

Rape Culture and Sexual Crime: Evidence from U.S. Newspapers, 2000-2013

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Abstract: We offer the first quantitative analysis of “rape culture” in the United States. Observers have long worried that biased news coverage of rape - which blames victims, empathizes with perpetrators, implies consent, and questions victims' credibility - may deter victims from coming forward, and ultimately increase the incidence of rape. We present a theory of how rape culture might shape the preferences and choices of perpetrators, victims and law enforcement, and test this theory with data on news stories about rape published in U.S. newspapers between 2000 and 2013. We find that rape culture in the media predicts both the frequency of rape and its pursuit through the local criminal justice system. In jurisdictions where rape culture was more prevalent, there were more documented rape cases, but authorities were less vigilant in pursuing them.

In recent years, the United States has seen growing public debate around media bias in news reporting of sexual violence. News coverage of cases like the 2012 Steubenville, Ohio gang rape raised concerns about media empathizing with the accused and neglecting the victim's perspective. Much of this discussion centers on the idea of "rape culture," which scholars and activists define as "a set of values and beliefs that provide an environment conducive to rape" (Boswell and Spade 1996), where "rape is often not acknowledged as a crime and its victims are frequently blamed ... for their own violation" (Vogelman 1990). If news reporting reflects the norms and policy preferences of journalists and their audience (Hamilton 2004), a closer look at this media coverage may help us understand why some local authorities are less assertive in investigating rape allegations, some victims are less likely to report assaults, and some perpetrators are more likely to commit rape.

Rape culture has important implications. Social perceptions of sexual violence -- for example, whether rape is possible within marriage -- bound women's political, social and economic rights. Feminist scholars have long viewed social norms surrounding rape as defining features of gender equality (Brownmiller 1975), with "rape-prone" societies characterized by high levels of sex segregation, devaluation of women, and interpersonal violence (Sanday 1981). Despite growing public interest (Madden 2014), social science research on rape culture remains limited (Wolf 2013).

Our study bridges the gap between literatures on political communication, sexual violence, and economic models of crime, providing a theoretical logic by which local norms about rape might affect the choices of victims, perpetrators and police. It is also the first to move beyond small group experiments and qualitative case studies to quantitatively link these norms to the local prevalence of rape. We employ newspaper coverage as a measure of local norms, and

develop a text classification model to detect several aspects of rape culture in the media – like victim-blaming, empathy for the accused, implications of consent and incredulity toward victims. We classify over 300,000 news articles about rape across 279 mostly local U.S. newspapers between 2000 and 2013. We then analyze whether rape culture in the press helps predict local variation in documented rape cases and arrests, based on data from F.B.I. Uniform Crime Reports. In doing so, we account for a host of political, social and economic confounding factors, and exploit exogenous variation in news content due to shocks to the local media market.

We find that where there is more rape culture, there is more rape. In areas with more prevalent rape culture in the press, police receive more frequent reports of rape, but make *fewer* arrests in response. Because lower police vigilance may deter victims from reporting, while raising perpetrators' senses of impunity, the association between rape culture and crime likely reflects an increased *incidence* of rape, rather than increased *reporting* by victims. We do not find similar patterns for other violent or non-violent crimes. To the extent that rape culture, as reflected in news coverage, can help explain the choices of perpetrators, victims and police, this finding highlights a key missing element from existing theories of crime, advancing our understanding of sexual violence and conditions that enable it.

Causes of rape and sexual violence

Although policy discourse often assumes that rape culture is socially harmful, scholars have yet to empirically link gendered media biases to the prevalence of rape. Economic theories of crime generally assume that a person commits an offense if the expected utility gained from it exceeds that of investing time and resources into other activities (Becker 1968: 176). As the expected costs of committing a crime increase -- as discovery becomes more likely or punishment more severe -- fewer people will commit it. Such theories have greatly influenced

policy, by offering a simple, generalizable logic of deterrence. Yet they rarely address normative drivers of criminal behavior, its cultural context, or the effects of age, race and gender (Eide et al. 2006).

Applications of economic models of crime to sexual violence remain nascent (Benson and Zimmerman 2007; Beauregard et al. 2007), and their empirical validity uncertain. While police resources (i.e. staffing, training, equipment) should affect perpetrators' expectations of being caught and punished, empirical research finds that they have a stronger deterrent effect on property crime (Levitt 1997) than on violent crimes like rape (Evans and Owens 2008). The same is true for other political-economic factors -- like women's demographic presence (Iyer et al. 2011), or local attitudes on criminal justice (Jost et al. 2003).

Gendered biases in media coverage of rape. Existing research overlooks a potentially important source of variation in sexual crime: community norms on gender and sexual violence, as reflected in mass media.

Social scientists have examined select forms of gendered biases in the media, like exposure to violent pornography (Russell 1988; Malamuth et al. 1986), false beliefs or “myths” about rape (Benedict 1992; Soothill and Walby 1991), and the conduciveness to rape of specific social settings (Boswell and Spade 1996; Armstrong et al 2006). Most of this research holds that news coverage shapes, rather than reflects, prevailing norms (Benedict 1992). Yet unless potential victims, perpetrators and police all read their local newspapers, it is unclear how newspaper reporting would alter their behavior.

Political communication scholars (Entman 2004; Strömbäck and Dimitrova 2006) have argued that, with rare exceptions, news reporting *reflects* rather than *challenges* the normative context within which it is produced. Reporters' biases mirror the norms of the communities in

which they live and work. Their audiences, meanwhile, resist or avoid frames (i.e. emphases or perspectives on a story) that conflict with their preexisting norms or values (Goldman and Mutz 2011; Iyengar and Hahn 2009). News organizations that neglect these norms risk losing their audience, particularly in diverse media markets where consumers have numerous options (Mutz and Martin 2001).

A new model

We introduce a stylized model to assess the relationship between rape culture and sexual crime. Following Donohue & Levitt (2001) and Iyer et al. (2011), we assume that rape results from an interaction between three actors: perpetrators, victims and police. Initially, a perpetrator decides whether to commit rape. If they do so, the victim decides whether to contact the police. If the victim reports, the police decide whether to arrest the perpetrator.

This interaction produces four possible outcomes: (1) perpetrator does not commit rape, (2) perpetrator commits rape, but victim doesn't report, (3) perpetrator commits rape, victim reports, but the police make no arrest, and (4) perpetrator commits rape, victim reports, police make an arrest. The prevalence of rape culture in society affects actors' preferences over these outcomes and, by extension, the probability that each occurs.

Police. By backward induction, the perceived likelihood that law enforcement will pursue a rape allegation affects decisions both to commit and report the crime. The police have limited resources and are more likely to make an arrest if they view the allegation as credible. Where rape culture is prevalent, the threshold for justifying an investigation will be high. If local norms favor victim-blaming and empathy for the accused, police embedded in those norms may be more likely to scrutinize the victim's account, more wary of making a false arrest, and more likely to drop cases early in the criminal justice process (Schuller and Stewart 2000; Jordan

2006). Where rape culture is less pervasive, police may be more likely to believe the victim, conduct a full investigation, and make arrests. Higher levels of rape culture should be associated with decreased police vigilance in rape cases.

Victims. Rape survivors' decisions to report violations depend on various factors, including trauma, fear of reprisal, their relationship to the perpetrator, and trust in law enforcement. Assuming that victims seek increased security or justice, they may prefer that the police make an arrest following a report over either no arrest or no report.¹ The greater a victim's expectation of an arrest, the stronger their incentive to report the crime.

If rape culture is pervasive, victims will expect the investigation threshold to be high, and may not expect police to bring alleged rapists to justice. Reporting is also likely to be costlier -- proceedings take longer, with victims subject to greater public scrutiny and risk of retaliation. A victim in a high rape culture context may conclude that it is least costly -- in terms of damage to dignity and reputation -- to forgo reporting the crime. Higher levels of rape culture should be associated with decreased reporting of rape by victims.

Perpetrators. Decisions to engage in criminal activities depend, at least in part, on the perceived probability of being caught, and the severity and immediacy of punishment. Perpetrators prefer committing rape when victims don't report and police don't arrest, and prefer not offending over doing so and being punished. The costs of rape therefore depend on how victims and police respond.

Where rape culture is limited, potential perpetrators may expect a higher probability of detection and arrest, because police are more likely to vigilantly pursue victims' allegations, and victims are more likely to come forward. By reducing the probability of arrest and severity of

¹ Empirically, rape victims are more likely to report if they experienced high levels of violence and injuries, and less likely if the perpetrator was a relative or acquaintance (Pino and Meier 1999).

punishment, rape culture lowers the expected costs of rape, and raises the likelihood that perpetrators commit it.²

Empirical implications. The previous discussion implies that higher levels of rape culture should be associated with a higher incidence of rape. Yet an increase in documented cases could result from either a higher incidence of rape, or from more reporting by victims.

To empirically distinguish between these possibilities, we can examine the number of rape reports that result in arrests. We expect that where rape culture is high, police are less likely to investigate rape reports, and make arrests. Victims are thus less likely to report the crime, and perpetrators more likely to offend. Consequently, if we observe lower police vigilance in high-rape culture contexts, we can have greater confidence that increases in *crime*, rather than victims' propensities to report, account for increases in documented rape cases.

News content as an indicator of local rape culture

If the threshold for investigating rape cases indeed depends on the local normative context, then an empirical measure of these norms may help predict the local prevalence of rape. One such indicator is public information about rape that local communities produce and consume. In the context of print media, this information is of two types: *news content* (i.e. *what* journalists write about rape) and *news volume* (i.e. *frequency* of stories about rape). We take the first of these to be more informative of journalistic ethics and community norms.

Following the emerging consensus in political communication, we assume that commercially-oriented media organizations are reticent to risk alienating readers by publishing content that falls far outside the normative mainstream of its target audience (Hamilton 2004). If local news coverage of rape systematically features victim-blaming language, empathy for the

² Perpetrators are sensitive to these expected costs, and use strategies to avoid capture -- targeting acquaintances and vulnerable groups who are less likely to report, and drugging victims before the assault (Lisak and Miller 2002; Tjaden and Thoennes 2006).

accused, implications of consent and incredulity toward victims, we can reasonably interpret such content as a noisy indicator of attitudes that local news consumers and journalists find normatively acceptable and commercially viable. We should therefore expect lower police vigilance and a higher incidence of rape where rape culture is readily observable in news content.

Multiple considerations may drive decisions to print a story on rape, from the newsworthiness of a high-profile case to a general “bad news bias” in the industry (Patterson 1996; Cappella & Jamieson 1997). These decisions are not free of normative motivations. Where local norms invite skepticism over victims’ credibility, for example, newspapers may be wary of publicizing a rape allegation until a court establishes the facts. While more news coverage creates more opportunities for rape culture to appear in the press, a greater volume of stories on rape is itself unlikely if potential readers are inherently dismissive of such news. This dynamic highlights the need to differentiate between the raw number of articles on rape and the proportion of articles that contains elements of rape culture. These two variables may well move in opposite directions.

Measuring rape culture

To evaluate the empirical relationship between rape culture and rape, we collected original data on news coverage of sexual violence: whether a newspaper published a story about rape on a given day, and whether the content of that story (or stories) demonstrates evidence of rape culture, as defined below. By connecting newspapers to communities that either produce or consume their coverage, we estimate the local extent of rape culture.

Data collection. We collected every article mentioning the keywords “rape” or “sexual assault” published in all daily and weekly U.S. newspapers listed in Lexis-Nexis between 2000 and 2013. We also collected information on the physical address of newspapers’ main bureaus

and average daily circulations by county. We focus on newspapers due to their prevalence as primary sources of local information on political, economic and social events, and the ability to collect a consistent and representative data sample across the largest set of geographic units.³

Our corpus includes 310,938 articles published in 279 newspapers (Appendix A.1). The median newspaper published 52 articles about rape, including both news and opinion-editorials.⁴ The *Washington Post* and *New York Times* featured the most coverage, with over 20,000 articles each, followed by the *St. Louis Post Dispatch*, *Washington Times* and *New York Daily News*.⁵ 143 newspapers published fewer than 10 stories, and 49 published just one.

Measurement. Rape culture is difficult to quantify because most existing definitions are imprecise. Our review of previous work revealed convergence around four main categories: (1) victim-blaming language, (2) empathy for perpetrators, (3) implied victim consent and (4) questioning of victims' credibility. These categories feature prominently in toolkits and guidelines for journalists (Garcia-Rojas 2012; Dart Center for Journalism and Trauma 2011), and have dominated recent public discourse.

To develop a coding instrument around these categories, we solicited feedback from two dozen experts, including academic researchers, journalists and activists. Through these consultations, we disaggregated our four main categories into 76 components, and developed the coding instrument as an online survey form (summary in Table 1; details in Appendix A.2).

[Table 1]

We used supervised machine learning to classify each news story into these categories,

3 Ten of the fifteen most popular Internet news sources either are online versions of print newspapers or feature aggregated newspaper content (ebizMBA.com, accessed July 2, 2017). Fraile (2011) finds that newspapers have a larger effect on political knowledge than other media, like television.

4 Even national and international stories can reveal local cultural attitudes about rape, since editors retain discretion over which wire service stories they print.

5 Even national papers, like the *New York Times* have strong local components: they cover local and regional issues and events, and local residents and businesses account for most print subscriptions.

based on a training set of randomly-selected reference articles manually classified by research assistants (RAs) (Appendix A.2). Our team of 10 RAs created a combined training set of 21,911 manually coded newspaper articles. Intercoder reliability statistics, based on 341 overlapping articles, meet or exceed conventional standards of agreement (Appendix A.3).

With these training data, we used a Support Vector Machine (SVM) classifier to assign each document to the categories in Table 1 (Appendix A.4).⁶ To optimize classification performance, we weighted the features in the document-term matrix by term frequency/inverse document frequency (tf/idf) and normalized word counts (Salton and Buckley 1988).

Overview of rape culture in the press. Along with the four main categories of rape culture, we created a combined variable, coded 1 if an article contained *any* of the four types of coverage. Overall, rape culture is relatively rare in the news. The SVM algorithm classified about 3% of rape-related stories as containing any of the four components of rape culture (Appendix A.5). The most common sub-category was victim blaming (1.3 percent), and least common was incredulity toward victims (0.5 percent). The average U.S. county saw 417 newspaper articles about rape per year, 12 of which featured some element of rape culture.

Figure 1 reports the relative probability that SVM-classified articles on rape mention a specific term.⁷ Solid circles indicate that a term is more likely to appear in articles that belong to each rape culture category, compared to articles not in that category. These probabilities reveal stark separation between articles with and without rape culture, and across the main categories.

For instance, articles with *no rape culture* focus more on investigations and judicial proceedings,

6 SVM classifies documents by fitting a maximally-separating hyperplane to a feature space (i.e. relative frequency of words across documents), examining combinations of features that best yield separable categories. We trained this algorithm on human-coded data for each variable, using median values (majority vote) from training articles that overlapped between coders.

7 For parsimony, Figure 1 lists only terms in the top 95th percentile by tf/idf weights. See Appendix A.5 for additional classification results.

commonly mentioning terms like “suspect,” “convict” and “sentence,” but only rarely contextual language like “drink” or “night.” They also tend to focus on more violent crimes (“kill”, “murder”).

By contrast, articles containing at least one of the four categories (*any rape culture*) focused more on the individuals at the center of the case (“student,” “player,” “team”), and less on the severity or criminal nature of an incident (“abus[e]”, “crime”). Breaking these probabilities down by category, *victim-blaming* articles focus on the circumstances of the incident, particularly those that might cast doubt on the victim's physiological state (“drink,” “parti[es]”). *Empathy for the accused* features terms associated with athletic institutions (“player,” “team,” “coach,” “football”) and standards of evidence (“evid[ence]”, “innoc[ent]”, “test”). This category is also unlikely to refer to the accused as “suspect[s].” Articles that imply consent are more likely to mention a “sexual” “relationship” between victim and accused, particularly in an educational setting (“student,” “teacher,” “school”). Finally, articles that question a victim's credibility emphasize the victim's account of events (“accus[e]”, “alleg[e]”) during adversarial court proceedings (“defens[e]”, “prosecutor,” “attorney”).

[Figure 1]

To analyze the relationship between rape culture and crime, we aggregated these article-level indicators to county-years, as local proportions of newspaper stories containing each category of rape culture. We matched newspapers to counties in two ways (Appendix A.6). First, we examined communities that produce the news (*producers*), weighing newspaper articles by the geographic proximity of each newspaper’s main bureau to the county center.⁸ Second, we

⁸ The weights for newspaper k in county i are $w_{ik} = 1$ if $d(i,k) \leq d_{(r)}(i,k)$ and $w_{ik}=0$ otherwise, where $d(i,k)$ is the distance between country i and main bureau of k , and $d_{(r)}(i,k)$ is the r -th nearest bureau to i (details in Appendix A.6). The nearest-neighbor weights ensure that all counties, including ones without nearby bureaus, have the same number of newspapers. Below, we used $r=5$, but Appendix C.1 reports

examined communities that consume the news (*consumers*), with weights based on each newspaper's market share in the county, according to circulation data from the Alliance for Audited Media.⁹

These measures carry different theoretical interpretations. The *producers* measure assumes that news content reflects local norms in communities where journalists and editors live. The *consumers* measure assumes that it reflects the norms of communities where potential readers live. The largest differences are in how the measures treat national newspapers like the *Washington Post* and *New York Times*. The first measure gives greater weight to local, small circulation papers, which may claim to more closely represent the “voice” of a local community, even if they have a smaller local market share than their national counterparts. The second measure places more weight on large-circulation papers, and assumes that journalists aim to reflect the norms of a broader audience than resides in the immediate vicinity of their home bureau. If the *New York Times* has more local subscribers than the small-town newspaper, this measure will consider coverage in the *Times* to be more informative of local norms. The second measure is also more dynamic than the first: *producer* weights change only as nearby bureaus open and close, while *consumer* weights fluctuate with local subscribership.

Figures 2a and 2b show the geographic distribution of rape culture in newspaper articles according to these two measures, averaged over 2000-2013. The percent of local news stories about rape containing rape culture language ranges from 0 (dark blue) to 5 (bright yellow).

The two maps convey different distributions of news content about rape. According to the *producers* measure, areas with highest prevalence of rape culture include the Mountain States, parts of central California and the Upper Midwest. Of 100 counties with the highest levels of

sensitivity analyses over $r \in \{1, 20\}$.

⁹ The weights are $w_{ik} = \text{circulation}_{ik} / \sum_k \text{circulation}_{ik}$, or newspaper k 's local circulation in county i as a share of all newspapers' local circulation (Appendix A.6).

rape culture, 52 were in Minnesota and Iowa, 13 were in North Carolina and 10 were in California. Conversely, the Midwestern states of Indiana, Ohio and Michigan had relatively little rape culture; these states include 75 of the 100 counties that scored lowest on the index.

The county map based on circulation (Figure 2b, *consumers*) offers a more conservative estimate of local rape culture in the press. Although some areas of high rape culture overlap with those in Figure 2a, like the Upper Midwest, Mid-Atlantic and parts of California, there are also significant disparities, as in the Mountain States and Florida. Much of this discrepancy is due to local media consumption favoring national or regional newspapers, which offsets the influence of locally-based, low-readership media. For instance, areas that appear orange in Figure 2a, but blue in 2b, indicate that local journalists produce more rape culture in their content than local readers tend to consume. To ensure that our results are not artifacts of geographic aggregation, we conduct all analyses separately for these two measures.

[Figure 2]

Figure 2c shows the distribution of reported rapes per 1,000 county residents, from the FBI's Uniform Crime Reports statistics, averaged over 2000-2013.¹⁰ Figure 2d shows the difference between arrest rates and rape reports, with higher numbers (yellow) indicating higher police vigilance, and lower, negative numbers indicating lower vigilance.

Descriptive statistics support our expectation of a positive relationship between rape culture and the reported incidence of rape. According to the *producers* measure, county-years with above-average rape culture in local newspapers (greater than 3 percent) saw 93% more reported rapes than county-years with below-average rape culture (0.93 vs. 0.50 rapes per 1,000

10 The FBI defines rape as “penetration... of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim.” Before 2013, the FBI used a narrower interpretation of “forcible rape,” or “the carnal knowledge of a female forcibly and against her will” (FBI, 2014).

residents, respectively, $p < .001$). The difference for the more conservative *consumers* measure is far smaller (1 percent, $p < .001$), but also statistically significant.

An even stronger relationship appears between rape culture and local police vigilance. In counties with higher-than average rape culture, between 1 and 2 additional reported rapes per year did not result in arrest, according to the *producers* measure. According to the *consumers* measure, there were up to eight additional reports without arrests per year. Where rape culture is prevalent, there are more reported rapes, but fewer of them result in arrests.¹¹

The strength of this relationship, however, is difficult to discern from summary statistics. Like other violent crime, rape results from multiple economic, demographic and political risk factors. Any correlation between rape culture and rape might disappear once we account for these confounders. Alternatively, it may reflect heightened media attention in locations with high preexisting rates of rape. If so, a third, unobserved factor may be driving variation in both news and crime. We thus perform a series of more rigorous empirical tests.

Regression Analysis

To examine the relationship between sexual violence and rape culture in local print media, we use the following core model specification:

$$y_{it} = \rho C_{it-1} + \beta X_{it} + \alpha_i + u_t + \epsilon_{it} \quad (1)$$

where y_{it} is the number of reported rapes per 1,000 residents in county i in year t . The covariate of central interest, C_{it-1} , is the proportion of local newspaper articles on rape published in the previous year containing one or more of the rape culture categories listed in Table 1. The coefficient ρ captures the impact of such coverage on local crime.

