decisions when sober and his decisions when drunk.[5]

Various factors may influence how these encounters develop. We can think of these as divided into two main categories: temperament and circumstances. Temperament consists of any psychological or other factors that might make two individuals behave differently in similar circumstances, and we summarize these factors in a single type variable $\theta \in \{C, T\}$. We do not claim that θ corresponds to a single psychologically identifiable condition - it is just a statistical aggregate of factors that contribute to different behavior in similar circumstances. C-type ('Calm') individuals will tend to be less likely to commit assaults in any given circumstances than T-type ('Turbulent') individuals.

Circumstances consist of a range of factors, of two broad kinds. There are persistent institutional characteristics (such as the system in place for the investigation and punishment of assault), which may be shaped by actions of the individuals in the model, but which, once chosen, remain unchanged. Then there are chance factors that may alter from one moment to the next.

The various possible outcomes of the student's interaction with others result in costs and benefits. Some of these are standard private costs and benefits. The student has a monetary endowment y out of which he may incur costs, and in particular a cost of alcohol consumption c, consuming the remainder. That cost is a random variable that is uniformly distributed on an interval $[0, K]$, so that two students who have identical benefits from drinking might nevertheless make different decisions (this is to enable us to make predictions of the incidence of various outcomes as continuous functions of the parameters). If he is successful in initiating consensual sex he gains a

[5]It would be straightforward to make the partner's decision a function of the partner's objectives and constraints, but would not, we believe, bring additional insight.

benefit of F.[6]

In addition to these standard costs and benefits, the student may incur certain costs of violating social norms. These norms fall into two main categories - those that impose purely psychological costs and those that impose physical or social costs.[7] The student has a different attitude to these two types of norms: he accepts that the social costs are exogenous constraints, but purely psychological costs can be avoided by various means, notably by consuming alcohol.

Alcohol, in other words, is a "disinhibitor": once it has been consumed, it reduces the actual psychological costs of norm violation by γ, and also the perceived social cost of future norm violation by δ. However, in the sober state, the student knows that alcohol consumption will reduce only the future psychological costs of the norm violation, and will have no effect on real future social costs; the student also knows that once he is drunk he will forget that alcohol does not really reduce social cost. Alcohol also affects the probabilities of sexual encounters, namely by acting as a socially validated mechanism for bringing individuals into physical proximity in a way that increases the opportunities for sexual offers to be made. We represent this by a multiplier α on the probability that an encounter takes place.

Acts of consensual sex can generate both psychological costs and social costs, and so can acts of non-consensual sex. We write g and s for the psychological and social costs of consensual sex, and G_θ and S for the psychological and social costs of non-consensual sex, noting that the psychological costs may differ between types.

Finally, while most of the costs of norm violation are known to the student in advance, there is uncertainty about how much he will suffer psychological costs of engaging in non-consensual sex. These are not known to the student in advance of the decision to whether or not to assault a partner who has refused. Furthermore, this uncertainty differs between calm and turbulent types. Turbulent types have, for any given set of other parameters, a greater expected probability of having psychological costs low enough to make them choose to assault their partner. We represent this uncertainty by a uniform distribution of G_θ over the interval $[\,0, G_\theta^+]$, which is $[\,0, H]$ for calm types and $[\,0, L]$ for turbulent types, with $H > L$. This means that $E[\,G_C] = \frac{H}{2}$ and $E[\,G_T] = \frac{L}{2}$. We assume that L is large enough that, even for turbulent types, for normal values of the other parameters, the probability that the student assaults a partner who refuses is strictly less than one even when the student is drunk. Observed levels of S are such that, even for calm types, the probability that the student assaults a partner who refuses is strictly greater than zero even when the student is sober.

[6] This might vary by type, F_C being either greater or less than F_T, but we do not explore this complication here.

[7] We originally considered calling these these "guilt" and "shame", and our notation of g and S grew out of this, but the reality is more complex than this. The point about the distinction between psychological costs and social costs is that the sober student may resort to alcohol to reduce the former, but this will do nothing to reduce the latter.

3.2 The student's choices

3.2.1 The timing of events and decisions

Actions take place in the following sequence. First, nature determines the type of the individual student, who is Calm with probability π_C and Turbulent with probability $1 - \pi_C$. Next the student decides whether or not to consume alcohol. We represent this as a binary choice of strategy $a \in \{0, 1\}$.

The student then searches for a partner, meeting one and making a sexual proposition to that partner with a probability p, which increases when he consumes alcohol by a factor $\alpha > 1$. The partner then decides whether or not to accept, with a probability q. If the partner refuses, the student decides whether or not to insist. We represent this last action as a binary choice of strategy $b \in \{0, 1\}$.

In modeling the student's payoff function we have to distinguish between the objective payoffs, which the student evaluates when sober, and the payoffs as they appear to the student after consuming alcohol. We begin with the objective payoffs, which we write as:

$$U = Y - a.c + I(J(F - s - g(1 - a.(1 - \gamma))) - (1 - J)b.(F - S - G_\theta(1 - a.(1 - \gamma)))) \quad (1)$$

where we can summarize the variables as:

- $Y \in R^+$ is the student's endowment of financial resources.
- $a \in \{0, 1\}$ is the decision to consume alcohol or not.
- $c \in [\,0, K]$ is the cost of consuming alcohol.
- $I \in \{0, 1\}$ is an indicator variable indicating whether the student meets a partner and can make a sexual proposition to her.
- $J \in \{0, 1\}$ is an indicator variable indicating whether the partner accepts.
- $F > 0$ is the benefit from sexual intercourse.
- $\theta \in \{C, T\}$ is the student's type.
- $s \geq 0$ is the social cost of engaging in consensual sex.
- $g \geq 0$ is the psychological cost of engaging in consensual sex.
- $S \geq 0$ is the social cost of engaging in non-consensual sex.
- $G_\theta \in [\,0, G_\theta^+]$ is the psychological cost of engaging in non-consensual sex.
- $b \in \{0, 1\}$ is the decision to insist or not, if the partner refuses.
- γ is the discount factor on psychological costs due to alcohol.

When the student has consumed alcohol a subtle shift takes place, which is that the social costs as well as the psychological costs of norm violation appear to be discounted. Thus after alcohol consumption, when by definition $a = 1$, we write the utility function as V to distinguish it from the objective form U:

$$V = Y - c + I(J(F - \delta.s - \gamma.g) - (1 - J)b.(F - \delta.S - \gamma.G_\theta)) \tag{2}$$

where δ is the discount factor on social costs due to alcohol. We assume $\delta \geq \gamma$, in other words that psychological costs are discounted at least as much as social costs.

The order of events is depicted in Figure 1, with payoffs depicted using the U(.) function.

3.2.2 The decision to assault

Several conclusions follow immediately from this. First of all, alcohol makes the student more willing, once drunk, to engage in non-consensual sex than he would be without alcohol, to an extent that increases the smaller are γ and δ:

- If the student is sober, he will be willing if $F - S - G_\theta > 0$.
- If student is drunk, he will be willing if $F - \delta.S - \gamma.G_\theta > 0$.

We can write the conditional probability that the sober student, faced with a refusal, assaults his partner as the probability that $G_\theta < F - S$. For the calm type this is equal to $\frac{F-S}{H}$ while for the turbulent type it is equal to $\frac{F-S}{L}$. Our earlier assumptions on H and L ensure that $0 < \frac{F-S}{H} < \frac{F-S}{L} < 1$.

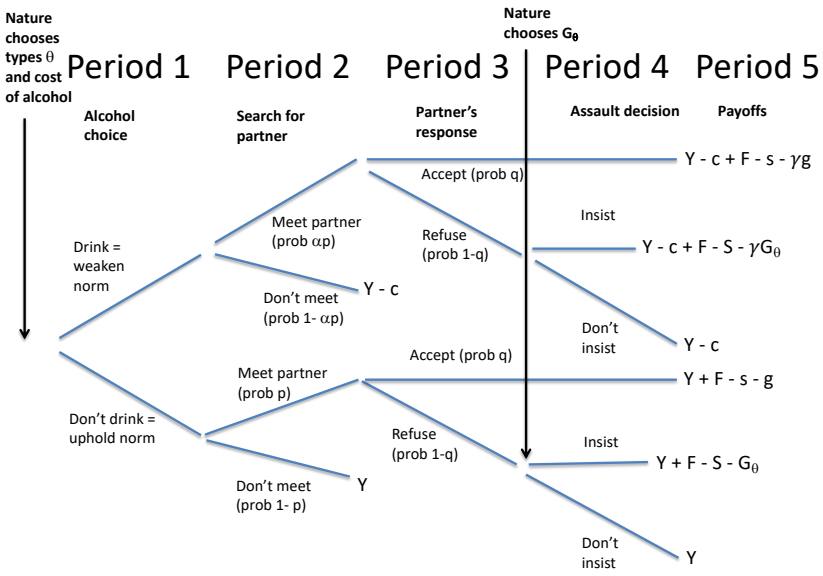

Figure 1: Timing of events and decisions in the model: objective payoffs

In the same way, the conditional probability that the drunk student, faced with a refusal, assaults his partner is the probability that $\gamma.G_\theta < F - \delta.S$. For the calm type this is equal to $\frac{F-\delta.S}{\gamma.H}$ while for the turbulent type it is equal to $\frac{F-\delta.S}{\gamma.L}$, with $0 < \frac{F-\delta.S}{\gamma.H} < \frac{F-\delta.S}{\gamma.L} < 1$.

Secondly, alcohol makes opportunities for non-consensual sex occur more often, to a greater extent if α is large (alcohol increases the student's probability of meeting a partner) and if q is small (the probability of his offer being accepted is low). However, when sober the student will be aware of these risks. We can write the probability R_θ that a student will engage in non-consensual sex, conditional on drinking, as

$$R_\theta = \alpha.p(1-q).(\frac{F-\delta.S}{\gamma.G_\theta^+}) \tag{3}$$

while the probability Q_θ that a student will engage in non-consensual sex, conditional on remaining sober, is

$$Q_\theta = p(1-q).(\frac{F-S}{G_\theta^+}) \tag{4}$$

This means that drinking increases the overall probability of engaging in non-consensual sex by:

$$R_\theta - Q_\theta = (\frac{p(1-q)}{G_\theta^+})[(\frac{\alpha}{\gamma}-1)F - (\frac{\alpha.\delta}{\gamma}-1)S] \tag{5}$$

This will always be positive, and is increasing in F, p and α and decreasing in S, q, γ and δ. It is also decreasing in G_θ^+, meaning that turbulent types are not only more likely to engage in non-consensual sex, but their probability of doing increases by more when they consume alcohol.

3.2.3 The decision to consume alcohol

We can now calculate the student's incentive to consume alcohol, taking all these considerations into account.

His expected utility U_S of staying sober (evaluated when sober) is:

$$U_S = Y + pq(F - s - g) + Q_\theta.(F - S) - E[\,Q_\theta.G_\theta] \tag{6}$$

And his expected utility U_D of drinking (evaluated when sober) is:

$$U_D = Y - c + \alpha pq(F - s - \gamma.g) + R_\theta.(F - S) - \gamma.E[\,R_\theta.G_\theta]. \tag{7}$$

Subtracting (6) from (7) and rearranging shows that the student will drink if:

$$(F - s)[\,p.q(\alpha - 1)] \; - g.p.q(\alpha\gamma - 1) + (R_\theta - Q_\theta)(F - S) - (\gamma.R_\theta - Q_\theta).\frac{G_\theta^+}{2} > c \tag{8}$$

which yields:

$$c < (F - s)[\,p.q(\alpha - 1)] \; - g.p.q(\alpha\gamma - 1) + \\ (R_\theta - Q_\theta)(F - S) - \frac{p(1-q)[\,(\alpha - 1)F - (\alpha.\delta - 1)S]}{2} \tag{9}$$

The probability of drinking, which we can call D_θ, is therefore the expression on the RHS of inequality (9), divided by K. The first term in that expression represents the net benefit to the student from consensual sex (excluding psychological costs) multiplied by the extent to which drinking increases the probability of achieving consensual sex. The second term represents the net change in the psychological costs of consensual sex due to drinking, and will represent a reduction in these costs if γ is low enough. The third term represents the net benefit to the student from non-consensual sex (again excluding psychological costs), multiplied by the increased probability of

its occurrence. The fourth term represents the expected psychological cost of non-consensual sex, multiplied by the increased probability of incurring it.

What factors affect the probability of drinking, and in what way do they do so? It's not possible to sign the derivatives of D_θ unambiguously with respect to α: a higher α makes both consensual and non-consensual encounters more likely to happen, so the student will be encouraged to drink by a higher α if they are more attracted by the former than afraid of the latter.

With respect to the other parameters the comparative statics are fairly straightforward. The student will be more likely to drink if he is the turbulent type, and, for either type, if:

- F is large, provided q is large enough or (if q is small) provided S is small enough - the student strongly desires sex, and either has a reasonable chance of obtaining it consensually or is prepared to risk obtaining it non-consensually.
- when G_θ^+ (that is, either H or L) is small - fear of the psychological costs of non-consensual sex also discourages drinking.
- g is large, provided γ is small enough (so that $\alpha\gamma < 1$) - the psychological costs of consensual sex are high and drinking substantially reduces these costs;
- S is small, provided δ is small enough (so that $\alpha\delta < 1$) - fear of the social costs of non-consensual sex discourages drinking, since drinking increases the risk of incurring these costs. When δ is larger than this threshold (so that $\alpha\delta > 1$), fear of the social costs of non-consensual sex does not discourage drinking, since the student knows that he is not likely to behave when drunk very differently from how he would behave when sober.
- s is small - there are few social costs of consensual sex.
- K is small - alcohol is cheap;
- γ is small - alcohol is a major disinhibitor;
- p is large - the student has a reasonable probability of meeting partners;
- q is large - those encounters are likely enough to lead to consensual sex (provided γ is small enough, so that $\alpha\gamma < 1$) and S is large enough;

3.2.4 The incidence of assault

Finally, we can use these insights to calculate the determinants of the overall incidence of non-consensual sex, by both sober and drunk students, which we denote by A_S and A_D respectively. This is given by the overall proportions of the each of the two types of student, the probabilities that each type chooses to drink (D_θ), and the probabilities for each type of assaulting the partner conditional on drinking or remaining sober. The incidence of assaults by drunk students is given by:

$$A_D = p(1-q)[\,\Pi_C.D_C.\alpha\frac{(F-\delta.S)}{\gamma.H} + (1-\Pi_C)D_T.\alpha\frac{(F-\delta.S)}{\gamma.L}] \tag{10}$$

while assaults by sober students are given by:

$$A_S = p(1-q)[\,\Pi_C.(1-D_C)\frac{(F-S)}{H} + (1-\Pi_C)(1-D_T)\frac{(F-S)}{L}] \tag{11}$$

The incidence of both types of assaults is unambiguously increasing in p, the probability of meeting other students. It is also unambiguously decreasing in Π_C, meaning that the fewer turbulent types there are in the population, the fewer assaults there are - and the incidence of drunken assaults is more sensitive to the proportion of turbulent types than is the incidence of sober assaults.

The effect of q (the probability that the student's encounter leads to consensual sex) on the probability of drunken assaults is ambiguous. It reduces the probability of assault both when drunk and when sober, but also (under reasonable values of the other parameters) makes drinking more attractive and thereby increases the proportion of encounters with a higher probability of assault.

Comparing the two equations, we note that the cost of drinking, which reduces the probability of drinking, and thereby the incidence of assaults by drunk students, also increases the probability of sobriety, and to that extent the incidence of assaults by sober students. In other words, alcohol leads to some substitution between assaults while sober and assaults while drunk. However, the fact that $\alpha\frac{(F-\delta.S)}{\gamma.H} > \frac{(F-S)}{H}$ and that $\alpha\frac{(F-\delta.S)}{\gamma.L} > \frac{(F-S)}{L}$ means that this cost reduces the incidence of assaults by drunk students by more than it increases the probability of assaults by sober ones, and therefore also decreases the total incidence of assaults by all students combined. The same reasoning also implies that any factors which affect A_D and A_S only through affecting D_θ will also have an effect on the total incidence of assaults that is of the same sign, though smaller in absolute value, as their effect on the incidence of assaults with alcohol. This also applies to the variable g which, like the cost of drinking, has an opposite effect on assaults while drunk and on assaults while sober.

We can summarize the impact of different parameters on the incidence of assaults while drunk, assaults while sober, and total assaults as follows:

Proposition 1:

- The incidence of assault by drunk students is **increasing** in:
  - F, the benefit of sex to the student, provided q is large enough or (if q is small) provided S is small enough;

- p, the probability of meeting potential sexual partners;
- the effect of alcohol on the psychological cost of consensual sex - low values of γ lead to more assaults.
- g - the psychological cost of consensual sex - provided $\gamma < \frac{1}{\alpha}$;

- The incidence of assault by drunk students is **decreasing** in:
  - Π_C, the proportion of calm students in the population;
  - $K/2$ - the average cost of alcohol;
  - s the social cost of consensual sex;
  - S, the social cost of non-consensual sex - provided $\delta < \frac{1}{\alpha}$, i.e. that alcohol is more effective as a disinhibitor than as a social lubricant;
  - H and L, the psychological costs of non-consensual sex for the two types.

Proposition 2:

- The incidence of assaults by sober students is **increasing** in:
  - F, the benefit of sex to the student, provided q is large enough or (if q is small) provided S is small enough;
  - p, the probability of meeting potential sexual partners;
  - the cost of alcohol.
- The incidence of assaults by sober students is **decreasing** in:
  - Π_C, the proportion of calm students in the population;
  - the social and psychological costs of consensual sex;
  - the social and psychological costs of non-consensual sex.

Proposition 3:

- The total incidence of sexual assault by all students is increasing in $F$and p and decreasing in s, S, H and L. It is affected by the factors K and g in the same direction as is the incidence of sexual assault by drunk students, but the absolute magnitude of the effect is smaller.

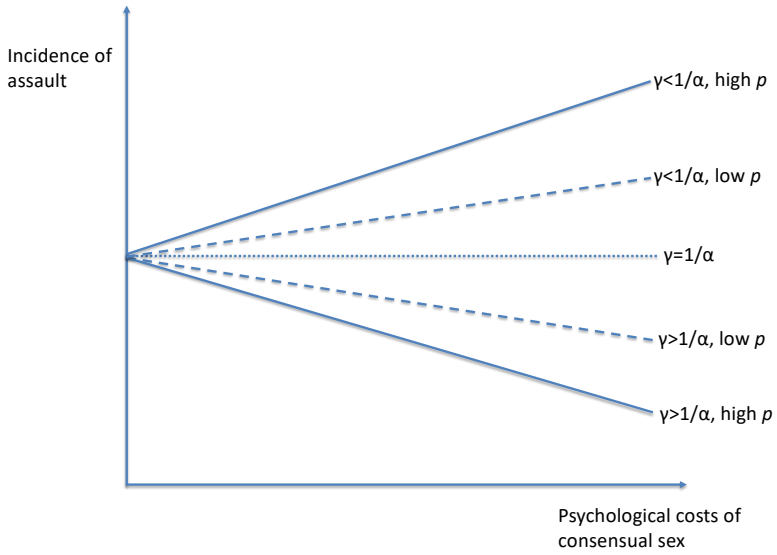

Figure 2: Predicted effect of g on drunken assault for various values of γ

Of particular interest in relation to our data is the impact of g, the psychological cost of consensual sex, on drunken assaults. Figure 2 shows the way in which the incidence of drunken assault varies with g, with separate lines drawn for whether γ is greater than, equal to or smaller than $1/\alpha$, and according to whether p is low or high.

The observation that γ is likely to be small where alcohol is concerned motivates our choice of empirical specification. We will test the hypothesis that the incidence of assaults by drunk students is increasing, and the incidence of assaults by sober students is decreasing, in empirical measures of the psychological cost of consensual sex. We will also test the hypothesis that the total incidence of assaults is increasing in empirical measures of the psychological cost of consensual sex.

To do this we need to control for other potential confounding variables. We now consider our data sources and the potential confounding variables for which they help us control.

4 Data and Descriptive Statistics

4.1 Data sources and choice of variables

Our main dataset was constructed using data from a wide variety of sources. Crime data are sourced from the National Incident-Based Reporting System (NIBRS) [13], a rich dataset containing a wealth of information on crimes reported to police. The NIBRS gathers data from various reporting agencies all over the U.S.; as our analysis focuses on campus sexual violence, we restrict our dataset to only those reporting agencies located on a college campus.

This leaves us with data from 370 unique reporting agencies across 34 states[8]. NIBRS variables include the location and exact time of occurrence, as well as some limited perpetrator characteristics, including – crucial for this analysis – whether the suspected perpetrator was considered to be under the influence of alcohol (such information is not available about victim(s)).

The case-by-case dataset is then transformed into a datset recording the total number of incidents for each campus during a given day or month. Extreme underreporting of sex crimes means the NIBRS data do not present a complete picture of the problem of campus sexual violence; however, the purpose of this paper is not to comment on the overall scale of the problem, but to attempt to determine under which circumstances sexual violence is *relatively* more likely to occur.[9]

Data on university characteristics such as enrolment, athletic association membership and religious affiliation have been drawn from the National Center for Education Statistics' Integrated Post-secondary Education Data System (IPEDS) [32]; data on university alcohol policy was collected from university student handbooks. Data on Planned Parenthood clinic availability by county was collected from the Planned Parenthood website.

County-level voting data for the House, Senate, and Presidential elections, sourced from the Atlas of U.S. Presidential Elections[28], are used to control for each county's overall political environment; we construct dummies for campuses are located in entirely Democrat-voting or entirely Republican-voting counties.[10] In addition, we collect data on state laws regarding alcohol and sexual assault. Table 4.1 provides definitions for the most important variables.

[8] Arkansas, Colorado, Connecticut, Delaware, Georgia, Iowa, Indiana, Kansas, Kentucky, Louisiana, Massachussetts, Michigan, Minnessota, Missouri, Mississippi, Montana, Nebraska, North Carolina, North Dakota, New Hampshire, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Vermont, Washington, Wisconsin, and West Virginia.

[9] In the Appendix, section B, we describe a number of alternative data sources and explain why they were not appropriate for the purpose of this paper.

[10] Note that, as whether a county is "blue" or "red" depends on voting behavior, campuses may be alternately located in a blue or a red county depending on the current election cycle.

Variable	Definition
Incidents of sexual assault	Outcome variable (total and with/without alcohol)
Incidents of rape	Outcome variable (total and with/without alcohol)
No. of Planned Parenthood clinics	Number of PP clinics in county
NCAA membership	Dummy, =1 for members of the National Collegiate Athletic Association
Religious affiliation	Dummy, =1 for universities with a religious affiliation
Dry campus	Dummy, =1 if alcohol is banned in dorms or on campus
Beer tax	Tax on commercial sale of beer (%age points)
log(enrolment)	Log of 12-month enrolment
Blue county	Dummy, =1 if county voted Democrat in last House, Senate and Presidential elections
Red county	Dummy, =1 if county voted Republican in last House, Senate and Presidential elections
Gender-inclusive housing	Dummy, =1 if university offers gender-neutral housing
Freshman residency requirement	Dummy, =1 if university requires freshmen to reside on campus
Single-gender dorms offered	Dummy, =1 if university has single-gender dorms
Single-gender dorms only	Dummy, =1 if university only has single-gender dorms
Weekend	Dummy, =1 on Friday and Saturday

Further data on university characteristics were collected directly from university web pages; this includes factors that might reflect or influence overall campus attitudes towards gender relations and casual sex, such as whether the university offers gender-inclusive housing[11], or factors that might affect opportunities for potential offenders to find victims, such as whether the university requires freshmen to live on campus or whether single-gender dorms are offered.

We construct a dummy variable indicating whether the university campus in question is a "dry campus" or not. It is important to note that, (as data for previous years are largely unavailable), this variable is based on the university's alcohol policy at time of research in 2018-21, and should thus be taken as a proxy of the university's past policies, and overall attitude toward alcohol. Due to limitations in the availability and quality of data from earlier years, the final dataset spans from 1997 to 2019.

A series of descriptive statistics are reported in Table 1 below.

[11]Gender-inclusive housing is generally aimed at LGBTQ+ students, and takes into account gender identification regardless of legal gender or assigned gender at birth.

Table 1: Summary statistics (main dataset)

Variable	Mean	Std. Dev.
Average incidents of sexual assault per day	0.007	0.10
... of which with alcohol	0.001	0.05
Average incidents of sexual assault per month	0.218	0.69
... of which with alcohol	0.045	0.28
Average incidents of rape per day	0.004	0.07
... of which with alcohol	0.001	0.04
Average incidents of rape per month	0.110	0.45
... of which with alcohol	0.029	0.21
Dry campuses (%)	49.0	50.0
Counties with Planned Parenthood (%)	46.0	0.50
Number of Planned Parenthood clinics in county	0.73	1.08
National Collegiate Athletic Association members (%)	82.9	37.6
Religious campuses (%)	8.55	2.79
Located in blue county (%)	37.9	49.7
Located in red county (%)	34.5	37.3
12-month enrolment	27,194	24,777
% of student body that is female	57.7	10.5
% with freshman residency requirement	46.1	49.9
% offering single-gender dorms	34.6	47.6
% offering single-gender dorms	5.24	22.2
% with gender-inclusive housing	29.8	45.8

4.2 Using the model to derive an empirical specification

4.2.1 Our dependent and independent variables of interest

We use incidents of sexual assault per month as our main dependent variable of interest (regression results for rapes, a subset of sexual assaults, are reported in the Appendix). We subdivide these into incidents with and without alcohol, as well as using the sum of the two.

Our model predicts a probability of assault per student, not a total number of assaults, so we clearly need to control for campus size. We use (the logarithm of) total enrolment for this purpose as a control variable, as our descriptive data clearly indicate a strongly non-proportional relationship between campus size and assaults; we discuss this further below.

For our independent variables of interest, we have three proxies for g, the strength of norms against consensual sex[12]. The first main proxy we use is the number of Planned Parenthood clinics available in-county. By making both contraception and information on sexual health available to all who request it, these clinics offer a non-

[12]We exclude consideration of norms governing sex between married couples, which are not the focus of interest in this study, although there are also serious problems of sexual assault in such a setting.

judgmental environment that enables both men and women to consider consensual sex outside marriage a reasonable lifestyle choice; we therefore expect this proxy to be negatively related to the strength of norms against consensual sex.

Consumption of alcohol is far from being the only way in which individuals disinhibit themselves with respect to involvement in consensual sex. One other likely candidate is involvement in high-level sporting activities, which are commonly considered to legitimate high-frequency sexual activity, especially among the most successful athletes.[13]

However, it's not clear what exactly is the link between these two disinhibitors - rather than simply serving as a substitute to alcohol, sports activities are likely to be a complement, providing an environment in which high-level consumption of alcohol is both tolerated and encouraged. Sporting events furthermore provide opportunities for students to intermingle, and college athletes are often expected to make sexual conquests. We therefore expect NCAA membership to have a positive effect on both types of sexual assault, but a disproportionate effect on incidents where alcohol is involved. Another way of expressing this is that NCAA membership lowers the psychological AND the social costs of consensual and non-consensual sex - that, is g, G, s and S. This seems to us importantly different from the effect of Planned Parenthood clinics, which lower the costs of consensual sex but certainly not those of non-consensual sex.

We test this by including college membership of the National Collegiate Athletic Association as a control variable: if sports are a complement to alcohol consumption we should see a larger coefficient in the equation for incidents with alcohol, while if they are a substitute we should see a larger coefficient in the equation for incidents without alcohol. We describe our data on athletics below.

