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Counting Guns in Early America

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Abstract

The picture of gun ownership that emerges from these analyses directly contradicts the assertions of Michael Bellesiles in Arming America: The Origins of a National Gun Culture (2000). Contrary to Arming America's claims about probate inventories in 17th and 18th century America, there were high numbers of guns, guns were much more common than swords or other edge weapons, women in 1774 owned guns at rates (18%) higher than Bellesiles claimed men did in 1765-90 (14.7%), and 83-91% of gun-owning estates listed at least one gun that was not old or broken. The authors replicated all the portions of Bellesiles' published study where he both counted guns in probate inventories and cited sources containing inventories. They conclude that Bellesiles appears to have substantially misrecorded or misremembered the 17th and 18th century probate data he presents.

ABSTRACT

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Probate inventories, though perhaps the best prevailing source for determining ownership patterns in early America, are incomplete and fallible. In this article, the authors suggest that inferences can be improved by using multivariate techniques and control variables of other common objects. To determine gun ownership from probate inventories, the authors examine three databases in detail—Alice Hanson Jones' national sample of 919 inventories (1774), 149 inventories from Providence, RI (1679-1726), and Gunston Hall Plantation's sample of 325 inventories from Maryland and Virginia (1740-1810). Also discussed are a sample of 59 probate inventories from Essex County, MA (1636-1650) and Anna Hawley's study of 221 Surry County, VA estates (1690-1715). Guns are found in 50-73% of the male estates in each of the five databases and in 6-38% of the female estates in each of the first four databases.

Gun ownership is particularly high compared to other common items. For example, in 813 itemized male inventories from the 1774 Jones national database, guns are listed in 54% of estates, compared to only 30% of estates listing any cash, 14% listing swords or edge weapons, 25% listing Bibles, 62% listing any book, and 79% listing any clothes. Using hierarchical loglinear modeling, the authors show that guns are more common in early American inventories where the decedent was male, Southern, rural, slave-owning, or above the lowest social class—or where the inventories were more detailed.

The picture of gun ownership that emerges from these analyses directly contradicts the assertions of Michael Bellesiles in *Arming America: The Origins of a National Gun Culture* (2000). Contrary to *Arming America's* claims about probate inventories in 17th and 18th century America, there were high numbers of guns, guns were much more common than swords or other edge weapons, women in 1774 owned guns at rates (18%) higher than Bellesiles claimed men did in 1765-90 (14.7%), and 83-91% of gun-owning estates listed at least one gun that was not old or broken.

The authors replicated all the portions of Bellesiles' published study where he both counted guns in probate inventories and cited sources containing inventories. They conclude that Bellesiles appears to have substantially misrecorded or misremembered the 17th and 18th century probate data he presents. For the Providence probate data (1679-1726) Bellesiles has misclassified over 60% of the inventories he examined. Nationally, for the 1765-90 period the average percentage of estates listing guns that Bellesiles reports (14.7%) is not mathematically possible, given the regional averages he reports and known minimum sample sizes.

Counting Guns in Early America

James Lindgren[*] and Justin Lee Heather[**]

I
Introduction

Doing good basic statistical research in history does not require training in quantitative methods—but it helps. Sometimes what might seem a reasonable methodology to an undergraduate writing a history paper on a small sample of cases—keeping a running tally of ticks on a legal pad[1]—would be grossly inadequate for a serious research project with thousands of records and high stakes. When someone keeps only a running total, it is difficult for future researchers to replicate, check, or verify a study without taking the extraordinary step of starting over and doing the project the way the original researcher should have in the first place. With adequate notes and a list of records, another researcher could reliably validate earlier research by taking a random sample of those records. Results, even in history, should be reproducible.

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1. Bellesiles has disclosed that this was his statistical method. Email to James Lindgren from Michael Bellesiles, Sept. 13, 2000.

This article has several goals, both factual and methodological. First, we report high levels of gun ownership in every probate database we examined in early America—chiefly Alice Hanson Jones' collection of 919 inventories throughout the American colonies in 1774,[2] the probate records in Providence, Rhode Island in 1679-1726,[3] and the Gunston Hall database of 325 Virginia and Maryland estates, 1740-1810.[4] These counts of guns are especially high when we compare them to other commonly owned items, such as other weapons and books. For example, in the itemized personal property inventories of white males in the three databases listed, gun ownership ranges from 54% to 73%. Because the Jones database is weighted to match the entire country in 1774, we can estimate that at least 50% of all wealth owners (both males and females) owned guns.

Second, we show how historical researchers using probate records can improve their inferences by using control variables of other commonly owned objects. Because inventories are often incomplete, it makes more sense to compare relative levels of ownership than to note absolute levels of ownership. In early American probate inventories, guns are much more commonly owned than cash of any kind or than Bibles and religious books—and nearly as common as all books together. Guns are also much more common than swords, cutlasses, spears, tomahawks, or other edge or blade weapons.

Third, we partially replicate the probate gun study in perhaps the most celebrated American history book of the last year, Michael Bellesiles' *Arming America: The Origins of a National Gun Culture*.[5] It was welcomed to the cover of the *New York Times* book review section with a gushing review by the respected academic and Pulitzer Prize winner Garry Wills.[6] Then, the eminent historian Edmund Morgan, wrote a glowing review in the *New York Review of Books*,[7] praising *Arming America* particularly for its puncturing of myths by drawing real facts from such

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2. Alice Hanson Jones, AMERICAN COLONIAL WEALTH: DOCUMENTS AND METHODS (3 vols.) (1978).

3. 6, 7, & 16 EARLY RECORDS OF THE TOWN OF PROVIDENCE (Horatio Rogers, et al. eds. 1892-1915).

