

AN EMPIRICAL EXAMINATION OF SOCIETAL EXPECTATIONS OF PRIVACY IN THE DIGITAL AGE OF GPS, CELL PHONE TOWERS, & DRONES

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I. INTRODUCTION

The Fourth Amendment provides, in relevant part, that “[t]he right of the people to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures, shall not be violated.”* A search occurs, within the meaning of the Fourth Amendment, if the government intrudes on the property¹ or violates the “reasonable expectation of privacy”² of an

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*** U.S. CONST. amend. IV.

¹ United States v. Jones, 132 S. Ct. 945, 945 (2012).

² See *Katz v. United States*, 389 U.S. 347, 360 (1967) (holding that one who

individual. The reasonable expectation of privacy analysis, crafted from Justice Harlan's concurring opinion in *Katz v. United States*³ in 1967, is the viable lens courts utilize to evaluate searches and seizures by digital or technological invasions without physical trespass.⁴

In deciding *Katz*, the United States Supreme Court expanded the right of privacy beyond mere trespass.⁵ The Fourth Amendment, the Court reasoned, "protects people, not places."⁶ The Court adopted Justice Harlan's two-part test for determining when individuals had an expectation of privacy, and did not: first, individuals asserting a privacy protection must "have exhibited an actual (subjective) expectation of privacy," and second, that subjective expectation of privacy must "be one that society is prepared to recognize as 'reasonable.'"⁷

In this era of advancing technology, the courts are utilizing this test to assess Fourth Amendment claims.⁸ This privacy test, however, suffers from several significant deficiencies, including that the Court has never attempted, in any systematic way, to

entered a telephone booth, shut the door, and paid the toll had a reasonable expectation of privacy); *See, e.g.*, *Bond v. United States*, 529 U.S. 334, 338-339 (2000) (holding that law enforcement's physical manipulation of a defendant's carry-on bag on a bus violated the Fourth Amendment); *California v. Ciraolo*, 476 U.S. 207, 214 (1986) (holding warrantless aerial observation of fenced-in backyard within the curtilage of a home was not unreasonable under the Fourth Amendment); *Smith v. Maryland*, 442 U.S. 735, 745-46 (1979) (holding that the installation and use of a pen register by a telephone company did not constitute a "search" within the meaning of the Fourth Amendment).

³ *See Katz v. United States*, 389 U.S. 347, 360-61 (1967) (Harlan, J., concurring).

⁴ *See cf. United States v. Jones*, 132 S. Ct. 945, 954-64 (2012) (Sotomayor, J., and Alito, J. concurring) (opining that physical presence is not required for intrusion).

⁵ *See United States v. Jones*, 132 S. Ct. 945, 950 (2012) (citing *Katz v. United States*, 389 U.S. 347, 351 (1967)). Prior to *Katz*, Fourth Amendment jurisprudence was limited to common-law trespass. *Id.* at 949. Later cases, starting with *Katz*, "have deviated from that exclusively property-based approach" and "have applied the analysis of Justice Harlan's concurrence in [*Katz*], which said that a violation occurs when government officers violate a person's 'reasonable expectation of privacy.'" *Id.* at 950.

⁶ *Katz v. United States*, 389 U.S. 347, 351 (1967).

⁷ *Id.* at 361 (Harlan, J., concurring).

⁸ *See generally*, Orin S. Kerr, *The Fourth Amendment and New Technologies: Constitutional Myths and the Case for Caution*, 102 Mich. L. Rev. 801, 805 (2004) (stating that "[a]s a result [of *Katz*], the courts must update and redefine the Fourth Amendment as technology evolves, creating and recreating reasonable rules that effectively regulate law enforcement and protect privacy in new technologies.").

gauge, “how ‘society’ might objectively view privacy rights in a particular search and seizure context.”⁹ Instead the Court has unilaterally decided societal views on privacy.¹⁰ This type of decision-making is often criticized, raising questions about the legitimacy of the Court because, “its legitimacy rests on notions of honesty and fairness and, most importantly, on popular perceptions of the judicial decision-making process.”¹¹ Until recently, the Court has not had the empirical information necessary to objectively identify societal expectations of privacy.¹² Without published empirical studies, the Court has been left to its own assessments of those privacy values.¹³ Empirical research could “inform the judiciary about how ‘society’ conceptualizes privacy[.]” which should “increas[e] public perceptions of the legitimacy of judicial decision-making.”¹⁴

Only three studies have investigated reasonable expectations of privacy from an empirical perspective.¹⁵ These studies evaluated the correlation between survey respondents’ views on privacy and the United States Supreme Court decisions on privacy, and the respondents were predominantly from a university setting (i.e., law students, undergraduates and faculty).¹⁶ In other words, the three previous studies examined

⁹ Henry F. Fradella, et al., *Quantifying Katz: Empirically Measuring “Reasonable Expectations of Privacy” in the Fourth Amendment Context*, 38 AM. J. CRIM. L. 289, 293 (2011) [hereinafter Fradella].

¹⁰ *Id.* at 293.

¹¹ *Id.*

¹² *Id.*

¹³ See Fradella, *supra* note 10, at 293; see also Jeremy A. Blumenthal, et. al., *The Multiple Dimensions of Privacy: Testing Lay “Expectations of Privacy,”* 11 U. PA. J. CONST. L. 331, 332 (2009) (explaining the need for empirical research for purposes of determining societal privacy expectations); Marc McAllister, *The Fourth Amendment and New Technologies: The Misapplication of Analogical Reasoning*, 36 S. ILL. U. L. J. 475, 522 (2012) (“rulings associated with more traditional forms of surveillance do not always comport with society’s actual expectations of privacy and often fail to account for relevant differences between the analogized cases.”); Stephen E. Henderson, *Beyond the (Current) Fourth Amendment: Protecting Third-Party Information, Third Parties, and the Rest of Us Too*, 34 PEPP. L. REV. 975, 1000 (2007) (“the Court . . . declare[s] societal expectations without any foundation or support.”); Christopher Slobogin & Joseph E. Schumacher, *Reasonable Expectations of Privacy and Autonomy in Fourth Amendment Cases: An Empirical Look at “Understandings Recognized and Permitted by Society,”* 42 DUKE L.J. 727 (1993) (an empirical investigation regarding Fourth Amendment issues such as expectations of privacy).

¹⁴ Fradella, *supra* note 10, at 293.

¹⁵ Fradella, *supra* note 10, at 346; Slobogin & Schumacher, *supra* note 14, at 728; McAllister, *supra* note 14, at 482.

¹⁶ See Slobogin & Schumacher, *supra* note 14, at 737; McAllister, *supra* note

already-decided scenarios, and interestingly the studies found that respondents' views of privacy in some instances aligned with Supreme Court decisions (most often when privacy was protected), but in others did not align (most often when privacy was denied).¹⁷

This study replicated and expanded on the research by Fradella and his colleagues, by examining perceptions about new, technologically-advanced privacy scenarios (tracking by global positioning system devices, searching the content of cell phones, using “fake” cell phone towers to track and monitor citizens, and implementing drones to engage in general reconnaissance of citizens) — with two¹⁸ having yet-to-be-decided by the Supreme Court. Furthermore, while obtaining a larger, more diverse and nationally representative respondent sample this study also measures the influence of respondent perceptions of and interactions with law enforcement officers.¹⁹ Like that of Fradella and his colleagues, this research is intended to aid the Supreme Court, and the judiciary as a whole, in their fact-finding²⁰ on societal expectations of privacy, and “improve their ‘best guesses’ in the interpretive calculus that often comprises the process of constitutional interpretation.”²¹

Like Fradella et al., we found much agreement between respondent perceptions and the Court's determinations about

14, at 528.

¹⁷ See Fradella, *supra* note 10, at 737 (describing one of the scenarios presented in the study).

¹⁸ See discussion *infra* Part II (the Court has not decided cases concerning government-created cell towers or reconnaissance drones); Tim Sheehan, Note, *Taking the Third-Party Doctrine Too Far: Why Cell Phone Tracking Data Deserves Fourth Amendment Protection*, 13 GEO. J.L. & PUB. POL'Y 181, 197 (2015); see Taly Matiteyahu, *Drone Regulations and Fourth Amendment Rights: The Interaction of State Drone Statutes and the Reasonable Expectation of Privacy*, 48 COLUM. J.L. & SOC. PROBS. 265, 292–293 (2015) (discussing possible approaches the Supreme Court could take to address drone reconnaissance fourth amendment issues).

¹⁹ See *infra* Part III, Table Two & Table Four. See generally Alisa M. Smith et al., *Testing Judicial Assumptions of the “Consensual” Encounter: An Experimental Study*, 14 FLA. COASTAL L. REV. 285, 290 (2013) (a study of individuals' views of encounters with security officers).

²⁰ See generally Allison Orr Larsen, *Confronting Supreme Court Fact Finding*, 98 VA. L. REV. 1255 (2012) (discussing the prevalence of in-house fact-finding at the U.S. Supreme Court and the extent to which the Justices use these findings).

²¹ Fradella, *supra* note 10, at 294 (quoting David L. Faigman, “Normative Constitutional Fact-Finding”: *Exploring the Empirical Component of Constitutional Interpretation*, 139 U. PA. L. REV. 541, 546 (1991)).

societal expectations of privacy.²² The vast majority of respondents agreed with the Court's decisions that warrants were necessary before attaching a GPS device to monitor the movements of a car and searching the content of a cell phone incident to a suspect's arrest.²³ Respondents also thought that police should obtain a warrant before tracking the location data emitted from a car or cell phone via GPS technology or cell phone towers (real or fake).²⁴ Findings on drone use and the ability to access information from a cell phone if the phone could be disabled by removing the battery, were mixed.²⁵ Even though most respondents agreed there remained an expectation of privacy from information gathered using cell phones (under the removal of the battery circumstances) and drone devices, more individuals disagreed with the perception of an expectation of privacy.²⁶

Similar to the findings of Fradella et al., there were some significant factors that influenced perceptions about privacy, but the factors themselves did not explain many differences in respondent perceptions about privacy.²⁷ Some of the demographic characteristics (e.g., gender, race, ethnicity) and situational factors (college education, religion, and household income) were significantly related to some privacy perceptions, but most provided a modest-to-weak understanding of overall perceptions.²⁸ Individuals may simply be more likely to agree (regardless of demographics and attitudes) on digital or technological privacy interests. At least in this area, our research findings do not support the idea that "societal" perceptions vary on the common demographic or attitudinal traits.

This article is organized into four parts. First, we briefly review a history of Fourth Amendment privacy law. Part II will describe the three previous studies that empirically examined perceptions about expectations of privacy. Part III examines the methodology and findings of the current study. Part IV will discuss the future relevance and suggested use of the findings by

²² See Fradella, *supra* note 10, at 362–367 (discussing respondent agreement with precedent).

²³ See *infra* Part III, Table 3.

²⁴ See *infra* Part III, Table 3.

²⁵ See *infra* Part III, Table 3.8

²⁶ See *infra* Part III, Table 3.

²⁷ See *infra* Part III, Table 4; Fradella, *supra* note 10, at 359–362 (discussing factors with the strongest impact on expectations of privacy).

²⁸ See *infra* Part III, Table Four.

the courts and empirical research on societal perceptions.

I. A BRIEF HISTORY OF FOURTH AMENDMENT
PRIVACY LAW²⁹

The Fourth Amendment provides that:

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.³⁰

Before *Katz*, Fourth Amendment law was rooted in common law notions of physical trespass which acted as the catalyst for the birth of the Fourth Amendment.³¹

In *Boyd v. United States* (1886),³² the United States Supreme Court held a statute that compelled the production of papers (to be used against a defendant at trial) violated the Fourth Amendment,³³ harkening back to the roots of the Fourth Amendment:

In order to ascertain the nature of the proceedings intended by the Fourth Amendment to the Constitution under the terms “unreasonable searches and seizures,” it is only necessary to recall the contemporary or then recent history of the controversies on the subject, both in this country and in England. The practice had obtained in the colonies of issuing writs of assistance to the revenue officers, empowering them, in their discretion, to search suspected places for smuggled goods, which James Otis pronounced “the worst instrument of arbitrary power, the most destructive of English liberty, and the fundamental principles of law, that ever was found in an English law book;” since they placed “the liberty of

²⁹ See Fradella, *supra* note 10, at 294–338 (providing a thorough and multidisciplinary discussion of the foundations of privacy).

³⁰ U.S. CONST. amend. IV, pt. 1.

³¹ Orin S. Kerr, *The Curious History of Fourth Amendment Searches*, 2013 SUP. CT. REV. 67, 68 (2013).

³² *Boyd v. United States*, 116 U.S. 616 (1886).

³³ See *id.* at 622. Justice Miller concurred with the holding; for Justice Miller, it was the failure to produce the papers, which under the statute was considered a confession, that was problematic because the machinery used to get the evidence resulted in a confession that violated the Fifth Amendment. *Id.* at .639.

every man in the hands of every petty officer.” This was in February, 1761, in Boston, and the famous debate in which it occurred was perhaps the most prominent event which inaugurated the resistance of the colonies to the oppressions of the mother country. “Then and there,” said John Adams, “then and there was the first scene of the first act of opposition to the arbitrary claims of Great Britain. Then and there the child Independence was born.”³⁴

The seizing of property was a trespass, even “though the eye cannot by the laws of England be guilty of a trespass” because the removing and taking of private papers must be justified, and without authority such a practice “would be subversive of all the comforts of society.”³⁵ Under this reasoning the *Boyd* Court³⁶ struck down a law that authorized the production of papers without a warrant under the trespass theory.³⁷

It became well settled that the federal government could not enter property (a home or business) without a warrant to conduct a search and seize evidence, or the illegally seized evidence was subject to exclusion.³⁸ The seizing of property without a warrant was likewise deemed unconstitutional in *Ex parte Jackson*,³⁹ holding the Fourth Amendment applied to sealed letters and packages in the mail, and those items could only be opened and examined with a warrant.⁴⁰

By 1928, technology advanced, and, in *Olmstead v. United States*,⁴¹ the Court had to determine “whether the use of evidence of private telephone conversations between the defendants and others, intercepted by means of wire-tapping, amounted to a

³⁴ *Id.* at 624–25 (note by the Court omitted).

³⁵ *Id.* at 628.

³⁶ At this time, the recourse available to defendants was to sue for damages. *See id.* at 626. (citing *Entick v. Carrington* (1765) 19 Howell’s State Trials 1029).

³⁷ *Boyd*, 116 U.S. at 638.

³⁸ *Weeks v. United States*, 232 U.S. 383 (1913) (holding that the police could not obtain a key to Weeks’ home, enter and seize documents without a warrant); *see Silverthorne Lumber Co. v. United States*, 251 U.S. 385 (1919) (holding the search of the defendant’s company, without a warrant, and the seizing of books, papers and documents violated the Fourth Amendment, and a post-search and seizure subpoena did not redeem the original, illegal character of the search or seizures).

³⁹ *Ex Parte Jackson*, 96 U.S. 727 (1877).

⁴⁰ *Id.* at 733.