Our third proxy, which we expect to be positively related to the strength of such norms, is whether the campus has a formal religious affiliation. This is of course a highly imperfect measure - religious campuses vary as to whether and how much they seek to influence students' decisions about engaging in consensual sex outside marriage, but it seems fair to say that the majority of such campuses are likely to consider that pre-marital and extra-marital sex should be at least informally discouraged if not formally prohibited. Certainly so-called "hookup culture" is more actively and seriously discouraged on religious campuses than on most secular campuses.[14]

[13]See the article 'Sex and the Olympic City" by Matthew Syed, in *The Times* (of London), August 22nd 2008.

[14]See "The voices of young people with different views of social justice are pushing the Mormon Church to modernize", *New York Times*, April 12, 2019. The article reveals that there may also be a negative correlation between g and S: among the claims recorded are that "After Brigham Young drew outrage for punishing sexual assault victims who were found to have violated the honor code, the school implemented a new "amnesty" policy in 2017" and "Another student said she overdosed on pills after she was punished for revealing she had been sexually assaulted."

This is not to say that there are no norms discouraging hookup culture on secular campuses. Many students on secular campuses will attend religious services at which such norms are reinforced. But they typically do not form part of the explicit culture of the campus as a whole, and are therefore more easily avoided by students who do not wish to be bound by them. The key distinction therefore between religious and secular campuses is that on secular campuses such norms are voluntary whereas on religious campuses they are (usually) obligatory to some extent.

4.2.2 Confounding variables

Several parameters of our model are not readily empirically observable, but are also ones that we have no reason to think will vary systematically from one time to another or from one university campus to another. These include F, the benefit of sex to the student; γ, the effect of alcohol on the actual psychological cost of consensual and non-consensual sex; and δ, the effect of alcohol on the perceived social cost of consensual and non-consensual sex. Other variables in the model for which we do have reasonable proxies include:

- p - the probability of meeting potential partners. We expect this to be higher in larger campuses, and those that have a freshman residency requirement, and higher at weekends than during the working week. We also expect it to be lower in campuses that have an asymmetric sex ratio, though this seems a less reliable measure to us, since an asymmetric sex ratio may also be associated with higher levels of sexual frustration among at least some individuals, and therefore with higher values of F.

  Two other campus characteristics are also likely to affect p, but may also reflect other confounding influences. One is the presence of gender-inclusive housing on campus, which is likely to increase the ease with which opportunities arise for both consensual and non-consensual sex. But it is typically also associated with norms that accept the right of students to express both their gender identity and their sexuality – the latter of which consensual sex outside marriage. These two influences act in opposite directions, making it difficult to anticipate the direction of the net effect.

  A second influence on p is the presence of separated dormitories, which in principle reduces the opportunities for both consensual and non-consensual sex, but may also be correlated with stricter norms against both. Once again this makes for an ambiguous net effect, which will have to be measured empirically.

- $K/2$ - the average cost of obtaining alcohol. We do not have direct measures of this, but we do observe one variable that is likely to make a major difference to the time, energy and financial costs associated with obtaining alcohol. This

is whether the campus operates a "dry" policy, forbidding the sale of alcohol at outlets located on campus. Other things equal, the cost of alcohol at a dry campus is likely to be significantly higher than at other campuses. However, this variable is also likely to be endogenous, because the decision to operate a dry policy may itself represent a response to certain behaviors, including the incidence of sexual assault. It may also be influenced by other unobserved factors that are correlated with the error term in our equation.

- S - the social cost of non-consensual sex. This is the variable for which it is hardest to find reliable proxies. We do not have data that allow us to measure these directly, so we use an indirect measure, which is the lagged incidence of sexual assaults (which is also likely to act as a signal to individuals about what is considered regular or normal in their community). To capture possible spillover effects of assaults in creating a culture of impunity, we use lagged assaults with alcohol as a regressor in our equation without alcohol, and vice versa.

Finally, because our proxies for g are only proxies, and not direct measures, we want to control for other confounding influences that might be correlated with them. The political alignment of the county in which the campus is located may have an independent influence on many factors that might affect the incidence of assaults other than through norms around consensual sex; to control for these we use voting indicators of the county in previous elections.

We now turn to some descriptive statistics revealed by our dataset.

4.3 Incidents by month and campus type

Figure 3 shows the pattern of incidents across the calendar year. Most reported incidents are concentrated toward the beginning of the academic term, in September and October, with two small peaks around February, and April, when many universities have their spring breaks.

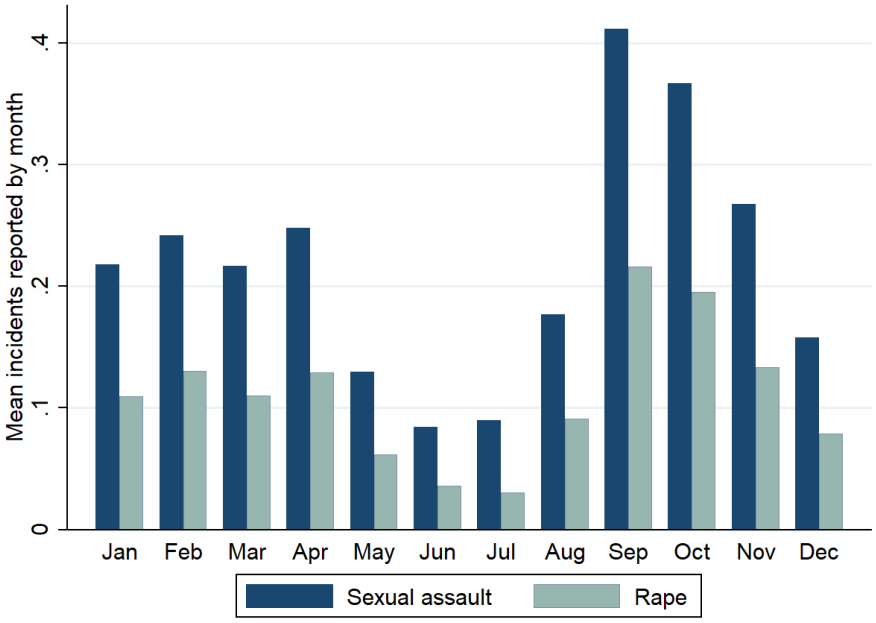

Figure 3: Mean number of incidents by month

Figure 4 shows that incidents per month across the year are significantly lower in campuses that ban alcohol than in those that do not.

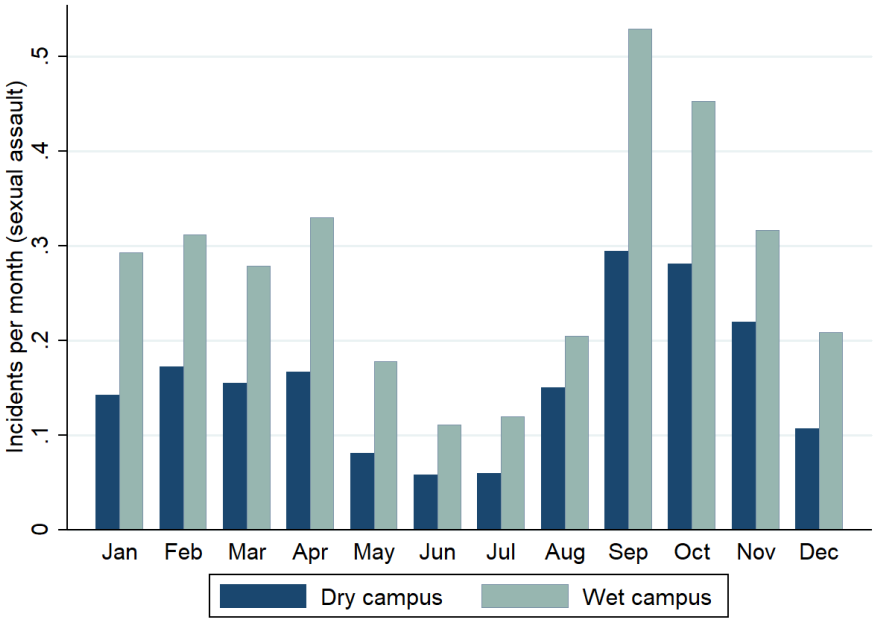

Figure 4: Mean incidents per month by campus alcohol policy

The relationship between campus alcohol policy and incidents of sexual assault may be at least in part due to size effects: there is a clear decreasing relation between a university's size and the number of incidents of sexual assault per capita, as shown in Figure 5, and dry campuses are smaller by almost 7,000 students per year – an average of 23,000 students enrolled per year, compared to an average yearly enrolment of 31,000 students on campuses that do not ban alcohol.

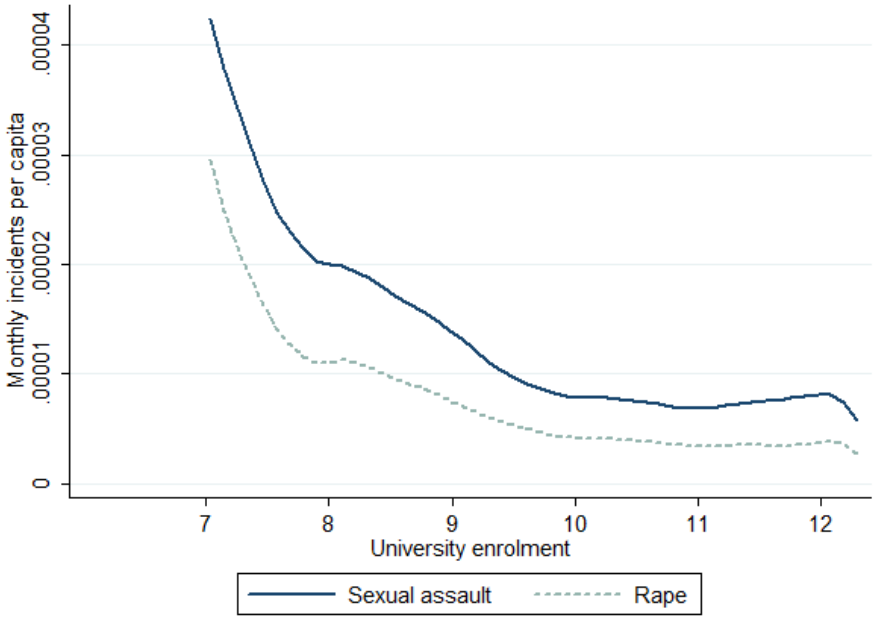

Figure 5: Incidents per capita by university size

Universities that ban alcohol present a slightly higher rate of alcohol use in cases of rape than universities where alcohol is permitted on campus, and nearly identical rates of alcohol use for sexual assault more generally. Table 2 illustrates.

Table 2: Alcohol use by campus alcohol policy

Alcohol allowed on campus	Incidents of sexual assault involving alcohol	(Percent of total)	Incidents of rape involving alcohol	(Percent of total)
Yes	1,371	(20.5)	858	(25.6)
No	757	(20.8)	496	(26.4)

While at first glance it seems somewhat counter-intuitive to see such small differences in these rates between the two kinds of campus, it is important to note there is likely endogeneity at play in these statistics. Campuses that ban alcohol may have chosen to do so precisely because of problems with excessive alcohol consumption or alcohol-fuelled sexual assault. It should therefore not be too surprising to see that campuses which ban alcohol do not have greatly reduced rates of alcohol-fuelled sexual assault relative to campuses that do not.

The importance of size effects makes it worth comparing campuses on a per capita basis. Following our arguments about norms, Figures 6 and 7 show how assaults *per capita* across the year differ by two indicators of norms concerning consensual sex. Average assaults per capita per month are somewhat higher on campuses where there are

no Planned Parenthood clinics in the county, and substantially higher on religiously affiliated campuses than on secular campuses.

Once again, though, size effects may be at work here. With the exception of Brigham Young University, which is affiliated with the Church of Latter-Day Saints and has an average 12-month enrolment of 26,764 students (median = 20,082), secular colleges are far larger than religious ones, with an average enrolment of 28,718 students (median = 22,244), compared to 4,401 for the average religious college (median = 3,760). For this reason we need to move beyond bivariate correlations and undertake multivariate regression, and the multivariate regression has to control for campus size.

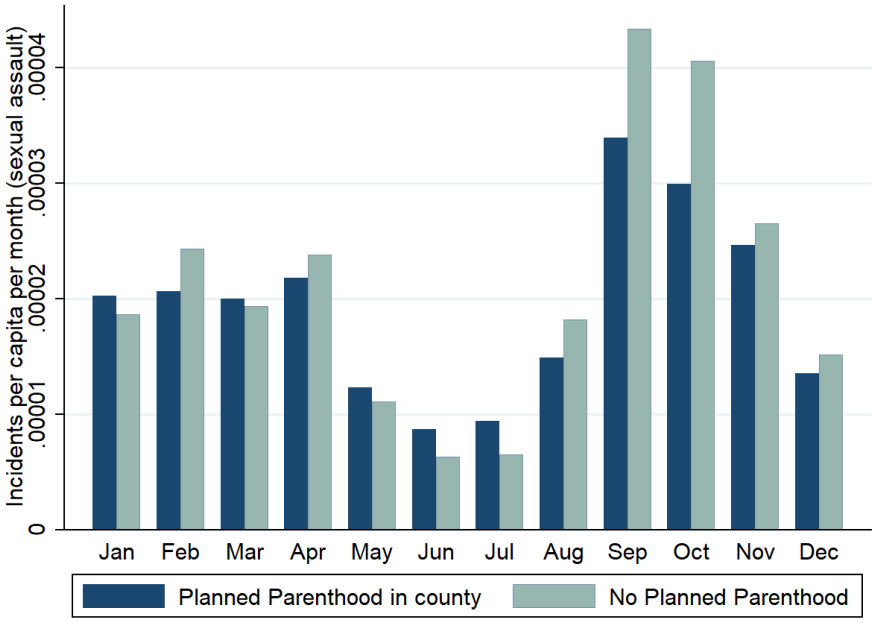

Figure 6: Mean incidents per month by Planned Parenthood availability

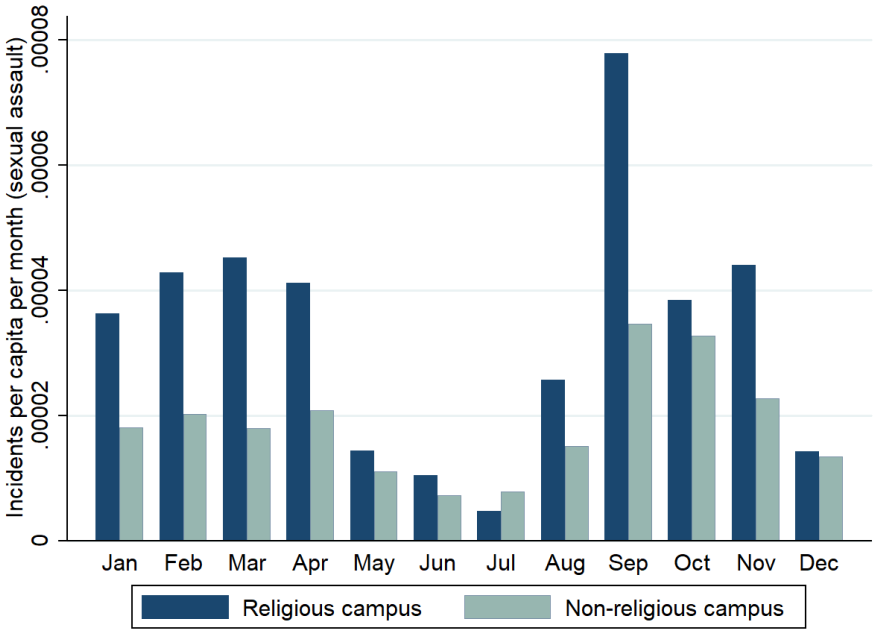

Figure 7: Mean incidents per capita per month by campus religion

4.4 Regional characteristics

County-level voting data serve as a proxy for the general political environment at the time for each university's county. Rates of alcohol involvement are similar, but slightly higher in counties that voted Republican in each of the previous House, Senate and Presidential election cycle than in those that voted Democrat for all three races. This information is presented in Table 3.

Table 3: Alcohol use by red county/blue county

County election results	Incidents of sexual assault involving alcohol	Percent of total	Incidents of rape involving alcohol	Percent of total
Blue county	1,056	19.8	634	24.8
Red county	565	21.3	397	27.6
Purple county	507	21.5	323	26.2

Consistent with our model, counties with greater Planned Parenthood availability see lower rates of alcohol involvement, with each additional clinic associated with a 2 percentage point reduction in incidents that involved alcohol, as a proportion of the total.

Finally, political climate is highly correlated with campus alcohol policy, as nearly two thirds of campuses in "red" counties ban alcohol, compared with less than a

third in "blue" counties. Alcohol-free campuses are also more likely to be located in counties without a Planned Parenthood clinic – 64% of dry campuses do not have a Planned Parenthood clinic within the county, compared to 46% of campuses where alcohol is permitted. Finally, while alcohol prohibitions are common on U.S. campuses, universities with an official religious affiliation are somewhat more likely to prohibit alcohol on their premises: 59% of religious campuses do so, compared to 50% of secular ones.

Table 4: Alcohol policy by county type

	Blue county	Red county	Purple county
Proportion banning alcohol	36.5%	63.0%	48.2%

4.5 Characteristics of perpetrators and victims

In 87% of all reported sexual assault and 92% of reported rape cases, the victim knew the attacker, a figure consistent with previous research (see e.g. [2]). Alcohol was involved in 20% of all reported cases of sexual assault on college campuses, and is involved at similar rates whether the victim and perpetrator were acquainted or not. As might be expected for crimes occurring on college campuses, the mean age of all offenders is between 23 and 24 years old. The mean victim age is between 20 and 21 years old.

5 Regression Results

5.1 The effect of technical factors excluding social and psychological costs

Our main regressions take as their dependent variables the number of incidents of sexual assault and rape committed per campus per calendar month. As these variables take integer values and have many more zeroes than positive values, natural techniques to use are Poisson or negative binomial regressions. Our data display a degree of over-dispersion that makes the negative binomial the more appropriate of the two, but Poisson regressions not reported here show that this makes little difference to the qualitative results. The Appendix reports a number of other specifications that change the qualitative results only marginally if at all.

We begin by reporting a preliminary specification that uses only the "technical" variables affecting the opportunities for consensual and non-consensual sex, and excludes the variables representing the social and psychological costs. Table 5 illustrates.

Table 5: Regression excluding social and psychological costs

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Dry campus	-0.269	(0.17)	-0.211	(0.13)	-0.228+	(0.13)
Beer tax	-0.274	(0.30)	0.079	(0.20)	0.003	(0.20)
Log of total enrolment	0.488***	(0.09)	0.702***	(0.06)	0.655***	(0.06)
Freshman residency requirement	0.651***	(0.16)	0.433***	(0.13)	0.484***	(0.12)
Single-gender dorms offered	0.307*	(0.15)	0.387**	(0.14)	0.374**	(0.13)
Single-gender dorms only	-0.282	(0.40)	0.122	(0.28)	0.054	(0.27)
Gender-inclusive housing	-9.088***	(0.92)	-9.415***	(0.53)	-8.803***	(0.55)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.311***	(0.87)	-8.843***	(0.54)	-7.737***	(0.49)
N	46,294		46,294		46,294	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	6.807***	(0.95)	1.914***	(0.26)	1.851***	(0.22)
	$+\ p < 0.10$,	$*\ p < 0.05$,	$**\ p < 0.01$,	$***\ p < 0.001$		

It reports results for assaults under three headings: assaults with alcohol, assaults without alcohol and total assaults. All specifications use year, month and region fixed effects.

As expected, a dry campus reduces both alcohol-related and total incidents, though the effect is significant at only the 10 per cent level and only in the equation for total incidents.

Several control variables that increase the ease with which students of the opposite gender can meet each other have the expected positive sign: the presence of a freshman residency requirement, gender-inclusive housing. The presence of single-gender dorms also has a significant positive sign, which (as we discussed above) would be a surprise if this variable reduced purely reduced opportunities for sexual encounters. This suggests it may also capture an element of attitudes, as will be confirmed in the next specification.

5.2 Main findings: including social and psychological costs

Table 6 reports the results of our preferred specification including our three proxies for social and psychological costs of consensual sex, as well as the use of lagged assaults

as a proxy for the social costs of non-consensual sex.

The results here are very striking. The number of Planned Parenthood clinics has a large and negative effect on the incidence of assaults with alcohol, one that is statistically significant at less than a tenth of one per cent. Consistently with our interpretation that alcohol serves as a disinhibitor in the presence of norms against consensual sex, and that the presence of Planned Parenthood clinics correlate with weaker norms against consensual sex, we see the negative effect only on incidents with alcohol. There is essentially no effect on incidents without alcohol. The effect on total incidents is in the same direction as the effect on incidents with alcohol but much smaller and statistically insignificant (our model predicts that the effect should be negative but smaller).

The dummy variable for campus membership of the National Collegiate Athletic Association has a very large and extremely significant coefficient. It is substantially larger (almost twice as high) in the equation for incidents with alcohol, indicating that the disinhibiting effect of this institution is complementary to alcohol consumption and not a substitute for it. However, it also has a large effect on incidents without alcohol.

The coefficient on the dummy variable for campuses with a religious affiliation has a positive sign and quite a large effect on incidents with alcohol (over twice that of the number of Planned Parenthood clinics). But this effect is not statistically significant, which may be unsurprising given that religious campuses make up under 10 per cent of our sample.

Our proxy for the weakness of social norms against aggression, namely the lagged level of incidents, is strongly and significantly positive as predicted (whether we include this variable or not makes little difference to the other coefficients). Finally, the dummies for red and blue counties are weakly significant, indicating that campuses in blue counties have somewhat more, and campuses in red counties somewhat fewer incidents than would be predicted given their other characteristics in the regression, though this effect appears to be driven primarily by incidents without alcohol.

Including social and psychological costs in the regression makes very little difference to the coefficients on the "technical" parameters. The coefficient on single-gender dorms becomes smaller and loses its significance, which is consistent with the view that its importance in Table 5 reflects its correlation with attitudes. The coefficient on the dummy variable for a dry campus becomes weakly significant in the equation for incidents with alcohol, but essentially none of the other coefficients are affected in any meaningful way. This tells us, reassuringly, that the proxy variables for social and psychological costs are unlikely to be confounded by any of the technical factors we have been considering, with the mild exception of the presence of single-gender dorms.

Table 6: Main regressions - incidents of sexual assault, monthly data

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.223***	(0.07)	0.016	(0.04)	-0.022	(0.03)
National Collegiate Athletic Association membership	1.913***	(0.33)	1.038***	(0.18)	1.121***	(0.16)
Religious affiliation	0.523	(0.36)	0.196	(0.21)	0.237	(0.20)
Dry campus	-0.244+	(0.14)	-0.162	(0.11)	-0.168+	(0.10)
Beer tax	-0.165	(0.30)	0.171	(0.19)	0.076	(0.17)
Log of total enrolment	0.478***	(0.08)	0.672***	(0.06)	0.583***	(0.05)
Freshman residency requirement	0.371**	(0.14)	0.271**	(0.10)	0.276**	(0.09)
Single-gender dorms offered	0.044	(0.14)	0.227+	(0.13)	0.173	(0.11)
Single-gender dorms only	-0.392	(0.47)	0.000	(0.28)	-0.070	(0.27)
Gender-inclusive housing	0.370*	(0.15)	0.309*	(0.14)	0.296*	(0.12)
Lagged incidents of sexual assault w.o. alcohol	0.191***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.184***	(0.05)		
Lagged incidents of sexual assault					0.230***	(0.03)
Blue county	0.099	(0.12)	0.175*	(0.08)	0.139+	(0.07)
Red county	-0.198	(0.14)	-0.171+	(0.10)	-0.156+	(0.08)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.311***	(0.87)	-8.843***	(0.54)	-7.737***	(0.49)
N	45,924		45,924		45,924	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.643***	(0.74)	1.729***	(0.22)	1.559***	(0.17)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

5.3 Robustness checks

In a series of tables in the Appendix, we report a range of robustness checks of our main specification. The first check in Table 16 provides the same analysis for the incidence of rape; the results are qualitatively the same as for sexual assault. The second robustness check in Table 17 uses a dummy variable for the presence of Planned Parenthood clinics in the county, rather than the number of clinics, to verify that the results are not driven by outliers, and indeed the qualitative results hold up.

The third robustness check involves using daily rather than monthly data. A feature of Table 18 is the addition of the weekend variable, which is consistently positive and significant (and more than double the size of the planned parenthood coefficient for incidents with alcohol). It provides some perspective on the impact of the dummy variable for athletic association membership - this is associated with increases in incidents of assault of more than three times the difference in incidence on an average campus between weekdays and weekends. Otherwise there is no qualitative difference in these results compared to the use of monthly data.

A fourth robustness check, in Table 19 involves using incidents per capita per month instead of total incidents as the dependent variable. Here the fact that we no longer have integer values means we can no longer use the negative binomial, so we use Ordinary Least Squares, but the presence of so many zeroes makes the estimation less reliable. The main difference with our preferred specification is that the coefficient on religious affiliation in the equation for incidents with alcohol becomes significantly positive at 5%. It is also much larger relative to the other coefficients of interest than in the main regressions - eight times as large in absolute terms as the coefficient on Planned Parenthood and three times as large as that on Athletic Association membership. It's hard to know how much weight to give to this specification compared to the others. However, if there is a tendency for religiously affiliated campuses to have higher incidence, as was suggested strikingly by Figure 7, it may be principally a by-product of the other characteristics of these institutions, and the small number of such campuses in our dataset makes it hard to generalize further.

Finally, because of the possible endogeneity of campus alcohol policy, we report in Table 15 in the Appendix an instrumental variable (IV) specification, where campus alcohol policy is instrumented using the first principal component of a series of measures of the strictness of states' laws on alcohol and a dummy for restrictions on the sale of alcohol at the county level. These instruments appear to satisfy the twin requirements of relevance and exogeneity: while campus alcohol policy is likely affected by the same overall attitudes towards alcohol that drive state and county laws and taxes, it is unlikely that the prevalence of sexual violence at any particular campus would affect legislature at the county or state level. However, the results are virtually unchanged from the specification without instrumentation, so we do not pursue this line of investigation further here.

5.3.1 A possible sources of bias: selection by individual temperament

One legitimate source of concern with our interpretation of our findings is that colleges that differ in their attitudes to consensual sex may attract different kinds of student. In some circumstances, this might reinforce our conclusions - if, for example colleges located in areas without Planned Parenthood clinics not only have higher values of g for their students through norms against consensual sex, but also attract students who have higher intrinsic levels of g than the rest of the population. However, this is not the only way in which selection might affect our results. Suppose, for example, that parents who recognize their children to have behavioral problems prefer to send them to colleges with more conservative norms governing relationships between students, in the hope that they will be better looked after in an environment where there is greater discipline. In that case the higher levels of assaults by drunk students in colleges with less Planned Parenthood presence might simply reflect the more troubled nature on average of the student intake.

There is some plausible evidence in favor of this hypothesis, as campuses without Planned Parenthood clinics do observe higher per-capita levels of crimes such as property damage or assault, as shown in Figures 8 and 9. So also do religious campuses compared to non-religious ones, as shown in Figures 10 and 11.