4. Gunston Hall Plantation, PROBATE INVENTORY DATABASE, CD-ROM (2000).

5. Michael A. Bellesiles, ARMING AMERICA: THE ORIGINS OF A NATIONAL GUN CULTURE (2000) (hereafter AA).

6. Garry Wills, *Spiking the Gun Myth,* NEW YORK TIMES, s.7, at 5, col. 1 (Sept. 10, 2000).

7. Edmund Morgan, *In Love With Guns,* NEW YORK REVIEW OF BOOKS (Oct. 19, 2000).

sources as probate records. The *Philadelphia Inquirer* chose it as the best nonfiction book of the year.[8]

Bellesiles argues that America in the 1700s and early 1800s did not have a "gun culture," notwithstanding what he acknowledges were the comments of some prominent constitutional framers. His sources are varied, but are of three basic types: contemporary accounts; gun censuses and manufacturing records; and gun ownership in probate records. First are contemporary letters and descriptive accounts, including reports of militia incompetence, complaints about the lack of guns, and accounts of travelers in America. Although researchers have already found some substantial mistakes in this evidence,[9] we have no way of knowing just how systematic these problems are, nor is this body of evidence the subject of this article.

Bellesiles' second kind of source is gun censuses of militia, gun manufacturing records, and homicide counts. Once again, researchers have already found some mistakes in this evidence—particularly on gun manufacturing and gunsmith accounts—and the homicide weapon counts may have been superceded by Eric Monkkonen's careful *Murder in New*

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8. Carlin Romano, *The Most Important Books of 2000*, PHILADELPHIA INQUIRER (Dec. 14, 2000) ("In nonfiction, the most important book of the year was Michael A. Bellesiles' "Arming America: The Origins of a National Gun Culture" (Alfred A. Knopf, $30). It accomplished the astounding scholarly feat of convincing many experts in American history that a fundamental belief about our country—that the United States began as a land in which most citizens owned guns and used them—is false.").

9. See Joyce Lee Malcolm, *Concealed Weapons: The Controversial Book Arming America has the Facts All Wrong,* REASON (Jan. 1, 2001); Clayton Cramer, *Firearms Ownership and Manufacturing in Early America* (unpublished manuscript, Dec. 2000).

Cramer criticizes Bellesiles for a number of mistakes and misleading citation practices. These involve many of the book's major types of evidence, including travel accounts, military accounts, statutes, and gun manufacturing information. For example, in one travel account, Ole Rynning urges immigrants to bring "good rifles with percussion locks, partly for personal use, partly for sale." Id. Arguing that guns were not needed, Bellesiles paraphrases Rynning as saying: "Rynning advised his Norwegian readers to bring 'good rifles with percussion locks,' as such good guns . . . could be sold there for a solid profit. Guns thus had an economic value, but if thought requisite for self-protection, it remained an unstated assumption." AA at 341. The assumption that they should be brought in part "for personal use" is *not* unstated.

Bellesiles also purports to quote the Militia Act of 1792, 1 STAT. 271 (1792), as saying that militia members will be supplied with guns (by the government), when the Act says that the members will supply their own guns.

York City.[10] Further, the gun censuses are probably not reliable enough to base any strong conclusions on them. As we will see, the ubiquitousness of guns in probate inventories suggests that these gun censuses are incomplete, even compared with incomplete probate inventories.

The most interesting claim of Michael Bellesiles' book—and the most persuasive if true—is that gun ownership was rare in early America, even among propertied males. As Jacob Price has argued: "Probate records are the most valuable single source we have for the economic and social history of extended communities."[11] Bellesiles claims to have used many sets of probate data, but in his book he cites only two sets that he apparently used.[12]

One run of probate records that Bellesiles cites as a source of his data[13] is a published set of about 186[14] decedents' estates in colonial Providence in 1679-1729.[15] Even though he finds high gun ownership in Providence in this period (48%), he undercounts the percentage of estates listing guns substantially—according to our careful count, 63% of adult male estates with itemized personal property inventories had guns.

Bellesiles also claims that most of the guns in the (approximately) 90 Providence inventories listing guns[16] "are evaluated as old and of poor

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10. See Eric Monkkonen, MURDER IN NEW YORK CITY (2000); Cramer, *supra* note 9.

11. Jacob M. Price, *Quantifying Colonial America: A Comment on Nash and Warden,* 6 J. OF INTERDISCIPLINARY HISTORY, 701, 701 (1976).

12. AA at 445 n. 113; 530 n.16. See text and notes *infra* notes 13, 37-41.

13. In *Arming America*, Bellesiles disclosed that he obtained his Providence data from three volumes of the published records: "This data is drawn from Horatio Rogers et al., eds., The Early Records of the Town of Providence, 21 vols. (Providence, RI, 1892-1915), vols. 6, 7, 16." AA at 485 n.133.

That his Providence data was drawn from the published records was confirmed in an email: "Finally, I am sorry to hear that you come up with different numbers from Horatio Rogers, et al., eds., The Early Records of the Town of Providence (21 vols. Providence, R.I., 1892-1915). I used these books at the Huntington Library six years ago and have not yet come across my notes." Email communication to James Lindgren from Michael Bellesiles, Nov. 30, 2000.

14. Precisely how many decedents' estates there are depends on how you count them—that is, how much has to be in a record to count it. Nonetheless, there are *not* 186 probate records for adult males containing inventories itemizing personal property (which is what Bellesiles says he analyzed). There are only 149 (or a few more if one uses even looser standards for itemization than we did).

15. See PROVIDENCE RECORDS, *supra* note 3 (these records include one inventory from 1670 and no inventories from the last three years of records—1727-1729)

16. