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THE CHILLING EFFECTS OF *DOBBS*

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Abstract

The Supreme Court's evisceration of the federal constitutional right to abortion has raised the specter of criminal and civil liability for abortion providers and patients. Police and prosecutors have easy access to commercial reservoirs of intimate data. As individual accounts made clear in the wake of the *Dobbs v. Jackson Women's Health Organization* decision, corporate surveillance of intimate life chilled expressive activities, such as searching for information about reproductive health and using period tracking apps. Health professionals did not feel safe to speak out about the impact of new abortion laws. Harassment and threats directed at abortion clinics and at people seeking abortion services ensured their silence. Evidence of chilling effects was anecdotal, yet empirically unproven. That is no longer the case.

This Article describes the results of the first empirical study of post-*Dobbs* chilling effects. Our study explores how view counts for Wikipedia articles on period tracking apps and Google search terms related to period tracking apps decreased after the widespread media coverage of the new legal, privacy,

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and personal risks that the *Dobbs* decision created for period tracking app users. This Article sets forth our study design, explores the results, and discusses the implications for lawmakers, courts, and advocates. Lawmakers can rely on our study to show that people are being deterred from accessing crucial information that could help them better understand their reproductive health. Privacy law enforcers can leverage our findings to show proof of harm for privacy violations and to show standing. This study goes a long way to providing the proof needed to justify strong intimate privacy protections.

INTRODUCTION

After the Court revoked the federal constitutional right to abortion in *Dobbs v. Jackson Women's Health Organization*,[1] members of Congress called for legislation that would restrict businesses from collecting, using, and retaining reproductive health information, including the details of people's periods, contraceptives, prescriptions, drug store purchases, medical diagnoses, and surgical procedures.[2] Bills introduced in the House and Senate were animated by two central concerns. In states with criminal abortion bans, law enforcers could bypass the Fourth Amendment's protections by buying people's reproductive health data.[3] Fearing law enforcement access, people would stop using online tools and accessing information that helps them understand their bodies.[4]

Individuals talked to the press about their hesitancy to use digital health tools in the wake of *Dobbs*. Ohio resident Angela Lin gave up her period tracking app after the state's six-week abortion ban went into effect.[5] Colorado resident Lisa Vallejos

1. 597 U.S. 215 (2022). The decision has been described as the "most consequential case in modern history." Aaron Tang, *After* Dobbs*: History, Tradition, and the Uncertain Future of a Nationwide Abortion Ban*, 75 STAN. L. REV. 1091, 1094 (2023).

2. *See, e.g.*, My Body, My Data Act of 2022, H.R. 8111, 117th Cong.; Health and Location Data Protection Act of 2022, S. 4408, 117th Cong.

3. *See* Press Release, Senator Elizabeth Warren, Warren, Wyden, Murray, Whitehouse, Sanders Introduce Legislation to Ban Data Brokers from Selling Americans' Location and Health Data (June 15, 2022) [hereinafter Press Release, Warren], https://www.warren.senate.gov/newsroom/press-releases/warren-wyden-murray-whitehouse-sanders-introduce-legislation-to-ban-data-brokers-from-selling-americans-location-and-health-data [https://perma.cc/KK2Q-TGB8] (attempting to ban data brokers from selling health and location data while empowering the FTC, state attorneys general, and injured members of the public to enforce the proposed law). Law enforcers had million-dollar contracts with data brokers that provided fine-grained details of people's intimate lives. *See also* Letter from Senator Elizabeth Warren to Auren Hoffman, CEO, SafeGraph, Inc. (May 17, 2022), https://www.warren.senate.gov/imo/media/doc/2022.05.17%20Letters%20to%20Safegraph%20and%20Placer.ai%20re%20Abortion%20Clinic%20Data.pdf [https://perma.cc/5P8Z-6Q3D] (demanding justification for SafeGraph's sale of cellphone-based location data of people who visited abortion clinics).

4. Rina Torchinsky, *How Period Tracking Apps and Data Privacy Fit Into a Post-*Roe v. Wade *Climate*, NPR (June 24, 2022, 3:06 PM), https://www.npr.org/2022/05/10/1097482967/roe-v-wade-supreme-court-abortion-period-apps [https://perma.cc/Y779-WHC6].

5. Morgan Trau, *Period Tracking App Users Delete App, Citing Privacy Concerns After Abortion Banned in Ohio*, OHIO CAP. J. (June 29, 2022, 3:40 AM), https://ohiocapitaljournal.com/2022/06/29/period-tracking-app-users-delete-app-citing-privacy-concerns-after-abortion-banned-in-ohio/ [https://perma.cc/CFT7-Z2YM].

and her daughter deleted their health apps even though abortion is legal in their state.[6] Vallejos was worried about a future "department of 'protecting the unborn' . . . whose entire job is to find people who are potentially seeking abortion care."[7] Lawsuits have been brought in states across the country aimed at vindicating the privacy rights and reproductive freedoms threatened by *Dobbs*.[8] Given Project 2025's commitments, women's concerns about government exploitation of reproductive health tracking technologies are well-founded.[9]

And yet, legislative efforts on the Hill have stalled, and lawsuits have been dismissed on the grounds that the privacy harms in the wake of *Dobbs* are speculative. Judges, lawyers, and scholars have been skeptical about the chilling effects associated with privacy and surveillance threats.[10] This extends to concerns about how new abortion restrictions can

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6. Saja Hindi, *Colorado Women Join Purge of Period-Tracking Apps, but Experts Warn Privacy Risks Go Deeper*, DENV. POST (July 5, 2022, 6:00 AM), https://www.denverpost.com/2022/07/05/colorado-period-tracking-apps-abortion-roe-wade/ [https://perma.cc/W4ZJ-DDYD].

7. *Id.*; *see also* Geoffrey A. Fowler & Tatum Hunter, *For People Seeking Abortions, Digital Privacy is Suddenly Critical*, WASH. POST (June 24, 2022, 4:23 PM), https://www.washingtonpost.com/technology/2022/05/04/abortion-digital-privacy [https://perma.cc/4WAC-3K5F] (discussing more broadly the issue of data privacy as it relates to search engine history, location data, chat history, and reproductive health data).

8. *See* Mabel Felix, Laurie Sobel & Alina Salganicoff, *Legal Challenges to State Abortion Bans Since the* Dobbs *Decision*, KFF (Jan. 20, 2023), https://www.kff.org/womens-health-policy/issue-brief/legal-challenges-to-state-abortion-bans-since-the-dobbs-decision/ [https://perma.cc/NW8H-DKHB] (discussing lawsuits brought at the state level, with active state constitutional challenges in Ohio, Oklahoma, Georgia, Indiana, Kentucky, Utah, and Wyoming, among many other states). Of note, lawsuits criminalizing abortion in the United States were present pre-*Dobbs*. A recent report found sixty-one cases, across twenty-six states, of criminal investigation or arrest for receiving an abortion or helping someone else do so between 2000 and 2020. *See* LAURA HUSS, FARAH DIAZ-TELLO & GOLEEN SAMARI, IF/WHEN/HOW, SELF-CARE, CRIMINALIZED: THE CRIMINALIZATION OF SELF-MANAGED ABORTION FROM 2000 TO 2020, at 21 (2023), https://ifwhenhow.org/wp-content/uploads/2023/10/Self-Care-Criminalized-2023-Report.pdf [https://perma.cc/DYT9-6UFE] (detailing the rise of abortion prosecution throughout the United States).

9. Roger Severino, *Department of Health and Human Services, in* 14 MANDATE FOR LEADERSHIP: THE CONSERVATIVE PROMISE 449, 455–56 (2023).

10. Jonathon W. Penney, *Chilling Effects: Online Surveillance and Wikipedia Use*, 31 BERKELEY TECH. L.J. 117, 120–21 (2016) [hereinafter Penney, *Chilling Effects*] (describing skepticism among courts and scholars as to the existence of chilling effects and their impact); Jonathon W. Penney, *Understanding Chilling Effects*, 106 MINN. L. REV. 1451, 1459–60 (2022) [hereinafter Penney, *Understanding Chilling*] (articulating the same).

chill expression. When the U.S. Supreme Court considered a pre-enforcement legal challenge to the Texas Heartbeat Act,[11] which banned abortions in the state after six weeks, the Court failed to consider the potential chilling effects caused by the privacy threats that the law unleashed, including surveillance, harassment, stalking, and vigilantism.[12]

Reform efforts would be strengthened by evidence showing that people are being deterred from using online tools that could help them better understand their health. Polls show that women have privacy concerns about period tracking apps in the aftermath of *Dobbs*.[13] National surveys of OB-GYN physicians suggest a post-*Dobbs* chilling effect on abortion provision.[14] Survey research recently demonstrated women's concerns about the privacy practices of period tracking apps post-*Dobbs*.[15] Of note, this study was limited to concerns regarding hypothetical situations.[16] Until now, there have been no systematic studies demonstrating the real-time impact of *Dobbs*.

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11. Texas Heartbeat Act, S.B. 8, 87th Leg., Reg. Sess. (Tex. 2021) (codified at TEX. HEALTH & SAFETY CODE ANN. §§ 171.201–171.212 (West 2024)).

12. Whole Woman's Health v. Jackson, 595 U.S. 30, 50–51 (2021).

13. Eva Epker, *Survey Finds Women's Health Apps Are Among The Least Trusted: What To Know And How To Keep Your Data As Safe As Possible*, FORBES (May 16, 2023, 4:11 PM), https://www.forbes.com/sites/evaepker/2023/05/16/survey-says-womens-health-apps-are-among-the-least-trusted-what-to-know-and-how-to-keep-your-data-as-safe-as-possible/?sh=32ec0cb468b8 [https://perma.cc/A76Q-XN7A] (discussing a survey of 918 Americans that found women's period tracking and fertility apps were the "least trusted" apps in the country). *See generally* Audrey Kearney, Ashley Kirzinger, Mollyann Brodie, Laurie Sobel, Michelle Long, Alina Salganicoff & Usha Ranji, *Views on and Knowledge About Abortion in Wake of Leaked Supreme Court Opinion*, KFF HEALTH TRACKING POLL (June 9, 2022), https://www.kff.org/womens-health-policy/poll-finding/kff-health-tracking-poll-views-knowledge-abortion-2022/ [https://perma.cc/WZJ8-PY6M].

14. Simone Arvisais-Anhalt et al., *Paging the Clinical Informatics Community: Respond STAT to* Dobbs v. Jackson's Women's Health Organization, 14 APPLIED CLINICAL INFORMATICS 164, 166 (2023); Mariel Padilla, *Abortion Bans are Causing 'Chilling Effect' for OBGYNs, Study Says*, 19TH NEWS (June 21, 2023, 6:07 AM), https://19thnews.org/2023/06/obgyns-abortion-miscarriages-study/ [https://perma.cc/A25D-8HMT].

15. Jiaxun Cao, Hiba Laabadli, Chase Mathis, Rebecca Stern & Pardis Emami-Naeini, *"I Deleted It Afer the Overturn of* Roe v. Wade*": Understanding Women's Privacy Concerns Toward Period-Tracking Apps in the Post* Roe v. Wade *Era*, *in* PROCEEDINGS OF THE 2024 CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS (2024), https://dl.acm.org/doi/pdf/10.1145/3613904.3642042 [https://perma.cc/7NU5-HGZA].

16. *Id.*

This Article discusses the results of the first empirical study providing evidence of a post-*Dobbs* chilling effect on women's reproductive freedom and autonomy. Using Wikipedia article view count data and Google search term trend data, our research documents the perceived privacy and surveillance threats posed by abortion criminalization. It shows that potential law enforcement access to and corporate sharing of reproductive health data from fertility-related online activities chilled people's willingness to read and search for information related to period tracking apps. Both statistical mean calculations and segmented regression analysis before and after *Dobbs* demonstrate this chilling effect. View counts for Wikipedia articles on period tracking apps and Google searches for terms associated with period tracking apps *decreased* after the widespread publicity of the *Dobbs* decision.[17]

Our findings not only offer compelling evidence of chilling effects caused by the *Dobbs* decision but also offer insights about the nature and scope of these corrosive impacts on intimate privacy and reproductive freedom. Wikipedia and Google Search are immensely popular online tools. We chose them as the focus of this case study because any chilling effect on Wikipedia or Google searching has important implications, including for access to knowledge and information.[18]

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17. Building on recent studies documenting and exploring chilling effects, we use an interdisciplinary research design—an interrupted time series (ITS) design with segmented regression analysis and comparator groups. *See infra* notes 113–17 and accompanying text. For a discussion of ITS design with segmented regression analysis, see generally Patrick Schober & Thomas R. Vetter, *Segmented Regression in an Interrupted Time Series Study Design*, 132 ANESTHESIA & ANALGESIA 696 (2021) (detailing how segmented regression impacts trend analysis); Monica Taljaard, Joanne E. McKenzie, Craig R. Ramsay & Jeremy M. Grimshaw, *The Use of Segmented Regression in Analysing Interrupted Time Series Studies: An Example in Pre-hospital Ambulance Care*, 9 IMPLEMENTATION SCI. 1 (2014) (describing how ITS affects experiment design); Mylene Lagarde, *How To Do (or Not To Do)… Assessing the Impact of a Policy Change with Routine Longitudinal Data*, 27 HEALTH POL'Y AND PLAN. 76 (2012) (explaining how ITS contributes to the quality of data); A.K. Wagner, S.B. Soumerai, F. Zhang & D. Ross-Degan, *Segmented Regression Analysis of Interrupted Time Series Studies in Medication Use Research*, 27 J. CLINICAL PHARM. & THERAPEUTICS 299 (2002) (specifying how ITS may be used to analyze policy). The ITS design itself has long been employed in various fields of social science, with both experimental and quasi-experimental variations. *See, e.g.*, DONALD T. CAMPBELL & JULIAN C. STANLEY, EXPERIMENTAL AND QUASI-EXPERIMENTAL DESIGNS FOR RESEARCH 37–43 (1966); Robert B. Penfold & Fang Zhang, *Use of Interrupted Time Series Analysis in Evaluating Health Care Quality Improvements*, 13 ACAD. PEDIATRICS S38, S38 (2013).

18. *See infra* Part III.

Our findings demonstrate the urgency of strong privacy protections for intimate data. The revocation of the federal constitutional right to abortion has undermined people's expressive freedom and intimate privacy—the ability to manage who has access to and information about one's body, health, thoughts, sexual activity, sex, gender, sexual orientation, and close relationships.[19] Health professionals' reluctance to discuss the impact of new abortion restrictions on patients makes this research more salient. If health providers do not talk to their patients and patients are left to assume the worst, then research showing chilling effects is more critical than ever for policymakers.[20]

Lawmakers can leverage this evidence to show that people are being deterred from accessing crucial information that could help them better understand their reproductive health. Privacy law enforcers can point to our findings to show proof of harm for privacy violations and to show standing. This study significantly contributes to the proof needed to justify strong intimate privacy protections.

This Article has five parts. Part I sets the stage by exploring the concept of chilling effects. Part II lays out our methodology. Part III discusses our findings, notably the compelling evidence of both immediate and longer-term chilling effects on people's willingness to read about or search for period tracking apps following the *Dobbs* decision. Part IV explores the implications for lawmakers and privacy law enforcers. A conclusion follows.

I. UNDERSTANDING CHILLING EFFECTS

This Part begins with a discussion of chilling effects theory, including conventional theories and their limits for understanding post-*Dobbs* chilling effects. From there, we draw on new research on chilling effects theory to theorize the

19. Danielle Keats Citron, *Sexual Privacy*, 128 YALE L.J. 1870, 1890–1963 (2019) [hereinafter Citron, *Sexual Privacy*]. *See generally* DANIELLE KEATS CITRON, THE FIGHT FOR PRIVACY: PROTECTING DIGNITY, IDENTITY, AND LOVE IN THE DIGITAL AGE (2022) [hereinafter CITRON, FIGHT FOR PRIVACY] (arguing that privacy is a civil, human right).

20. *See, e.g.*, Elizabeth Cohen, Justin Lape & Danielle Herman, *'Heartbreaking' Stories Go Untold, Doctors Say, as Employers 'Muzzle' Them in Wake of Abortion Ruling*, CNN (Oct. 12, 2022, 6:15 PM), https://www.cnn.com/2022/10/12/health/abortion-doctors-talking/index.html [https://perma.cc/A8C2-GNM6]; Jessica Guynn, *Talking about Abortion Online in Texas? What You Say on Facebook or Twitter Could Hurt You*, YAHOO NEWS (Sept. 3, 2021, 5:18 PM), https://www.yahoo.com/now/talking-abortion-online-texas-facebook-205305779.html [https://perma.cc/8X76-2DF3].

chilling effects of various privacy and personal threats in the wake of the *Dobbs* decision. States have criminalized abortion, some from the moment of conception.[21] Some states have erected barriers to abortion care, including bans on the purchase of abortion medicine.[22] Some states have created civil bounties, raising the specter of fines.[23] Abortion providers, people considering abortion care, and anyone who aids them in that effort may face criminal or civil penalties as well as online abuse, which can silence and terrorize.[24] Law enforcers and private individuals can purchase people's intimate data.[25] All of these threats contribute to post-*Dobbs* chill. We develop a hypothesis—centered on the *Dobbs* decision of June 2022—that we test in the study discussed in this Article.

A. *Chilling Effects Theory and Post-*Dobbs *Threats*

Chilling effects theory is an emerging area of interdisciplinary behavioral theory and research today, but the idea of "chilling effects" first gained currency in U.S. constitutional law.[26] The U.S. Supreme Court began to invoke the term in striking down overreaching McCarthy- and civil rights-era statutes impacting First Amendment protected speech and other expressive activities.[27] Professor Frederick Schauer's foundational 1978 account of chilling effects focused

21. *After* Roe *Fell: Abortion Laws by States*, CTR. FOR REPROD. RTS., https://reproductiverights.org/maps/abortion-laws-by-state/ [https://perma.cc/29WA-9M2A].

22. *Id.* (detailing states whose laws ban telemedicine related to abortion care, prohibit certain abortion methods, mandate ultrasounds, strictly regulate abortion facilities, and require parental consent for minors' abortions); *see, e.g.*, ARIZ. REV. STAT. §§ 13-3603.01, 13-3603.02(A), 36-449.02 (banning abortion after fifteen weeks; prohibiting abortion sought for reasons of race, sex, or "genetic abnormality"; and placing restrictions on providers of abortion care).