We also control for several covariates, X_{it} , which correspond to the previously discussed

¹¹ Kolmogorov-Smirnov test statistics for the *producers* and *consumers* measures are .04 ($p < .001$) and .03 ($p < .001$) for rape reports and .03 ($p < .001$) and .04 ($p < .001$) for police vigilance.

alternative explanations of crime. These include median personal income (as a proxy for police resources), unemployment, female share of the population, religious affiliation and political party vote during the last presidential election (summary statistics in Appendix A.7). Admittedly, these controls include only some of the potential determinants of rape, and omit important yet endogenous factors -- like local resources for survivors and sex crime units -- which may correlate with both local crime and news coverage. To account for these and other differences across space and time, we include county and year fixed effects, α_i and u_t , and robust standard errors clustered on media markets.

Because news coverage is event-driven, local crime trends likely influence the volume and content of news stories about rape. We address this issue in two ways. First, we lag our rape culture variables by one year to avoid contemporaneous feedback from crime to news. Second, we consider a separate specification employing changes in local newspaper circulation as an instrument for rape culture. Assuming that shocks to the local print media market are unlikely to affect crime rates, except through their impact on news content, this approach, detailed below (and Appendix B.1), allows us to exploit exogenous variation in rape culture.

Is there more rape where there is more rape culture? The first two columns of Table 2 report the results of the model in equation (1), for reports of rape at the county-year level. Model 1 presents estimates based on the *producers* measure, and Model 2 presents estimates based on the *consumers* measure. The standardized coefficients represent the impact of a standard deviation increase in each variable on a standard deviation change in the outcome.

[Table 2]

Rape is significantly more prevalent where there is more rape culture in the press. The size of this impact varies across the two measures, but its direction is the same. A standard

deviation increase above the mean in *any rape culture* yields, respectively, 11 (95% CI: 6.1, 15.8) and 5.8 (95% CI: 3.0, 8.6) percent increases in reported rapes.¹²

What do these numbers mean in practice? Because we employ news content as a proxy for local norms, the precise magnitude of rape culture's impact on crime is difficult to establish. In the current context, a standard deviation increase in rape culture is equivalent to 8 additional newspaper articles per county-year (recall that an average county saw 12 articles with rape culture, out of 417 articles per year). Whether or not such an increase in rape culture – from 2.9 to 4.8 percent of local articles – represents a substantial shift in norms, its estimated impact on crime is modest: on average, one additional rape case per thousand local residents per year.

Rape culture in the press is a stronger predictor of reported rapes than several widely-cited variables, like local unemployment and gender ratio. Still, even the largest standardized coefficient for rape culture is one-tenth of that for income or religiosity. Although it is a consistent and meaningful contributing factor, rape culture cannot by itself explain fundamental differences in the incidence of rape across counties.

Exogenous variation in rape culture. That rape culture correlates with increases in documented rape cases reveals little about the direction of the relationship. There simply may be less sensitivity among journalists where rape is more common, or some other, unobserved factor may drive both local news content and sexual violence. We thus consider another specification of the model in equation (1), employing changes in the average daily circulation of local newspapers as an instrument for rape culture in the media (Appendix B.1).¹³

Circulation shocks are a valid instrument because newspapers adapt the content of their

12 The SD shift is from .03 to .05 for *producers* and from .007 to .023 for *consumers*.

13 Although our *consumer* measure uses a subscription-based weighted average, shocks to overall local newspaper circulation do not mechanically bias this weighted average up or down (see simulation in Appendix B.2).

coverage in response to market pressures, but market pressures are unlikely to affect crime rates, except through their effect on news coverage.¹⁴ The relationship between market incentives and media bias is a subject of ongoing debate in political science and economics (Gentzkow & Shapiro 2010; Hamilton 2004). This research assumes that news organizations modify coverage to optimize readership, but disagrees on whether market pressures create cutbacks in reporting and editorial quality (Zaller 1999), or increase the diversity of published opinions (Gentzkow & Shapiro 2008). Regardless, market pressures create incentives against news coverage that alienates marginal consumers -- the readers *most* likely to cease consuming if displeased with content, and whom publishers can *least* afford to lose (Hamilton 2004).

Who are these marginal consumers today? In the last decade, the print media market has steadily declined across the United States. From 2004 to 2012, U.S. weekday newspaper circulation fell by 20%, from 55 to 44 million. According to a Pew Center (2012) survey, one of the few groups bucking this trend is unmarried women, with those who report reading a local or community newspaper “Sometimes” or “Regularly” rising from 56 to 61 percent over the same eight years. The corresponding trend among single men is an eight-point *decline*, from 50 to 42 percent. If unmarried females are more attentive to press coverage of gender issues than are consumers less essential to newspapers’ bottom lines, outlets in declining local markets should be less likely to feature coverage with gendered biases about rape.

Rape culture is indeed more common where market pressures are less severe. The proportion of newspapers with *any rape culture* is significantly higher in counties where newspaper readership increased or stayed constant from year-to-year, and lower where

14 While we cannot directly test the exclusion restriction, the pairwise correlation between circulation shocks and reported rape cases is quite small (0.02), and is even smaller for police vigilance (0.004).

readership declined.¹⁵ Rape culture is also lower where single women are more important to newspapers' bottom lines. Where a higher-than-average proportion of readers were single women, there was far less rape culture in local newspapers than would be expected by chance.¹⁶

The rape-culture-inhibiting influence of unmarried female newspaper readers dramatically strengthens in more competitive markets, with more than one newspaper based in the county (Appendix B.1). If declining markets and heightened competition reduce gendered biases in the media, we can exploit this variation to find a consistent estimate of the relationship between rape culture and crime.

Models 3 and 4 in Table 2 report the results of the instrumental variable regressions, estimated by two-stage least squares (2SLS) with county and year fixed effects. Test statistics for underidentification, overidentification and weak instruments all fall within conventional bounds of significance. For both measures of rape culture, the 2SLS coefficients are substantially larger than the reduced form estimates in Models 1 and 2. While a one standard deviation increase above the mean in *any rape culture* previously produced a 3.1 or 2 percent rise, respectively, for the *producers* and *consumers* measures, the same counterfactuals yield increases of 81 (95% CI: 55, 108) and 202 (95% CI: 89, 316) percent in the 2SLS specification.

Figure 3a breaks this result down for each component of rape culture, the colored areas representing the density of the distribution of each standardized coefficient and its 95% confidence interval. White vertical dashes represent point estimates. The impact of rape culture

15 We define a “decline in readership” as either a negative change in average self-reported frequency of newspaper readership (i.e. from “Regularly” to “Sometimes,” “Sometimes” to “Hardly ever”), or as a decline in the proportion of local Pew survey respondents who reported reading a newspaper “yesterday.” According to the two measures, there were 141 (expected: 153) and 103 (116) counties with both a decline in readership and higher-than-average rape culture, with Chi-squared tests significant at $p < .10$.

16 There were 102 (expected: 121) counties with above-average proportions of single, female newspaper readers and above-average rape culture, compared to 179 (160) with below-average rape culture. Chi-squared statistics were significant at $p < .01$.

on rape is more robust in communities that produce biased news coverage than in communities that consume this coverage, but general patterns are the same. For the *producers* measure, every category of rape culture yields a positive and significant association with rape, with some minor differences in magnitude. For the *consumers* measure, *empathy for accused* was the only subcategory with a strong, positive relationship to reported rapes.