⁴¹ *Olmstead v. United States*, 277 U.S. 438 (1928), *overruled by Katz v. United States*, 389 U.S. 347.

violation of the Fourth . . . Amendment[].”⁴² The *Olmstead* Court was unwilling to extend the protection afforded a letter carried in the mail in *Ex Parte Jackson*⁴³ to communication by telegraph or telephone because there was no physical search or seizure by the government: “[t]he evidence was secured by the use of the sense of hearing and that only. There was no entry of the houses of offices of the defendants.”⁴⁴ The Court distinguished between the government’s role in caring for letters carried by the postal service (a government function) and communicating by telephone (not a function of the government).⁴⁵ Relying on the meaning of the Fourth Amendment at the time it was adopted, the *Olmstead* Court concluded the constitutional protection could not expand beyond the home and office:

By the invention of the telephone 50 years ago, and its application for the purpose of extending communications, one can talk with another at a far distant place. The language of the amendment cannot be extended and expanded to include telephone wires, reaching to the whole world from the defendant’s house or office. The intervening wires are not part of his house or office, any more than are the highways along which they are stretched.⁴⁶

Justice Brandeis, dissenting from *Olmstead*, perceived the Fourth Amendment more broadly, construing it to protect against the exercise of government power “over objects which the Fathers could not have dreamed.”⁴⁷

Analogizing to the due process clause, Justice Brandeis reasoned the Constitution should not be constrained to evaluate “modern conditions” with regulation dating to “a century ago, or even half a century ago.”⁴⁸ The Fourth Amendment should keep pace with the “[s]ubtler and more far-reaching means of invading privacy [as they] become available to the government.”⁴⁹

⁴² *Id.* at 455.

⁴³ *Ex Parte Jackson*, 96 U.S. 727, 733 (1877).

⁴⁴ *Olmstead*, 277 U.S. at 465. *Olmstead* had been convicted of illegally importing and selling “intoxicating liquors.” *Id.* at 455.

⁴⁵ *Id.* at 464.

⁴⁶ *Id.* at 465.

⁴⁷ *Id.* at 472 (Brandeis, J., dissenting).

⁴⁸ *Id.* (Brandeis, J., dissenting) (quoting *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365 (1926); *Buck v. Bell*, 274 U.S. 200 (1927)).

⁴⁹ *Id.* at 473 (Brandeis, J., dissenting).

The property-rights approach, reinforced by *Olmstead*,⁵⁰ was the prevailing view until *Katz v. United States*,⁵¹ in 1967. In *Katz*, the Supreme Court expanded and augmented the Fourth Amendment beyond property, holding that “the Fourth Amendment protects people, not places,” and searches and privacy interests do not “turn upon the presence or absence of a physical intrusion,” but extend the Fourth Amendment to protection “not only [to] the seizure of tangible items, but [] the recording of oral statements” as well.⁵² It was the recording of Katz’s words within the telephone booth by the government without a warrant that invaded his privacy interest and amounted to a search by the government.⁵³

Justice Harlan’s, concurring opinion, in *Katz*, framed the privacy analysis by adopting two discrete questions used to assess whether an individual has a legitimate interest that protects against governmental intrusion or search: first, has the individual by conduct “exhibited an actual (subjective) expectation of privacy,” and, second, is this a privacy interest “that society is prepared to recognize as ‘reasonable.’”⁵⁴ The Court uniformly (until *Jones*) applied the *Katz* test to determine whether the government’s use of advancing technologies was a search, or not.⁵⁵ The use of a pen register to record the numbers dialed on a telephone did not violate a privacy interest because, as the Court determined, it was not reasonable to presume an expectation of privacy in information that is voluntarily conveyed to third parties, and certainly not a privacy interest that society was willing to deem as legitimate.⁵⁶ Similarly, the Court in *Knotts*⁵⁷ determined that individuals did not have a legitimate privacy interest while traveling on public roadways, or in a tracking beeper placed in a purchased container of ether, which emitted a signal that the police followed on the roadways.⁵⁸ With respect to tracker beepers, it wasn’t until the police used one to monitor movements within the home that the Supreme Court

⁵⁰ *Olmstead v. United States*, 277 U.S. 438 (1928).

⁵¹ *Katz v. United States*, 389 U.S. 347 (1967).

⁵² *Id.* at 351, 353.

⁵³ *Id.* at 353.

⁵⁴ *Id.* at 361 (Harlan, J., concurring).

⁵⁵ *See generally, e.g., Rakas v. Illinois*, 439 U.S. 128, 143 (1978) (discussing the propositions set forth in *Jones* and the Court’s use of *Katz* as guidance).

⁵⁶ *See Smith v. Maryland*, 442 U.S. 735, 743 (1979).

⁵⁷ *United States v. Knotts*, 460 U.S. 276 (1983).

⁵⁸ *Id.* at 285.

held that an individual had a legitimate expectation of privacy, and before the government can intrude in that manner, it must obtain a warrant.⁵⁹

Individuals, however, do not have an expectation of privacy, even in their homes, if they expose private information to the public.⁶⁰ For example, the government did not intrude on a reasonable expectation of privacy when it used an airplane to observe the growing of marijuana in a backyard.⁶¹ Even though a privacy fence sufficiently demonstrated a subjective expectation of privacy, the Court reasoned society is unwilling to recognize this type of “naked-eye” surveillance as legitimate because the yard was exposed for viewing.⁶² The use of a thermal-imaging device, however, that monitored heat signatures within a home and revealed intimate details of the homeowners’ activities, invaded legitimate privacy interests, required a warrant, and without one, violated the Fourth Amendment.⁶³

More recently, the Court has confronted privacy questions about the government placing a GPS tracking device on a car.⁶⁴ In *Jones*, the Court revitalized the trespass theory, holding the government violated Jones’s legitimate expectation of privacy by *physically* intruding on a constitutionally-protected area — his car — to install the GPS device without a warrant.⁶⁵

Even though the majority did not analyze the question from a *Katz*-privacy perspective, Justices Sotomayor and Alito in separately concurring opinions⁶⁶ observed that technological advances “made possible nontrespassory surveillance” which will implicate the *Katz* test and force the Court to “shap[e] the evolution of societal privacy expectations.”⁶⁷ Justice Sotomayor poignantly and presciently wondered “whether people reasonably expect that their movements will be recorded and aggregated in a manner that enables the Government to ascertain, more or less

⁵⁹ See *United States v. Karo*, 468 U.S. 705, 714 (1984) (“This case thus presents the question whether the monitoring of a beeper in a private residence, a location not open to visual surveillance, violates the *Fourth Amendment* rights of those who have a justifiable interest in the privacy of the residence. [W]e think that it does.”).

⁶⁰ *Katz v. United States*, *supra* note 4, at 351.

⁶¹ *California v. Ciraolo*, 476 U.S. 207, 215 (1986).

⁶² *Id.* at 210–11, 215.

⁶³ *Kyllo v. United States*, 533 U.S. 27, 40 (2001).

⁶⁴ *United States v. Jones*, 132 S.Ct. 945, 948 (2012).

⁶⁵ *Id.* at 949.

⁶⁶ *Id.* at 955 (Sotomayer, J., concurring).

⁶⁷ *Id.*

at will, their political and religious beliefs, sexual habits, and so on.”⁶⁸

Although not an “expectation of privacy” case, the Court noted similar concerns in holding that searching a cell phone as incident to a lawful arrest was not reasonable without a warrant.⁶⁹ In discussing the digital data available on cell phones and the reasonableness of the search, the Court rejected the government’s argument that searching data stored on a cell phone was the equivalent of searching other physical items because “[m]odern cell phones, as a category, implicate privacy concerns far beyond those implicated by the search of a cigarette pack, a wallet, or a purse.”⁷⁰ The Court described the differences in quantitative and qualitative terms, noting that cell phones are essentially minicomputers with a large capacity to store information that reveal the “sum of an individual’s private life.”⁷¹

New surveillance technologies need not physically intrude on property to track movements or access information, and the Supreme Court will continue to confront difficult questions about whether individuals have legitimate expectations of privacy in their digital lives. Determining what society is willing to accept as reasonable privacy interests is an empirical question with an empirical answer. Three prior research studies, discussed in the next section, provide some data that inform societal perceptions about expectations of privacy.

II. EMPIRICAL RESEARCH ON EXPECTATIONS OF PRIVACY

Only three prior studies have empirically examined reasonable expectations of privacy within the *Katz* framework.⁷² The first, in 1993, by Professors Christopher Slobogin and Joseph Schumacher, employed an intrusiveness ranking system, asking 217 people to rank various governmental activities from least to most intrusive.⁷³ The second conducted by Fradella et al. published in 2011, created a reasonable expectation of privacy survey, and asked 589 individuals whether they agreed or

⁶⁸ *Id.* at 956.