23. Emma Bowman, *As States Ban Abortion, the Texas Bounty Law Offers a Way to Survive Legal Challenges*, NPR (July 11, 2022, 5:00 AM), https://www.npr.org/2022/07/11/1107741175/texas-abortion-bounty-law [https://perma.cc/48PM-RTSM].

24. *See* Danielle Keats Citron, *Intimate Privacy in a Post-*Roe *World*, 75 FLA. L. REV. 1033, 1035–36 (2023).

25. *Id.*; *see also* Jennifer Korn & Clare Duffy, *Search Histories, Location Data, Text Messages: How Personal Data Could Be Used to Enforce Anti-Abortion Laws*, CNN BUS. (June 24, 2022, 4:27 PM), https://www.cnn.com/2022/06/24/tech/abortion-laws-data-privacy [https://perma.cc/Z2HY-MYVS].

26. Penney, *Chilling Effects*, *supra* note 10, at 125; Penney, *Understanding Chilling*, *supra* note 10, at 1459; Neil M. Richards, *The Dangers of Surveillance*, 126 HARV. L. REV. 1934, 1949 (2013).

27. *See* Penney, *Chilling Effects*, *supra* note 10, at 125 (describing the era in which the Supreme Court struck down statutes related to limits on free speech).

on these cases, analyzing what First Amendment lawyers call the "chilling effects doctrine."[28] Schauer's "chilling effects" theory shaped the now well-accepted insight that a person has been chilled in his expression if he refrains from engaging in protected speech out of fear of a legal threat and the associated costs from vague or overbroad laws.[29] Such law-centered claims are now widely recognized as First Amendment injuries, with courts invalidating statutes and regulations for having a chilling effect on protected speech.[30]

This conventional understanding, however, does not fully capture privacy threats, including government surveillance and private abuse, that deter expressive activity. Because chilling effects theory focuses on laws, statutes, and regulations, it does not account for self-censorship related to surveillance and private threats. This impedes our understanding of the full breadth of chilling effects experienced in the aftermath of *Dobbs*. New abortion restrictions create fear of legal harms, including criminal prosecution, which is consistent with conventional theories. But the decision has also unleashed and magnified privacy and personal threats that deter expressive activities. In short, a different theory of chilling effects is required to fully understand the impact of *Dobbs*.

Fortunately, chilling effects theory and research have been extended beyond law's conventional account. Today, there is a growing body of scholarship and empirical research that theorizes and explores chilling effects as a behavioral phenomenon in a variety of contexts, such as government

28. Frederick Schauer, *Fear, Risk, and the First Amendment: Unraveling the "Chilling Effect"*, 58 B.U. L. REV. 685, 685 (1978).

29. *See, e.g.*, Julie Cohen, *A Right to Read Anonymously: A Closer Look at 'Copyright Management' in Cyberspace*, 28 CONN. L. REV. 981, 1010 n.116 (1996) (suggesting that Schauer's work is the "definitive treatment of the 'chilling effect' as an independent and sufficient basis for according First Amendment protection"); Penney, *Understanding Chilling*, *supra* note 10, at 1465–68 (describing the conventional understanding of chilling effects in law and its influence among lawyers, judges, and legal scholars); Danielle Keats Citron, *From Bad to Worse: Stalking, Threats, and Chilling Effects*, 2023 SUP. CT. REV. 175, 180 n.39 (2024) (relying on Schauer's foundational work).

30. Margot E. Kaminski, *Standing After Snowden: Lessons on Privacy Harm from National Security Surveillance Litigation*, 66 DEPAUL L. REV. 413, 425 (2017).

surveillance;[31] corporate data collection;[32] and targeted personal threats, harassment, and abuse.[33] For instance, Professors Neil Richards and Julie Cohen have written about how surveillance and associated threats, such as exposure through unauthorized disclosure, can disrupt our reading, thinking, expression, and personal development and can incline us "toward the bland and the mainstream."[34] Professor Daniel Solove's work has likewise theorized the chilling effects of data collection, retention, and sharing in society as akin to "environmental . . . pollution" in that it creates a broader atmosphere of risk and fear that encourages chilling effects and

31. Daniel J. Solove, *A Taxonomy of Privacy*, 154 U. PENN. L. REV. 477, 491, 493 (2006) [hereinafter Solove, *A Taxonomy*]; Daniel J. Solove, *The First Amendment as Criminal Procedure*, 82 N.Y.U. L. REV. 112, 116 (2007) [hereinafter Solove, *First Amendment*]; NEIL RICHARDS, INTELLECTUAL PRIVACY: RETHINKING CIVIL LIBERTIES IN THE DIGITAL AGE 107 (2015); Julie E. Cohen, *Studying Law Studying Surveillance*, 13 SURVEILLANCE & SOC'Y 91, 92 (2015); Julie E. Cohen, *Surveillance vs. Privacy: Effects and Implications*, *in* THE CAMBRIDGE HANDBOOK OF SURVEILLANCE LAW 455, 469 (David Gray & Stephen E. Henderson eds., 2017); Julie E. Cohen, *What Privacy Is For*, 126 HARV. L. REV. 1904, 1917 (2013).

32. *See, e.g.*, Moritz Büchi, Eduard Fosch-Villaronga, Christoph Lutz, Aurelia Tamò-Larrieux, Shruthi Velidi & Salome Viljoen, *The Chilling Effects of Algorithmic Profiling: Mapping the Issues*, 36 COMPUT. LAW & SEC. REV. 1, 4 (2020), https://www.sciencedirect.com/science/article/pii/S0267364919303784 [https://perma.cc/5CS3-27A2] (demonstrating that an innovative body of research has explored the chilling effects associated with data surveillance in communications scholarship); Moritz Büchi, Noemi Festic & Michael Latzer, *The Chilling Effects of Digital Dataveillance: A Theoretical Model and an Empirical Research Agenda*, 9 BIG DATA & SOC'Y 1, 1 (2022), https://journals.sagepub.com/doi/10.1177/2053951 7211065368 [HTTPS://PERMA.CC/542N-T5Q7]; Joanna Strycharz & Claire M. Segijn, *Consumer Differences in Chilling Effects*, *in* 12 ADVANCES IN ADVERTISING RESEARCH: COMMUNICATING, DESIGNING AND CONSUMING AUTHENTICITY AND NARRATIVE 107, 107 (Alexandra Vignolles & Martin K. J. Waiguny eds., 2023); Alexis Shore, Kelsey Prena & James J. Cummings, *To Share or Not to Share: Extending Protection Motivation Theory to Understand Data Sharing with the Police*, 130 COMPUTS. IN HUM. BEHAV. 1, 2 (2022), https://www.sciencedirect.com/ science/article/pii/S0747563222000103 [https://perma.cc/CT4G-LLGR]; Alexis Shore & Kelsey Prena, *Platform Rules as Privacy Tools: The Influence of Screenshot Accountability and Trust on Privacy Management*, 27 NEW MEDIA & SOC'Y 1053, 1065 (2023).

33. *See, e.g.*, CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 5–8 (explaining how much intimate data is collected every day); Mary Anne Franks, *Sexual Harassment 2.0*, 71 MD. L. REV. 655, 657–58 (2012); Danielle Keats Citron & Jonathon W. Penney, *When Law Frees Us to Speak*, 87 FORDHAM L. REV. 2317, 2318–20 (2019); *see also* PEW RSCH. CTR., ONLINE HARASSMENT 2, 6–8 (2014), https://www.pewresearch.org/wp-content/uploads/sites/9/2014/10/PI_OnlineHarassment_72815.pdf [https://perma.cc/FF8M-YXC7] (discussing the results of polls relating to the after-effects of online harassment and the perceptions of online environments).

34. *See* Julie E. Cohen, *Examined Lives: Informational Privacy and the Subject as Object*, 52 STAN. L. REV. 1373, 1426 (2000); RICHARDS, *supra* note 31, at 125–29.

self-censorship.[35] Meanwhile, the work of one of us (Professor Danielle Keats Citron) and that of other scholars, such as Professor Mary Anne Franks, has shown how harassment, abuse, and intimate privacy violations can have a "totalizing and devastating impact"[36] upon victims, chilling them into silence and inhibiting their sharing and engagement online and offline.[37] More recently, one of us (Professor Jonathon Penney) has argued that chilling effects are best understood as a more powerful form of conforming and compliance effects with deeper psychological foundations: a product of a tendency to engage in conformity in response to perceived threats, such as surveillance, uncertainty, and targeted abuse.[38] All of these contributions to chilling effects theory and research move us beyond the predominant conventional approach, which is narrow and legalistic, to focus on a broader range of privacy and personal threats that can cause chilling effects beyond the law itself.

Building on these works, we can appreciate the far-reaching scale and scope of chilling effects in the aftermath of the *Dobbs* decision because they involve compounding layers of privacy and personal threats. Specifically, there is the threat of mass and indiscriminate government and law enforcement surveillance.[39] The *Dobbs* decision triggered automatic abortion bans in thirteen states across the country and spurred other restrictions on abortion care.[40] This raises the risk of law enforcement investigations that involve surveillance of abortion providers, anyone who has obtained an abortion or planned to obtain one, and anyone who has assisted them in

35. Solove, *A Taxonomy*, *supra* note 31, at 488; Daniel Solove, *I've Got Nothing To Hide and Other Privacy Misunderstandings*, 44 SAN DIEGO L. REV. 745, 769 (2007).

36. Citron & Penney, *supra* note 33, at 2319.

37. CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 6–8; Franks, *supra* note 33. *See generally* PEW RSCH. CTR., *supra* note 33.

38. Penney, *Understanding Chilling*, *supra* note 10, at 1456–57. This theory is elaborated in a book forthcoming with Cambridge University Press in 2025: JONATHON W. PENNEY, CHILLING EFFECTS: AN EMERGING THREAT TO FREEDOM AND DEMOCRACY IN THE DIGITAL AGE (forthcoming 2025).

39. *See generally* Citron, *supra* note 24, at 1038–39 (detailing post-*Dobbs* intimate surveillance by individuals, governments, and commercial enterprises).

40. Aziz Z. Huq & Rebecca Wexler, *Digital Privacy for Reproductive Choice in the Post*-Roe *Era*, 98 N.Y.U. L. REV. 555, 557 (2023); Natasha Ishak, *Trigger Laws and Abortion Restrictions, Explained*, VOX (June 25, 2022, 5:02 PM), https://www.vox.com/2022/6/25/23182753/roe-overturned-abortion-access-reproductive-rights-trigger-laws [https://perma.cc/DLM5-2U62].

doing so.[41] Police, prosecutors, and various government agencies would almost surely employ digital surveillance, data tracking, and data collection methods to enforce abortion bans and other post-*Dobbs* restrictions; such methods could include purchasing, obtaining, retaining, and analyzing data—including intimate health information from private sector companies, data brokers, health providers, and social media companies.[42]

Privacy threats do not just extend to people living in states that have criminalized or restricted abortion. Investigations and surveillance will affect people living anywhere in the United States. Government surveillance is not limited by territorial lines or national boundaries.[43] Lawmakers in Texas have threatened in-state employers for having health plans that cover abortion costs for employees living elsewhere in the country.[44] There is "growing interest" among state governments to implement interstate abortion travel bans—laws that prohibit a person from obtaining an abortion across state lines, or assist someone in doing so.[45] In April 2023, Idaho became the first to do so.[46]

The threat of surveillance by commercial enterprises is significant. Even before the *Dobbs* decision, there were powerful economic incentives to collect, retain, and monetize

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41. Citron, *supra* note 24, at 1034–35; Huq & Wexler, *supra* note 40; Danielle Keats Citron, *The End of* Roe *Means We Need a New Civil Right to Privacy*, SLATE (June 27, 2022, 11:36 AM), https://slate.com/technology/2022/06/end-roe-civil-right-intimate-privacy-data.html [https://perma.cc/EA7D-UZ97].

42. Citron, *supra* note 24, at 1044–48, 1049–52; Huq & Wexler, *supra* note 40, at 561, 576–81; Anya E.R. Prince, *Reproductive Health Surveillance*, 64 B.C. L. REV. 1077, 1084–85 (2023).

43. Huq & Wexler, *supra* note 40, at 599–600.

44. Daniel Wiessner, *Legal Clashes Await U.S. Companies Covering Workers' Abortion Costs*, REUTERS (June 27, 2022, 4:08 PM), https://www.reuters.com/world/us/legal-clashes-await-us-companies-covering-workers-abortion-costs-2022-06-26/ [https://perma.cc/G5ZY-KBYD]; *see also* Hannah Rahim, *The Constitutionality of Banning Interstate Travel for Abortion*, BILL OF HEALTH BLOG, HARV. L. SCH. (Oct. 6, 2023), https://blog.petrieflom.law.harvard.edu/2023/10/16/the-constitutionality-of-banning-interstate-travel-for-abortion/ [https://perma.cc/4G6M-4QTK] (discussing the constitutionality of various types of interstate abortion travel bans); Citron, *supra* note 24, at 1036 (identifying states where legislators are criminalizing or attempting to criminalize the interstate travel for or delivery of abortion care).

45. Rahim, *supra* note 44.

46. Angela Kerndi, *Updated Bill Would Criminalize Helping a Minor Get an Abortion Without Parent Consent*, CBS 2 IDAHO NEWS (Jan. 26, 2024, 10:10 PM), https://idahonews.com/ news/local/updated-bi ll-introduced-to-restrict-access-to-out-of-state-abortion-care-for-minors [https://perma.cc/6RZW-K4K3]; Citron, *supra* note 24, at 1036.

people's intimate data and information.[47] Long before the repeal of *Roe v. Wade*,[48] women and girls faced far-reaching commercial surveillance of their intimate lives.[49] The "femtech" market—the vast array of apps tracking menstrual periods, fertility, pregnancies, sexual habits, and other reproductive health conditions—is an example.[50] Over 100 million women and girls around the world use period tracking apps, for instance, including a third of women and girls in the United States.[51] Now, there is far greater value in this data for law enforcement and companies aiming to monetize new abortion regulatory efforts post-*Dobbs*. It is hardly surprising that femtech companies have done little to ensure sufficient privacy protections, such as anonymizing subscribers' data.[52] There is little commercial incentive for strong privacy protections—anonymized data is far less valuable, and refusing to share makes monetization more difficult.[53] Most period tracking and fertility apps lack sufficient privacy protections for users and offer little transparency about how and when they disclose data to government and law enforcement.[54] Thus, these apps became an obvious target for governmental intimate surveillance.[55]

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47. JULIE COHEN, BETWEEN TRUTH AND POWER: THE LEGAL CONSTRUCTIONS OF INFORMATIONAL CAPITALISM 51 (2019); SHOSHANA ZUBOFF, THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER (2019); *see also* Huq & Wexler, *supra* note 40, at 572.

48. 410 U.S. 113 (1973), *overruled by* Dobbs v. Jackson Women's Health Org., 597 U.S. 215 (2022).

49. CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 14.

50. *Id.*

51. *Id.*

52. Catherine Roberts, *These Period Tracker Apps Say They Put Privacy First. Here's What We Found*, CONSUMER REPS. (Aug. 30, 2022), https://www.consumerreports.org/health/health-privacy/period-tracker-apps-privacy-a2278134145 [https://perma.cc/VM22-TUUZ] (noting that all the period tracking apps tested in 2020 stored data in the "cloud" and offered no guarantees that the data would not be shared with third parties).

53. Amitai Richman, *Advantages and Disadvantages of Anonymized Data*, K2V BLOG (Feb. 26, 2023), https://www.k2view.com/blog/anonymized-data [http://perma.cc/PAQ4-R52Q].

54. Citron, *supra* note 24, at 1042–43.

55. *See* Gennie Gebhart & Daly Barnett, *Should You Really Delete Your Period Tracking App?*, ELEC. FRONTIER FOUND. BLOG (June 30, 2022), https://www.eff.org/deeplinks/2022/06/should-you-really-delete-your-period-tracking-app [https://perma.cc/K49H-WTZZ]; Darragh Roche, *Why Delete Period Tracking App?* Roe v. Wade *Ruling Sparks Panic Over Data*, NEWSWEEK (June 25, 2022, 10:31 AM), https://www.newsweek.com/why-delete-period-tracking-app-roe-v-wade-ruling-sparks-panic-data-1719167 [https://perma.cc/4PMR-XSMB]; Kashmir Hill, *Deleting*

Dobbs has unleashed new possibilities and incentives for widespread harassment, stalking, and vigilantism. On an individual level, abortion regulation makes spyware apps even more dangerous.[56] Once installed on a victim's phone, spyware gives stalkers remote access to the phone's messages, emails, search history, and location data, as well as access to more intimate content such as videos, images, and other media.[57] With the criminalization of abortion, perpetrators have more incentives to track and monitor partners; they can control, manipulate, and extort partners with threats to disclose intimate data to law enforcement.[58] The commercial spyware industry, ballooning 239% over the last three years, may see additional growth in light of post-*Dobbs* incentives.[59]

Yet, perhaps the most powerful threats to privacy and personal safety post-*Dobbs* are due to large-scale, government-enabled, and mob-led campaigns of online and offline surveillance, harassment, doxing, threats, and vigilantism.[60] Cyber mobs are a reality, and people accused of illegally obtaining an abortion may face campaigns of harassment and abuse.[61] In September 2021, Texas enacted Senate Bill 8 (SB 8), the Texas Heartbeat Act,[62] which banned abortions after six

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Your Period Tracker Won't Protect You, N.Y. TIMES (June 30, 2022), https://www.nytimes.com/2022/06/30/technology/period-tracker-privacy-abortion.html [https://perma.cc/FG34-RRYZ]; *see also* Citron, *supra* note 24, at 1049–52 (discussing the use of intimate data in prior abortion-related prosecutions—including the kind that law enforcement could obtain from period tracking apps).

56. Danielle Keats Citron, *Abortion Bans Are Going to Make Stalkerware Even More Dangerous*, SLATE (July 5, 2022, 8:00 AM), https://slate.com/technology/2022/07/stalkerware-abortion-bans-privacy.html [https://perma.cc/RU9Q-RH7K].

57. Citron, *supra* note 24, at 1039.

58. *Id.* at 1058.

59. *Stalkerware Grows 239% Worldwide Over the Past Three Years*, YAHOO FIN. (Mar. 14, 2023), https://finance.yahoo.com/news/stalkerware-grows-239-worldwide-over-130000198.html [https://perma.cc/9F45-DZZL].

60. Citron, *supra* note 24, at 1057–58.

61. *Id.*; CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 53–54 (describing how cyber-mobs have "relentlessly" targeted victims and their families with death and rape threats); *cf.* David Folkenflik & Sarah McCammon, *A Rape, an Abortion, and a One-Source Story: A Child's Ordeal Becomes National News*, NPR (July 13, 2022, 10:28 PM), https://www.npr.org/2022/07/13/1111285143/abortion-10-year-old-raped-ohio [https://perma.cc/63PA-SRQX] (discussing the intense public outlash directed toward a ten-year-old girl who received an abortion); Katie Robertson, *Facts Were Sparse on an Abortion Case. But That Didn't Stop the Attacks.*, N.Y. TIMES (July 14, 2022), https://www.nytimes.com/2022/07/14/business/media/10-year-old-girl-ohio-rape.html [https://perma.cc/752Y-DYAY] (same).

62. Texas Heartbeat Act, S.B. 8, 87th Leg., Reg. Sess. (Tex. 2021) (codified at TEX. HEALTH & SAFETY CODE ANN. §§ 171.201–171.212 (West 2024)).

weeks of pregnancy.[63] Based on prior data, the ban would cover nearly all abortions in the state.[64] SB 8 has an unusual enforcement mechanism.[65] Under SB 8, any member of the public can bring a lawsuit against those who violate the ban or assist others in doing so, offering cash bounties starting at $10,000 and covering legal fees and costs to encourage such litigation.[66] And they can do so without showing injury, stake, or any personal connection to any abortion.[67] As U.S. Supreme Court Justice Sonia Sotomayor would later note, the law had effectively "deputized" all state citizens as "bounty hunters," offering them "cash prizes for civilly prosecuting their neighbors' medical procedures."[68] The "chilling effect" of SB 8 was "near total," she explained, depriving women of "virtually all" opportunity to explore options for abortion in Texas after six weeks.[69]

While the Supreme Court focused on SB 8's legal scheme, it missed the central cause of those chilling effects. It wasn't legal threats—so far there has been scant litigation.[70] Rather, it was a large-scale and systematic campaign of surveillance, stalking, harassment, and vigilantism that SB 8 unleashed, terrorizing and chilling its targets into silence and conformity. Judge Robert Pitman, who heard one of the legal challenges to SB 8 in the District Court for Western Texas, described in his findings a "relentless" campaign of harassment, intimidation,

63. Charles W. Rhodes & Howard M. Wasserman, *Solving the Procedural Puzzles of the Texas Heartbeat Act and Its Imitators: The Potential for Defensive Litigation*, 75 SMU L. REV. 187, 189 (2022); Peter N. Salib, *Ban Them All; Let the Courts Sort Them Out. Saving Clauses, the Texas Abortion Ban, and the Structure of Constitutional Rights*, 100 TEX. L. REV. ONLINE 13, 15 (2021); Kimberley Harris, *How Do You Solve a Problem Like SB 8? Flagrantly Unconstitutional Laws, Procedural Scheming, and the Need for Pre-Enforcement Offensive Litigation*, 89 TENN. L. REV. 829, 831, 833, 858–61 (2022); Randy Beck, *Popular Enforcement of Controversial Legislation*, 57 WAKE FOREST L. REV. 553, 555, 628 (2022).

64. Rhodes & Wasserman, *supra* note 62; Salib, *supra* note 62, at 15.

65. Beck, *supra* note 62, at 556; Salib, *supra* note 62, at 14; Rhodes & Wasserman, *supra* note 62, at 190.

66. TEX. HEALTH & SAFETY CODE ANN. § 171.208; Rhodes & Wasserman, *supra* note 62, at 190; Salib, *supra* note 62, at 14–15.

67. TEX. HEALTH & SAFETY CODE ANN. § 171.208; Rhodes & Wasserman, *supra* note 62, at 189–90; Salib, *supra* note 62, at 14.

68. Whole Woman's Health v. Jackson, 141 S. Ct. 2494, 2498 (2021) (Sotomayor, J., dissenting).

69. Whole Woman's Health v. Jackson, 595 U.S. 30, 62 (2021) (Sotomayor, J., concurring in part, dissenting in part).

70. Citron, *supra* note 24, at 1057.

surveillance, and similar forms of abuse.[71] Since SB 8 was enacted, he observed, clinics endured violent threats to doctors, patients, and staff; trespassing; destruction of property and vandalism; roadblocks; illegal sound amplification directed at them; surreptitious recording inside; and video recording of people, vehicles, and license plates outside, with activists attempting to track and follow staff home.[72] One clinic reported that at night, anti-abortion activists "flooded the areas" around the clinic with light, "shining flashlights into the cars of patients as they entered and exited the parking lots."[73] Later, activists "brought in giant lights and shined them at the clinic, illuminating the parking lot and the building" to track "every move" of staff and patients.[74]

Social media and other networked technologies have magnified the scope, reach, and impact of these threats. Shortly after SB 8 came into force, the Texas Right to Life group set up a "whistleblower" website (prolifewhistleblower.com) that invited people to help "enforce" the law, including litigating, acting as plaintiffs, or collecting data about violators.[75] On a Reddit thread, numerous individuals discussed how they could become "bounty hunters" and "turn doctors into the police."[76] As one clinic reported, staff were "plagued by fear and instability" by this "state-directed harassment."[77] That is precisely what this was—state-licensed campaigns of harassment, surveillance, and abuse.

Many experts and scholars have warned about the chilling effects of *Dobbs*, and for good reason.[78] An extensive body of social science research explores how merely being aware of being watched or under surveillance by peers or strangers, even when people *know* the surveillance is artificial, has a chilling effect on people—described as the watching eye.[79] This speaks

71. United States v. Texas, 566 F. Supp. 3d 605, at 670–71 n.54 (D. Tex. 2021), *cert. dismissed as improvidently granted*, 595 U.S. 74 (2021).

72. *Id.* at 670–73.

73. *Id.* at 672 n.56.

74. *Id.* at 672–73 n.56.

75. *Id.* at 670–71 n.54.

76. *Id.* at 670–71.

77. *Id.* at 80.

78. Penney, *Understanding Chilling*, *supra* note 10, at 1483–84.

79. *Id.*; *see, e.g.*, Costas Panagopoulos & Sander van der Linden, *The Feeling of Being Watched: Do Eye Cues Elicit Negative Affect?*, 19 N. AM. J. OF PSYCH. 113, 113 (2017); Stefan Pfattheicher & Johannes Keller, *The Watching Eyes Phenomenon: The Role of a Sense of Being Seen and Public Self-Awareness*, 45 EUR. J. OF SOC. PSYCH.

to the deeper psychological foundations of chilling effects.[80]

But, here, these are not merely subjects in an experiment. We are talking about large-scale data collection, retention, and sharing by entities with immense power, authority, and resources. Privacy scholars have long warned about how such surveillance threats have chilling effects, arguing that the "pervasive monitoring" made possible by surveillance, data collection, and data retention will "chill the expression of eccentric individuality" and "dampen" our aspirations for it.[81] Writing in the wake of far-reaching state surveillance infrastructure erected in the United States and across the West following 9/11, scholars theorized about the chilling effects of such surveillance and data collection creating conditions of fear and risk, leading to broader societal chilling effects.[82] In the aftermath of the Edward Snowden revelations about mass government surveillance, one scholar has extensively elaborated on how such privacy threats have a chilling effect on intellectual privacy, disrupting our reading, thinking, and intellectual expression in private and intimate contexts.[83] These contributions are consistent with a theory or hypothesis of chilling effects due to *Dobbs*. Where the surveillance concerns intimate information, intimate privacy is threatened.[84] Violations of intimate privacy have a profound impact, chilling victims into silence and conformity.[85]

560, 560–61 (2015); Costas Panagopoulos & Sander van der Linden, *Conformity to Implicit Social Pressure: The Role of Political Identity?*, 11 SOC. INFLUENCES 177, 177 (2016); Ryo Oda, Yuta Kato & Kai Hiraishi, *The Watching-Eye Effect on Prosocial Lying*, 13 EVOLUTIONARY PSYCH. 1, 1–2 (2015), https://journals.sagepub.com/doi/epub/10.1177/1474704915594959 [https://perma.cc/UQ83-UJPA]; Costas Panagopoulos, *I've Got My Eyes on You: Implicit Social-Pressure Cues and Prosocial Behavior*, 35 POL. PSYCH. 23, 23 (2014).

80. Penney speaks to this. *See* Penney, *Understanding Chilling*, *supra* note 10, at 1483–84.

81. *See* Cohen, *supra* note 34, at 1426; *see also* Paul M. Schwartz, *Privacy and Democracy in Cyberspace*, 52 VAND. L. REV. 1607, 1607 (1999); JEFFREY ROSEN, THE UNWANTED GAZE: THE DESTRUCTION OF PRIVACY IN AMERICA 8–12 (2000). Kaminski, *supra* note 30.

82. *See, e.g.*, Solove, *A Taxonomy*, *supra* note 31, at 488; Solove, *supra* note 35, at 745; CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 6–8; Kaminski, *supra* note 30; NEIL RICHARDS, WHY PRIVACY MATTERS 125–29 (2022); RICHARDS, *supra* note 31.

83. RICHARDS, *supra* note 82; RICHARDS, *supra* note 31.

84. CITRON, FIGHT FOR PRIVACY, *supra* note 19, at xiii.

85. Danielle Keats Citron & Mary Anne Franks, *Criminalizing Revenge Porn*, 49 WAKE FOREST L. REV. 345, 385 (2014) ("[T]he nonconsensual disclosure of a person's sexually explicit images chills private expression.").

Two other factors amplify the chilling effects. One concerns the uncertainty and ambiguity involved.[86] The other relates to the idea that the more personal the threat, the greater the chill.[87]

First, the new abortion restrictions are broad and expansive.[88] There is ambiguity about the scope and nature of the government, law enforcement, and corporate surveillance—it is vast, unlimited, and indiscriminate. Anyone who is pregnant can and will be a target; anyone seeking abortions or even undergoing a miscarriage and anyone who may assist them in exercising their reproductive freedoms is a target. No doubt, vulnerable populations will be disproportionately impacted.[89]

Second, research shows that chilling effects are magnified by threats of violence and physical harm on top of other factors, such as situational uncertainty.[90]

These factors—surveillance, uncertainty, and personal threats—are further magnified by the threat of individual and cyber-mob campaigns of harassment, stalking, and abuse, which can include all three of the factors. Indeed, the law has not just created an army of legal vigilantes or "bounty hunters," in Justice Sotomayor's apt phrasing.[91] It has called forth such vigilantes. It has created a massive surveillance apparatus of all private citizens, with neighbors spying on and informing on neighbors, targeting women's privacy, health, and fundamental rights. It has unleashed a state-directed mob to threaten and intimidate. These things, altogether, create powerful chilling effects that eviscerate not only abortion rights but also the speech, privacy, and security for women and anyone helping them vindicate their rights, including doctors, nurses, clinical

86. Penney, *Understanding Chilling*, *supra* note 10, at 1497–1502.

87. *Id.* at 1523–25.

88. *Id.* at 1509 (explaining how targeted legal enforcement is especially chilling); Huq & Wexler, *supra* note 40, at 599, 602 (discussing the uncertainty in post-*Dobbs* abortion laws, which likely create chilling effects); Prince, *supra* note 42, at 1106 (speaking to the rapidly changing legal environment post-*Dobbs*).

89. Elizabeth E. Joh, Dobbs *Online: Digital Rights as Abortion Rights*, *in* FEMINIST CYBERLAW 129, 130–33 (Amanda Levendowski & Meg Leta Jones eds., 2024); Huq & Wexler, *supra* note 40, at 564.

90. Penney, *Understanding Chilling*, *supra* note 10, at 1500; Steven L. Neuberg, Douglas T. Kenrick & Mark Schaller, *Evolutionary Social Psychology*, *in* 1 HANDBOOK ON SOC. PSYCH. 761, 778–79 (5th ed., Susan T. Fiske et al., eds., 2010).

91. Whole Woman's Health v. Jackson, 595 U.S. 30, 62 (2021) (Sotomayor, J., dissenting).

workers, staff, family, and friends. The resulting chilling effects are profound.

B. *Hypothesizing Post-*Dobbs *Period Tracking Chill*

The *Dobbs* decision introduced a uniquely "chilling" climate, triggering substantial chilling effects, particularly on the reproductive expression of women and girls. Given the extensive media coverage around the privacy and legal risks of using period tracking apps after *Dobbs*,[92] we hypothesized that *Dobbs* chilled women's willingness to read about and search for period tracking apps, which ultimately influenced usage of those apps, and that this chilling effect would be apparent in Wikipedia article view count data and Google Search trend data following *Dobbs*.

This hypothesis is supported not only by recent chilling effects theory and research that goes beyond a mere conventional and legalistic focus, but also by empirical studies that explored the chilling effects of government surveillance threats and data monitoring, retention, and processing. A 2016 study provided evidence that online government surveillance chilled Wikipedia use.[93] That study investigated whether the Snowden disclosures about government surveillance by the National Security Agency (NSA), publicized in June 2013 and intensely covered by the media,[94] had a chilling effect on what Wikipedia articles people were willing to read, comparing Wikipedia article traffic to privacy-sensitive articles before and

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92. *See* Raphael Thomadsen, Robert Zeithammer & Song Yao, *The Impact of a Supreme Court Decision on the Preferences of Americans Regarding Abortion Policy*, 69 MGMT. SCI. 5405, 5405–06 (2023) (noting extensive media coverage following *Dobbs*); Prince, *supra* note 42, at 1095 ("As will be discussed, this worry over chilling behavior is especially relevant in the wake of *Dobbs*, as many lay media sources are encouraging women to ditch their fertility tracking apps and watch their online presence regarding abortion searches.").

93. Penney, *Chilling Effects*, *supra* note 10, at 124.

94. *See* Barton Gellman & Laura Poitras, *U.S., British Intelligence Mining Data from Nine U.S. Internet Companies in Broad Secret Program*, WASH. POST (June 7, 2013), https://www.washingtonpost.com/investigations/us-intelligence-mining-data-from-nine-us-internet-companies-in-broad-secret-program/2013/06/06/3a0c0da8-cebf-11e2-8845-d970ccb04497_story.html [https://perma.cc/A62B-AVBF]; Glenn Greenwald, *NSA Collecting Phone Records of Millions of Verizon Customers Daily*, GUARDIAN (June 6, 2013, 6:05 AM), https://www.theguardian.com/world/2013/jun/06/nsa-phone-records-verizon-court-order [https://perma.cc/LUW8-9QUX]. For discussion of media coverage, see David Lyon, *Surveillance, Snowden, and Big Data: Capacities, Consequences, Critique*, 1 BIG DATA & SOC'Y 1, 2 (2014), https://journals.sagepub.com/doi/epub/10.1177/2053951714541861 [https://perma.cc/SX8L-2PX5].

after the June 2013 revelations.[95] The hypothesis was that people would be chilled from accessing privacy-sensitive content due to awareness of possible NSA surveillance online after the Snowden revelations in 2013.[96] The study, conducted by one of us (Professor Penney), examined Wikipedia article "page view" data for forty-eight privacy-sensitive Wikipedia articles before and after June 2013 for a period of thirty-two months.[97] The forty-eight Wikipedia articles concerned topics associated with "terrorism," such as "dirty bomb," "suicide attack," and "Al Qaeda," among others.[98]

The study's findings showed a large, sudden, and statistically significant (twenty-five percent) drop off in views of privacy-sensitive articles after June 2013.[99] This was consistent with the chilling effect in June 2013 caused by public awareness about government surveillance from high-profile reporting.[100] There was also a statistically significant change in the overall trend in monthly article views.[101] The view counts for privacy-sensitive Wikipedia articles were increasing month to month before June 2013, but they entirely reversed after that month, decreasing month to month.[102] This was consistent with a longer-term chilling effect due to public awareness about NSA government surveillance.[103] When made aware of far-reaching government surveillance, people immediately avoided privacy-sensitive content on Wikipedia that month and over time.[104] The study's findings demonstrated an immediate and long-term chilling effect on Wikipedia use due to awareness about the privacy threat of mass government surveillance online.

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95. Penney, *Chilling Effects*, *supra* note 10, at 144.

96. *Id.* at 156.

97. *Id.* at 141. The article set was created using a U.S. Department of Homeland Security (DHS) list of "terrorism" keywords that it uses to track and monitor social media. *Id.* at 139. *See generally* U.S. DEP'T OF HOMELAND SEC., PRIVACY IMPACT ASSESSMENT FOR THE OFFICE OF OPERATIONS COORDINATION AND PLANNING: PUBLICLY AVAILABLE SOCIAL MEDIA MONITORING AND SITUATIONAL AWARENESS INITATIVE UPDATE app. B (2013), https://www.dhs.gov/sites/default/files/publications/NOC%20MMC%202013.pdf [https://perma.cc/ZL3U-DBS4] (identifying a representative list of terms used to monitor social media sites).

98. A survey of 415 Mechanical Turkers showed that content associated with the keywords was privacy-sensitive—that is, raised privacy concerns for the survey participants. Penney, *Chilling Effects*, *supra* note 10, at 140, 142–43.

99. *Id.* at 151.

100. *Id.*

101. *Id.*

102. *Id.*

103. *Id.* at 152–53.

104. *Id.*

Another study by researchers at Massachusetts Institute of Technology similarly supports our hypothesis about post-*Dobbs* chilling effects.[105] That study examined the chilling effects of the Snowden disclosures about surveillance using Google Search data.[106] It found that Google search trends for privacy-sensitive terms showed a statistically significant decrease following the Snowden revelations in June 2013.[107] That finding was consistent with a chilling effect due to the Snowden revelations about government surveillance that month.