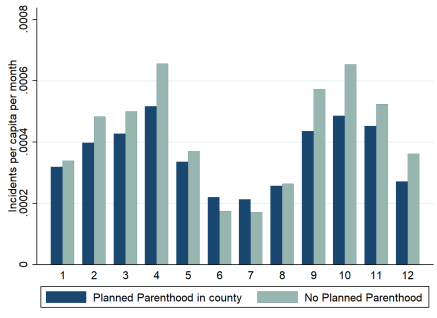

Figure 8: Property damage and PP clinics

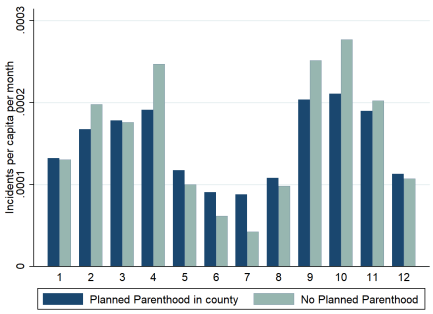

Figure 9: Assault and PP clinics

Fortunately our model allows us to test this hypothesis, and notably to distinguish it from the hypothesis that what distinguishes colleges with and without Planned Parenthood presence is principally the stronger norms against consensual sex. Table 7 shows the results. If colleges with more conservative norms regarding sex have more students with a turbulent temperament, the model predicts that this will increase assaults by both drunk AND sober students (albeit to a greater degree by drunk students). However, the effect of stronger norms against consensual sex is only to increase

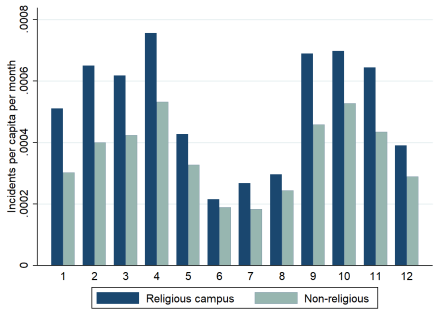

Figure 10: Property damage and religious affiliation

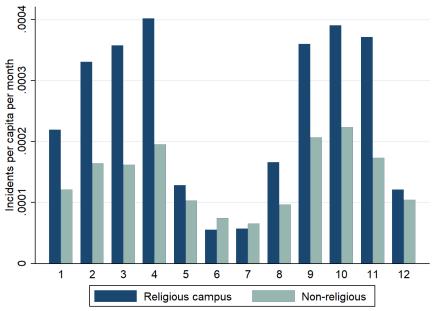

Figure 11: Assault and religious affiliation

assaults by drunk students; the effect on assaults by sober students has the opposite sign, though it is not statistically significant.

The coefficients on incidents of property damage, burglary and assault are all statistically significant, though small. Property damage and burglary show slightly higher coefficients for incidents with alcohol, but the opposite is true for the most violent category, assault. Controlling for incidents of other types of crime also lowers the coefficient on Planned Parenthood very slightly for incidents with assault, but remains large and highly significant; similarly, the coefficients on National Collegiate Athletic Association membership are lower for both incidents with alcohol and without (as well as for total incidents). Overall the results do not provide support for the hypothesis that the gap in rates of alcohol-fuelled sexual assault between campuses with and without nearby Planned Parenthood clinics, or between members of the NCAA and non-members, is due to selection bias.

Table 7: Regressions with other crimes as controls

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.201***	(0.06)	0.015	(0.03)	-0.023	(0.03)
National Collegiate Athletic Association membership	1.780***	(0.31)	0.860***	(0.15)	0.990***	(0.14)
Religious affiliation	0.295	(0.34)	0.052	(0.18)	0.119	(0.18)
Dry campus	-0.242+	(0.13)	-0.130	(0.08)	-0.157*	(0.08)
Beer tax	-0.242	(0.29)	0.106	(0.15)	0.029	(0.16)
Property damage (total incidents)	0.033***	(0.01)	0.020***	(0.00)	0.023***	(0.00)
Burglary (total incidents)	0.019*	(0.01)	0.013**	(0.00)	0.015**	(0.01)
Assault (total incidents)	0.028**	(0.01)	0.047***	(0.01)	0.044***	(0.01)
Log of total enrolment	0.223**	(0.08)	0.445***	(0.05)	0.394***	(0.05)
Freshman residency requirement	0.225+	(0.12)	0.156*	(0.08)	0.173*	(0.07)
Single-gender dorms offered	0.009	(0.12)	0.169+	(0.09)	0.135	(0.09)
Single-gender dorms only	-0.244	(0.43)	0.104	(0.24)	0.038	(0.23)
Gender-inclusive housing	0.396**	(0.13)	0.256*	(0.11)	0.282**	(0.10)
Lagged incidents of sexual assault w.o. alcohol	0.134**	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.196***	(0.03)		
Lagged incidents of sexual assault					0.186***	(0.03)
Blue county	-0.001	(0.12)	0.056	(0.06)	0.038	(0.06)
Red county	-0.100	(0.13)	-0.075	(0.08)	-0.079	(0.07)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-6.291***	(0.79)	-6.959***	(0.49)	-6.261***	(0.46)
N	45,602		45,602		45,602	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.214***	(0.67)	1.528***	(0.18)	1.438***	(0.15)
	+ $p < 0.10$,	* $p < 0.05$,	** $p < 0.01$,	*** $p < 0.001$		

Table 8: Regressions with excess female/male students

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Excess female students	-2.647*	(1.06)	-0.253	(0.87)	-0.616	(0.75)
Excess male students	-3.056*	(1.33)	-1.088	(0.69)	-1.298*	(0.64)
No. of Planned Parenthood clinics	-0.217***	(0.06)	0.011	(0.04)	-0.027	(0.03)
National Collegiate Athletic Association membership	1.898***	(0.33)	1.033***	(0.18)	1.111***	(0.16)
Religious affiliation	0.460	(0.39)	0.198	(0.22)	0.237	(0.21)
Dry campus	-0.249+	(0.13)	-0.172	(0.11)	-0.171+	(0.09)
Beer tax	-0.195	(0.30)	0.173	(0.19)	0.073	(0.17)
Log of total enrolment	0.390***	(0.09)	0.638***	(0.06)	0.544***	(0.05)
Freshman residency requirement	0.252*	(0.13)	0.259*	(0.10)	0.241**	(0.08)
Single-gender dorms offered	0.044	(0.13)	0.209	(0.13)	0.161	(0.11)
Single-gender dorms only	-0.422	(0.45)	0.044	(0.30)	-0.036	(0.27)
Gender-inclusive housing	0.442**	(0.14)	0.319*	(0.15)	0.321**	(0.12)
Lagged incidents of sexual assault w.o. alcohol	0.171***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.182***	(0.05)		
Lagged incidents of sexual assault					0.226***	(0.03)
Blue county	0.125	(0.11)	0.181*	(0.08)	0.152*	(0.07)
Red county	-0.126	(0.13)	-0.199*	(0.10)	-0.164*	(0.08)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.399***	(1.01)	-9.099***	(0.63)	-7.967***	(0.56)
N	41,463		41,463		41,463	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.087***	(0.67)	1.700***	(0.22)	1.492***	(0.16)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

5.3.2 Gender ratios

A final test of robustness is to control for the gender ratios in the student body: these may affect p, the probability that students can meet, but may also be correlated with other factors including religious affiliation. There would be grounds for concern if the inclusion of these controls diminished significantly the impact of our variables of interest.

In fact, as can be seen in Table 8, including these makes essentially no difference to the impact of Planned Parenthood clinics. We control both for any excess of male students above parity, and for any excess of female students above parity (either of which would tend to reduce p). The coefficients on both measures are significantly negative, as expected. [15]

5.3.3 Reporting bias: using the National Crime Victimization Survey Data

A major issue in the use of any statistics on sexual assault is the presence of reporting bias. A large part of the voluminous literature on this issue has attempted to establish accurate average rates of sexual assault, in the face of evidence of substantial under-reporting (see in particular [16]). Our concern here is not so much with average levels of under-reporting as with *differences* in reporting rates which may bias our estimates of the contribution of our independent variables of interest.

To explore this question empirically, we collect data from the National Crime Victimization Survey (NCVS)[6], a nationally representative random survey. For comparability purposes, we use data only from the years that appear in our main dataset. Although this dataset has the important limitations we discussed above, it may still shed some light on whether differences in reporting rates might affect our empirical analysis, given that the survey asks respondents both whether they informed the police of a crime committed against them, and whether police were involved in general, as well as including questions on reasons for not reporting, if applicable.[16]

Table 9 reports descriptive statistics for sex crimes in the NCVS data.[17] Table 10 sets out reporting rates for sexual assault and compares them with other crimes.

[15] However, it is important to bear in mind individuals may take into account information about the prevalence of sexual violence at a given institution when deciding which university to enrol in; this might make these variables to some degree endogenous.

[16] Table 13 in the Appendix summarizes definitions of the most important of our NCVS variables.

[17] Offender race is recorded only for multiple-offender crimes prior to 1Q2012.

Table 9: Summary statistics for sexual assault (NCVS) - proportions of total cases

	Mean	Std. Dev.
Victim reported crime	0.178	0.38
Police involved	0.290	0.45
Alcohol involved	0.278	0.45
Offender is stranger	0.155	0.36
White offender	0.512	0.50
Black offender	0.177	0.38
White victim	0.800	0.40
Black victim	0.132	0.34
Weapon used	0.118	0.32
Victim has college degree	0.109	0.31
Urban	0.849	0.36
Northeast	0.098	0.30
Midwest	0.201	0.40
South	0.252	0.43
West	0.215	0.41

Table 10: Reporting rates by crime (NCVS)

	Self-reporting		Police involvement	
	Mean	Std. Dev.	Mean	Std. Dev.
Sexual assault	0.178	0.38	0.286	0.45
Assault and battery	0.258	0.44	0.503	0.50
Theft	0.262	0.44	0.354	0.48
Property damage	0.519	0.50	0.681	0.47

Unsurprisingly, sex crimes suffer from the lowest reporting rates, with only one in six NCVS respondents saying they reported their crime to police themselves, and police being involved in only 29% of cases.

An important issue concerns possible differences in reporting rates by race, of both perpetrator and victim. Though the majority of perpetrators of sexual assault are white, black perpetrators are over-represented in the NIBRS dataset, comprising over 20% of all perpetrators in reported incidents of rape versus 13% of the U.S. population overall. This over-representation is present in all sexual crimes taken individually (groping, sexual assault with an object, etc.) as well as together. Black individuals are also over-represented in violent crimes (43-44% for aggravated and simple assault). This proportion falls back in line with population averages, however, for non-violent crime such as property damage (13%).

It is possible that the races of both the perpetrator and the victim may play a role in whether the crime is reported, or whether a suspect is identified. Stacey, Martin

and Brick[41], for example, find that arrests are more likely in cases of stranger rape when the perpetrator is black and the victim white. They also find that victims co-operate less with the police in black-on-black family assaults. Spohn and Holleran[39] find that prosecutors are more likely to file charges when the victim was white, but less likely when they had been engaging in risk-taking behavior. If victims form rational expectations of how police will deal with their case, this may affect propensity to report depending on the characteristics of the victim, the perpetrator, and the crime itself.

These differences may reinforce already existing differences in prevalence due to stereotypes in the minds of both perpetrators and victims. O'Flaherty and Sethi[33] suggest that common stereotypes of black males in the U.S. as violent may lead black males looking to commit a crime to self-select into crimes which involve face-to-face contact (such as robbery over burglary), knowing that the stereotype may work in their favour in ensuring cooperation from the victim.

Table 11 uses the NCVS data to estimate, using a probit estimation, the effect of various perpetrator and victim characteristics and characteristics of the incident on police involvement and victim self-reporting.

Table 11: Probit marginal effects - cases of sexual assault

	Police involvment		**Self-reporting**	
	Coef.	Std. Err.	Coef.	Std. Err.
Alcohol involved	-0.065	(0.05)	-0.034	(0.06)
Offender is stranger	0.339***	(0.07)	0.250**	(0.08)
Offender is stranger*alcohol	-0.235+	(0.12)	-0.371**	(0.14)
White victim	0.166**	(0.06)	0.150*	(0.07)
Black offender	0.234***	(0.06)	0.107	(0.07)
Weapon used	0.467***	(0.07)	0.326***	(0.07)
Post-secondary education	-0.164***	(0.05)	-0.058	(0.05)
College	-0.298***	(0.08)	-0.232*	(0.09)
Urban area	-0.143*	(0.06)	-0.104	(0.07)
Northeast	-0.091	(0.09)	-0.150	(0.10)
South	0.010	(0.07)	-0.013	(0.07)
West	0.026	(0.07)	0.062	(0.08)
Year of incident dummies	YES		YES	
N	3,654		3,654	

White victims are more likely to report sexual crimes against them to the police than those of other races. Black offenders are 23 percentage points more likely than white offenders to face police involvement, ceteris paribus, even though rates of reporting by victims do not significantly change. Stranger offenders are also more likely to be reported, though this tendency interacts in complex ways with the whether alcohol was involved (note that again, there is no information on victim's use of alcohol - only

the offender(s)').

In Figure 12 we compare offender race data from the NIBRS and NCVS to U.S. Census demographic data and student demographic data from the IPEDS. While black individuals are slightly underrepresented among U.S. college students, they are very much over-represented in our crime data. It is possible that this over-representation reflects higher rates of police involvement when a crime is committed by a person of color; and this may affect our results if the racial composition of the student body correlates with our variables of interest.

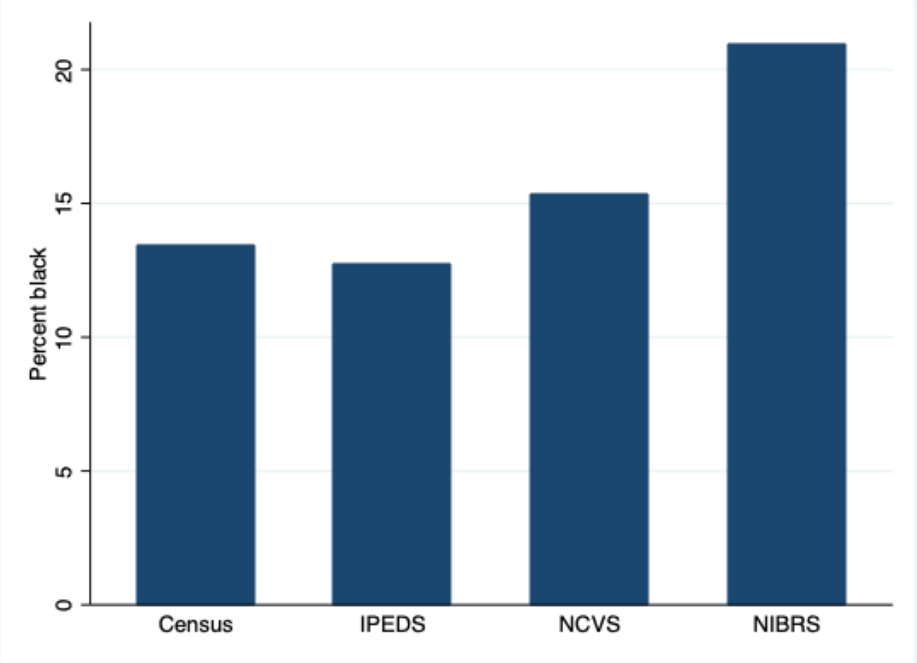

Figure 12: Black individuals' representation among offenders compared to general and student populations

Therefore, in Table 22 we control for the proportion of the student body that is black. The coefficient is insignificant at the 5% level for incidents of sexual assault both with and without alcohol, as well as for total incidents. It is, additionally, *negative* and weakly significant at the 10% level for incidents with alcohol. Including the variable makes essentially no difference to the sign or magnitude of the coefficients on any of our explanatory variables of interest.