⁶⁹ *Riley v. California*, 134 S. Ct. 2473, 2493 (2014).

⁷⁰ *Id.* at 2488–89.

⁷¹ *Id.* at 2489.

⁷² *Katz v. United States*, 389 U.S. 347 (1967); Slobogin & Schumacher, *supra* note 14; Fradella, *supra* note 10; McAllister, *supra* note 14.

⁷³ Slobogin & Schumacher, *supra* note 14, at 732, 738.

disagreed with Supreme Court determinations on objective privacy interests.⁷⁴ Third, in 2012, McAllister tested as a hypothesis, Justice Sotomayor's observation in her concurring decision in *Jones*, that she doubted that today's society would accept the warrantless disclosures of electronic information as reasonable, by administering a survey to over 200 individuals to evaluate their views on the privacy implicated in GPS tracking and information voluntarily conveyed to third parties.⁷⁵ The current study replicates and expands on the Fradella et al. and McAllister studies, but focuses exclusively on digital intrusions.

The Slobogin and Schumacher (1993) respondents were asked to rank order intrusiveness for varying scenarios from a first- and third-person perspective, and the study concluded that the Court's "conclusions about the scope of the Fourth Amendment are often not in tune with commonly held attitudes about police investigative techniques."⁷⁶ This study suffered from several significant weaknesses (fleshed out in greater depth by Fradella and his colleagues), including that respondents were drawn from predominately law student samples, limiting its generalizability, and perhaps more importantly, required respondents to rank abstract privacy interests, rather than determining whether individuals perceived that they had a privacy interest under particular and specific circumstances.⁷⁷ These relative and ranked findings do not provide sufficient information for determining whether society is willing to accept particular privacy interests as objectively reasonable. In other words, the study failed to provide the Court with usable information.

Fradella et al. improved upon the Slobogin and Schumacher study by more directly investigating "whether societal views on whether a subjective expectation of privacy was objectively reasonable aligned with judicial determinations concerning reasonable expectations of privacy as expressed in the holdings of leading Fourth Amendment cases."⁷⁸ Specifically, Fradella et al. made improvements by:

using a larger, more diverse sample drawn from more geographic areas; by controlling for knowledge of constitutional criminal

⁷⁴ Fradella, *supra* note 10, at 342, 346.

⁷⁵ McAllister, *supra* note 14, at 481–82.

⁷⁶ Slobogin & Schumacher, *supra* note 14, at 735–36, 774.

⁷⁷ Fradella, *supra* note 10, at 340–41.

⁷⁸ *Id.* at 362.

procedure; by omitting instructions that attempt to define privacy; by providing all respondents with more complete fact patterns to allow them to contextualize the police actions at issue in governing Fourth Amendment precedent; and by using Likert scales that measure levels of agreement or disagreement with case holdings so that the data provide an empirical understanding into when particular actions by law enforcement intrude upon reasonable expectations of privacy.⁷⁹

Fradella et al. created a “Reasonable Expectations of Privacy Survey” consisting of thirteen demographic and attitudinal questions about fact patterns that mimicked leading Fourth Amendment cases.⁸⁰ They collected survey responses from 589 individuals by distributing the survey to students and faculty at eleven colleges and universities in the United States, and obtaining additional participants through Facebook and soliciting friends to develop a snowball sample.⁸¹

The independent variables measured sex, ethnicity, age, relationship status, political party affiliation, political views, religion, religiosity, religious attendance, income, level of education, major, and whether the participant had ever taken a constitutional criminal procedure course.⁸² Fradella and his colleagues measured, as dependent variables, participants’ agreement with the holdings of leading Fourth Amendment cases by the Supreme Court.⁸³ Using a five-point Likert scale (one – strongly disagree, two – disagree, three – neither agree nor disagree, four – agree, and five – strongly agree), participants were asked to report their level of agreement on each of the Court’s decisions on varying privacy scenarios, divided into four categories of privacy: (1) bodily privacy,⁸⁴ (2) territorial privacy,⁸⁵

⁷⁹ *Id.* at 342.

⁸⁰ *Id.* at 343.

⁸¹ *Id.* at 346.

⁸² *Id.*

⁸³ Fradella, *supra* note 10, at 347.

⁸⁴ *Id.* at 344. The bodily privacy scale examined respondent’s agreement with privacy interests in random drug testing by public transportation employees, searching high school students’ lockers and personal effects, randomly drug testing high school athletes and other high school students, searching incident to arrests, and arresting someone for minor traffic violations.

⁸⁵ *Id.* at 344–45. The territorial privacy scale examined respondents agreeing with privacy interests in searching cars, passengers, or personal belongings in cars, using plain view or plain smell to enter and search a home, searching a car incident to arrest, conducting protective sweeps of homes, searching the curtilage of the home surrounded by fencing, no trespassing signs, and

(3) information privacy,⁸⁶ and (4) communication privacy.⁸⁷

Respondents reported high level agreements with Supreme Court decisions favoring privacy, particularly regarding the home, car and property, and likewise agreed less with decisions that permitted vehicle searches (e.g., the automobile exception) or tracking movements with a beeper (e.g., *United States v. Knotts*).⁸⁸ Fradella et al. found that seven of thirteen independent variables were found to be significantly associated with at least one of the privacy scales: age, political affiliation, religion, religious attendance, education, college major, and prior exposure to a constitutional criminal procedure course.⁸⁹ “Sex, race, marriage/relationship status, political view, religiosity, and income were not significantly associated with any of the privacy scales.”⁹⁰ The strongest impact was from political affiliation and educational level, but the models (again) explained little of the variance in perceptions about privacy ($R^2 = 4.0$ percent - 7.7 percent).⁹¹ Generally, Republicans had lower support for privacy than Democrats, significantly so in the area of territorial and communications privacy.⁹² “Education was an important factor across all four domains.”⁹³ Those with higher levels of education reported less support of body and territory privacy, but more support in the area of information and communication privacy than those with only a high school degree.⁹⁴ Agnostic/atheist individuals reported higher levels of support for the protection of bodily privacy than Catholics.⁹⁵ Finally, those with knowledge about criminal procedure were significantly less likely than those

outbuildings, searching open fields with low fencing or signage, conducting aerial searches of homes and commercial property from varying aircrafts at different heights, and using a thermal imaging device to search residences.

⁸⁶ *Id.* at 345. The informational privacy scale was measured by examining respondents agreeing with privacy interests in tracking cars movements using electronic tracking devices, searching garbage, obtaining bank records, and searching computer hard drives at international borders.

⁸⁷ *Id.* The communication privacy scale was measured by respondents agreeing to privacy interests in using images of teenagers sent via cell phones as evidence in child pornography prosecutions, and the wiretapping of landlines, phone booths, and cell phones.

⁸⁸ Fradella, *supra* note 10, at 366.

⁸⁹ *Id.* at 359.

⁹⁰ *Id.* at at 360.

⁹¹ *Id.* at 361, 368.

⁹² *Id.* at 361.

⁹³ Fradella, *supra* note 10, at 361.

⁹⁴ *Id.* at 369.

⁹⁵ *Id.* at 362.

never taking a course to support informational privacy.⁹⁶

The third study, by McAllister, collected survey responses, similar to that of Slobogin and Schumacher, but more directly asked respondents “whether they believe police should have to obtain a search warrant [issued by a judge] before undertaking each type of activity identified by the survey instrument.”⁹⁷ So, rather than incorporating a one hundred-point scale, McAllister asked respondents to answer the questions yes or no.⁹⁸ Specifically, McAllister asked respondents if police should obtain a search warrant to attach a GPS tracking device to the car of a suspected drug dealer and monitor the car’s movements by asking questions about seven types of suspects, including, a person who has not been convicted of a previous crime and who is currently not suspected of committing any crime; a person who has not been convicted of a previous crime but who is currently suspected of having committed an unspecified crime; a person who is a convicted felon, but who is not currently suspected of committing another crime; a person who is a convicted felon, and who is currently suspected of committing another, unspecified crime; a suspected terrorist; a suspected drug dealer; and a suspected serial killer.⁹⁹

Reporting the percentage of respondents who answered “yes,” McAllister found the individuals that he surveyed supported “warrantless GPS tracking for a longer period of time when investigating the most serious offenses.”¹⁰⁰ Survey respondents also reported that police should have to obtain a warrant before attaching a GPS device to track the movements of an innocent as well as a suspect.¹⁰¹

Overall, Slobogin, Fradella et al., and McAllister lend some support to the importance of objectively examining societal perceptions, and Fradella and his colleagues, using the most sophisticated instrument, showed that respondents expressed significant levels of agreement with precedent protecting privacy

⁹⁶ *Id.* at 370.