More recently, a study found that users disfavored popular but less secure browsers, such as Google Chrome, following the June 2013 Snowden disclosures in favor of a "substandard" search engine that promised greater privacy.[108] The authors concluded this behavioral change was evidence of a chilling effect—users avoided those browsers that were more vulnerable to government surveillance threats, even though they were overall lower quality.[109]

Each of these studies provides compelling evidence of a chilling effect associated with government surveillance online—a central privacy threat that we hypothesize also arose post-*Dobbs* due to increased government, law enforcement, and corporate intimate surveillance discussed earlier. However, these studies *also* demonstrate those chilling effects by analyzing Wikipedia and Google Search data. As such, these studies provide critical theoretical, empirical, and methodological guidance. In the next Part, we explain our research design for testing our hypothesis.

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105. Alex Marthews & Catherine Tucker, Government Surveillance and Internet Search Behavior 28 (Apr. 29, 2015) [hereinafter Marthews & Tucker, Internet Search Behavior] (unpublished manuscript), https://www.sebastianwendt.de/wp-content/uploads/2015/06/Government-Surveillance-and-Internet-Search-Behavior.pdf [https://perma.cc/9CAA-W7FN]; Alex Marthews & Catherine Tucker, *The Impact of Online Surveillance on Behavior*, *in* CAMBRIDGE UNIVERSITY HANDBOOK ON SURVEILLANCE LAW 437, at 437, 440, 447 (David Gray & Stephen E. Henderson eds., 2017) [hereinafter Marthews & Tucker, *Impact of Online Surveillance*] (finding chilling effects on Google Search users due to NSA surveillance).

106. Marthews & Tucker, *Impact of Online Surveillance*, *supra* note 105, at 446–47.

107. Marthews & Tucker, Internet Search Behavior, *supra* note 105, at 4; Marthews & Tucker, *Impact of Online Surveillance*, *supra* note 105, at 446–47.

108. Mark Rosso, ABM Nasir & Mohsen Farhadloo, *Chilling Effects and the Stock Market Response to the Snowden Revelations*, 22 NEW MEDIA & SOC'Y 1976, 1990–91 (2020).

109. *Id.* (noting that the "overwhelmingly primary reason to use [DuckDuckGo] was for privacy," thus people were avoiding Chrome for privacy reasons—a chilling effect).

II. METHOD AND DESIGN

This Part begins by explaining our methodology, including research design, method of analysis, and data sources. It sets out our results, leaving a discussion of its implications for Part III.

A. *Research Design*

This study uses a robust quasi-experimental approach common in social science research—an ITS design with segmented regression analysis.[110] In an ITS design, a series of observations on the same outcome, collected at equally spaced intervals over time, before and after an intervention or triggering event are used to test the immediate and longer-term effect of the intervention.[111] A major strength of the design is its ability to clearly demonstrate and isolate the causal effect of a triggering event or intervention—in our case, the *Dobbs* decision—by controlling for other factors and variables via segmented regression analysis.[112] As a result, ITS designs have been used to explore the impact of laws, policing, and other policy changes generally[113] and, as discussed earlier, in recent studies of surveillance chilling.[114]

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110. *See supra* note 17.

111. Taljaard, McKenzie, Ramsay & Grimshaw, *supra* note 17; Lagarde, *supra* note 17, at 76–77; Schober & Vetter, *supra* note 17, at 696–97; CAMPBELL & STANLEY, *supra* note 17, at 37; Wagner, Soumerai, Zhang & Degnan, *supra* note 17, at 299–301.

112. Taljaard, McKenzie, Ramsay & Grimshaw, *supra* note 17.

113. *See, e.g.*, Carl Bonander, Finn Nilson & Ragnar Andersson, *The Effect of the Swedish Bicycle Helmet Law for Children: An Interrupted Time Series Study*, 51 J. SAFETY RSCH. 15, 15–16 (2014) (using ITS design to explore the impact of a bicycle helmet law by examining inpatient data on injured cyclists before and after the law was enacted); Becky Briesacher et al., *A Critical Review of Methods to Evaluate the Impact of FDA Regulatory Actions*, 22 PHARMACOEPIDEMIOLOGY & DRUG SAFETY 986, 990 (2013) (reviewing a range of ITS design studies examining the impact of Food and Drug Administration (FDA) regulatory actions often by exploring health data before and after the FDA action); David Décary-Hétu, *Police Operations 3.0: On the Impact and Policy Implications of Police Operations on the Warez Scene*, 6 POL'Y & INTERNET 315, 325–26 (2014) (exploring the impact of police operations and crackdown on the "warez" (online piracy) scene with an ITS design that examined data on the output of different warez communities before and after five different police operations).

114. *See* Penney, *Chilling Effects*, *supra* note 10, at 117 (finding chilling effects on Wikipedia use due to NSA surveillance and using June 2013 as the "focusing event" for study); Rosso, Nasir & Farhadloo, *supra* note 108 (finding a chill on certain browser usage post-Snowden).

An ITS design thus offers a powerful statistical means to analyze and understand the impact of *Dobbs* on Wikipedia article traffic and Google search trends. In our design, we treat the *Dobbs* decision, and the subsequent extensive media coverage, as a "triggering" event analogous to major law, policy, or economic changes that are a central focus in policy research, like the earlier mentioned studies.[115] In those studies, behavioral changes—such as chilling effects post-*Dobbs*—can be studied by examining or observing data before and after the triggering event.[116] Empirical studies on chilling effects discussed above treated Snowden's disclosures in June 2013—and the widespread coverage following them—as a similar triggering event to document the chilling effects associated with government surveillance online.[117]

B. *Data Selection and Collection*

Given the media attention about the privacy and legal risks of using period tracking apps following *Dobbs*,[118] we examined the view count data and search trend data for Wikipedia articles and Google search terms associated with popular period tracking apps. Wikipedia and Google Search are both immensely popular tools for information, knowledge, and informed expression. Wikipedia remains one of the ten most

115. Taljaard, McKenzie, Ramsay & Grimshaw, *supra* note 17; Lagarde, *supra* note 17, at 76–77.

116. Graeme Boushey, *Punctuated Equilibrium Theory and the Diffusion of Innovations*, 40 POL'Y STUD. J. 127, 130 (2012); William Lowry, *Potential Focusing Projects and Policy Change*, 34 POL'Y STUD. J. 313, 313–15 (2006) (discussing research analyzing the impact on policy (and other social and political factors) of focusing or intervening events); FRANK R. BAUMGARTNER & BRYAN D. JONES, AGENDAS AND INSTABILITY IN AMERICAN POLITICS 285 (2d ed. 2009) (asserting that dramatic policy shifts can, at least in part, be attributed to important triggering events).

117. *See, e.g.*, Penney, *Chilling Effects*, *supra* note 10, at 117 (finding chilling effects on Wikipedia use due to NSA surveillance and using June 2013 as the "focusing event" for study); Marthews & Tucker, *Internet Search Behavior*, *supra* note 105, at 4 (finding chilling effects on Google Search users due to NSA surveillance pre– and post–June 2013); Rosso, Nasir & Farhadloo, *supra* note 108 (finding chilling effects on certain browser usage post-Snowden).

118. Prince, *supra* note 42, at 1095 ("[T]his worry over chilling behavior is especially relevant in the wake of *Dobbs*, as many lay media sources are encouraging women to ditch their fertility tracking apps and watch their online presence regarding abortion searches."); Kendra Albert, Maggie Delano, & Emma Weil, *Okay, Fine, Let's Talk About Period Tracking: The Detailed Explainer*, MEDIUM (June 28, 2022), https://medium.com/@maggied/okay-fine-lets-talk-about-period-tracking-the-detailed-explainer-2f45112eebb4 [https://perma.cc/UA5B-LXGT] (noting popular articles, viral tweets, and reports "identifying period trackers as a risk vector post-Dobbs back in May").

visited sites in the world, with billions of users accessing the site monthly.[119] The site is widely influential, impacting law, science, and technology,[120] with studies showing that the main reason people visit Wikipedia is to obtain information and deepen their understanding and learning of modern issues.[121] In other words, any chilling effects detected on either Wikipedia use or Google Search would have significant public implications.

There is also an element of methodological pragmatism in using these sites to explore chilling effects. Both Wikipedia article view count data and Google Search data are open source, transparent, trustworthy, and valuable for understanding human behavior. Wikipedia article view count trends have been shown to reflect the degree of general public interest in a particular subject matter.[122] The same is true of Google Search. Google's search engine is the most popular web search engine by far—commanding a 91.88% share of the global search engine market as of 2022.[123] Like Wikipedia article viewing trends, Google search trends have been shown to reflect public awareness of particular issues or subject matter.[124] By contrast, internal corporate data about usage statistics or downloads of period tracking apps, if it were available (which it is not), would be difficult to validate and would be less trustworthy given that

119. Sarah Perez, *Wikipedia Gets its First Makeover in Over a Decade…and it's Fairly Subtle*, TECHCRUNCH (Jan. 18, 2023, 2:24 PM), https://techcrunch.com/2023/01/18/wikipedia-gets-its-first-makeover-in-over-a-decade-and-its-fairly-subtle/ [https://perma.cc/LG3E-7DA8].

120. Noam Cohen, *Judges Rely on Wikipedia for their Opinions, a New Study Finds*, WASH. POST (Aug. 5, 2022, 2:31 PM), https://www.washingtonpost.com/outlook/2022/08/05/judges-rely-wikipedia-their-opinions-new-study-finds/ [https://perma.cc/Q2L3-KEZG]; Mark Zastrow, *Wikipedia Shapes Language in Science Papers*, NATURE (Sept. 26, 2017), https://www.nature.com/articles/nature.2017.22656 [https://perma.cc/FQ5R-QHZ3]; Jon Gertner, *Wikipedia's Moment of Truth*, N.Y. TIMES (Sept. 8, 2023), https://www.nytimes.com/2023/07/18/magazine/wikipedia-ai-chatgpt.html [https://perma.cc/2L5C-JPML].

121. Florian Lemmerich, Bob West & Leila Zia, *Why the World Reads Wikipedia: What We Learned about Reader Motivation from a Recent Research Study*, DIFF WIKIMEDIA BLOG (Mar. 15, 2018), https://diff.wikimedia.org/2018/03/15/why-the-world-reads-wikipedia/ [https://perma.cc/QQ4R-UUPU].

122. Mitsuo Yoshida, Yuki Arase, Takaaki Tsunoda & Mikio Yamamoto, *Wikipedia Page View Reflects Web Search Trend*, *in* PROCEEDINGS OF THE ACM WEB SCIENCE CONFERENCE (2015), https://dl.acm.org/doi/10.1145/2786451.2786495 [https://perma.cc/6MDG-C3NK].

123. *Search Engine Market Share: Who's Leading the Race*, KINSTA (2023), https://kinsta.com/search-engine-market-share/ [https://perma.cc/9H5F-U28A].

124. Yoshida, Arase, Tsunoda & Yamamoto, *supra* note 122.

it is in the interests of those apps to exaggerate or manipulate usage.[125]

This case study uses data on English-language Wikipedia article view counts collected from the online service pageviews.wmcloud.org, a portal created and maintained by Wikimedia Foundation employees that provides access to Wikipedia article view count data.[126] The view count data is aggregated on a monthly basis, with each raw view count or "page view" representing a single loading of a given Wikipedia article on a browser by an actual internet user. Although this includes redirects, view count data excludes page loads by bots and other automated programs.[127] Google Search data was collected from the Google Trends portal. Unlike Wikipedia article view counts, Google Trends provides only a sample of search activity on a weekly basis, and it normalizes the data to

125. For example, two period tracking apps that made claims of greater privacy protections (Clue and Stardust) had increased downloads immediately following *Dobbs* in late June. But upon closer scrutiny, both companies were forced to walk back privacy claims. By early 2023, media reports surfaced that Clue was struggling, including that it was "bleeding staff" and cutting its workforce by twenty-five percent. *See* Kristen Poli, *The Most Popular Period-Tracking Apps, Ranked by Data Privacy*, WIRED (July 20, 2022, 7:00 AM), https://www.wired.com/story/period-tracking-apps-flo-clue-stardust-ranked-data-privacy/ [https://perma.cc/KW3V-GA3Q]; Samantha Cole, *The #1 Period Tracker on the App Store Will Hand Over Data Without a Warrant*, VICE (June 27, 2022, 11:12 AM), https://www.vice.com/en/article/y3pgvg/the-1-period-tracker-on-the-app-store-will-hand-over-data-without-a-warrant [https://perma.cc/T53R-WEBL]; Leigh McGowran, *Period Tracker Stardust Rolls Back Encryption Claims Amid Scrutiny*, SILICONREPUBLIC (June 28, 2022), https://www.siliconrepublic.com/enterprise/stardust-period-app-encryption [https://perma.cc/4DGD-W5RB]; Harry Guinness, *Privacy Concerns over Period-Tracking Apps are Valid, Mozilla Report Finds*, POPULAR SCI. (Aug. 23, 2022, 3:00 PM), https://www.popsci.com/technology/mozilla-period-app-privacy-report/ [https://perma.cc/4827-JYFD]; Samantha Masunaga, *How Data from Period-Tracking and Pregnancy Apps Could be Used to Prosecute Pregnant People*, L.A. TIMES (Aug. 18, 2022, 4:49 PM), https://www.latimes.com/business/story/2022-08-17/privacy-reproductive-health-apps [https://perma.cc/R2WH-QS5Z]; Cate Lawrence, *Period Tracking Startup Clue is Bleeding Staff and Cuts its Workforce by 25 Percent*, TECHEU (Jan. 19, 2023), https://tech.eu/2023/01/19/period-tracking-startup-clue-cuts-its-workforce-by-25-per-cent/ [https://perma.cc/YG6J-AFQD].

126. *Pageviews Analysis*, WIKIMEDIA, https://meta.wikimedia.org/wiki/Pageviews_Analysis [https://perma.cc/5A52-ZPNF]. The data is collected via the Wikimedia Pageview application programming interface. *See Pageview Analysis FAQ*, PAGEVIEWS ANALYSIS, https://pageviews.wmcloud.org/pageviews/faq/ [https://perma.cc/635T-TFXN].

127. *Id.*

allow for comparisons between search terms.[128] Although search data collected from Google Trends does not reflect actual numbers of searches, it reflects trends in broader web search interest and activities.[129] In addition to normalized search trends, Google Trends also provides the "top searches" (the most popular or most frequent searches containing the search terms tracked in a country or region) as well as the "rising searches" (the searches most increasing in frequency containing the search terms tracked, also by country or region), which provides additional insights on search trends.[130]

We collected view count data for Wikipedia articles associated with period tracking apps for the period of February 2021 to February 2023, which totaled 173,647 article views.[131] We collected Google search term data associated with period tracking apps for approximately the same period—January 2021 to February 2023.[132] We also collected data on the "top"

128. *FAQ About Google Trends Data*, GOOGLE TRENDS, https://support.google.com/trends/answer/4365533?hl=en&ref_topic=6248052&sjid=12284583695895777674-NA [https://perma.cc/H2XS-BHWD].

129. *Id.*

130. *Find Related Searches*, GOOGLE TRENDS, https://support.google.com/trends/answer/4355000 [https://perma.cc/3H6S-4RYU].

131. *Pageviews Analysis for Flo (app), Clue (mobile app), Natural Cycles, Fertility Awareness, & Femtech*, WIKIMEDIA https://pageviews.wmcloud.org/?project=en.wikipedia.org&platform=all-access&agent=user&redirects=1&start=2021-02-01&end=2023-02-28&pages=Flo_(app)%7CClue_(mobile_app)%7CNatural_Cycles%7CFertility_awareness%7CFemtech [https://perma.cc/QW5Y-EZ2P]. The Wikipedia article study group included all period tracking apps with a Wikipedia article—Flo, Clue, and Natural Cycles—as well as two additional Wikipedia articles related to period tracking apps: the "period tracker" Wikipedia article (which redirects users to the "fertility awareness" article on the site) and the "femtech" Wikipedia article. Period tracking apps are typically associated with femtech products, tools, and applications. *See* Isabel Woodford, *Digital Contraceptives and Period Trackers: The Rise of Femtech*, GUARDIAN (Oct. 12, 2018, 10:34 PM), https://www.theguardian.com/technology/2018/oct/12/femtech-digital-contraceptive-period-trackers-app-natural-cycles [https://perma.cc/32GH-2LAJ]. The specific Wikipedia articles are as follows: *Flo (app)*, WIKIPEDIA, https://en.wikipedia.org/wiki/Flo_(app) [https://perma.cc/7P5N-R5WX], *Clue (mobile app)*, WIKIPEDIA, https://en.wikipedia.org/wiki/Clue_(mobile_app) [https://perma.cc/9DHJ-WGQT], *Period Tracker*, WIKIPEDIA, https://en.wikipedia.org/wiki/Period_tracker [https://perma.cc/H83W-PKKS], *Natural Cycles*, WIKIPEDIA, https://en.wikipedia.org/wiki/Natural_Cycles [https://perma.cc/92Y6-DUZ7], and *Femtech*, WIKIPEDIA, https://en.wikipedia.org/wiki/Femtech [https://perma.cc/QH6E-VPLD].

132. The Google search article sample included search terms for seventeen of the most popular period tracking apps: Flo, Clue, Ovia Fertility, Glow, MagicGirl, MyFlo, Apple cycle app, Cycles, Natural Cycles, Clover, Stardust, Femometer, Meiyou, Period Calendar, MeetYou, My Calendar, and Wocute. For each, the app name was

and "rising" searches associated with each term tracked. This data was used to create two separate time series data sets and, thus, two sets of results for both Wikipedia article view trends and Google search trends over the corresponding study period.