[Figure 3]

Instrumental variable results suggest that direction of bias due to endogeneity is the opposite of what one would expect if news outlets in high-rape areas were systematically more skeptical toward victims' accounts and more supportive of the accused. Instead, we see heightened sensitivity and caution among news outlets in such markets. Where there is more rape, journalists and editors produce *less* news coverage that might increase it. Therefore, reduced form estimates understate the true magnitude of rape culture's potential impact. When we purge these estimates of their correlation with the error term, the size of the estimate spikes: a standard deviation increase in rape culture is associated with two to five additional reported rapes per thousand residents in a county year.

To be clear, our results do not suggest that the publication of several newspaper articles produces a major impact on crime. We employ rape culture in the news as a proxy for local community norms, and we make no claims about the precise "exchange rate" between the number of articles with rape culture and the extent of underlying rape culture in communities that produce or consume them. It may take a small or huge increase in rape culture to generate an additional article containing it, and this relationship likely varies across time and space. Due to the noisiness of our proxy, the magnitude of the impact of one additional newspaper article is, for our purposes, secondary to the direction of the relationship. Our analyses clearly show this

direction is consistently positive.

Does rape culture increase the incidence of rape, or victims' reporting, of rape? An increase in documented rape cases may reflect either a true increase in incidence, or an increase in victims' reporting. Only the former is consistent with our theory, which holds that rape culture in the media reflects local norms that fail to deter potential perpetrators, and that this increased incidence offsets decreases in reporting by victims. If the latter is true, then rape culture may actually motivate outraged victims to come forward.

To determine which of these two stories is more plausible, we reexamine the incentives facing perpetrators, victims and police. Our theory implies that rape culture should produce the following interaction (working backwards): police are less likely to make arrests, which makes victims less likely to report, which, in turn, emboldens perpetrators to offend. Since expectations of police behavior drive others' choices, the empirical challenge is to establish how police react to victims' reports.

An analysis of per capita arrest rates does not necessarily capture the vigilance of police - there may simply be more arrests where there are more reports. A more revealing measure is the *difference* between rape-related arrests and reports. Where this number is high and positive, police are highly vigilant, arresting more suspects than there are reports. Where it is negative, there are fewer arrests than reports, and police vigilance is low.

We model the determinants of police vigilance using the same general specification as in equation (1), substituting county-level arrest-report differences as the new dependent variable. The covariates, instruments and fixed effects are the same as before.

The last four columns of Table 2 report the determinants of police vigilance in rape cases, in both reduced form (Models 5 and 6) and instrumented (Models 7 and 8). Figure 3b further

reports instrumented standardized coefficient estimates for each component of rape culture.

According to the *producers* measure, there is a negative and significant relationship with police vigilance for every category of rape culture except victim blaming. A standard deviation increase in *empathy for the accused*, for instance, yields a .18 standard deviation decrease in police vigilance, equivalent to 9 fewer rape cases with perpetrators arrested (95% CI: -15, -1.6) per county-year. The same increase on the *consumers* measure produces 19 fewer reported cases with arrests (95% CI: -31.8, -6.9).

The difference between arrests and reports may also reflect police resources, electoral politics or other confounding factors. As Table 2 shows, police vigilance in rape cases is significantly lower in Republican-leaning counties, and -- depending on specification -- in counties where unemployment and religiosity are high. Yet the impact of rape culture on police vigilance still holds even after accounting for these and other, unobservable characteristics captured by county and year fixed effects.

One additional concern is that lower police vigilance may not be unique to rape, and that police in communities with high rape culture may generally struggle to keep up with crime. To investigate this possibility, we replicated Models 7 and 8 for other categories of violent and property crime. Figure 3c shows that the negative association between rape culture and police vigilance does not emerge for murder, where under-reporting is less of a concern, or robbery, a non-sexual, opportunistic crime. In neither case does news content have a discernible effect, for either the general measure of rape culture, or its subcategories. Given that police vigilance is generally higher for murder and robbery than for rape -- 18 and 12 percent of county-years, respectively, had more arrests than reports, compared to 7 percent for rape -- the negative impact of rape culture is even more compelling. Unless victims are most likely to seek justice in places

where they know it is most elusive, variation in documented rape cases more likely reflects a true increase in rape rather than in victims' reporting.

News content or news volume? A key assumption behind our empirical approach is that news content (i.e. proportion of stories that contain rape culture) is more informative of local norms than news volume (i.e. number of stories about rape). Yet if the volume of coverage is indeed decreasing in local rape culture, then our proportional measure is capturing only one dimension of this phenomenon.

A deeper look at the data reveals that news volume has a very different relationship to crime than news content. To investigate this relationship, we replicated our empirical models, substituting the average number of articles on rape (per newspaper) per county-year in place of our proportional measures of rape culture. The results (Appendix B.7) show a positive and significant link between the volume of rape coverage and both reported rape cases and police vigilance. A standard deviation rise in the local number of stories about rape -- from 81 to 126 articles per newspaper, according to the *producers* measure -- is associated with 2 additional reported rape cases per 1,000 residents in a county-year (95% CI: 1.1, 2.6). However, ten more of these rape reports are likely to result in arrests (95% CI: 3.9, 16.2).

Contrary to our prior findings, police are *more likely* to follow through on victims' reports and make arrests where newspapers publish more stories about rape. Theoretically, this should make victims more eager to come forward. Hence, the increased incidence of rape in these locations likely results from increased reporting by victims rather than a genuine rise in sexual crime. As we have seen, however, much depends on how news organizations actually cover these stories -- and what their tone and content reveal about the local normative context.

Robustness checks. To account for several other potential sources of error in our analysis,

we conducted a set of robustness checks and placebo tests, which we report fully in Appendix C. Some of these checks pertain to measurement: our geographic aggregation method, and newspapers included in our sample. First, we replicated our models with alternate *producers* measures (Appendix C.1), using search radii from 1 to 20 nearest newspaper bureaus to each county (the main analyses used only the 5 closest bureaus). Second, we investigated the potentially disproportionate influence of major newspapers like the *Washington Post* and *New York Times* -- which together account for 17 percent of the articles in our dataset. We thus replicated our analyses, iteratively excluding each of the top ten newspapers by volume (Appendix C.2).

The remaining robustness checks addressed our estimation strategy. First, because the fixed effects models in equation (1) are “static,” omitting a lagged dependent variable due to a high ratio of counties to years, we fit a series of dynamic panel data estimators to account for temporal autocorrelation while avoiding the problem of Nickell Bias (Appendix C.3). Second, to account for shocks common to media markets, we fit models with media market-level fixed effects (Appendix C.4).¹⁷ Third, we conducted a series of placebo tests with leads of the rape culture variable, to address the possibility that our coefficient estimates are capturing anticipatory effects -- where crime increases not because local norms have recently changed, but because perpetrators expect them to change, based on pre-existing trends (Appendix C.5). Fourth, we added media market- and state-specific linear time trends to our models, to account for potentially heterogeneous regional trends -- in demographic and economic growth, police surveillance and forensics, or crime reporting -- any one of which could conceivably alter incentives for sexual crime for reasons that have little to do with underlying community norms (Appendix C.6). Finally, because our first dependent variable (rape reports per 1,000 people) is

17 We used Nielsen’s Designated Market Areas to denote media market boundaries.

highly skewed, we re-estimated our models with logarithmic transformations (Appendix C.7).