⁹⁷ McAllister, *supra* note 14, at 237.

⁹⁸ *Id.* at 509. See Marc McAllister, *GPS and Cell Phone Tracking: A Constitutional and Empirical Analysis*, 82 U. CIN. L. REV. 207, 237 (2014) [hereinafter *GPS and Cell Phone Tracking*] (McAllister discusses his survey format).

⁹⁹ McAllister, *supra* note 14, at 509, n.241; *GPS and Cell Phone Tracking*, *supra* note 99, at 238 (McAllister discusses his survey results).

¹⁰⁰ *GPS and Cell Phone Tracking*, *supra* note 99, at 256.

¹⁰¹ McAllister, *supra* note 14, at 515–16.

rights,¹⁰² but expressed significant levels of disagreement with data, they concluded “reinforce[d]” those of Slobogin and Schumacher “that judges often fail to appreciate the degree to which ‘society’ believes privacy should be protected from law enforcement intrusions.”¹⁰³ Since empirical research on societal values is essential to Supreme Court fact-finding on objective societal views about privacy, the following research is intended to add to and build on Fradella et al.’s research to foster judicial decisions that “reflect realistic societal attitudes rather than their own”¹⁰⁴ on questions related to global positioning devices, the content of cell phone searches,¹⁰⁵ the use of “fake” cell phone towers to track and monitor citizens, and the use of drones to engage in general reconnaissance of citizens.

III. EXPECTATIONS OF PRIVACY IN THE DIGITAL AGE: METHODS & FINDINGS

This research replicates and extends the Fradella et al. study by using a larger, more diverse sample to evaluate privacy interests regarding the use of two technologies not yet decided by the Supreme Court of the United States—cell phone towers and drones—as well as societal views on the use of GPS tracking, expectations of privacy in cell phone data, and using cell phone

¹⁰² Fradella, *supra* note 10, at 362–63 (as examples, Fradella et al. identify the significant agreement with the Court’s decisions protecting against forced surgery for the purpose of retrieving evidence, using thermal imaging to invade the interior privacy of the home, prohibiting the strip search of a middle school student for drugs, and wiretapping of phones).

¹⁰³ *Id.* at 371–72, n.445 (identifying as examples random drug testing of student athletes, warrantless searches of computer hard-drives at international borders, arrests for minor traffic violations, warrantless searches of motor vehicles, allowing the search of an open field marked with “no trespassing” signs, low-altitude aerial searches of private residence yards, warrantless searches and seizures at private residences based on plain view or plain smells doctrines, warrantless access to bank records, and the warrantless tracking of beepers to monitor the travels of a car. Also, “[i]n fact, the only areas in which the research sample agreed with decisions limiting the applicability of Fourth Amendment privacy protections concerned abandoned property, special needs searches for health and safety reasons, and the applicability of the plain view doctrine to contraband during a protective sweep.”).

¹⁰⁴ *Id.* at 373 (quoting Slobogin & Schumacher, *supra*, note 14, at 774).

¹⁰⁵ See *Riley v. California*, 134 S.Ct. 2473, 2495 (2014) (the United States Supreme Court, at the time of the drafting of this survey, had just decided whether a warrant was necessary to search a cell phone, and so the respondents were asked about expectations of privacy related to the searching the content of cell phones without a warrant).

GPS technology in tracking individual movements. Respondent views will be examined to determine whether perceptions vary depending on demographic characteristics.

A. Methods

The survey created by Fradella and his colleagues was modified in the present study to capture similar demographic and attitudinal factors, but used new scenarios to capture respondent views on the use of technology by the police. The modified Fradella et al. survey¹⁰⁶ was uploaded to *www.surveymonkey.com*,¹⁰⁷ an online survey generation software, and the company collected over 1000 responses—discussed below—from a nationally representative sample. Respondents were given vignettes that depicted police use of technology to investigate criminal activity, then respondents were asked to select one of the following responses to questions about the privacy interest, if any, that was involved in the use of the technology: strongly agree, disagree, neither agree or disagree, agree, or strongly agree. The vignettes focused on police use of GPS tracking, cell phone tracking and searches, cell tower tracking, and drone surveillance to conduct investigations:

1. Without obtaining a search warrant, police attached a global positioning system (GPS) device to an individual's car. The GPS device enabled the officers to track and record the speed, time, direction, and geographic location of the car within five to ten feet for nearly a month. Police used the information they gathered to get a search warrant for two storage units that the individual frequently visited.

a. Individuals should enjoy an expectation of privacy in their cars, so police should obtain a warrant BEFORE they can place a GPS tracking device on their cars.

b. Individuals should enjoy an expectation of privacy in their movements while traveling in their cars, so police should obtain a warrant BEFORE tracking an individual for a month.

2. A detective was investigating a series of residential burglaries. The detective developed probable cause to arrest the

¹⁰⁶ See *Faculty Grants and Professional Development*, THE UNIVERSITY OF TAMPA, <https://www.ut.edu/ctl/development/> (last visited Jan. 24, 2015) (the survey was approved by the Faculty Development Committee and funded by the David Delo Research Professor Grant in spring 2015).

¹⁰⁷ SURVEYMONKEY, <https://www.surveymonkey.com> (last visited Jan. 24, 2015).

suspect. The police obtained an arrest warrant to search and arrest the suspect. Following this, the police contacted the suspect's cell phone provider and obtained (without an additional search warrant and outside the limits of the arrest warrant) the location of a cell phone that the police believed belonged to the suspect. The police got the location information three times in one night. Using the cell-phone-location information, the police found the suspect's car at a motel. They called the suspect and asked that the suspect step outside the hotel room. The suspect did and was arrested.

a. An individual has an expectation of privacy in the location data emitted from his or her cell phone.

b. The police must obtain a warrant, based on a showing of probable cause, from a judge to obtain tracking information through the use of a cell phone.

3. An individual was arrested for robbing a convenience store. The arresting officer seized his phone during a search incident to that arrest. The individual was placed in the back of a police car and secured. Without a warrant, the arresting officer searched for data on the phone and found incriminating pictures from the robbery on the phone.

a. Individuals have an expectation of privacy in the content (data) located on their cell phones.

b. Police must obtain a warrant before searching the content of or data from an individual's cell phone.

c. Even when an individual has been arrested, police must obtain a search warrant, requiring probable cause and review by a judge, before searching the content of an arrested individual's cell phone.

4. A state law enforcement agency purchased a device (a tower) that imitated a service provider's network tower. This device was used secretly to capture service and location data emitted from a suspect's cell phone. The police erected the cell-phone-tracking tower near the home of a suspected drug dealer. Without a warrant, the police intercepted and captured the signals sent from the drug dealer's (and others in the neighborhood) cell phone. Using that captured information, the police obtained a warrant to search the location of a storage facility that the suspected drug dealer frequented.

a. Even though individuals convey tracking information to service provider towers, individuals maintain an expectation of privacy in the location data that emanates from their cell phones.

b. Since individuals can remove the battery from their phones (and thereby disable them), they do not have an expectation of privacy in the data released from their cell phones and the government may use the cell towers to intercept phone signals.

c. Police should get a warrant before erecting and using a cell-phone tracking tower.