C. *Method of Analysis*

Examining Wikipedia article view count trends and Google search trends, before and after *Dobbs*, provides insight as to any chilling effects. Because *Dobbs* was released in late June 2022, we segmented the time series for analysis as of July 2022, given that any chilling effect would likely manifest in that month, rather than immediately. There may be an immediate increase in interest in *Dobbs* and its implications following the decision in June, which would likely be reflected in increased Wikipedia view counts and Google searches for terms associated with *Dobbs* and period tracking apps that market themselves as privacy friendly.[133]

However, because public awareness and understanding of the new privacy and legal threats introduced by *Dobbs* increased over the following weeks, including risks associated with period tracking apps themselves, we hypothesized that the resulting chilling effects would be apparent in July and in subsequent months. We conducted segmented regression analysis on Wikipedia article view count data and Google search trends before and after July 2022 and tabulated the results. For the Wikipedia case study, we conducted similar ITS analyses on three separate comparator groups of Wikipedia articles over the same period: articles associated with *non-*

combined with the term "app" (e.g., "Flo app"), which collected data on any searches that included those terms to allow for variability but also to avoid data from exogenous searches (e.g., searches for "cycles" without the term "app" could include searches unrelated to period tracking apps). The list was extrapolated from various lists of the most popular period tracking apps: Sarah Bradley, Elizabeth Bacharach, Ashley Martens & Jamie Spanfeller, *Best Period Tracker App: 11 Options To Get To Know Your Cycle, According To Ob-Gyns*, WOMEN'S HEALTH, https://www.womenshealthmag.com/health/g26787041/best-period-tracking-apps/ [https://perma.cc/6MKM-QKZD]; *Leading Period Tracker And Female Health Apps Worldwide In July 2024, by Downloads*, STATISTA, https://www.statista.com/statistics/1307702/top-period-tracker-apps-worldwide-by-downloads/ [https://perma.cc/6RAH-ZVVQ]; Suzy Davenport, *The 10 Best Period Tracking Apps*, MED. NEWS TODAY, https://www.medicalnewstoday.com/articles/320758 [https://perma.cc/QQ2T-4E7H].

133. There is some evidence to suggest that this happened. *See* Poli, *supra* note 125.

digital fertility awareness methods,[134] the most popular Wikipedia articles,[135] and articles based on keywords associated with the *Dobbs* decision.[136] The aim was to create comparator

134. The aim was to create a comparator group closely related to the study group in subject matter but not impacted by any privacy or legal concerns post-*Dobbs*. The list included: *Basal Body Temperature*, WIKIPEDIA, https://en.wikipedia.org/wiki/Basal_body_temperature [https://perma.cc/SS9Z-ZSY6]; *Calendar-Based Contraceptive Methods*, WIKIPEDIA, https://en.wikipedia.org/wiki/Calendar-based_contraceptive_methods [https://perma.cc/N7XP-UR3Z]; *Ovulation Prediction Kit*, WIKIPEDIA, https://en.wikipedia.org/wiki/Ovulation_prediction_kit [https://perma.cc/4J64-TL7R]; *Billings Ovulation Method*, WIKIPEDIA, https://en.wikipedia.org/wiki/Billings_ovulation_method [https://perma.cc/9NFE-C4XN]; *Cycle Beads*, WIKIPEDIA, https://en.wikipedia.org/wiki/CycleBeads [https://perma.cc/579P-9CKP]; *Creighton Model FertilityCare System*, WIKIPEDIA, https://en.wikipedia.org/wiki/Creighton_Model_FertilityCare_System [https://perma.cc/HJ22-X5F6]; *Periodic Abstinence*, WIKIPEDIA, https://en.wikipedia.org/wiki/Periodic_abstinence [https://perma.cc/7QNZ-4GY2]; *Lactational Amenorrhea*, WIKIPEDIA, https://en.wikipedia.org/wiki/Lactational_Amenorrhea_Method [https://perma.cc/YGQ2-3Y54]; and *Symptothermal Method*, WIKIPEDIA, https://en.wikipedia.org/wiki/Symptothermal_method [https://perma.cc/98DM-9Q8P]. The list was extrapolated from research articles outlining various fertility awareness methods: Maria Minerva P. Calimag et al., *Natural Family Planning Methods: A Scoping Review*, 1 J. OF SOC. HEALTH 39, 41 (2020); A. Thijssen, A. Meier, K. Panis & W. Ombelet, '*Fertility Awareness-Based Methods' and Subfertility: A Systematic Review*, 6 FACTS, VIEWS & VISION IN OBGYN 113, 114–16 (2014); David A. Grimes, Maria F. Gallo, Vera Grigorieva, Kavita Nanda & Kenneth F. Schulz, *Fertility Awareness-Based Methods For Contraception: Systematic Review Of Randomized Controlled Trials*, 72 CONTRACEPTION 85, 87–88 (2005).

135. The aim here was to compare broader Wikipedia trends and any impacts over the same period with the period tracking app study group. The list included: *Elizabeth II*, WIKIPEDIA, https://en.wikipedia.org/wiki/Elizabeth_II [https://perma.cc/6RCC-3SRQ]; *Jeffrey Dahmer*, WIKIPEDIA, https://en.wikipedia.org/wiki/Jeffrey_Dahmer [https://perma.cc/C7RN-MJPD]; *Russian Invasion Of Ukraine*, WIKIPEDIA, https://en.wikipedia.org/wiki/Russian_invasion_of_Ukraine [https://perma.cc/2XGC-AKX3]; *2022 FIFA World Cup*, WIKIPEDIA, https://en.wikipedia.org/wiki/2022_FIFA_World_Cup [https://perma.cc/NKA9-YTJX]; *Elon Musk*, WIKIPEDIA, https://en.wikipedia.org/wiki/Elon_Musk [https://perma.cc/HW6Y-AM55]; *Deaths in 2022*, WIKIPEDIA, https://en.wikipedia.org/wiki/Deaths_in_2022 [https://perma.cc/BP9R-QKMU]; *Deaths in 2021*, WIKIPEDIA, https://en.wikipedia.org/wiki/Deaths_in_2021 [https://perma.cc/U4FF-EAKV]; *Spider-Man: No Way Home*, WIKIPEDIA, https://en.wikipedia.org/wiki/Spider-Man:_No_Way_Home [https://perma.cc/UNQ6-4XZT]; *Vladimir Putin*, WIKIPEDIA, https://en.wikipedia.org/wiki/Vladimir_Putin [https://perma.cc/VS2W-QS7C]; and *Squid Game*, WIKIPEDIA, https://en.wikipedia.org/wiki/Squid_Game [https://perma.cc/5RQE-7JPB]. The list of articles was generated using the "top views" function in the pageviews.wmcloud.org site. *See Top Views Analysis FAQ*, PAGEVIEWS ANALYSIS, https://pageviews.wmcloud.org/topviews/faq/ [https://perma.cc/V4PW-CRVM].

136. Again, the aim here was to create a comparator group of articles closely related to *Dobbs* but, again, not impacted by any privacy or legal concerns. The Wikipedia article group was created by matching articles to a list of keywords

groups of articles, one closely related in subject matter to the period tracking app study group and another to the *Dobbs* case itself, that would not be impacted by the same legal or privacy concerns associated with digital activities. The popular Wikipedia articles comparator helps to illustrate broader Wikipedia article viewing trends over the same period and compare them to results for the period tracking app group.

One additional factor in the analysis is the pre-decision leak of the *Dobbs* decision in May 2022.[137] That leak was also widely covered by the media, though, as we discuss, that coverage differed from the decision itself.[138] Still, the leak could confound results by disrupting or obfuscating actual or more typical view trends. A benefit of an ITS design is that it controls for longer-term trends before and after the tested intervention—here, the actual *Dobbs* decision in June 2022. Nevertheless, our analysis also examines results for leak impacts.

In summary, we analyze these different groups of Wikipedia articles with the same segmented regression analysis and compare results. Our prediction or hypothesis based on chilling effects theory is that there was a decrease in the total views of Wikipedia articles and Google search terms associated with period tracking apps in July 2022 following the *Dobbs* decision, but no similar impact with the comparator groups, because they do not raise privacy concerns. So, any statistically significant

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associated with *Dobbs* generated by ChatGPT. The AI was prompted to generate keywords associated with the *Dobbs* decision, and the list was extrapolated from the keywords common over five different iterations. The list included: *Mississippi*, WIKIPEDIA, https://en.wikipedia.org/wiki/Mississippi [https://perma.cc/2ZVS-THLA]; *Abortion*, WIKIPEDIA, https://en.wikipedia.org/wiki/Abortion [https://perma.cc/2JHB-9QFC]; *Abortion Law*, WIKIPEDIA, https://en.wikipedia.org/wiki/Abortion_law [https://perma.cc/U4GZ-9XWW]; *Supreme Court*, WIKIPEDIA, https://en.wikipedia.org/wiki/Supreme_court [https://perma.cc/L54U-TLKU]; *Constitutional Law*, WIKIPEDIA, https://en.wikipedia.org/wiki/Constitutional_law [https://perma.cc/L54U-TLKU]; *Fetal Viability*, WIKIPEDIA, https://en.wikipedia.org/wiki/Fetal_viability [https://perma.cc/L54U-TLKU]; *Reproductive Rights*, WIKIPEDIA, https://en.wikipedia.org/wiki/Reproductive_rights [https://perma.cc/L54U-TLKU]; *Women's Health*, WIKIPEDIA, https://en.wikipedia.org/wiki/Women's_health [https://perma.cc/L54U-TLKU]; *Pro-Life*, WIKIPEDIA, https://en.wikipedia.org/wiki/Pro-life [https://perma.cc/L54U-TLKU]; and *Abortion In Mississippi*, WIKIPEDIA, https://en.wikipedia.org/wiki/Abortion_in_Mississippi [https://perma.cc/L54U-TLK].

137. Josh Gerstein & Alexander Ward, *Supreme Court Has Voted to Overturn Abortion Rights, Draft Opinion Shows*, POLITICO (May 3, 2022, 2:14 PM), https://www.politico.com/news/2022/05/02/supreme-court-abortion-draft-opinion-00029473 [https://perma.cc/KEL6-TQJ8].

138. *See* Nathan T. Carrington & Logan Strother, *Plugging the Pipe? Evaluating the (Null) Effects Of Leaks On Supreme Court Legitimacy*, 20 J. EMPIR. LEG. STUD. 669, 670 (2023).

immediate drop after that month or any change in overall view trends after that month for the period tracking app Wikipedia articles—while the comparator groups of articles do not show the same impacts—would be consistent with an immediate and long-term chilling effect.

III. RESULTS AND DISCUSSION

In this Part, we set out and discuss our empirical findings. We begin with our findings for the Wikipedia article view count trends and then move to the Google search trends. The full results for the Wikipedia case study analysis are represented in Table 1 below, which includes results for both the study group (period tracking apps) and comparator groups. Results are also visualized in Figures 1, 2, and 3. The full results for the Google Search case study are in Table 2 and visualized in Figure 4.

A. *Wikipedia Results*

Our results are consistent with our chilling effects hypothesis and provide compelling evidence of a chilling effect post-*Dobbs*. Within articles referencing period tracking apps, there was a statistically significant drop-off of over 1,000 views from June 2022 to July 2022. This represented an approximately 13% reduction from the expected views for the articles based on trends before *Dobbs*.

The article view count trend reversed entirely after *Dobbs*. Before July 2022, views for the period tracking app Wikipedia articles increased every month, which was a statistically significant trend. After *Dobbs*, there was a sudden, sharp, and statistically significant change in that trend, with views for the articles beginning to decrease on a monthly basis. If people were chilled by the privacy and legal risks associated with using period tracking apps, they would be chilled from using them, and thus also would not seek out information about them. These findings (fully set out in Table 1) are consistent with both an immediate and long-term chilling effect due to the *Dobbs* decision and corresponding media coverage.

Table 1. *Both the highly statistically significant drop in view count after June 2022 and the shift to fewer monthly views after June 2022 for the period tracking app articles is consistent with a chilling effect. The comparator article groups show no similar statistically significant results.*

Wikipedia Article Group	Monthly trend pre–June 2022	Change in view count in June 2022	Change in monthly trend after June 2022	Model Fit
Period Tracking App Articles	**112.19**** ***p*=0.00**	**−1,034.75*** ***p*=0.04**	**−318.63**** ***p*=0.00**	**Yes** ***F*=0.00**
Non-Digital Fertility Awareness Methods Articles	**−241.0**** ***p*=0.00**	1129.0.34 *p*=0.22	35.84 *p*=0.82	**Yes** ***F*=0.00**
Popular Wikipedia Articles	878,189.3 *p*=0.14	997619.4 *p*=0.93	1,095,071 *p*=0.56	**Yes** ***F*=0.00**
Dobbs Related Articles***	**9,774.54** ***p*=0.04*** **−3,074.23** ***p*=0.03***	−37,640 *p*=0.65 **96,656** ***p*=0.00****	−23,360 *p*=0.13 −8,278.19 *p*=0.07	No *F*=0.14 **Yes** ***F*=0.01**

Statistically significant findings in bold (*$p<0.05$, **$p<0.01$); ***robust regression results, also displayed as model diagnostics, show an extreme outlier in the original results (robust regression reduces the influence of outliers).

The comparator group results also support this theory. If the comparator groups showed similar trends to the period tracking apps after *Dobbs*, then there would be less evidence of a chilling effect because these articles do not raise privacy concerns and should not show the same impacts post-*Dobbs*. But they do not—none of the comparator groups show similar impacts. First, none of the comparator groups show a statistically significant drop-off in July 2022.[139] Further, they also do not

139. For the *Dobbs*-related Wikipedia articles comparator group, two sets of results are provided in Table 1. The first set of results did not show a model fit for an ITS analysis centered on July 2022, meaning it made no sense to analyze that data using a model or theory based on a July 2022 intervention; there are no trends

show a comparable statistically significant trend reversal, from increasing views before *Dobbs* to decreasing views after it.

For the period tracking app study group, the positive pre-*Dobbs* view trend, the drop immediately after the *Dobbs* decision, and the declining monthly view trend in the following months are all statistically significant. None of the other comparator groups have comparable results. The non-digital fertility awareness method comparator had only a negative pre-*Dobbs* trend and no statistically significant change immediately after *Dobbs* in July or in the following monthly view trends. The popular Wikipedia article comparator group had no statistically significant view trends before, immediately after, or in the months following *Dobbs*. Unlike the period tracking app articles, these additional results demonstrate that this comparator shows no overall trend impact. Given that the three comparators show no similar evidence of trends or impacts comparable to the period tracking app articles, this is also consistent with a chilling effect, because *Dobbs* content would not be expected to raise the same privacy and legal threats as the period tracking app articles. A chilling effects explanation for the findings is even more compelling when the data is visualized in Figure 1.

in the data at all concerning that timeframe, in other words. However, to account for an extreme outlier in those results identified through model diagnostics, we conducted a robust regression analysis to reduce the influence of outliers for a second set of results for this comparator—also provided in Table 1. Robust regression results for the *Dobbs*-related comparable articles still show no evidence of any comparable chill. In fact, they show the opposite: there was both an increase in views for articles after July 2022 and no trend reversal. The decreasing monthly view count trend for the articles prior to *Dobbs* did not change after the decision—it kept declining.

Figure 1. *Pre– and Post–June 2022 Article View Trends. The sudden drop in views and trend shift—from increasing monthly views over to decreasing after June 2022—is consistent with a significant and lasting chilling effect.*

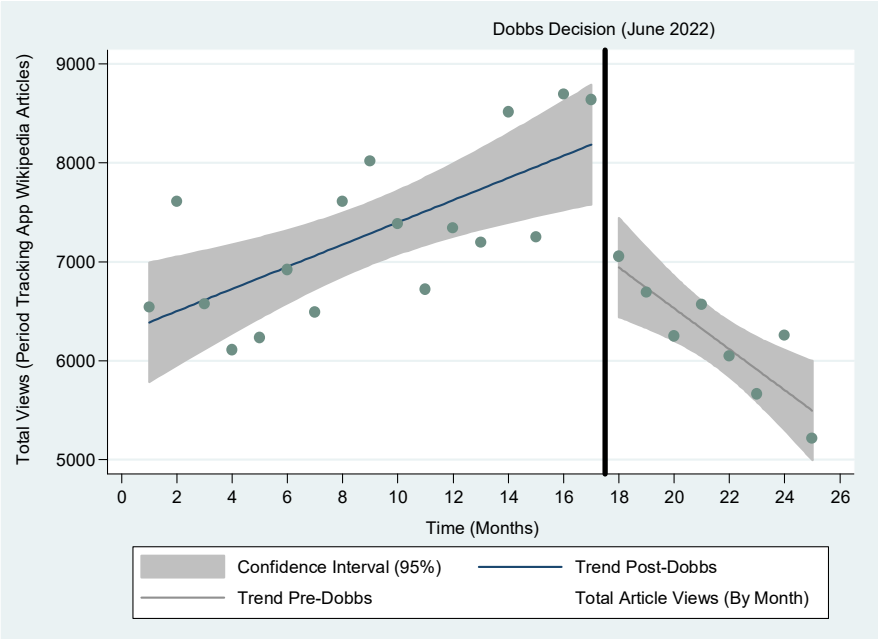
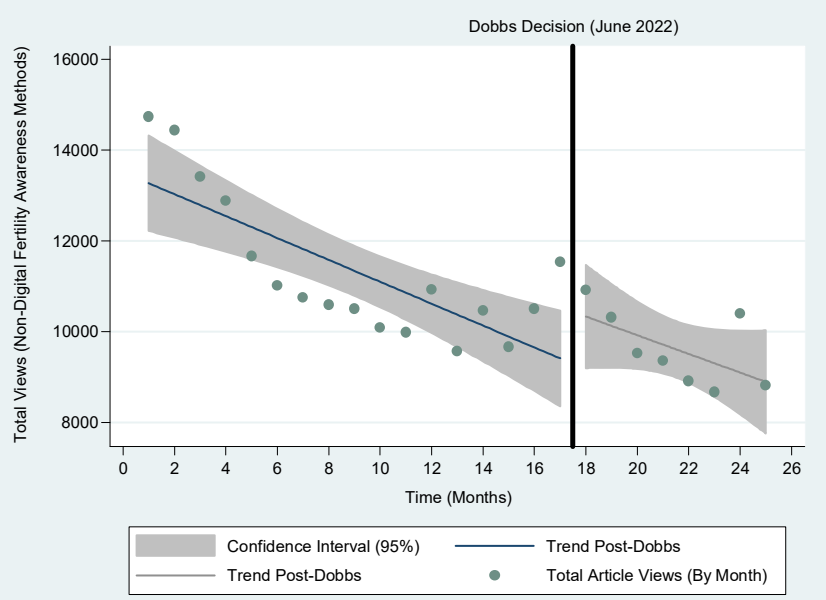


Figure 1 shows the period tracking app Wikipedia articles over the course of the study period—twenty-five months, from February 2021 to February 2023—with the data trends for views before and after *Dobbs*. Months are plotted horizontally, and the total views and trend line for the articles in each month are plotted vertically. The increasing monthly views for period tracking app articles before the *Dobbs* decision in June 2022, as well as the statistically significant drop-off in article views and overall trend reversal following *Dobbs* in July 2022, is clearly visible.