6 HERI attitudinal data

The Higher Education Research Institute (HERI) at UCLA administers *The Freshman Survey*[23], a yearly survey of incoming new university students which asks individuals about their activities in the past year, and attitudes towards various topics, as well as collecting data on students' overall political leanings, religion of preference, etc. Among the attitudinal data that have been collected in the past are views on the legality of abortion, and the morality of sex outside a committed relationship (in other words, hookups). We will use these data to investigate whether, and by how much, students attending university in areas without Planned Parenthood availability differ, as well as how much religious students differ from those with no religion. As universities are anonymized, it is impossible to assign responses to specific campuses; we therefore use students' home zip code instead. Responses by zip code serve as a measure of the environment in which individual campuses are embedded.While there may be some concern that students that attend university within, or close to, their home zip code differ systematically from those who depart, attempting the same procedure using only students attending college close to home reduces the size of the dataset by more than half and is therefore infeasible. To maximize comparability with our NIBRS data, we use HERI data only from 1997 onward only.

6.1 How do religious students differ from atheist ones?

Religious students, in general, are somewhat more likely than self-reported atheists to avoid alcohol or to drink it only occasionally. They also disagree far more strongly with the phrase "If two people really like each other, it is okay for them to have sex." They are also far more likely to choose "Disagree strongly" in response to the phrase "Abortion should be legal".

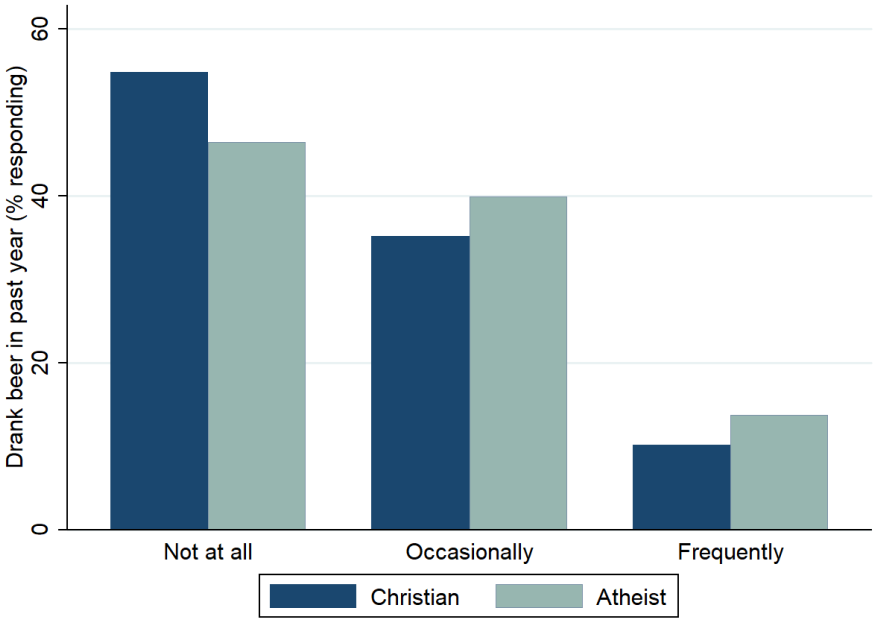

Figure 13: Beer consumption by religion

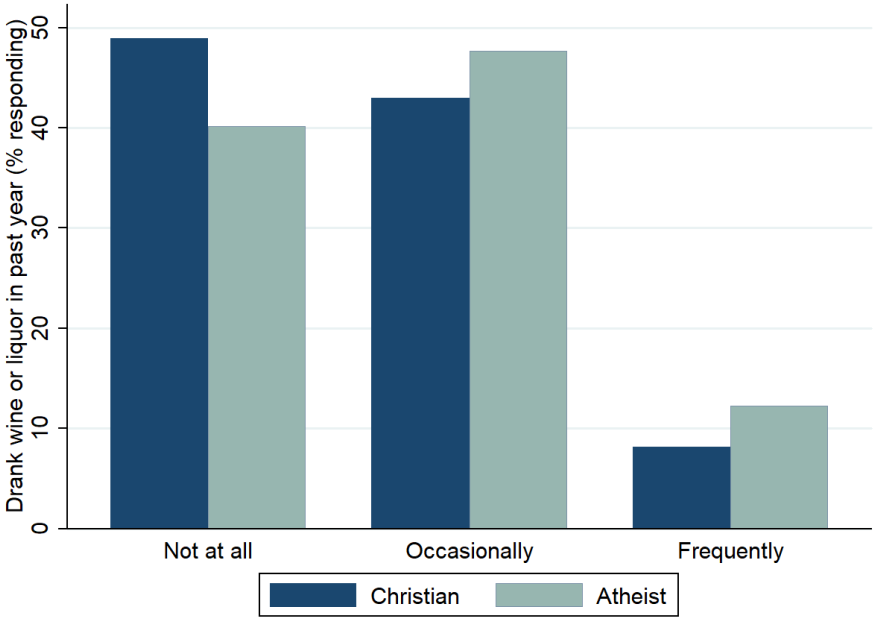

Figure 14: Wine consumption by religion

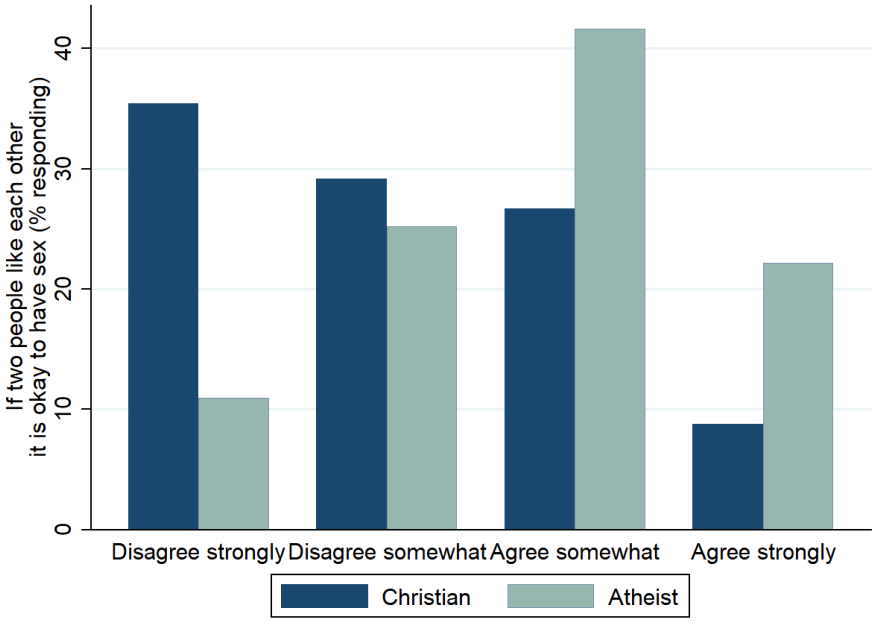

Figure 15: Attitudes towards hookups

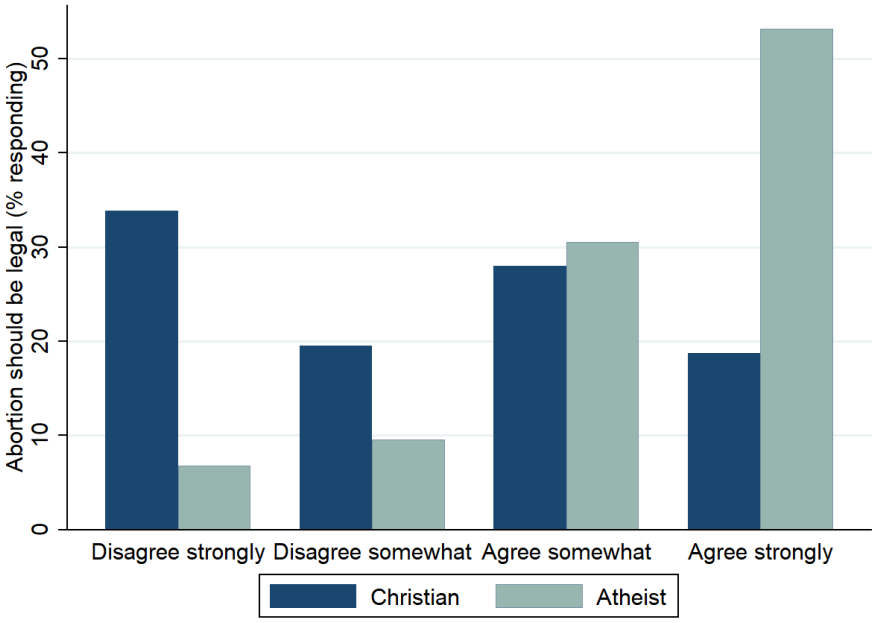

Figure 16: Attitudes towards abortion

In terms of how they allocate their time, however, differences between religious and

atheist students are less pronounced. They spend roughly equal hours on homework and partying.

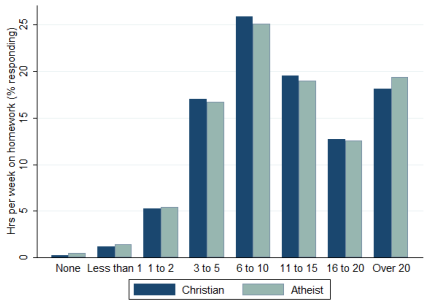

Figure 17: Hrs/week on homework

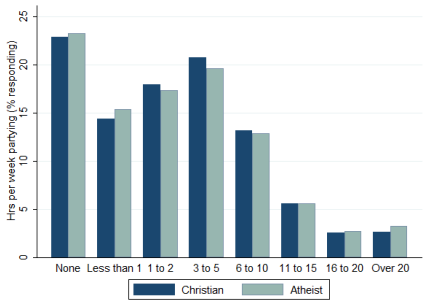

Figure 18: Hrs/week partying

6.2 How do students on campuses with a nearby Planned Parenthood clinic differ from those without?

As might be expected, students that attend universities in counties with at least one Planned Parenthood clinic look on abortion more favorably. What is rather more surprising is that, contrary to the idea that universities are centers of a "bacchanalian lifestyle", a majority of students disapprove of casual sex: nearly 62% reported either mild or strong disagreement overall. Here too, however, the presence of Planned Parenthood in the county correlates with a decreased rate of strong disapproval of casual sex, and small increases in the proportion of respondents reporting some level of favorability towards it. For both attitudinal variables, the presence or absence of Planned Parenthood appears to affect the incidence of strong approval or disapproval, while rates of mild approval or disapproval remain fairly similar.

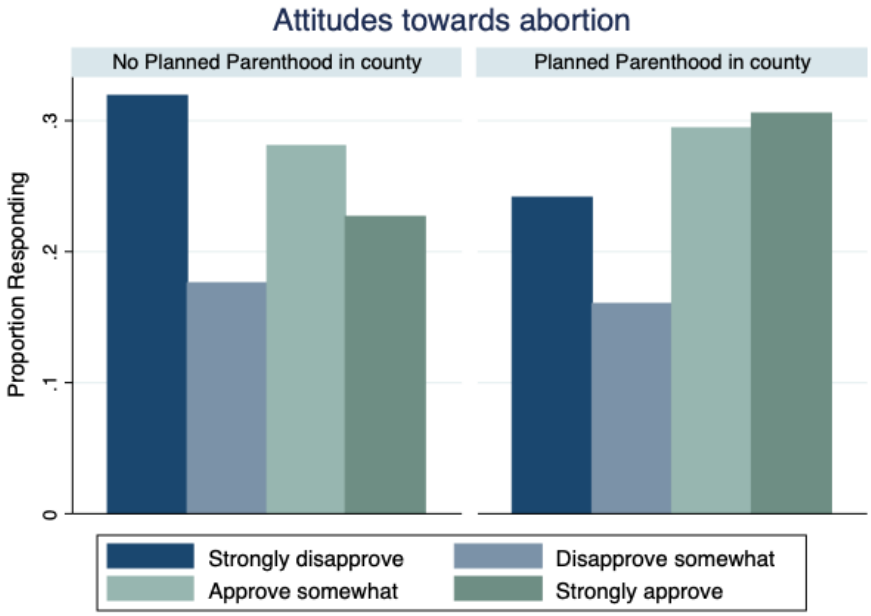

Figure 19: Attitudes towards abortion by campus

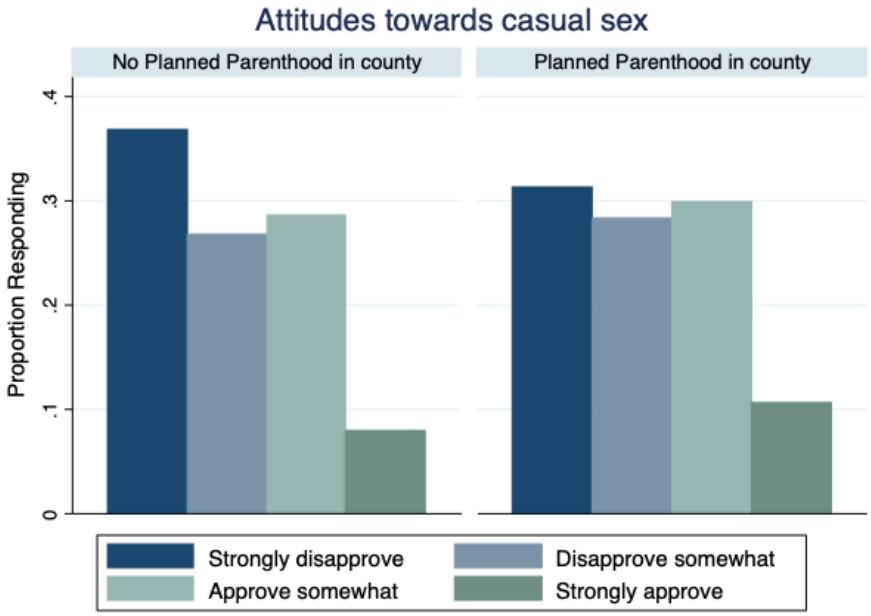

Figure 20: Attitudes towards hookups by campus

On the other hand, the availability of Planned Parenthood seems largely orthogo-

nal to drinking behavior: a majority of respondents report no drinking at all (consistent with both the U.S. legal drinking age and the large proportion of campuses that ban alcohol on the premises). Less than ten percent of respondents report frequent consumption of wine or beer in the past year. Of course, it is consistent with our hypothesis that alcohol is a disinhibitor that students might resort to it only occasionally rather than frequently.

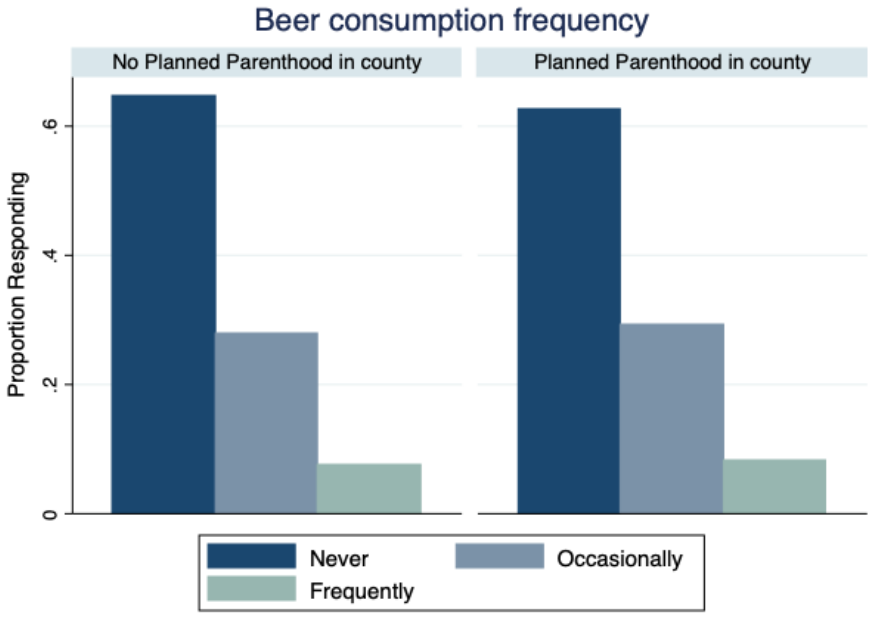

Figure 21: Beer consumption by campus

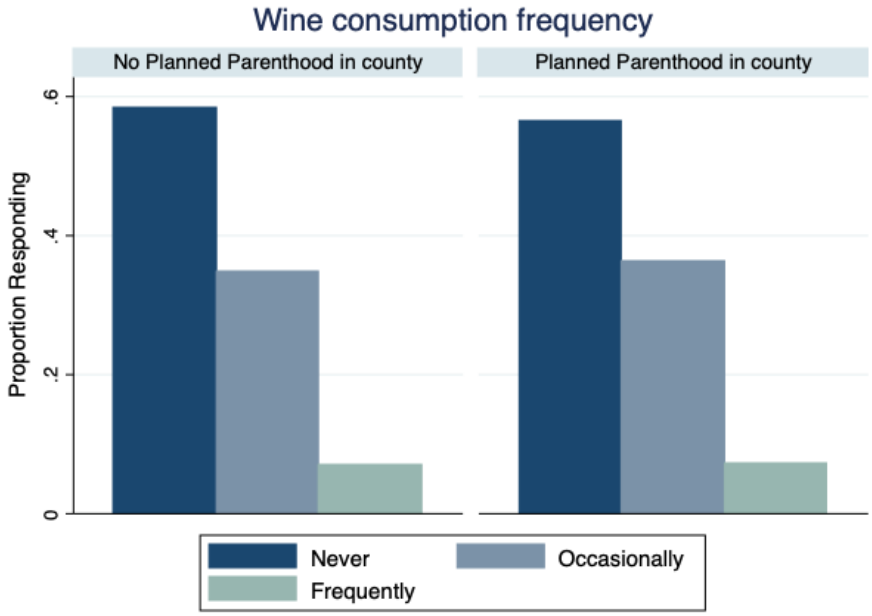

Figure 22: Wine consumption by campus

Table 12 therefore adds to our preferred specification the percentage of students on a campus that report strongly disapproving of casual sex. As this question was only part of the survey in 1997-2001 and 2004-5 – just 20% of our total dataset – we take the average percentage of respondents over the entire period. The coefficient is positive as expected in the regression for incidents with alcohol, though significant only at the 10% level. It is insignificant in the other regressions - for incidents without alcohol and for total incidents. Given that attitudes evolve over time but our observations are averaged over the whole period, there is substantial measurement error in this variable and it is not surprising that only weak effects are observed.

Surprisingly, though, including the disapproval variable increases substantially (by nearly a half) the coefficient on religious affiliation. However, this appears to be due to the fact that limitations on the availability of HERI data restrict the sample size (to around 36,000 instead of 45,000 in our main specification), and it is this restriction that results in an increased coefficient on religious campuses. To see this, we report in Table 21 in the Appendix our main specification on the restricted sample - this shows that that increased coefficient is entirely the result of the sample size restriction and not at all to the fact of controlling for student attitudes.

Table 12: Regressions with HERI attitudinal data

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
% Strongly disapproving of casual sex	0.531+	(0.32)	0.225	(0.29)	0.258	(0.25)
No. of Planned Parenthood clinics	-0.210*	(0.09)	0.019	(0.05)	-0.019	(0.04)
National Collegiate Athletic Association membership	2.386***	(0.36)	1.071***	(0.20)	1.202***	(0.17)
Religious affiliation	0.824*	(0.35)	0.256	(0.26)	0.356	(0.24)
Dry campus	-0.286+	(0.16)	-0.111	(0.16)	-0.147	(0.13)
Beer tax	-0.301	(0.36)	0.223	(0.24)	0.082	(0.22)
Log of total enrolment	0.605***	(0.09)	0.734***	(0.07)	0.656***	(0.06)
Freshman residency requirement	0.509**	(0.16)	0.418**	(0.14)	0.409***	(0.12)
Single-gender dorms offered	-0.061	(0.16)	0.253+	(0.15)	0.165	(0.13)
Single-gender dorms only	-0.098	(0.39)	-0.014	(0.34)	-0.027	(0.31)
Gender-inclusive housing	0.362*	(0.15)	0.338*	(0.16)	0.314*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.175***	(0.06)				
Lagged incidents of sexual assault w. alcohol			0.197***	(0.06)		
Lagged incidents of sexual assault					0.217***	(0.03)
Blue county	0.151	(0.15)	0.177+	(0.09)	0.148+	(0.09)
Red county	-0.229	(0.16)	-0.292*	(0.13)	-0.259*	(0.10)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional dummies	YES		YES		YES	
Constant	-9.541***	(0.94)	-9.738***	(0.69)	-8.665***	(0.62)
N	35,979		35,979		35,979	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.348***	(0.77)	1.650***	(0.27)	1.519***	(0.21)
	+ $p < 0.10$,	* $p < 0.05$,	** $p < 0.01$,	*** $p < 0.001$		

7 Conclusions and policy implications

There has been growing awareness in recent years that sexual assault on college campuses, like sexual assault in many other contexts, is a major social problem that requires careful analysis and evidence-based policy prescriptions. The hypothesis that a culture of sexual permissiveness has contributed to the extent of this problem is one

that has some initial plausibility, but such evidence as we have been able to collect provides no support for it. On the contrary, our findings suggest that, in the presence of a disinhibiting mechanism such as easy availability of alcohol, stricter norms against consensual sex are associated with somewhat more sexual assaults in which alcohol is implicated, and our behavioral model provides some grounds for thinking that such an association is causal. Nevertheless, we acknowledge that the evidence for our alternative hypothesis remains suggestive rather than definitive at this point - in particular we have not been able to find evidence that links student attitudes to consensual sex directly to the consumption of alcohol as a disinhibitor. This seems to reflect shortcomings in the available data that might enable such a link to be investigated - absence of evidence does not constitute evidence of absence - and it remains an important subject for future research.

It is important to make clear that, even if our hypothesis were more strongly supported by the data, this would not mean that colleges (religious or secular) would be wrong to implement stricter norms against consensual sex; that is a choice they might wish to make on a variety of other grounds. What it means is that, unless the implementation of these norms is accompanied by severe restrictions on the availability of alcohol (and perhaps of some analogous institutions such as fraternities), they may have damaging side-effects in an increased incidence of alcohol-fuelled cases of sexual assault.

Alongside restrictions on access to alcohol, various policy measures may be able to make more salient the possible consequences of alcohol for the risks of engaging in sexual assault. There may be valuable lessons to be drawn from the history of campaigns against drunken driving in many countries, which have radically changed the perceived social acceptability of consuming alcohol in any context where individuals may subsequently need to drive (see [36]). Reducing the social acceptability of consuming alcohol in contexts in which students may wish to engage in consensual sex would seem to be highly desirable - but probably easier to achieve if consensual sex is not itself considered a socially unacceptable activity.

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A Appendix: Supplementary tables

Table 13: NCVS variable definitions

Variable	**Definition**
Victim reported crime	Dummy, =1 if victim reported crime to police themselves
Police involved	Dummy, =1 if police were made aware of the incident by any means
Offender is stranger	Dummy, =1 if victim and perpetrator not acquainted
White offender	Offender is white (available for single offenders starting 2012Q1)
Black offender	Offender is black (available for single offenders starting 2012Q1)
White victim	Victim is white (available starting 2003Q1)
Black victim	Victim is black (available starting 2003Q1)
Weapon used	Dummy, =1 if weapon was used to threaten or harm victim
College	Dummy, =1 if victim has bachelor's degree or higher
Urban	Dummy, =1 if crime occurred in urban area
Northeast	Dummy, =1 if crime occurred in the Northeast
Midwest	Dummy, =1 if crime occurred in the Midwest
South	Dummy, =1 if crime occurred in the South
West	Dummy, =1 if crime occurred in the West

Table 14: NCVS probit marginal effects - cases of rape

	Police involvment		**Self-reporting**	
	Coef.	Std. Err.	Coef.	Std. Err.
Alcohol involved	-0.010	(0.06)	-0.048	(0.06)
Offender is stranger	0.393***	(0.09)	0.192*	(0.09)
Offender is stranger*alcohol	-0.278+	(0.14)	-0.341*	(0.16)
White victim	0.082	(0.07)	0.053	(0.07)
Black offender	0.244***	(0.07)	0.072	(0.07)
Weapon used	0.458***	(0.07)	0.343***	(0.08)
Post-secondary education	-0.177***	(0.05)	-0.068	(0.06)
College	-0.222*	(0.09)	-0.147	(0.10)
Urban area	-0.203**	(0.07)	-0.154*	(0.08)
Northeast	-0.030	(0.10)	-0.138	(0.11)
South	0.065	(0.07)	0.019	(0.08)
West	0.061	(0.08)	0.089	(0.09)
Year of incident	YES		YES	
N	3,018		3,018	

Table 15: IV Negative binomial - incidents of sexual assault

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.227***	(0.07)	0.015	(0.04)	-0.026	(0.04)
National Collegiate Athletic Association membership	1.912***	(0.34)	0.998***	(0.17)	1.130***	(0.17)
Religious affiliation	0.515	(0.36)	0.170	(0.21)	0.252	(0.21)
Dry campus (instrumented)	-0.462	(0.77)	-0.067	(0.45)	-0.145	(0.45)
Log of total enrolment	0.484***	(0.08)	0.618***	(0.05)	0.586***	(0.05)
Freshman residency requirement	0.377**	(0.14)	0.246**	(0.09)	0.277**	(0.09)
Single-gender dorms offered	0.037	(0.14)	0.209+	(0.11)	0.175	(0.11)
Single-gender dorms only	-0.363	(0.48)	-0.011	(0.28)	-0.081	(0.28)
Gender-inclusive housing	0.323+	(0.19)	0.303*	(0.13)	0.308*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.184***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.256***	(0.04)		
Lagged incidents of sexual assault					0.248***	(0.04)
	0.084	(0.14)	0.163+	(0.08)	0.144+	(0.08)
Red county	-0.191	(0.16)	-0.150	(0.11)	-0.157	(0.11)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.303***	(0.88)	-8.317***	(0.54)	-7.763***	(0.52)
N	45,602		45,602		45,602	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.643***	(0.75)	1.651***	(0.20)	1.573***	(0.17)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Table 16: Main regressions - incidents of rape, monthly data