5. The local police department purchased drones (unmanned aerial vehicles, which in some instances are small enough to fit in a backpack) to conduct surveillance during high-profile events and to monitor the movements of suspected criminals. Without a warrant, the police collected information, including photographs, using drones equipped with cameras. The drones may be monitored in real time or the footage collected could be reviewed later by the police.

a. Individuals do not have an expectation of privacy in their public movements and the police may monitor movements using a drone in public areas (including schools, streets, and stores) without a warrant.

b. Individuals have an expectation of privacy in their private movements, and the police should obtain a warrant before monitoring movements of individuals in their backyards through use of a drone.

c. Individuals do not have an expectation of privacy at high-profile and public events (like sports games, political events, etc.) and the police can use drones to monitor those events without a warrant.

B. Participants

Survey Monkey targeted respondents who were over the age of eighteen and evenly divided on gender with national diversity on age and ethnicity. A total of 1008 people responded to the survey.¹⁰⁸ The respondents were a diverse group on demographics as well as political and religious affiliations, education, and income. A snapshot of the respondents is provided in Table 1.

¹⁰⁸ See *infra* Table One (Not every respondent answered every question, so the sample size for each question or analysis varies and is noted. Moreover, respondents who reported that they neither agreed or disagreed (neutral) on the privacy vignettes were not included in the regression analyses reported in Table Seven).

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TABLE 1. DEMOGRAPHICS

VARIABLE	CODING	PERCENT	MEDIAN	MEAN
Sex	Male	43.5		
	Female	54.6		
Race/Ethnicity	White	50.6		
	Black	25.0		
	Hispanic	21.2		
	Asian/Pacific	6.6		
	American Indian	1.8		
Age				
Marital Status	Married	51.0		
	Not Married	47.5		
	Missing	1.5		
Political Affiliation	Democrat	41.2		
	Republican	20.5		
	Independent	29.8		
	Other	5.7		
	Missing	2.8		
Political Leaning	Liberal (1) to Conservative (5)		3	
Religion	Protestant	8.4		
	Catholic	21.4		
	Christian	39.2		
	Jew	2.2		
	Islam	1.0		
	Buddhist	2.3		
	Hindu	1.2		
	Native American	0.6		
	Non-Denominational	3.5		
No Religion	20.3			
Religiosity	Not (1) to Extremely (5)		3	

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Household		\$25,000	to
Income		\$49,999	
Education	Less than High School	3.7	
	High School/GED	24.1	
	Some College	27.1	
	Associate Degree	12.4	
	Bachelor's Degree	23.6	
	Master's Degree	8.9	

N=1,098

Respondents were asked to identify their sex (male or female); ethnicity (American Indian or Alaskan Native, Asian or Pacific Islander, Black or African American, Hispanic or Latino, White or Caucasian, or Prefer not to Answer); age (in years); whether they were legally married or domestically partnered (yes/no); their political affiliation (Democrat, Republican, Independent, or Other); religious affiliation (Protestantism, Catholicism, Christianity, Judaism, Islam, Buddhism, Hinduism, Native American, Inter/Non-denominational, No Religion, or Other); average household income (\$0 – 24,999, 25,000-49,999, 50,000-74,999, 75,000-99,999, 100,000-124,999, 125,000-149,999, 150,000-174,999, 175,000-199,999, and \$200,000 and up); highest level of school completed (less than high school, high school degree or equivalent, some college, but no degree, associate degree, bachelor degree, graduate degree); law-related course completed, e.g., constitutional law, criminal law and procedure, introduction to criminal justice or some other college, university or high school course); and if they had interacted with the police, whether that interaction positive, negative, or both.¹⁰⁹ Table 2 provides respondents' experiences with the law and police.¹¹⁰

¹⁰⁹ See *supra* Table 1 (respondents were asked various questions and the results for the entire group is documented in Table 1).

¹¹⁰ See *infra* Table 2.

TABLE 2. PERCEPTIONS OF LAW ENFORCEMENT

VARIABLE	CODING	PERCENT
Taken law or related classes	Yes	23.8
	No	76.2
Law Enforcement Interaction	Yes	58.2
	No	41.8
How was law enforcement interaction?	Positive	40.8
	Negative	15.1
	Both	44.1
General perception of law enforcement	Very Good	14.3
	Good	35.2
	Neutral	36.5
	Bad	9.6
	Very Bad	4.4

N=1,098

C. Quantitative Findings

1. Univariate Findings

Generally, respondents supported notions of privacy and were reluctant to support government digital intrusion.¹¹¹ A summary of the respondents' agreement, disagreement or neutrality toward expectations of privacy in the vignettes is reported in Table 3.¹¹²

TABLE 3. DEPENDENT VARIABLES

DEPENDENT VARIABLE	STRONGLY		NEUTRAL	STRONGLY	
	DISAGREE	DISAGREE		AGREE	AGREE
Vignette 1					
a. Warrant needed before GPS tracking	5.3	5.4	16.5	30.2	42.7
b. Warrant needed before	4.4	7.9	20.9	26.7	40.0

¹¹¹ See *infra* Table 3 (describing respondents' views on privacy).

¹¹² *Id.*

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tracking a person for a month

Vignette 2

a. Expectation of privacy for cell phone location data	2.9	11.5	25	33.3	27.3
b. Warrant needed for tracking information from use of a cell phone	2.8	6.8	17.9	35.7	36.8

Vignette 3

a. Expectation of privacy for data stored on cell phone	3.1	8.9	21.9	37.3	28.8
b. Warrant needed for searching the data on a cell phone	2.4	9.7	17.1	35.6	35.1
c. Warrant needed for searching the data on a cell phone after an arrest	5.4	12.8	22.1	30.3	29.4

Vignette 4

a. Expectation of privacy in data emanating from cell phones (service providers)	2.5	7.9	27.9	36.4	25.2
b. No expectation of privacy for cell phones since batteries can be removed	15.2	19.1	32.6	20.9	12.3
c. Warrant needed to access cell phone data from cell towers	2.6	8.3	25.5	31.1	32.5

Vignette 5

a. No expectation of privacy in public areas for police use of drones	10.3	13.4	27.6	32.4	16.4
b. Warrant needed to monitor back yards with a drone	2.9	9.8	25.3	31.9	30.2
c. No expectation of privacy at high profile, public events and police drone use	6.8	8.6	27.3	35.2	22.1

Overall respondents agreed or strongly agreed that police

should be required to get a warrant before installing a GPS tracking device to a car (72.9 percent)¹¹³ as well as tracking the movements of the car, including recording speed, times of travel, direction of travel and the geographic location of the car within five to ten feet, for a month (66.7 percent).¹¹⁴ This is the case, even if the police use cell phones to track, and in the scenario here, to track an individual who was arrested.¹¹⁵ Respondents were more likely to agree that individuals expect privacy in the location data emitted from their phones (60.6 percent),¹¹⁶ a requirement was necessary before police could track a cell phone emissions (72.5 percent),¹¹⁷ obtain tracking information from service provider towers (61.6 percent),¹¹⁸ or collect data from a government-erected cell tower that intercepted communication between cell phones and service providers (63.6 percent).¹¹⁹ Interestingly, respondents' perceptions of privacy dropped significantly if tracking could be disabled by removing the battery from the cell phone (33.2 percent).¹²⁰ Regarding content searches of cell phones, respondents agreed that privacy extends to the content of cell phones (66.1 percent),¹²¹ and police must obtain a warrant before searching the content of a cell phone (70.7 percent),¹²² and this is the case even following an arrest (59.7 percent).¹²³

Respondents were less likely than in the other vignettes to attribute privacy interests to drone use in public places. Almost half of respondents (48.8 percent) agreed that individuals do not have an expectation of privacy in their public (e.g., schools, streets, and stores) movements, and police may monitor those movements by drone.¹²⁴ Even more respondents (57.3 percent) perceived no expected privacy right that was violated by drone monitoring at high profile and public events.¹²⁵ But respondents distinguished these public uses from private ones, even if a

¹¹³ See *supra* Table 3 (refers to Vignette 1 a data).

¹¹⁴ See *id.* (refers to Vignette 1 b data).

¹¹⁵ See *id.* (refers to Vignette 3 c data).

¹¹⁶ See *id.* (refers to Vignette 2 a data).