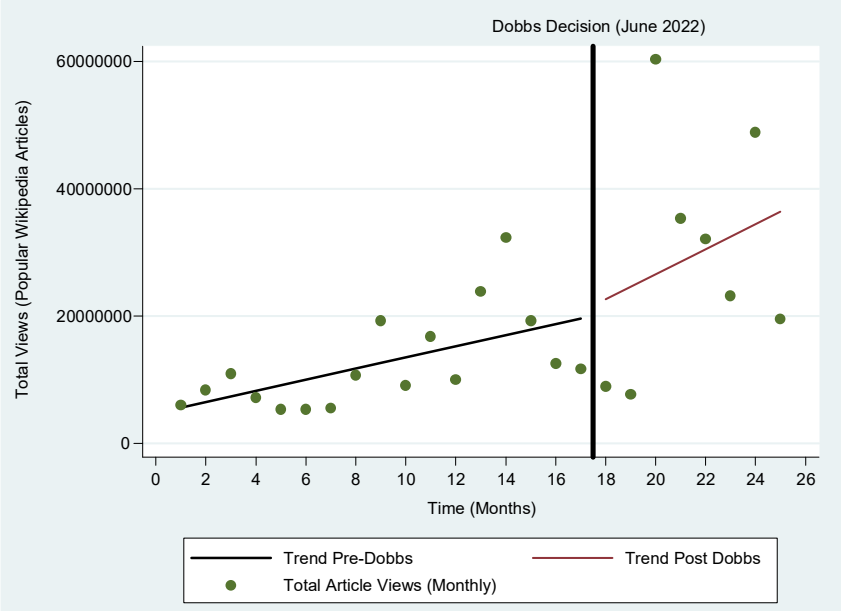
The same visualizations for the three comparators in Figure 2 show no comparable chilling effect. If anything, they show an increase in views post-*Dobbs* but nothing else of note:

Figure 2*. ITS analysis and results for each is visualized below, starting with Fertility Awareness articles, then popular Wikipedia articles and then* Dobbs*-related articles. No comparator shows a similar June 2022 impact comparable to a chill.*

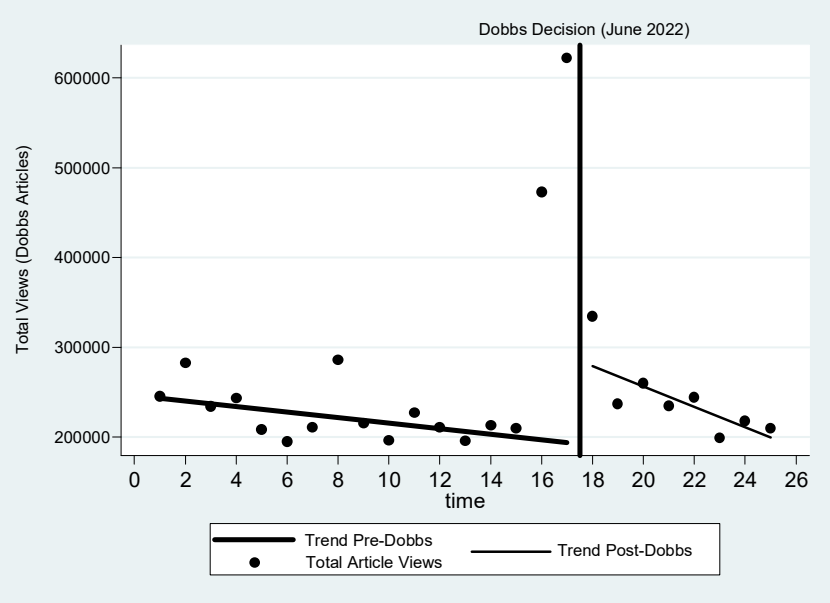
Non-Digital Fertility Awareness Methods Articles



Popular Wikipedia Articles



Dobbs Related Articles



The results for the third comparator group—articles associated with the *Dobbs* decision itself—show a substantial increase in views as of May 2022 and again in June 2022. This increase is likely due to both the decision itself and the earlier coverage of the pre-decision U.S. Supreme Court leak, but the article views return to their previous trend before those months, illustrating a monthly decline.

These are the only results anywhere in the study suggestive of an impact due to the *Dobbs* leak, and the impact is temporary. That is likely for a good reason. Media coverage of Supreme Court leaks tends to focus predominantly on how the leaks implicate the legitimacy and politics of the Court as an institution and less on the substance of the cases themselves.[140] Any response from the Court itself only exacerbates that focus.[141] Both happened here, with media and commentary focused on the legitimacy and politics of the Court following the leak.[142] And Chief Justice John Roberts's public statement following the leak amplified that focus.[143] An additional reason that the leak may not have caused the same impact as the *Dobbs* decision is that leaks come from questionable sources—in this case an anonymous source.[144] Due to problems with the credibility of the leak, it likely did not have the same impact as the decision itself.[145] Our finding that there was overall no impact from the leak—or, in the case of this one comparator group of Wikipedia articles, a temporary one—is consistent with findings from two other empirical studies.[146]

We also conducted a cross-validation analysis to further test the robustness and reliability of our analysis and findings. The cross-validation results, too, support our chilling effects hypothesis. Cross-validation is a statistical technique for

140. Carrington & Strother, *supra* note 138, at 669.

141. *Id.* at 671.

142. *Id.* at 669, 671–72; Thomadsen, Zeithammer & Yao, *supra* note 92, at 5405.

143. Carrington & Strother, *supra* note 138, at 671.

144. *Id.* at 678

145. *See generally id.* (finding a null result for impacts of the leak on public perceptions of the Court).

146. *Id.* at 678–79, 685 ("[C]redibility matters significantly for how people respond to new information, and anonymous sources are perceived to be less credible."); Thomadsen, Zeithammer & Yao, *supra* note 92, at 5415 (finding that the *Dobbs* leak had only a temporary impact on perceptions and preferences concerning abortion, while the decision itself caused a more lasting impact: "[i]n contrast to the rapid retrenchment along partisan lines after the post-leak polarization, we find the Dobbs decision had a more lasting polarizing effect along gender lines, making women more proabortion and men more anti-abortion . . .").

assessing the accuracy and performance of a statistical model, including comparing among different models.[147] It also helps assess the replicability of results, providing insight as to their reliability.[148] Here, we used a leave-one-out cross-validation analysis, which is among the most common.[149] In our analysis, we tested our model's performance—which treated July 1, 2022, as the intervention date based on the *Dobbs* decision—compared to other analyses and models that hypothesized other months as the intervention month, including May 2022, the month of the *Dobbs* draft decision leak.

If the cross-validation results showed an analysis or model centered on a different month—a month that has nothing to do with a *Dobbs* chilling effect, such as April, May, June, April, August, or September—that would be evidence to disconfirm the chilling effects hypothesis. By contrast, a chilling effects hypothesis would be supported if our model and analysis were best for the data and thus the most accurate. That's what we found (see results set out in Table 2).

147. LUKE J. KEELE, SEMIPARAMETRIC REGRESSION FOR THE SOCIAL SCIENCES 86 (2008) (describing "cross-validation" as a "general technique for assessing model fit based on resampling that can be applied to most statistical models"); Matías F. Schrauf, Gustavo de Los Campos & Sebastián Munilla, *Comparing Genomic Prediction Models by Means of Cross Validation*, 12 FRONTIERS IN PLANT SCI. 1, 1 (2021), https://www.frontiersin.org/journals/plant-science/articles/10.3389/fpls.2021.734512/full [https://perma.cc/V34B-85W2]. Cross-validation also speaks to the external validity, or replicability, of a model's results. Kristi Morin & John L. Davis, *Cross-Validation: What is it and How is it Used in Regression?*, 46 COMMC'N IN STAT. - THEORY AND METHODS 5238, 5238 (2017).

148. Morin & Davis, *supra* note 147.

149. KEELE, *supra* note 147, at 8 (describing "leave one out" cross-validation as "probably the most commonly used method" because it "works well with most any sample size" and describing it as a technique wherein "one observation is randomly selected and then omitted from the data set" in order to test the performance and reliability of the model).

Table 2. *The results from the leave-one-out cross-validation analysis also support our chilling effects hypothesis and findings. The results show that our analysis and statistical model, which is based on a July 1, 2022, intervention date due to the* Dobbs *decision, is the far superior model and fit for the data—showing the lowest errors and highest pseudo R^2 value—compared with analyses and models that assume an intervention date based on the time of the leak (June 2022) or four other alternative hypothesized months.*

Hypothesized Intervention Date	**Root Mean Squared Errors**	**Mean Absolute Errors**	**Pseudo R^2**
Intervention April 1st	696.57	563.58	0.40
Intervention May 1st	633.15	517.00	0.49
Intervention June 1st (Pre-*Dobbs* Leak)	671.53	545.54	0.43
Intervention July 1st (*Dobbs* decision)	**582.75****	**481.48****	**0.57***
Intervention August 1st	639.72	527.35	0.48
Intervention September 1st	709.11	591.96	0.37

** Lowest errors; * Highest R^2

These leave-one-out cross-validation analysis results, in **Table 2**, found that our analysis and statistical model, which was based on a July 1, 2022, intervention (due to *Dobbs*), was the far superior model and fit for the data: it had the lowest root mean squared errors; the lowest mean absolute errors; and the highest pseudo R^2 results as compared with analyses and models that assume an intervention based on either the time of the leak (June 1, 2022) or four other alternative hypothesized months that have nothing to do with any *Dobbs* chilling effect. The results also show that our chilling effect findings are much less likely to be simply coincidental, noise, or random—our hypothesis and analysis fit the data, and other alternative hypothesized months are much less accurate and reliable. Lastly, a model based on the pre-decision leak (where intervention or impact would begin June 1, 2022) was among

the least accurate and least reliable models, suggesting that analyzing the data based on a leak's impact did not fit the data. All of these findings support our chilling effects hypothesis based on a July 1, 2022, "intervention" date due to the *Dobbs* decision.

In summary, there is nothing in these comparator group results that would contradict a conclusion that we see a chilling effect in relation to the period tracking app's view counts post-*Dobbs*. To the contrary, the evidence of a chilling effect is compelling.

B. *Google Search Results*

The results for the Google search trends (**Table 3**) for period tracking app search terms are also consistent with a chilling effect. First, there was a statistically significant drop off in Google searches using terms associated with period tracking apps immediately following the decision in July 2022. Second, Google searches using terms associated with period tracking apps were also impacted—chilled after the *Dobbs* decision—showing a longer-term chilling effect. That is, Google searches using these terms were increasing before *Dobbs*, but then after the decision, there was a statistically significant change in that overall trend. Following the decision, Google searches using these terms decreased on a weekly basis. These findings, like the Wikipedia results, provide additional compelling evidence of a chilling effect—an immediate chilling effect after June 2022 and then a longer-term chilling effect in the months following the decision as the search trends declined on a monthly basis.

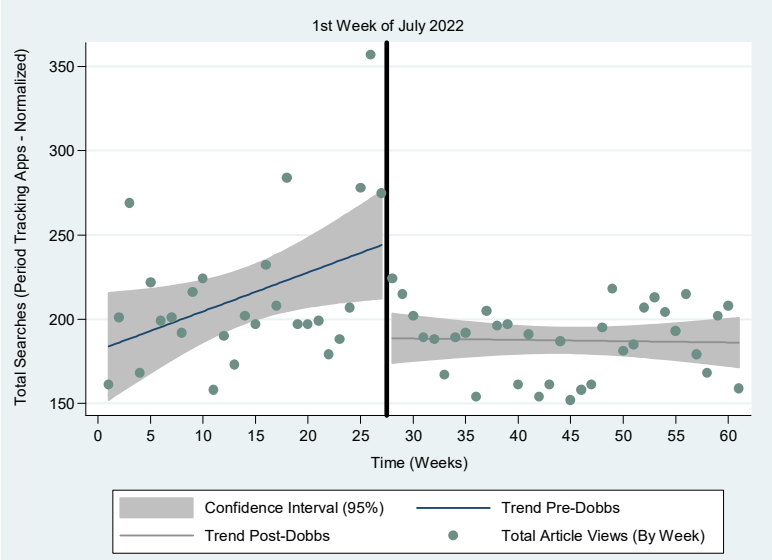
Table 3. *The statistically significant drop in Google searches after June 2022 and the shift to fewer monthly views after June 2022 is also consistent with a* Dobbs *chilling effect.*

Google Search Terms	Monthly trend pre–June 2022	Change in view count in June 2022	Change in monthly trend after June 2022	Model Fit
Period Tracking App Search Terms	**2.03*** ***p*=0.02**	**−37.28*** ***p*=0.03**	**−2.51*** ***p*=0.02**	**Yes** ***F*=0.01**

Statistically significant findings in bold (*$p<0.05$, **$p<0.01$);

These trends are again even clearer in a visualization of the results as set out in **Figure 3** below:

Figure 3*. Pre-/Post-June 2022 Google Search Trends (Normalized). The sudden drop in searches for period tracking apps and the subsequent trend shift—from increasing searches before June 2022 to decreasing searches after—is consistent with an immediate and lasting chilling effect.*

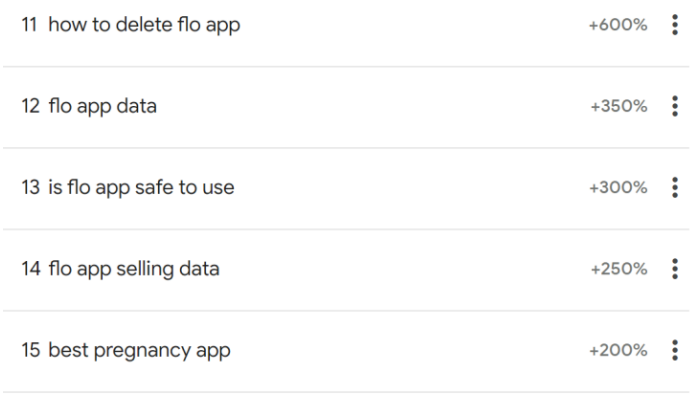


The statistically significant drop in searches post-*Dobbs* in July 2022 and the overall trend reversal following the decision are all apparent in this graph and are likewise consistent with a post-*Dobbs* chilling effect immediately and over the long term. These corroborate the similar findings in the Wikipedia article view count analysis.

Further evidence in support of a chilling effect hypothesis are the "top" (most frequent) and "rising" (trending up) related searches associated with the most popular period tracking apps in the study period. By far, the most popular app in the study in terms of total searches was Flo. Both Clue and Natural Cycles were also popular, typically topping the lists of the best and most popular period tracking apps reported in media. Top and rising searches for these period tracking apps are set out in Figure 4 below:

Figure 4*. A sample of Google searches that included the terms for popular period tracking apps associated with the search terms tracked that were the most frequent ("top") or were trending ("rising") over the course of the study period*

Flo App

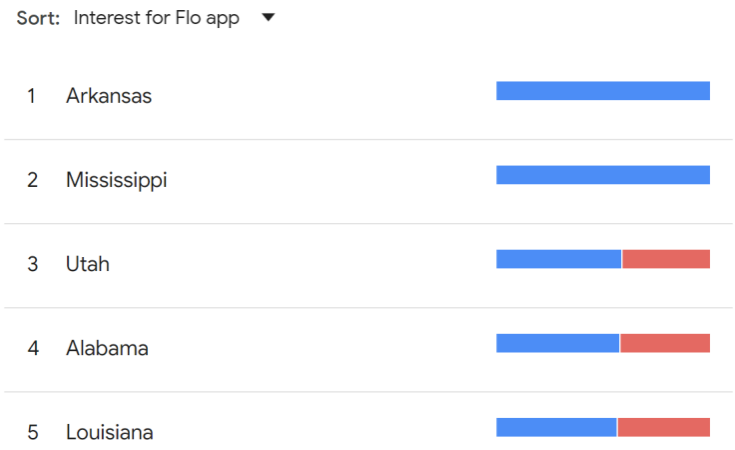


The Google searches for the Flo app that were most increasing in frequency during the study period ("rising" or trending up)—such as "how to delete flo app data," "does flo app sell data," "how to delete flo app," and "is flo app safe to use"—offer compelling additional evidence of privacy concerns and intentions to delete data or the app itself, which is also consistent with chilling effects due to privacy or legal threats. Furthermore, certain top and rising searches for the Clue app ("clue app privacy") and the Cycles and Natural Cycles apps

("natural cycles app review") are also consistent with privacy- or safety-related concerns. Lastly, as shown in Figure 5, the top regions for searches for the Flo app were states where a complete ban on abortion came into effect immediately after *Dobbs* or shortly thereafter.

Figure 5*. Top five states for Google searches relating to the period tracking app Flo were all states that had a complete ban on abortion immediately following* Dobbs *or shortly thereafter.*

Flo App



Flo app users from such states would be the most likely to have concerns about privacy, surveillance, and harassment, given those legal changes introduced following the *Dobbs* decision.[150] This, too, is consistent with a chilling effect finding.

IV. THE IMPLICATIONS OF OUR FINDINGS

The findings provide compelling evidence of an immediate chilling effect on people's willingness to read about or search for period tracking apps following the *Dobbs* decision. Crucially, they show a longer-term chilling effect that continued from July 2022 until the end of our study period in February 2023.

This Part discusses the implications of our findings for law, public policy, and social and behavioral science. We argue that our findings should lead to the rejection of persistent skepticism

150. Caroline Kitchener, Kevin Schaul, N. Kirkpatrick, Daniela Santamariña & Lauren Tierney, *States Where Abortion is Legal, Banned or Under Threat*, WASH. POST (June 24, 2022, 10:23 AM), https://www.washingtonpost.com/politics/2022/06/24/abortion-state-laws-criminalization-roe/ [https://perma.cc/RVM4-YBWC].

about the chill of privacy threats, including commercial and governmental surveillance as well as personal threats, including harassment, stalking, and abuse. Our findings provide new empirical support for law reform efforts centered on intimate privacy protections.