The results (at Appendix C), are consistent with those in Table 2 and Figure 3. Coefficients on the rape culture variable remain generally positive for rape reports and negative for police vigilance.

Caveats. Our study has many limitations, each of which suggests potential areas for future research. First, despite our consultation with numerous experts, many of the specific elements of our rape culture measure are not without controversy. The significance (Luciano 2015), and even *existence* (Kitchens 2014) of rape culture are both contested, and news coverage is only one potential indicator. Future studies might gather data on other local measures of culture, such as surveys about attitudes toward rape or local school curricula on sexual violence.

Second, future research could further validate our instrument for rape culture. For instance, longitudinal data on individual newspaper demographics may help determine the nature of market incentives facing media owners.

Third, official crime statistics may not accurately measure the true frequency of rape. Future research may reveal alternative means of triangulating, if not necessarily directly measuring, the frequency of such crimes.

Finally, it is important to assess, ideally through controlled experiments, whether and how rape culture actually produces individual-level effects (i.e. attitudes, behavior) that correspond to our observational, aggregate-level findings.

Conclusion

Where there is more rape culture, there is more rape, but also less vigilance among local police. This finding, and our broader attempt to empirically assess rape culture, represents an

important step forward for social science research on sexual violence, and for the public debate. Our research can potentially help journalists and editors uncover implicit biases in their work, allow policymakers to gauge police responsiveness, activists to devise methods to reduce sexual violence, and scholars to systematically investigate it. It also validates a long-standing concern that some social norms can enable, or at least fail to deter, sexual violence.

Because, even in the best of circumstances, rape culture in the press is a noisy and indirect indicator of local norms, some caution is warranted in over-interpreting these results. Our empirical strategy shows that rape culture in the media is a reliable local predictor of sexual crime, but these estimates do not represent a causal effect. That said, a variety of tests suggest that rape culture is more likely to predict rape reports than to be predicted by them. These patterns hold after we account for a variety of confounding factors, and after we exploit fluctuations in newspaper circulation as an exogenous source of variation. Our indirect tests of alternative causal pathways further suggest that rape culture drives the actual frequency of rape, rather than the propensity of victims to report it. We did not find a similar relationship for other crimes, like murder or robbery. Local community norms and biases, as reflected in this news reporting, appear to have a non-trivial impact on sexual crime.

Even if we stipulate that rape culture is both real and significant, there likely exists no unimpeachable and entirely exogenous empirical measure of it. Our approach has been to rely on the collective judgments of experts, maximize the transparency of measurement and analyses, test hypotheses against both aggregated and disaggregated measures of rape culture, conduct parallel tests of leading alternative explanations, and allow readers to judge for themselves. While some of these alternatives -- like local politics and religiosity -- help account for variation in rape rates, so too did our indicators of rape culture in the media.

This study contributes to several important strands of social science research. First, we demonstrate that economic models of crime have largely overlooked the role of culture, a key element in understanding the causes and consequences of rape. Second, we advance the literature on gendered violence, by bringing together insights from criminology, gender studies and political communication to present a novel argument about the choices of potential perpetrators, victims and police. Finally, this work joins other recent studies that analyze large amounts of text data (e.g., Shor et al. 2015), to offer an initial test of empirical linkages between community norms about sexual violence and the prevalence of rape in society.

Although our results confirm the worst fears of many observers, they can potentially help shift the study of rape culture away from the obscurity of ivory tower debates and internecine discussions among activists, and firmly into the domain of empirical social science and evidence-based policymaking. Rape culture has devastating consequences, and a better understanding of this phenomenon is the first step toward change.

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FIGURE 1. Relative probabilities of articles' mentioning terms. Point size proportional to difference in probability of term being mentioned in articles in vs. not in each category. Solid points indicate that term is more likely to appear in articles classified by SVM as containing rape culture. Terms listed are from corpus' 95-th percentile by mean tf-idf weights.

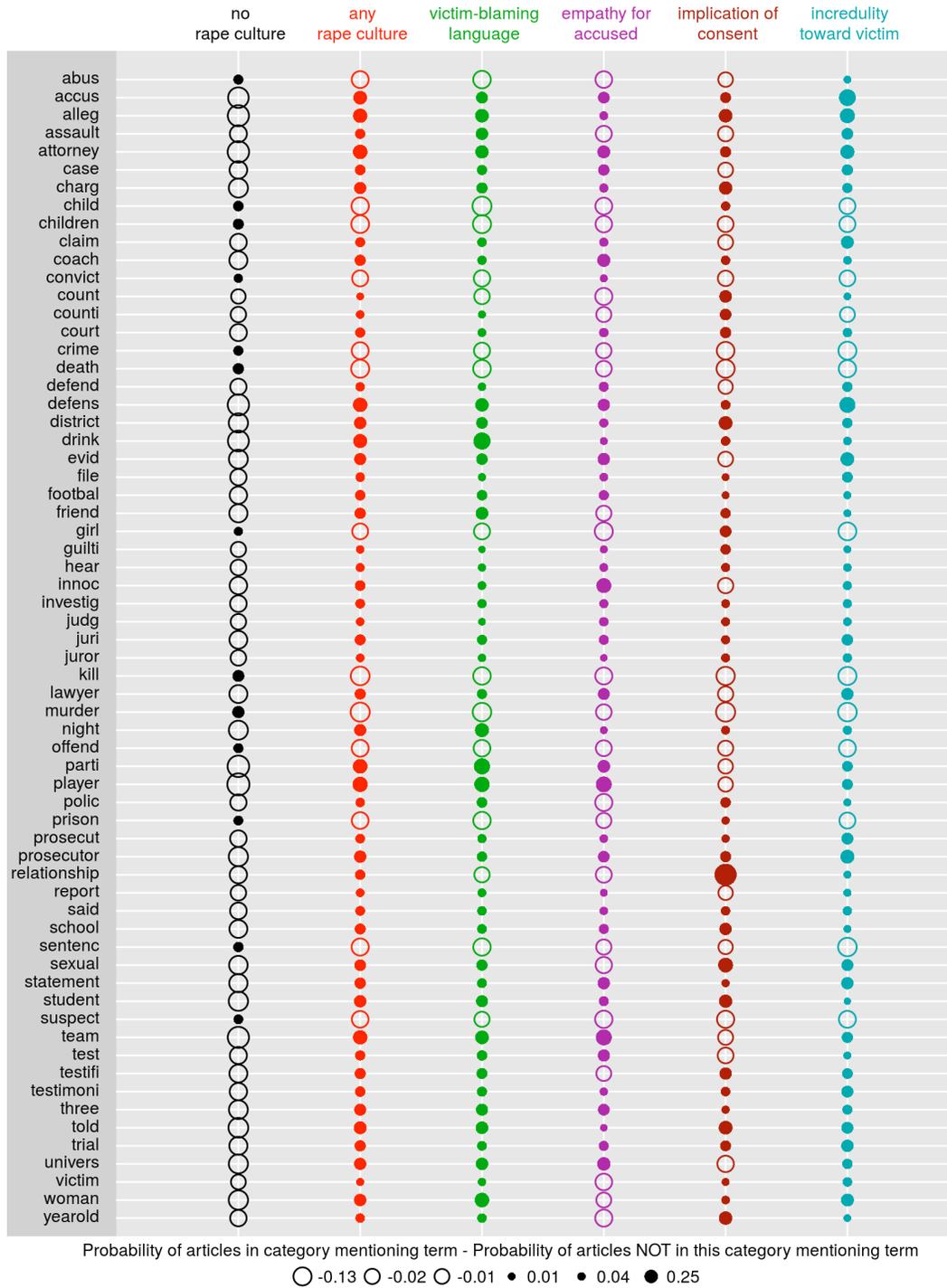


FIGURE 2. Geographic distribution of rape culture (a and b), reported rape (c) and police vigilance in rape cases (d).