¹¹⁷ See *supra* Table 3 (refers to Vignette 2 b data).

¹¹⁸ See *id.* (refers to Vignette 4 a data).

¹¹⁹ See *id.* (refers to Vignette 4 c data).

¹²⁰ See *id.* (refers to Vignette 4 b data).

¹²¹ See *supra* Table 3 (refers to Vignette 3 a data).

¹²² See *id.* (refers to Vignette 3 b data).

¹²³ See *id.* (refers to Vignette 3 c data).

¹²⁴ See *id.* (refers to Vignette 5 a data).

¹²⁵ See *supra* Table 3 (refers to Vignette 5 c data).

backyard is exposed to the public.¹²⁶ Respondents agreed (62.1 percent) that individuals have an expectation of privacy in their private movements, including the backyards to their homes, and police should obtain a warrant for that monitoring.¹²⁷

2. Regression Analysis Findings

After a review of the univariate statistics provided in Tables 1-3, logit regression analyses were utilized to evaluate the impact of the independent variables on the thirteen dependent variables listed in Table 3.

DEPENDENT VARIABLES (VIGNETTES)		2(B)	3(A)	3(B)	3(C)	4(A)	4(B)	4(C)
INDEPENDENT VARIABLES UNSTCOEFFS/ (ODDS)								
Pos. Law Enforcement				-	-			
Experience (Pos = 1)		0.146/(1.2)	0.251/(1.3)	0.154/(0.8)	0.381/(0.7)*	0.316/(1.4)	0.598/(1.8)*	0.383 (1.5)
Taken Law Related			-	-	-	-		-
Course (Yes = 1)		0.056/(1.1)	0.334/(0.8)	0.053/(1.0)	0.020/(1.0)	0.045/(1.0)	0.240/(1.3)	0.208 (0.8)
College Degree (Earned = 1)		0.100/(1.1)	0.498/(1.7)*	0.609/(1.8)*	0.423/(1.5)*	0.178/(1.2)	0.020/(1.0)	0.249 (1.3)
Household Income		-	-	-	-	-	-	0.165 (0.9)
		0.108/(0.9)	0.173/(1.0)*	0.075/(0.9)	0.005/(1.0)	0.158/(1.0)*	0.155/(0.9)*	*
Religion		-	-	-	-	-	-	-

¹²⁶ See *id.* (refers to Vignette 5 b data).

¹²⁷ See *id.*

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(Christian=1)	0.159/(0.9)	0.088/(0.9)	0.219/(0.8)	0.090/(0.9)	0.612/(0.5)	0.013/(1.0)	0.245/(0.8)
Political						-	
Affiliation (Democrat=1)	0.123/(1.1)	0.476/(1.6)*	0.385/(1.5)	0.269/(1.3)	0.243/(1.3)	0.082/(0.9)	0.166/(1.2)
Age	-	-	-	-	-	-	-
Ethnicity (Hispanic=1)	0.003/(1.0)	0.007/(1.0)	0.002/(1.0)	0.002/(1.0)	0.012/(1.0)	0.006/(1.0)	0.009/(1.0)
Race (Non-White=1)	1.133/(3.1)*	0.666/(2.0)*	0.758/(2.1)*	0.444/(1.6)	0.803/(2.2)*	0.260/(0.8)	0.394/(1.5)
Sex (Female=1)	0.365/(1.4)	0.359/(0.7)	0.089/(1.1)	0.482/(1.6)*	0.248/(1.3)	0.000/(1.0)	0.253/(1.3)
Constant	-	-	-	-	-	-	0.464
Chi-Square	0.491/(0.6)*	0.096/(0.9)	0.173/(0.8)	0.553/(0.5)*	0.150/(0.9)	0.228/(1.3)	/(0.6)*
-2 Log Likelihood	2.800/(16.4)*	2.777/(16.1)*	2.044/(7.7)*	1.894/(6.6)*	2.931/(18.8)*	0.797/(0.5)	/(29.46)*
Nagelkerke R ²	22.09*	25.90*	19.95*	27.48*	26.45*	28.63*	21.56*
	550.44	617.76	634.04	787.96	553.94	859.54	567.04
	0.053	0.059	0.042	0.054	0.06	0.058	0.05
	*p<0.05	N=833	N=796	N=837	N=791	N=728	N=679
							N=750

Due to the number of models evaluated, the dependent variables shown in Table 4 are listed in the rows by number.¹²⁸ These numbers correspond to the dependent variables listed in Table 3 with the dependent variables ranging from 1a through 5c.¹²⁹

The regression models for the first three dependent variables (warrant needed before GPS tracking, warrant needed before tracking a person for a month, and expectation of privacy for cell

¹²⁸ See *infra* Table 4.

¹²⁹ See *infra* Table 4; *supra* Table 3.

phone location data) and the last three dependent variables (no expectation of privacy in public area for police use of drones, warrant needed to monitor back yards with a drone, and no expectation to privacy at high profile, public event and police drone use) were statistically insignificant. As such, these analyses are omitted from Table 4. The first dependent variable evaluated is the dependent variable for Vignette 2(b).¹³⁰

The remainder of the models (for vignettes 2b through 5 c) did rise to statistical significance.¹³¹ These models are presented in Table 4 below.

TABLE 4. REGRESSION ANALYSES ON THE DEPENDENT VARIABLES

As noted above, Table 4 indicates that seven of the thirteen models rose to statistical significance, providing some predictive power in explaining respondents' views on the extent and legality of modern law enforcement surveillance techniques.¹³² While these models were statistically significant, all models have low predictive power. The collective models for these dependent variables explained from 4.2 percent to 6 percent of the variance.¹³³ These model coefficients suggest that there is more going into people's beliefs about modern surveillance than what was measured in this study.¹³⁴ We now turn to evaluating the impact of specific independent variables within the significant models.

For dependent variable 2b (warrant needed for tracking information from use of a cell phone), two variables were statistically significant: ethnicity and gender.¹³⁵ Hispanics were over three times more likely to believe that a warrant was necessary for tracking cell phone use information.¹³⁶ Also for this variable there was a statistically significant relationship along gender lines with males slightly more likely to think a warrant was necessary for tracking cell phone use information.¹³⁷

¹³⁰ See *infra* Table 4.

¹³¹ See *infra* Table 4.

¹³² See *supra* Table 4.

¹³³ *Id.*

¹³⁴ See Fradella, *supra* note 10, at 368.

¹³⁵ See *supra* Table 4.

¹³⁶ *Id.*

¹³⁷ *Id.*

Dependent variable 3a (expectation to privacy for data stored on a cell phone) was a strong model across our analyses (Nagelkerke $R^2=5.9$ percent).¹³⁸ Four variables were statistically significant: education, income, political affiliation, and ethnicity.¹³⁹ Those with a college degree were almost two times more likely to believe that an individual had an expectation of privacy for data stored on a cell phone.¹⁴⁰ Household income also mattered, but in a negative direction.¹⁴¹ Those with lower incomes were more likely to believe that an individual had an expectation of privacy in relation to data stored on their cell phones.¹⁴² Political affiliation was statistically significant with democrats more likely to adopt a position expecting privacy for cell phone data.¹⁴³ Finally, Hispanics were twice as likely to believe in an expectation of privacy in data stored on cell phones.¹⁴⁴

Dependent variable 3b was belief that a warrant is needed before a cell phone can be searched.¹⁴⁵ This was the least predictive of the statistical models to gain significance (Nagelkerke $R^2=4.2$ percent).¹⁴⁶ Two variables were statistically significant in this model: education and ethnicity.¹⁴⁷ Those with a college degree were almost two times more likely to believe that a warrant is needed before police can search the data on a cell phone, and Hispanics were over two times more likely to think a warrant was required before law enforcement could search the contents of a cell phone.¹⁴⁸

The analytic model for dependent variable 3c (warrant is needed for searching the data on a cell phone after an arrest) revealed that four variables from the model were statistically significant: experience with law enforcement, education, race, and sex.¹⁴⁹ As predicted, those who had a negative prior experience with law enforcement personnel were slightly more

¹³⁸ *Id.*

¹³⁹ *See supra* Table 4.