A. *Evidence of Chilling Effects Due to Privacy and Personal Threats*

Despite important contributions to understanding the chill of privacy threats,[151] lawyers, legal scholars, and courts have persisted in their skepticism about the impact and even existence of chilling effects due to privacy threats, such as government surveillance, commercial data collection, harassment, stalking, and abuse.[152] To take a prominent example, Professor Eric Posner remarked:

> This brings me to another valuable point you made, which is that when people believe that the government exercises surveillance, they become reluctant to exercise democratic freedoms. This is a textbook objection to surveillance, I agree, but it also is another objection that I would place under "theoretical" rather than real. Is there any evidence that over the 12 years, during the flowering of the so-called surveillance state, Americans have become less politically active? More worried about government suppression of dissent? Less willing to listen to opposing voices? All the evidence points in the opposite direction.[153]

Judges share this skepticism. When confronted with claims of chilling effects caused by government surveillance, the

151. *See*, *e.g.*, Cohen, *supra* note 34; *see also* Schwartz, *supra* note 81, at 1621 (outlining the difficulty of maintaining anonymity in cyberspace); ROSEN, *supra* note 81 (explaining the importance of privacy in protecting citizens from public misjudgment); Solove, *supra* note 35 (describing how privacy problems build up over time through a series of small acts); CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 6–8; Kaminski, *supra* note 30 (explaining the "chilling effect" of individual self-censorship following government action); RICHARDS, *supra* note 82, at 128–29 (describing the effects of surveillance on behavior); Richards, *supra* note 26, at 1934–35 (explaining how intellectual surveillance is harmful because it chills the exercise of civil liberties); RICHARDS, *supra* note 31, at 185–86.

152. Penney, *Chilling Effects*, *supra* note 10; Penney, *Understanding Chilling*, *supra* note 10.

153. Eric Posner, *The Secrecy Paradox*, N.Y. TIMES: ROOM FOR DEBATE (June 9, 2013), https://www.nytimes.com/roomfordebate/2013/06/09/is-the-nsa-surveillance-threat-real-or-imagined [https://perma.cc/4LPP-V9T8].

Supreme Court has expressed doubts. One of the earliest cases to challenge government surveillance, *Laird v. Tatum*,[154] decided in 1972, was based on claims of privacy chilling effects.[155] In *Laird*, the plaintiffs challenged the U.S. Army's surveillance of civil rights groups, arguing that it had a chilling effect on their protected speech activity.[156] The Court rejected the claim for lack of standing, finding that chilling effect allegations were "subjective" and thus did not constitute an "objective harm or a threat of specific future harm."[157] The Court refused to acknowledge that chilling effects due to surveillance constituted anything beyond a subjective or self-inflicted harm.[158]

This attitude has persisted, with the Court expressing similar sentiments in *Clapper v. Amnesty International*.[159] That 2013 decision involved a constitutional challenge to NSA surveillance authorized by the Foreign Intelligence Surveillance Act of 1978.[160] The complainants—lawyers, journalists, and activists—claimed that likely NSA surveillance of their digital communications prevented them from speaking to their clients on the phone, among other protected expressive activities.[161] Citing *Laird*, the Court dismissed the lawsuit, again for lack of standing, finding that the chilling effects caused by the threat of government surveillance were "too speculative" and based only on "subjective fear."[162] Again, the Court refused to recognize how privacy threats such as government surveillance could have a chilling effect on speech and other behavior.[163] Crucially, the NSA knew that it was engaged in such surveillance but said nothing on the grounds that the spying program was "top secret."[164] The harms flowing from surveillance were merely speculative (to plaintiffs)

154. 408 U.S. 1 (1972).
155. *Id.* at 13–14.
156. *Id.*
157. *Id.*
158. *Id.*
159. 568 U.S. 398 (2013).
160. *Id.* at 401; Foreign Intelligence Surveillance Act of 1978, Pub. L. No. 95-511, 92 Stat. 1783.
161. *Clapper*, 568 U.S. at 417.
162. *Id.* at 418.
163. *Id.* at 411.
164. *See* Eric Lichtblau & James Risen, *Spy Agency Mined Vast Data Trove, Officials Report*, N.Y. TIMES (Dec. 24, 2005), https://www.nytimes.com/2005/12/24/politics/spy-agency-mined-vast-data-trove-officials-report.html [https://perma.cc/S84A-44L5].

because the government refused to acknowledge the actual existence of the NSA's indiscriminate gathering of telecommunications.[165]

The lack of systematic study has been a key reason for scholarly and judicial skepticism about self-censorship due to surveillance. Our study goes a long way to refute the suggestion that chilling effects are not real in a post-*Roe* America.[166] Our findings are the first to demonstrate chilling effects associated with the *Dobbs* decision, and among the few concerning intimate privacy. More generally, our findings add to a growing body of chilling effect theory and research that documents chilling effects due to privacy threats.[167] Skeptics must reckon with the proof of concept that we provide.

Our intervention also can help change skepticism about chilling effects resulting from harassment, stalking, and other forms of online abuse. For instance, at oral arguments in *Counterman v. Colorado*,[168] several Supreme Court Justices trivialized the silencing and terrorizing impact of cyberstalking, suggesting that the victim's fear was irrational.[169] As Professor Mary Anne Franks wrote about the case:

> The justices' message was clear: Stalking is not the problem; sensitivity is. To them, stalking is quite literally a state of mind: If the stalker didn't mean for his conduct to be frightening, then it isn't. All the target has to do is understand that; she just needs to lighten up, take a joke, accept the compliment, grasp the lesson. Just because someone has made objectively terrifying statements is no reason to overreact and get law enforcement involved; victims

165. *Clapper*, 568 U.S. at 411. The Court noted that the government could help "resolve the standing inquiry by disclosing to a court, perhaps through an in camera proceeding, whether it is intercepting respondents' communications." *Id.* at 412 n.4.

166. Penney, *Chilling Effects*, *supra* note 10 (discussing skepticism and providing examples among judges, legal scholars, and social scientists).

167. Penney, *Understanding Chilling*, *supra* note 10, at 1460 n.39 (collecting research).

168. 600 U.S. 66 (2023).

169. Mary Anne Franks, *Chief Justice John Roberts' Mockery of Stalking Victims Points to a Deeper Problem*, SLATE (Apr. 21, 2023, 12:16 PM), https://slate.com/news-and-politics/2023/04/counterman-colorado-supreme-court-threats-stalking.html [https://perma.cc/QK6L-NAPP].

> should wait for the stalker to do something really frightening before they jump to conclusions.[170]

Our findings of a powerful chilling effect following *Dobbs* due to perceived risk of harm demonstrate why dismissive judicial skepticism must be rejected.

B. *The Limits of the Conventional Understanding*

Our findings show why the conventional understanding of chilling effects—a person is chilled if she is deterred from speaking out of fear of a legal threat and the associated costs[171]—requires supplementation. The conventional account fails to consider the full breadth of chilling effects. Our approach addresses what University of Virginia School of Law Dean Leslie Kendrick has called for—evidence of chilling, which so far has not been sufficiently provided.[172]

To begin with, there has been little empirical evidence offered to support the conventional account of law's chilling effects, as free speech scholars have underscored.[173] General deterrence theory, upon which the legalistic conventional understanding is based, requires very specific conditions that are not often present in concrete real-world contexts.[174] In other words, conventional understanding rests on shaky empirical foundations.

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170. *Id.*; *see also* Danielle Keats Citron, *The Continued (In)Visibility of Cyber Gender Abuse*, 133 YALE L.J. F. 333, 364 (2023) (describing the challenges in combating cyber gender abuse following the majority ruling in *Counterman*).

171. *See, e.g.*, Julie Cohen, *A Right to Read Anonymously: A Closer Look at 'Copyright Management' in Cyberspace*, 28 CONN. L. REV. 981, 1010 n.116 (1996) (suggesting Schauer's work was the "definitive treatment of the 'chilling effect' as an independent and sufficient basis for according First Amendment protection"); Penney, *Understanding Chilling*, *supra* note 10, at 1465–68 (describing the conventional understanding of chilling effects in law and its influence among lawyers, judges, and legal scholars).

172. Leslie Kendrick, *Speech, Intent, and the Chilling Effect*, 54 WM. & MARY L. REV. 1633, 1657 (2013).

173. *Id.* That includes the father of the conventional account, Fred Schauer. *See* Schauer, *supra* note 28, at 730 (noting that the behavioral assumptions for the chilling effects doctrine were "most likely unprovable"); *see also* Vincent Blasi, *The Pathological Perspective and the First Amendment*, 85 COLUM. L. REV. 449, 482 (1985) (arguing that the chilling effects doctrine, which assumed "fearful and overly risk-averse" speakers, was "oft-criticized" and based on "crude behavioral speculation"); Jennifer M. Kinsley, *Chill*, 48 LOY. U. CHI. L.J. 253, 253–55 (2016).

174. Penney, *Understanding Chilling*, *supra* note 10, at 1470–72 (detailing the lack of empirical support for the deterrence theory underlying the conventional understanding of chilling effects).

But more to the point, the conventional account does not capture chilling effects resulting from privacy threats such as government surveillance or cyber harassment and other forms of online abuse.[175] Naturally, a theory of chilling effects focused primarily on laws, statutes, and regulations cannot explain or account for impacts due to threats beyond the law. This is a serious problem for understanding chilling effects more generally and the chilling effects post-*Dobbs* specifically. Government access to the vast commercial reservoirs of intimate data and cyberstalking at the hands of individuals are the very threats that the decision unleashed and magnified.

The legalistic focus of the conventional account has likely perpetuated the skepticism about chilling effects, as illustrated in the *Laird* and *Clapper* decisions. The Court refused to even acknowledge that the privacy chill alleged was a real injury worthy of redress.[176] However, narrow and legalistic conventional understandings have given courts the license to trivialize, downplay, and ignore the silencing and chilling impact of online abuse.[177] In *Counterman v. Colorado*, the Supreme Court invoked "chilling effects" to overturn a stalking conviction under Colorado law.[178] It did so by finding that the Colorado criminal statute's objective standard for *mens rea* was inconsistent with the First Amendment; anything less than a recklessness standard, Justice Elena Kagan wrote for the majority, would mean the criminal statute would chill First Amendment protected speech.[179] The Court simply ignored the chilling effects resulting from the defendant's hundreds of unwanted texts and threats; the defendant's stalking campaign caused the victim to cancel concerts for fear of physical attack and ultimately to abandon her singing career.[180]

An even more stark example of this neglect was the Court's decision about Texas's SB 8, which unleashed a state-sanctioned stalking campaign against abortion clinics, their staff, and anyone seeking reproductive health services.[181] In the Supreme Court's decision in *Whole Woman's Health v.*

175. *Id.* at 1454–55.

176. *See* Laird v. Tatum, 408 U.S. 1, 13–14 (1972); Clapper v. Amnesty Int'l USA, 568 U.S. 398, 422 (2013).

177. *See* Franks, *supra* note 169.

178. Counterman v. Colorado, 600 U.S. 66, 81 (2023). For a critique of the decision, see Danielle Keats Citron, *supra* note 29.

179. *Counterman*, 600 U.S. at 79–80.

180. Citron, *supra* note 29, at 180.

181. Whole Woman's Health v. Jackson, 595 U.S. 30, 62 (2021) (Sotomayor, J., dissenting).

Jackson,[182] a "pre-enforcement" challenge to the legality of SB 8, not a single Justice on the Court mentioned *these* profound chilling effects. Instead, the Court focused on legal chill, which is how Justice Neil Gorsuch, writing for the majority, ultimately rejected the pre-enforcement challenge.[183] Because no SB 8 lawsuit had been filed at this pre-enforcement stage, Justice Gorsuch found that any chilling due to threats against and stalking of health providers would simply be due to the law being "on the books" and, thus, did not meet the high burden for the complainants.[184]

The conventional understanding of chilling effects rests on a weak empirical foundation and does not account for, or explain, the chilling effects revealed in this study, and it neglects the full breadth of the impact of abuse, which often includes doxing, threats, and defamation. Abortion restrictions passed in the wake of *Dobbs* have unleashed vicious abuse targeting individuals seeking abortion, healthcare professionals, and abortion clinics. Michela Meister and Professor Karen Levy highlighted the frightening reality for clinics and abortion seekers in the post-*Dobbs* environment:

> Clinics have been the targets of bombings, blockades, and invasions. Day to day, providers and their clients face picketers, protestors, online harassment, stalking, and doxing designed to intimidate clients into ceasing to exercise what reproductive rights they still have, and to dissuade providers from providing essential health services. The rise of digital technologies has exacerbated these threats in multiple ways, and digital threats have a marked impact on abortion access. Abortion is a common experience in the United States—almost 1 in 4 women will have an abortion in her lifetime—and these threats are clearly designed to chill and punish access to care for people seeking abortions.[185]

As cyber mobs and individual harassers target people involved in providing or obtaining reproductive health services, the chilling effects we found in this study will only compound.

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182. 595 U.S. 30 (2021).

183. *Id.* at 50 (majority opinion).

184. *Id.*

185. Michela Meister & Karen Levy, *Digital Security and Reproductive Rights: Lessons for Feminist Cyberlaw*, *in* FEMINIST CYBERLAW 139, 139 (Meg Leta Jones & Amanda Levendowski eds., 2024); *see also* Citron, *supra* note 24.

C. *Need for Stronger Privacy Protections*

If there is a critical implication of our findings, it is that the United States requires stronger privacy and data protection laws, especially for intimate information, including reproductive health data. We need a comprehensive federal privacy law that treats companies and institutions as "data guardians" with duties to curtail the collection, retention, and disclosure of intimate data, which would cover data collected by period tracking apps.[186]

As reform efforts proceed, we must change how we think about privacy problems and how to frame and advocate for solutions. Rather than viewing privacy as a technical legal interest or business problem, we should treat it as a "civil right," which reconnects it to its moral foundations as a fundamental human right.

We need to treat intimate privacy as a civil right. Civil rights are legal and moral rights whose protection is essential for human beings to flourish, enjoy respect, and feel that they belong. Civil rights guarantee our participation in a democratic society. They are moral rights: they cannot be traded away or denied without a good reason. Civil rights are fundamental entitlements owed to everyone, but they also require protection against discrimination, given the bigoted stereotypes and attitudes that vulnerable groups face. Civil rights are guaranteed to all, but too often and in too many ways they are denied to women, to people who aren't white, and to LGBTQ+ individuals—and, most of all, to people with more than one marginalized identity.[187]

Other important dimensions to this shift in thinking are the discriminatory effects of intimate privacy violations and abuses that are sure to follow *Dobbs* as well as the broader privacy, legal, and safety threats that it has introduced.[188] Prosecutions carried out to enforce abortion bans likely will not be brought against the powerful, but against women and members of marginalized groups who already face discrimination and other

186. For an elaboration of the conception of data guardianship and potential legislation addressing the handling of intimate data, see CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 106–10.

187. Citron, *supra* note 56; *see also* CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 106–10.

188. CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 110.

invidious attitudes.[189] This is a piece of the broader way that chilling effects work—they more often disadvantage the vulnerable.[190]

Normative conceptions of intimate privacy can help significantly reduce and mitigate those chilling effects. And legal reforms often require proof of harm, which our findings provide.

D. *Providing Proof of Harm for Litigants and Policymakers*

Our study offers objective proof of self-censorship, which could be fruitful to show injury in privacy-related claims.[191] Courts have recognized harm when people are chilled from exercising free speech rights in First Amendment cases.[192] Courts have found injury from surveillance where *objective* evidence showed the deterrence of expressive activities.[193] Our study supplies proof of harms to self-expression, which can be leveraged by litigants, lawmakers, and courts.

Consider unfair commercial acts and practice claims under the Federal Trade Commission Act (FTCA).[194] Under section 5 of the FTCA, a commercial practice is unfair if it is causing or is "likely to cause" substantial injury that cannot be reasonably avoided and is not outweighed by countervailing benefits to consumers and competition.[195] Objective evidence of self-

189. HUSS, DIAZ-TELLO & SAMARI, *supra* note 8, at 40 (finding that people of color were disproportionately represented in the sample of those criminalized for self-managing their own abortion and that people of color were more likely to be treated as "murderers"); *see also* KEBÉ, ELIZABETH LING & KYLEE SUNDERLIN, *STATE VIOLENCE AND THE FAR REACHING IMPACT OF* DOBBS 12 (2024), https://ifwhenhow.org/wp-content/uploads/2024/06/Repro-Legal-Helpline-Report-June-24.pdf [https://perma.cc/43PD-QVPL].

190. *See, e.g.*, Jonathon Penney, *Internet Surveillance, Regulation, and Chilling Effects Online*: *A Comparative Case Study*, 6 INTERNET POL'Y REV. 1, 18, 19 (2017) (finding that women and young people were disproportionately chilled by surveillance and personal threats); Citron, *Sexual Privacy*, *supra* note 19, at 1878 (noting that women and marginalized communities have "disproportionately experienced" these intimate privacy invasions throughout history); CITRON, FIGHT FOR PRIVACY, *supra* note 19, at 6–8.

191. Danielle Keats Citron & Daniel J. Solove, *Privacy Harms*, 102 B.U. L. REV. 793, 796 (2022).

192. Solove, *First Amendment*, *supra* note 31, at 142–43.

193. *Id.* at 143–44.

194. Federal Trade Commission Act, ch. 311, § 5, 38 Stat. 717, 719–21 (1914) (codified as amended at 15 U.S.C. § 45).

195. 15 U.S.C. § 45(n). States also have unfair and deceptive acts and practices (UDAP) laws that state attorneys general and sometimes private litigants can

censorship could support claims being brought against data brokers whose sale of intimate data imperils individuals seeking abortion care.

In August 2022, two months after the Court's issuance of the *Dobbs* decision, the Federal Trade Commission (FTC) sued location-data broker Kochava for violating section 5 by selling geolocation information of hundreds of millions of mobile devices.[196] The defendant offered customized feeds to purchasers that matched unique mobile device identification numbers with time-stamped latitude and longitude locations every fifteen minutes.[197] The FTC alleged that purchasers could track consumers' movements to and from sensitive locations, such as abortion clinics.[198] Disclosing data about people's movements was likely to cause "substantial injury" by (1) exposing consumers to risk of harm such as stigma, stalking, discrimination, job loss, physical violence, and emotional distress and (2) infringing on "consumers' right to privacy."[199] The agency sought a permanent injunction that would stop the defendant from selling location data revealing people's travel to sensitive locations and require it to delete the sensitive geolocation information that it had collected.[200]

The trial court dismissed the FTC's unfairness claim because the agency had not "adequately alleged a likelihood of substantial consumer injury."[201] The court began by noting that the FTC's first theory of consumer injury, increased risk of harm, could be "plausible."[202] A defendant could inflict "substantial injury under Section 5(n) . . . by creating 'a significant risk of concrete harm.'"[203] The court maintained that a company "could substantially injure consumers by selling their sensitive location information and thereby subjecting them to a significant risk of suffering concrete harms at the hands of third parties."[204] And yet, the court held, the complaint

enforce. Danielle Keats Citron, *State Attorneys General as Privacy Policymakers*, 92 NOTRE DAME L. REV. 747, 754 (2017). State UDAP laws were modeled after section 5 of the FTCA; many state laws have similar harm requirements. *Id.*

196. Fed. Trade Comm'n v. Kochava, Inc., 671 F. Supp. 3d 1161, 1166 (D. Idaho 2023).

197. *Id.* at 1166–67.