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.215**	(0.07)	-0.008	(0.05)	-0.051	(0.04)
National Collegiate Athletic Association membership	1.867***	(0.37)	1.490***	(0.23)	1.538***	(0.22)
Religious affiliation	0.171	(0.36)	0.188	(0.28)	0.158	(0.25)
Dry campus	-0.239+	(0.14)	-0.185	(0.11)	-0.190+	(0.10)
Beer tax	-0.046	(0.30)	0.207	(0.18)	0.131	(0.17)
Log of total enrolment	0.467***	(0.09)	0.596***	(0.07)	0.529***	(0.07)
Freshman residency requirement	0.398**	(0.14)	0.354**	(0.11)	0.347***	(0.10)
Single-gender dorms offered	0.099	(0.14)	0.234+	(0.12)	0.190+	(0.11)
Single-gender dorms only	-0.380	(0.41)	-0.278	(0.36)	-0.286	(0.30)
Gender-inclusive housing	0.355*	(0.16)	0.341*	(0.16)	0.336*	(0.14)
Lagged incidents of rape w.o. alcohol	0.311***	(0.07)				
Lagged incidents of rape w. alcohol			0.269***	(0.07)		
Lagged incidents of rape					0.316***	(0.03)
Blue county	0.042	(0.13)	0.075	(0.09)	0.065	(0.08)
Red county	-0.090	(0.14)	-0.212+	(0.12)	-0.154	(0.10)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.655***	(0.95)	-9.011***	(0.63)	-8.010***	(0.61)
N	45,602		45,602		45,602	
$p > \|\chi^2\|$	0.0000		-		0.0000	
α	6.714***	(0.98)	2.387***	(0.34)	2.112***	(0.25)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Table 17: Regressions using Planned Parenthood availability

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Planned Parenthood in county	-0.350*	(0.17)	0.140	(0.13)	0.047	(0.12)
National Collegiate Athletic Association membership	1.839***	(0.33)	1.009***	(0.18)	1.079***	(0.16)
Religious affiliation	0.441	(0.36)	0.167	(0.21)	0.202	(0.20)
Dry campus	-0.257+	(0.15)	-0.150	(0.10)	-0.158+	(0.09)
Beer tax	-0.176	(0.30)	0.165	(0.19)	0.073	(0.17)
Log of total enrolment	0.474***	(0.09)	0.653***	(0.06)	0.568***	(0.05)
Freshman residency requirement	0.426**	(0.14)	0.274**	(0.10)	0.291**	(0.09)
Single-gender dorms offered	0.095	(0.14)	0.233+	(0.13)	0.188+	(0.11)
Single-gender dorms only	-0.311	(0.47)	-0.022	(0.29)	-0.074	(0.27)
Gender-inclusive housing	0.397*	(0.16)	0.334*	(0.14)	0.321*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.191***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.192***	(0.05)		
Lagged incidents of sexual assault					0.234***	(0.03)
Blue county	0.075	(0.13)	0.155*	(0.08)	0.120+	(0.07)
Red county	-0.209	(0.14)	-0.149	(0.09)	-0.142+	(0.08)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-8.277***	(0.89)	-8.753***	(0.56)	-7.673***	(0.51)
N	45,924		45,924		45,924	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.796***	(0.78)	1.742***	(0.22)	1.581***	(0.17)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Table 18: Main regressions - incidents of sexual assault, daily data

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.225***	(0.07)	0.006	(0.03)	-0.033	(0.03)
National Collegiate Athletic Association membership	1.930***	(0.33)	1.025***	(0.17)	1.161***	(0.16)
Religious affiliation	0.514	(0.36)	0.181	(0.21)	0.264	(0.21)
Dry campus	-0.232+	(0.14)	-0.146	(0.10)	-0.167+	(0.10)
Beer tax	-0.165	(0.31)	0.156	(0.18)	0.088	(0.18)
Weekend	0.573***	(0.06)	0.178***	(0.04)	0.262***	(0.04)
Halloween	0.993**	(0.31)	0.506**	(0.15)	0.635***	(0.15)
Log of total enrolment	0.475***	(0.08)	0.633***	(0.05)	0.597***	(0.05)
Freshman residency requirement	0.351**	(0.13)	0.243**	(0.09)	0.266**	(0.09)
Single-gender dorms offered	0.034	(0.14)	0.194+	(0.12)	0.161	(0.11)
Single-gender dorms only	-0.390	(0.49)	0.000	(0.27)	-0.077	(0.28)
Gender-inclusive housing	0.363*	(0.15)	0.281*	(0.14)	0.294*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.180***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.226***	(0.03)		
Lagged incidents of sexual assault					0.219***	(0.03)
Blue county	0.122	(0.12)	0.162*	(0.07)	0.150*	(0.07)
Red county	-0.190	(0.14)	-0.150+	(0.09)	-0.159+	(0.08)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	-11.882***	(0.87)	-11.893***	(0.51)	-11.339***	(0.50)
N	1,384,420		1,384,420		1,384,420	
$p > \lvert\chi^2\rvert$	0.0000		0.0000		0.0000	
α	100.6***	(16.7)	21.40***	(3.90)	19.86***	(3.23)
	$+\ p < 0.10$,	$*\ p < 0.05$,	$**\ p < 0.01$,	$***\ p < 0.001$		

Table 19: Main regressions - incidents of sexual assault per capita

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.012**	(0.00)	0.001	(0.01)	-0.010	(0.01)
National Collegiate Athletic Association membership	0.027*	(0.01)	0.038	(0.03)	0.061+	(0.04)
Religious affiliation	0.101*	(0.05)	0.058	(0.07)	0.149	(0.09)
Dry campus	-0.018+	(0.01)	-0.021	(0.02)	-0.036	(0.03)
Beer tax	0.001	(0.03)	0.071	(0.07)	0.067	(0.08)
Log of total enrolment	-0.021**	(0.01)	-0.063***	(0.01)	-0.078***	(0.02)
Freshman residency requirement	0.023*	(0.01)	0.052*	(0.03)	0.070*	(0.03)
Single-gender dorms offered	-0.000	(0.01)	0.045+	(0.03)	0.041	(0.03)
Single-gender dorms only	-0.038	(0.03)	-0.066	(0.07)	-0.097	(0.07)
Gender-inclusive housing	0.022	(0.02)	0.067+	(0.04)	0.082+	(0.04)
Lagged incidents of sexual assault w.o. alcohol p.c.	0.021	(0.01)				
Lagged incidents of sexual assault w. alcohol p.c.			0.057	(0.03)		
Lagged incidents of sexual assault p.c.					0.101**	(0.03)
Blue county	-0.002	(0.01)	0.027	(0.02)	0.023	(0.02)
Red county	-0.002	(0.01)	-0.027	(0.02)	-0.027	(0.03)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional Dummies	YES		YES		YES	
Constant	0.191*	(0.08)	0.576***	(0.13)	0.715***	(0.17)
N	45,602		45,602		45,602	
$p > \|F^2\|$	0.0000		0.0000		0.0000	

$+ \ p < 0.10$, $* \ p < 0.05$, $** \ p < 0.01$, $*** \ p < 0.001$

Table 20: Regressions with HERI attitudinal data (II)

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Proportion disapproving strongly of casual sex	0.826*	(0.36)	0.154	(0.37)	0.262	(0.31)
Proportion disapproving strongly of abortion	-0.833+	(0.45)	0.181	(0.58)	-0.011	(0.47)
No. of Planned Parenthood clinics	-0.211*	(0.09)	0.018	(0.05)	-0.019	(0.04)
Athletic association membership	2.362***	(0.36)	1.077***	(0.19)	1.202***	(0.17)
Religious affiliation	0.778*	(0.35)	0.269	(0.26)	0.355	(0.24)
Dry campus	-0.302+	(0.16)	-0.108	(0.15)	-0.148	(0.13)
Beer tax	-0.293	(0.36)	0.220	(0.24)	0.082	(0.22)
Log of total enrolment	0.587***	(0.09)	0.739***	(0.07)	0.656***	(0.06)
Freshman residency requirement	0.535***	(0.16)	0.414**	(0.14)	0.409***	(0.12)
Single-gender dorms offered	-0.029	(0.16)	0.248	(0.16)	0.165	(0.13)
Single-gender dorms only	-0.130	(0.39)	-0.004	(0.34)	-0.027	(0.31)
Gender-inclusive housing	0.310*	(0.15)	0.349*	(0.16)	0.313*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.174***	(0.06)				
Lagged incidents of sexual assault w. alcohol			0.198***	(0.06)		
Lagged incidents of sexual assault					0.217***	(0.03)
Blue county	0.156	(0.15)	0.177+	(0.09)	0.148+	(0.09)
Red county	-0.165	(0.16)	-0.305*	(0.14)	-0.258*	(0.12)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional dummies	YES		YES		YES	
Constant	-8.654***	(1.05)	-9.616***	(0.83)	-8.384***	(0.72)
N	32,657		32,657		32,657	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.302***	(0.82)	1.733***	(0.27)	1.594***	(0.21)
	*	p<0.05,	**	p<0.01,	***	p<0.001

Table 21: Main regressions - restricted dataset

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
No. of Planned Parenthood clinics	-0.218*	(0.08)	0.016	(0.05)	-0.023	(0.04)
National Collegiate Athletic Association membership	2.419***	(0.36)	1.089***	(0.21)	1.221***	(0.18)
Religious affiliation	0.863*	(0.34)	0.277	(0.26)	0.379	(0.24)
Dry campus	-0.216	(0.16)	-0.085	(0.14)	-0.117	(0.12)
Beer tax	-0.332	(0.37)	0.210	(0.25)	0.066	(0.23)
Log of total enrolment	0.613***	(0.09)	0.739***	(0.07)	0.662***	(0.06)
Freshman residency requirement	0.434**	(0.15)	0.385**	(0.12)	0.372***	(0.10)
Single-gender dorms offered	-0.060	(0.16)	0.252+	(0.15)	0.163	(0.13)
Single-gender dorms only	-0.070	(0.39)	-0.003	(0.34)	-0.014	(0.31)
Gender-inclusive housing	0.370*	(0.16)	0.336*	(0.16)	0.314*	(0.14)
Lagged incidents of sexual assault w.o. alcohol	0.175***	(0.06)				
Lagged incidents of sexual assault w. alcohol			0.199***	(0.05)		
Lagged incidents of sexual assault					0.219***	(0.03)
Blue county	0.173	(0.12)	0.157+	(0.08)	0.140+	(0.07)
Red county	-0.179	(0.13)	-0.185+	(0.10)	-0.163+	(0.09)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional dummies	YES		YES		YES	
Constant	-9.397***	(0.96)	-9.694***	(0.69)	-8.609***	(0.62)
N	35,979		35,979		35,979	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.367***	(0.77)	1.656**	(0.27)	1.526**	(0.21)

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 22: Regressions controlling for student demographics

	Incidents w. alcohol		**Incidents w.o. alcohol**		**Total incidents**	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Proportion of black students	-0.901+	(0.53)	0.366	(0.37)	0.172	(0.33)
No. of Planned Parenthood clinics	-0.212**	(0.06)	0.008	(0.04)	-0.029	(0.03)
National Collegiate Athletic Association membership	1.880***	(0.33)	1.037***	(0.19)	1.113***	(0.17)
Religious affiliation	0.584	(0.36)	0.246	(0.21)	0.294	(0.21)
Dry campus	-0.169	(0.13)	-0.191+	(0.10)	-0.173*	(0.09)
Beer tax	-0.104	(0.30)	0.136	(0.20)	0.054	(0.18)
Log of total enrolment	0.452***	(0.08)	0.673***	(0.06)	0.580***	(0.05)
Freshman residency requirement	0.255*	(0.13)	0.278**	(0.10)	0.257**	(0.09)
Single-gender dorms offered	0.087	(0.13)	0.187	(0.12)	0.152	(0.10)
Single-gender dorms only	-0.440	(0.49)	-0.019	(0.29)	-0.090	(0.27)
Gender-inclusive housing	0.413**	(0.15)	0.316*	(0.15)	0.313*	(0.13)
Lagged incidents of sexual assault w.o. alcohol	0.177***	(0.05)				
Lagged incidents of sexual assault w. alcohol			0.190***	(0.05)		
Lagged incidents of sexual assault					0.229***	(0.03)
Blue county	0.173	(0.12)	0.157+	(0.08)	0.140+	(0.07)
Red county	-0.179	(0.13)	-0.185+	(0.10)	-0.163+	(0.09)
Month FE	YES		YES		YES	
Year FE	YES		YES		YES	
Regional dummies	YES		YES		YES	
Constant	-9.332***	(0.91)	-9.564***	(0.58)	-8.473***	(0.51)
N	41,463		41,463		41,463	
$p > \|\chi^2\|$	0.0000		0.0000		0.0000	
α	5.154***	(0.68)	1.701***	(0.22)	1.502***	(0.17)
	+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

B Other sources of U.S. data

B.1 National Women's Study [1989-1991]

This survey, conducted by the National Institute of Drug Abuse (NIDA), was one of the earliest surveys to provide information on the prevalence of sexual violence at the national level, using a nationally representative sample of 4,008 adult women. However, its lack of behaviorally-oriented questions - as well as its age - make it unsuited for our analysis.

B.2 National Violence Against Women Survey (NVAWS) [1995-6]

This one-off telephone survey conducted by the National Institute of Justice (NIJ) and the Center for Disease Control and Prevention (CDC) interviewed adults, both male and female, from across the U.S. It aimed to collect data not only on sexual violence but also physical assault suffered either as a child at the hands of a caretaker, or as an adult at the hands of a partner.

As the NVAWS asked respondents for lifetime incidence of these crimes, it is unsuitable for our analysis.

B.3 National College Women Sexual Victimization Survey [1997]

This survey interviewed a national sample of women attending a two- or four-year college. Each college included in the survey was selected randomly, with the probability of inclusion being proportional to female enrolment. This survey contained ten behaviorally-specific questions designed to establish whether respondents had been victims of a sexual crime, whether or not they themselves realized it.

B.4 National Intimate Partner and Sexual Violence Survey (NISVS) [2010-present]

The National Intimate Partner and Sexual Violence Survey is the successor to the NVAW. It is an ongoing, nationally representative survey collects detailed information about intimate partner violence, sexual violence and stalking, including victim and perpetrator characteristics and details about the context in which the crime occurred. However, while the CDC conducts this survey annually, the raw datasets are currently unavailable.

B.5 Campus Climate Survey on Sexual Assault and Sexual Misconduct [2010-2015]

This survey, developed by the Association of American Universities (AAU), aims to improve understanding of both the experiences and attitudes of students with respect to sexual assault and sexual misconduct. The raw data are, unfortunately, unavailable for download.