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *See supra* Table 4.

¹⁴⁴ *Id.*

¹⁴⁵ *See supra* Table 3; *supra* Table 4.

¹⁴⁶ *See supra* Table 4.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

likely to believe a warrant was needed before police could search the digital contents of a phone.¹⁵⁰ Also those with a college degree were more likely to hold that a warrant is needed for a cell phone search after an arrest.¹⁵¹ Similarly, non-white respondents believed that a warrant was necessary for a cell phone search after an arrest, and male respondents were a little more likely to believe that a warrant was needed before a legal cell phone search could occur.¹⁵²

The model for the dependent variable 4a (expectation of privacy in cell phone data from the service provider) was the strongest analytic model across all dependent variables (Naglekerke $R^2=6$ percent).¹⁵³ In this model, three variables were statistically significant: household income, religion, and ethnicity.¹⁵⁴ Those with lower household incomes were a little more likely to think there was an expectation of privacy from cell phone service providers.¹⁵⁵ Democrats were slightly more likely to register an expectation of privacy in cell phone data collected by service providers, and Hispanic respondents were over two times more likely to believe that there was an expectation of privacy of cell phone data with the service provider.¹⁵⁶

For dependent variable 4b (no expectation of privacy for cell phones since batteries can be removed), two variables in the model were statistically significant: experience with law enforcement encounters and household income.¹⁵⁷ Those respondents who had a positive experience with law enforcement in the past were almost two times more likely to believe that there is no expectation of privacy for cell phones due to the fact that batteries can be removed.¹⁵⁸ Those with lower household incomes were significantly more likely to determine that there was no expectation to privacy for cell phone data due to the ability to remove the battery.¹⁵⁹

The final model to reach statistical significance was in relation to dependent variable 4c (the necessity of a warrant to track cell

¹⁵⁰ *See supra* Table 4.

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ *See supra* Table 4.

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *Id.*

¹⁵⁸ *See supra* Table 4.

¹⁵⁹ *Id.*

phone information from government-erected cell phone towers).¹⁶⁰ In this model, two variables were statistically significant: household income and sex.¹⁶¹ Those respondents with a lower overall household income were slightly more likely to believe that a warrant was necessary for law enforcement to access data through government erected cell phone towers.¹⁶² Also males were slightly more likely to report that a warrant was necessary for police access to data sent over government erected cell towers.¹⁶³

IV. DISCUSSION OF RESEARCH FINDINGS & SUGGESTIONS FOR FUTURE RESEARCH

Similar to Fradella et al., we found much agreement with recent Supreme Court decisions favoring privacy (e.g., societal perceptions that a warrant was necessary before tracking individuals with GPS or searching the content of their cell phones), with the demographic, situational and attitudinal factors explaining few of the respondents' perceptions.¹⁶⁴ We concur with Fradella et al.'s conclusion that "many other factors beyond the demographic and attitudinal variables examined in the present study contribute to the complex belief system governing determinations of what constitutes a reasonable expectation of privacy."¹⁶⁵ Extending beyond Fradella et al., however, our findings reveal "normative" societal or "average" perception about privacy interests.¹⁶⁶ Since the Court must draw constitutional limits, and if the vast majority of citizens agree on privacy expectations, empirical research findings lend legitimacy to the Court's role as a decider of privacy.¹⁶⁷ Likewise, however, when the "average" citizen disagrees with the Court's decisions, or the Court is presented with contrary empirical findings on privacy, the perceived legitimacy of the Court is reduced if the Court ignores empirical determinations of societal perceptions

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *See supra* Table 4.

¹⁶³ *Id.*

¹⁶⁴ *See supra* Table 3 (showing large percentages in "agree" and "strongly agree" in categories 1(a), 1(b), 3(a), 3(b), and 3(c)).

¹⁶⁵ Fradella, *supra* note 10, at 368.

¹⁶⁶ *See supra* Table 3 (showing general consistency among results, where the percentage of strongly disagree is lower, and percentages increase with agreement level).

¹⁶⁷ Fradella, *supra* note 10, at 293.

about privacy to empower the government in circumventing the Fourth Amendment.¹⁶⁸

The public, like the Court, distinguishes between expectations of privacy in public and private, but unlike precedent, respondents included the backyard and open fields as private spaces.¹⁶⁹ Respondents perceived the government should have a warrant before drones may be used for surveillance of backyards.¹⁷⁰ These findings are consistent with the findings of Fradella et al. in which respondents overwhelmingly disapproved of invasions into territorial spaces, including the backyard, curtilage of the home, and buildings on property, even when not enclosed by a fence.¹⁷¹ Their findings were mixed on the use of aerial surveillance,¹⁷² but the closer to the government observations to the ground (400 feet), the more likely respondents disagreed with permitting that government surveillance without a warrant.¹⁷³

Respondents in this study disapproved of tracking individuals by GPS, cell phone and cell tower or searching the content of cell phones without a warrant. This finding is consistent with the Court's holding, in *Jones* and *Riley*, that police violated privacy interests by trespassing to install an external, GPS tracking device on a car and searching, even an arrested individual's, cell phone without a warrant.¹⁷⁴ Respondents' perceptions lend support to the concerns raised by Justices Sotomayer and Alito, in their concurring opinions in *Jones*, about the privacy implications of long-term, government tracking without judicial oversight.¹⁷⁵

¹⁶⁸ *Id.*; but see *supra* note 15 and accompanying text (discussing how perceived legitimacy is improved).

¹⁶⁹ See *supra* Table 3 (62.1 percent of respondents agreeing or strongly agreeing a warrant is needed for a drone search of a backyard).

¹⁷⁰ See *supra* Table 3 (refers to Vignette 5 b data).

¹⁷¹ See *supra* note 86 (discussing the territorial privacy scale identified by respondents).

¹⁷² See Fradella, *supra* note 10, at 365 (citing the disagreement between respondents over the necessity of a warrant for an aerial search at an altitude of 1,000 feet).

¹⁷³ See *id.* (discussing differences in concurrence at 400 feet).

¹⁷⁴ See *supra* text accompanying notes 65–72 (examining the *Jones* and *Riley* decisions and the Court's views on law enforcement and the right to privacy).

¹⁷⁵ See *supra* text accompanying notes 65–69 (examining concurrences of Justices Sotomayer and Alito in *Jones*); see also Table Three (72.9 percent of respondents agreeing or strongly agreeing a warrant is needed before GPS tracking and 66.7 percent of respondents agreeing or strongly agreeing a warrant is needed before tracking a person for a month).

Even though the findings here are largely consistent with Supreme Court decisions, it is important for empirical studies to continue to measure societal perceptions and inform the Court's "objective" analysis of privacy. Empirical research lends credibility and legitimacy to judicial findings that are consistent with judicial determinations (or even better, may inform those decisions before they are rendered), and in those instances (e.g., aerial surveillance of private property) when societal perceptions and Court decision-making diverge, the Court may reconsider its "best guess"¹⁷⁶ that society is unwilling to accept as reasonable those privacy interests.

The Court will eventually address the governmental use of cell phone towers and drones for tracking and surveillance.¹⁷⁷ The findings here suggest that society is unwilling to forfeit privacy interests and give the government unfettered and unmonitored authority to conduct that surveillance without a warrant.¹⁷⁸ Researchers should continue to explore the perceptions of citizens regarding the reasonableness of privacy expectations so that the Court may better define the limits of governmental intrusion into privacy as protected by the Fourth Amendment.

¹⁷⁶ See *supra* text accompanying note 22.

¹⁷⁷ See *e.g.*, *supra* Table 3 (62.1 percent of respondents agreeing or strongly agreeing a warrant should be required before monitoring of back yards using drones, and 63.3 percent of respondents agreeing or strongly agreeing a warrant should be required before access of phone data from cell towers).

¹⁷⁸ See *generally supra* Table 3, Table 4 (displaying results of this study); see also *supra* Part III(C) (discussing results).