198. *Id.* at 1167.

199. *Id.* at 1171.

200. *Id.* at 1167.

201. *Id.* at 1171.

202. *Id.*

203. *Id.* at 1172.

204. *Id.* at 1171.

fell short because, though it alleged that the risk of stigma, discrimination, or emotional distress was "theoretically possible," it failed to attach "any degree of probability to those risks."[205] The court reasoned that to give rise to an "inference of consumer injury," the FTC's complaint had to "go one step further and allege that Kochava's practices create a 'significant risk' that third parties will identify and harm consumers."[206]

The court then considered the FTC's second theory, that a privacy violation itself constitutes a "substantial injury" under section 5.[207] The court recognized that since the nation's founding, privacy has been a "legally protected interest" and that an "invasion of privacy may constitute an injury."[208] The court noted that countless federal and state statutes, regulations, and common law doctrines protect against the disclosure of certain sensitive personal information.[209] "In short, privacy is—and always has been—a legally protected interest in many contexts, including specifically with regard to sensitive personal information."[210] The court explained that a "privacy intrusion" would have to be "sufficiently severe to constitute 'substantial injury'" under section 5.[211]

For the court, "three factors lessen[ed] the severity of the alleged privacy injury." First, location data is not sensitive in itself, but it instead requires inferences that can be revealing and that also can be inaccurate.[212] The court stated that a person entering an abortion clinic might be a patient or, alternatively, a salesperson.[213] The possibility of inaccuracy "did not eliminate all the privacy concerns voiced by the FTC," but it "lessen[ed] the severity of the alleged privacy injury."[214] Second, location data also can be obtained by lawful means such as following someone as they "go to and from home or a medical facility" or reviewing public property records.[215] Last, the FTC

205. *Id.* at 1171–72.
206. *Id.* at 1172.
207. *Id.* at 1174.
208. *Id.*
209. *Id.*
210. *Id.*
211. *Id.* at 1175.
212. *Id.*
213. *Id.*
214. *Id.*
215. *Id.* This finding overlooks the very problem of aggregation that the case presents. *See* Daniel J. Solove, *Access and Aggregation: Public Records, Privacy and the Constitution*, 86 MINN. L. REV. 1137, 1185 (2002). *See generally* ARTHUR R.

failed to specify how many consumers would suffer privacy invasions.[216] As the court noted, an "act or practice can cause substantial injury by doing a small harm to a large number of people."[217] The court underscored that the complaint only alleged that "third parties *could* tie the data back to device users; not that they have done so or are likely to do so."[218] Given these concerns, the court held that the privacy intrusions alleged in the complaint were not "sufficiently severe to constitute 'substantial' injury."[219]

The harm story, however, was not over. The court dismissed the complaint but invited the FTC to amend it.[220] The amended complaint, filed in June 2023, added several factual assertions. It alleged that the defendant's database graph has "comprehensive profiles of individual consumers" with 300 data points for over 300 million people, including name, address, gender, status as a parent and number of children, political association, and social media presence.[221] The defendant's app graph shows a person's use of mobile apps, including whether someone has downloaded an LGBTQ+ dating app, a Muslim prayer app, or an app monitoring health concerns.[222] The amended complaint alleged that the defendant's audience segment offering can be used to identify whether individuals are "expectant parents" based on their "usage of pregnancy, ovulation, or menstruation tracking apps."[223] The defendant's product also "tracks women's uses of apps relating to pregnancy, ovulation, and menstruation in order to, among other things, target women who are pregnant or are considering becoming pregnant."[224] The defendant's customers can "purchase a list of all pregnant consumers."[225]

MILLER, THE ASSAULT ON PRIVACY: COMPUTERS, DATA BANKS, AND DOSSIERS (1971) (examining the growing threat to individual privacy posed by the increasing use of centralized data collection, raising concerns about the potential misuse of personal information). The court also failed to acknowledge that persistently following someone could amount to the crime of stalking. *See generally* CITRON, FIGHT FOR PRIVACY, *supra* note 19.

216. *Kochava Inc.*, 671 F. Supp. 3d at 1175.

217. *Id.*

218. *Id.*

219. *Id.*

220. *Id.* at 1175–76.

221. Amended Complaint at 6, 12–13, Fed. Trade Comm'n v. Kochava, Inc., No. 22-cv-00377 (D. Idaho June 5, 2023).

222. *Id.* at 16.

223. *Id.* at 19.

224. *Id.* at 27.

225. *Id.* at 21.

The amended complaint alleged that consumers are likely to suffer injury because, as the defendant promised, the details of people's movements will help "identify and target individual consumers," including more than eleven million "expectant parents" as well as individuals with cancer symptoms, based on an app on their phones.[226] The FTC's amended complaint pointed to a case where an advertising company purchased geolocation data to send pro-life ads to people entering and leaving abortion clinics.[227] The FTC's amended complaint briefly mentioned the harm of self-censorship. It alleged that consumers are "increasingly reluctant to share their personal information, such as digital activity . . . , especially without knowing which entities will receive it."[228]

On February 3, 2024, the district court rejected the defendant's renewed motion to dismiss and found that the amended complaint "significantly expands the factual allegations in the original Complaint and it easily satisfies the liberal plausibility standard."[229] The court found that the FTC had plausibly pled that the defendant's practices expose consumers to secondary harms, including stigma, discrimination, physical violence, and emotional distress.[230] The court underscored that the amended complaint had "provided several real-world examples of harms inflicted on device users due to the disclosure of their geolocation and app-use data."[231] Those examples did not have to involve the defendant's own data; those examples showed that the defendant's practices "cause or [are] likely to cause substantial injury to consumers."[232] The court continued: "By demonstrating that harms have resulted from the sales of similar mobile device data, the FTC support[ed] its claim that Kochava's practices are likely to cause consumer injury."[233] The court also found that the FTC had shown likely consumer injury due to the quantity and quality of the data that the defendant uses to make inferences about individuals, such as whether they have cancer based on their app usage.[234]

226. *Id.* at 16, 19, 22, 26.

227. *Id.* at 29–30.

228. *Id.* at 14–15.

229. Fed. Trade Comm'n v. Kochava, Inc., Case No. 22-cv-00377, 2024 WL 449363, at *2 (D. Idaho Feb. 3, 2024).

230. *Id.* at *4.

231. *Id.*

232. *Id.*

233. *Id.*

234. *Id.* at *5.

In the rest of this case and in others alleging unfair consumer acts and practices in the amassing and sale of intimate data, the FTC can point to our study for actual evidence of self-censorship. To be sure, while our study shows the chilling of searches and reading about fertility and period tracking apps in the aftermath of *Dobbs*, it does not specifically address the chilling of expression related to the practices of location-data brokers. Nonetheless, the study provides objective evidence for the notion that a significant number of consumers will likely be deterred from searching for, reading about, and ultimately using period tracking apps and other online health services related to pregnancy and reproductive services.

Our empirical proof of self-censorship provides additional reasons for state attorneys general to continue to protect reproductive health data. For instance, the California attorney general's office sued the fertility app Glow for failing to secure subscribers' intimate information, including fertility test results, miscarriages, abortions, and sexual experiences.[235] For years, Glow permitted people to access subscribers' accounts without asking subscribers for permission.[236] Glow agreed to fix that security flaw and to undertake privacy risk assessments that consider the special "online risks that women face, or could face, including gender-based risks, from privacy and security lapses."[237] Proof of self-censorship from gender-based risks, offered by our findings, can further support investigations and enforcement activity related to the protection of reproductive health data.

Another important role that our study can potentially play is to support privacy plaintiffs' standing in federal court. To bring claims in federal court, plaintiffs must show that privacy violations caused real injuries.[238] Under the Court's Article III standing doctrine, plaintiffs must allege concrete harms, which

235. Press Release, State of Cal. Dep't of Just., Attorney General Becerra Announces Landmark Settlement Against Glow, Inc.—Fertility App Risked Exposing Millions of Women's Personal and Medical Information (Sept. 17, 2020), https://oag.ca.gov/news/press-releases/attorney-general-becerra-announces-landmark-settlement-against-glow-inc-%E2%80%93 [https://perma.cc/RS5D-QKAW].

236. Complaint at 4, People v. Upward Labs Holdings, Inc., No. CGC-20-586611 (Cal. Super. Ct. filed Sept. 17, 2020).

237. Final Judgment and Permanent Injunction at 10–11, People v. Upward Labs Holdings, Inc., No. CGC-20-586611 (Cal. Super. Ct. Sept. 18, 2020).

238. Citron & Solove, *supra* note 191, at 799–800.

can be either tangible (physical or monetary) or intangible.[239] Privacy harms typically include intangible injuries such as emotional distress, self-censorship, and broken trust.[240] Professor Margot Kaminski has explored cases suggesting that the gathering of large quantities of sensitive data and specific chilling effects due to privacy violations could amount to harm to support standing.[241]

As this study shows, the indiscriminate collection of people's reproductive health data inflicts provable harm in the here and now—the chilling of people's expression.[242] Self-censorship is occurring and will continue to occur absent strong privacy protections. The unchecked collection of reproductive health data is causing people to refrain from expressive activities, including searching for and using fertility apps.[243]

Lawmakers can point to our findings to show that an absence of privacy protections hinders people from using reproductive health apps. Strong privacy protections would decrease the chance that people will be prevented from using apps that can enhance and enable expression related to reproductive health.

Several federal bills have been proposed to protect reproductive health privacy. Representative Sara Jacobs of California has said of her legislative proposal:

> As a young woman, reproductive health care is my health care. And like tens of millions of Americans, I've used period tracking apps to help manage my reproductive health. It's unconscionable that information could be turned over to the government

239. TransUnion LLC v. Ramirez, 594 U.S. 413, 425 (2021) (holding that for injuries to support constitutional standing, they must resemble long-recognized common law harms). Article III standing requires that a party demonstrate an injury from the contested state action that is "concrete, particularized and actual or imminent; fairly traceable to the challenged action and redressable by a favorable ruling." Lujan v. Defs. of Wildlife, 504 U.S. 555, 560–61 (1992). For a critique of the Court's most recent standing cases, see Daniel J. Solove & Danielle K. Citron, *Standing and Privacy Harms: A Critique of* TransUnion v. Ramirez, 101 B.U. L. REV. ONLINE 62, 70 (2021).

240. *Id.* at 68–69.

241. Kaminski, *supra* note 30, at 414–15.

242. *Id.* at 425.

243. *See, e.g.*, Church of Scientology v. United States, 506 U.S. 9, 10 (1992) (noting that the government's retention of private tapes of a taxpayer's communications amounted to an invasion of privacy supporting standing).

> or sold to the highest bidder and weaponized against us . . . .[244]

Senator Ron Wyden of Oregon, who is working with Representative Jacobs, noted that

> [i]t is just common sense that data brokers, tech companies, and advertisers shouldn't be able to put personal, sensitive information on the public auction block for anyone with a credit card. . . . when women and pregnant people use a period tracking app . . . they won't have to worry about [] third parties looking over their shoulder.[245]

Along these lines, the My Body, My Data Act of 2022,[246] co-sponsored by Representative Jacobs, Senator Wyden, and Senator Mazie Hirono of Hawaii, would minimize the extent that companies can handle reproductive health data. The bill would restrict businesses from collecting, using, retaining, or disclosing reproductive health information unless either such information would be necessary to provide the product or service requested by the consumer or the business has the express consent of the individual to whom the information relates.[247] Any entity that collects personal information related to a person's reproductive or sexual health, including information related to pregnancy, menstruation, surgery, termination of pregnancy, contraception, basal body temperature, or medical diagnoses, would be covered by the bill.[248] The bill would protect people who use fertility or period tracking apps or seek information about reproductive health services.[249] The bill would not preempt state laws from

244. Press Release, Rep. Sara Jacobs, Congresswoman Jacobs Announces My Body, My Data Act to Protect Reproductive Health (June 2, 2022), https://sarajacobs.house.gov/news/documentsingle.aspx?DocumentID=542 [https://perma.cc/UUU5-G2HN].

245. Press Release, Sen. Ron Wyden, Colleagues Introduce My Body, My Data Act to Protect Reproductive Health Data (June 21, 2022), https://www.wyden.senate.gov/news/press-releases/wyden-colleagues-introduce-my-body-my-data-act-to-protect-reproductive-health-data [https://perma.cc/N4P3-EG8A].

246. H.R. 8111, 117th Cong. (2022).

247. *Id.* § 2(a).

248. *Id.* § 3(b).

249. One of us (Professor Citron) worked with legislative staff to adopt a broader definition of the information covered by the bill because, post-*Dobbs*, such information—such as internet searches, reading, browsing, and communications with close friends—can be exploited against individuals.

providing even more robust protections for reproductive and sexual health privacy.[250]

Senator Elizabeth Warren's Health and Location Data Protection Act,[251] co-sponsored by four of her Senate colleagues, would ban the data broker industry from selling or transferring location or health data.[252] The bill would empower the FTC to promulgate rules to implement the law.[253] It would be enforced by the FTC, state attorneys general, and private individuals.[254] It would help ensure that state law enforcement could not do an end-run around the Fourth Amendment by purchasing data from data brokers to support investigations.[255]

These bills are at the ready. Now, lawmakers can point to our study to argue that reproductive health privacy matters because it is a precondition to expressive freedom and use of apps that improve people's understanding of their bodies. When the political environment on Capitol Hill is more amenable to lawmaking, our study will support the efforts of lawmakers in attesting to the chilling effects of the collecting, using, storing, and sharing of reproductive health data. Then too, our findings reinforce the work of state lawmakers working on laws that protect reproductive health privacy.[256]

CONCLUSION AND LIMITATIONS

The compelling evidence of chilling effects documented in this study has important implications for law, public policy, and social science. They add to a growing body of interdisciplinary chilling effects theory and research that documents this behavioral phenomenon in a variety of contexts.

Our findings oblige us to reject skepticism and trivialization of the impact and chill of privacy threats such as government and corporate surveillance and personal threats of harassment, stalking, and abuse. They highlight the impact of intimate privacy violations and their tendency to encourage profound chilling effects leading to self-censorship and silence. They demonstrate the need for intimate privacy protections and

250. H.R. 8111, 117th Cong. §§ 7, 8 (2022).

251. S. 4408, 117th Cong. (2022).

252. Press Release, Warren, *supra* note 3.

253. *Id.*

254. *Id.*

255. *Id.*

256. *See, e.g.*, FUTURE OF PRIVACY F., COMPARISON OF WASHINGTON & NEVADA CONSUMER HEALTH PRIVACY FRAMEWORKS, https://fpf.org/wp-content/uploads/2023/06/NV_WA-Comparison-Chart-FINAL.pdf [https://perma.cc/68RR-F37T].

other law reforms—efforts our findings support, along with litigation seeking to vindicate rights to free expression.

The study also has important methodological insights. Our study's methodology, which employed an ITS design combined with a segmented regression analysis and comparator groups, has provided a powerful research design and mode of analysis for researchers to explore chilling effects in other contexts and related regulatory impacts online.

This study has important limitations. First, the period of the study extends only until February 2023. This means that the persistence of any chilling effects beyond that month is unclear. Our findings here suggest a long-term chilling effect, though it is not possible to say whether the impact is permanent beyond that month. More research, extending our period, would provide insights on this count. Second, a true experimental design, one with a true control group—randomly drawn from the identical subject pool or population—was not possible. With post-*Dobbs* surveillance so vast and indiscriminate, and coverage of the decision similarly widespread, it is impossible to locate a "control group" of women *not* impacted by the decision. Still, we located very closely related comparator groups, which helped demonstrate chilling effects in our findings. Having no access to private sector data, we used data from publicly available sources via Wikipedia and Google Search. This has the benefits of transparency, but additional insights would be possible if other data sources from private sector companies were available.

Furthermore, this public data had important limits too. For instance, we cannot say for certain that users who avoided searching for or reading about period tracking apps were not accessing information through other means—such as offline. Confounding factors and alternative explanations are difficult to perfectly control for in an observational study such as this, which involves data derived from the field—that is, actual concrete contexts. Another limitation of the current study is our focus on period tracking apps—this cannot provide a full illustration of any *Dobbs* chilling effect. Additionally, some have made the point that while the chill of *Dobbs* is real, those chilling effects are likely more profound and substantial in other contexts—where criminalization and prosecution is more

common, especially for people of color and other marginalized communities.[257]

Lastly, the nature of the Google Search data and Wikipedia data also limited insights from our design. We used English Wikipedia articles and Google Trends data to construct the time series data sets, but the former did not allow us to distinguish the geographic origins of the view counts tabulated. At the same time, Google Trends data is normalized and not raw, so discerning the scale of the chill in concrete terms is more difficult. Research using other data, such as usage data for a wider array of femtech beyond simply period tracking apps, could help overcome these problems.

Despite a growing body of related research, lawyers, privacy theorists, and social scientists remain skeptical about chilling effects and are often dismissive of their importance or impact. Intimate privacy, despite being a foundational privacy interest, remains empirically underexplored. Although this work has sought to fill that void, new research is certainly required, not only on the complex and dangerous new threats in the post-*Dobbs* world but also more generally. Further quantitative research should continue to document and measure chilling effects at scale. Additionally, qualitative and ethnographic work is needed to understand the impact of legal and privacy threats to reproductive freedoms and intimate data at a more granular level.

257. *See* Fed. Trade Comm'n v. Kochava, Inc., 671 F. Supp. 3d 1161, 1175 (D. Idaho 2023) (describing the impact of acts causing small harms to large numbers of people).