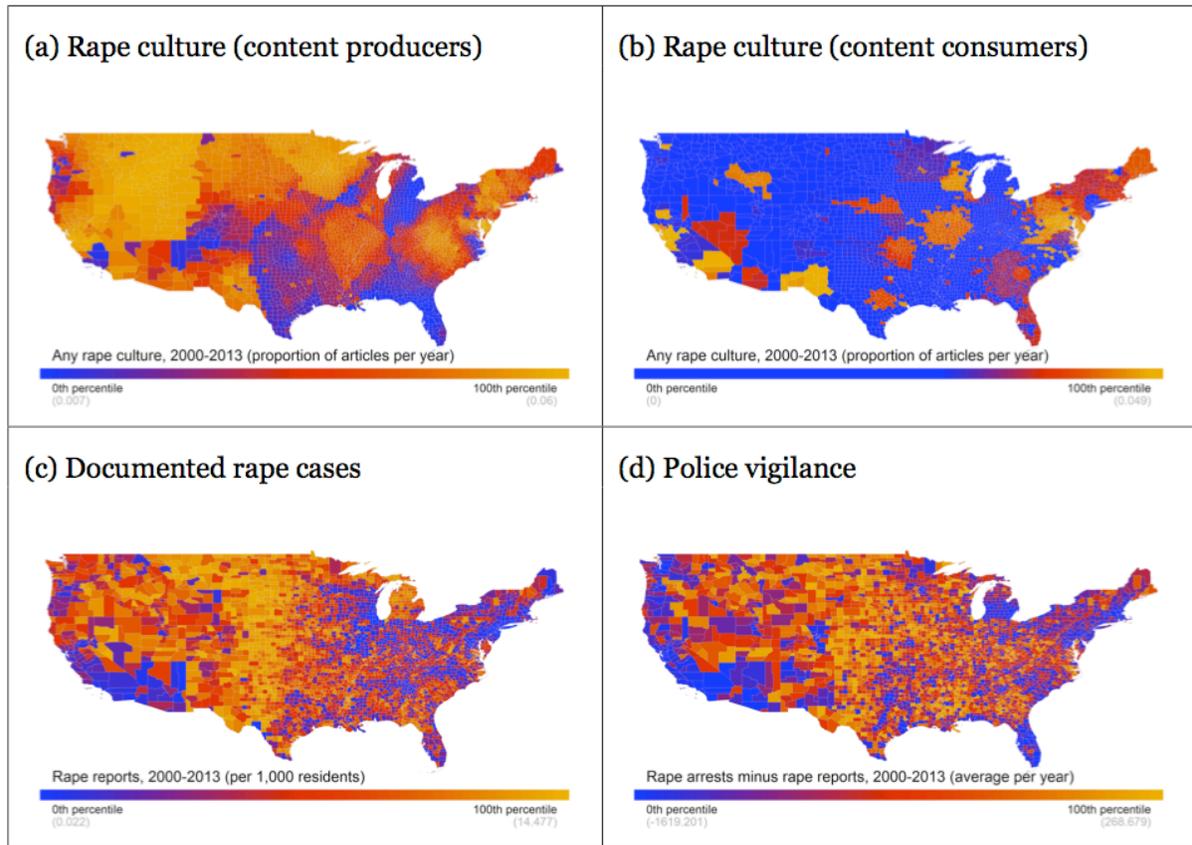
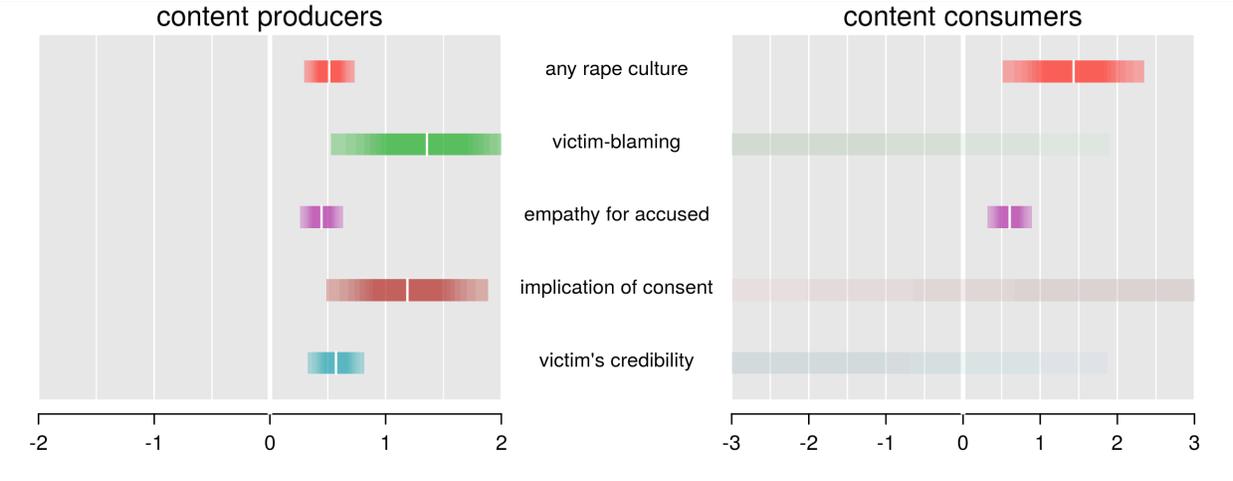
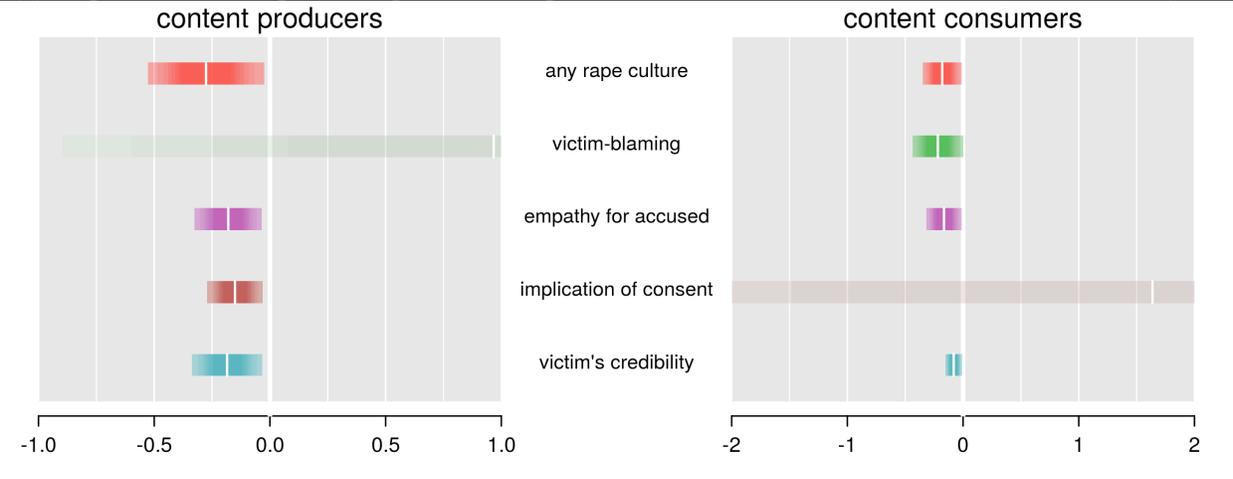


FIGURE 3. Impact of rape culture on crime.

(a) Rape culture and documented rape cases, standardized coefficients (instrumented)



(b) Rape culture and police vigilance in rape cases, standardized coefficients (instrumented)



(c) Police vigilance for other categories of crime, standardized coefficients (instrumented)

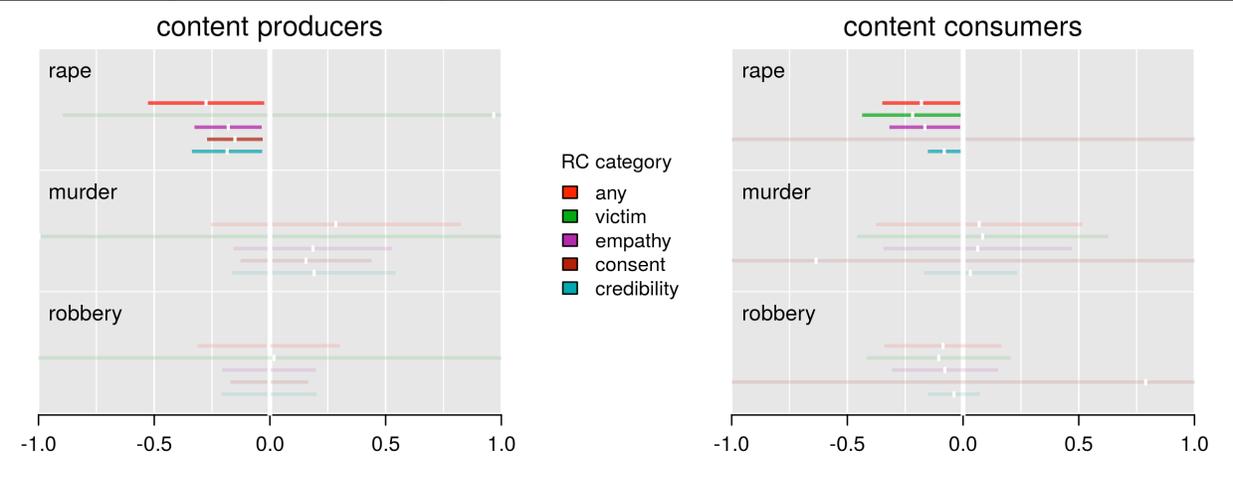


TABLE 1. Coding instrument (abridged, full list in online appendix).

<i>Category of bias</i>	<i>Individual components</i>
1. Victim-blaming language	Clothing, makeup of victim
	Victim's physiological state at time of incident (e.g. drunk, high, had consumed alcohol)
	Victim's former/current job as a sex worker or prostitute
	Victim's sexual history or promiscuity
	Victim's upbringing as explanation for current behavior (e.g. absentee parents, socioeconomic status)
	Locations that suggest victim culpability (e.g. victim had invited accused into own home)
	Use of loaded terms to describe rape self-reporting (e.g. the victim "complained", "admitted", "confessed")
2. Empathy for perpetrators	Mitigating factors and circumstances for accused (e.g. rape is "predictable outcome" of war, sports, substance abuse, age)
	Focus on suffering of the community as opposed to the victim
	Accused's promising future is now at risk (e.g. hopes dashed for honor-roll student, star athlete)
	Accused has high credibility or stature in the community
	Accused was the target of an unfair trial or overzealous prosecution
3. Implication of consent	Absence of physical resistance on part of victim
	Description of long-term abuse as an "affair" or a "sex scandal"
	Description of victim's past romantic relationship with the perpetrator
	Rape is referred to as "sex", "intercourse" or non-specific terms that diminish the force of rape
4. Questioning victim's credibility	Victim's past criminal record
	Inconsistencies in victim's account
	Victim's past or current history of substance abuse
	Victim's mental health
	Time elapsed between rape and report of rape; failure to report previous instances of abuse
	Ulterior motives on the victim's part (e.g. divorce proceedings)

Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	Reported rapes per 1,000 people				Arrest to report difference per 1,000 people			
Measure:	prod.	cons.	prod.	cons.	prod.	cons.	prod.	cons.
Any rape culture (t-1)	0.019***	0.011***	0.51***	1.43**	-0.0071***	-0.0037	-0.28*	-0.31**
	(0.0043)	(0.0028)	(0.11)	(0.47)	(0.0020)	(0.0027)	(0.13)	(0.10)
Median personal	0.55***	0.55***	0.60***	0.56***	-0.015'	-0.015'	-0.029**	-0.021*
	(0.063)	(0.063)	(0.021)	(0.032)	(0.0089)	(0.0090)	(0.011)	(0.0087)
Percent female	-0.047**	-0.047**	-0.062***	-0.062***	0.00039	0.00023	-0.0059	0.0057
population	(0.017)	(0.017)	(0.012)	(0.017)	(0.0037)	(0.0037)	(0.0058)	(0.0053)
Percentage of workers	0.034*	0.030*	0.16***	0.086***	-0.0076	-0.0061	-0.032*	-0.030**
unemployed	(0.015)	(0.015)	(0.029)	(0.025)	(0.0096)	(0.0096)	(0.014)	(0.010)
Percent population in	0.17*	0.17*	0.0039	-0.041	-0.0019	-0.0029	0.091	0.035
religious congregation	(0.078)	(0.078)	(0.063)	(0.095)	(0.024)	(0.024)	(0.057)	(0.030)
Percent presidential	0.087***	0.083***	0.27***	0.18***	-0.061***	-0.059***	-0.16***	-0.083***
vote for Republican	(0.022)	(0.022)	(0.044)	(0.044)	(0.015)	(0.015)	(0.045)	(0.012)
Constant	1.19***	1.19***			-0.58***	-0.58***		
	(0.045)	(0.045)			(0.018)	(0.018)		
Observations	40,349	40,358	37,244	37,253	40,349	40,358	37,244	37,253
County & Year FE	YES	YES	YES	YES	YES	YES	YES	YES
LL	-51506	-51519	-52673	-64384	-14035	-14043	-21089	-19992
Craig-Donald F			105	16.2			13.6	30.1
Kleiberger-Popp F			105	16.2			13.6	30.1
Anderson-Rubin F			26.2***	21.6***			7.01**	12.8***
Kleiberger-Popp LM			105	16.2			13.6	30.1

Notes: Fixed effect regression (1, 2, 5, 6), fixed effects two-stage least squares (3, 4, 7, 8), county-year level data. Standardized coefficients reported. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05, 'p<.1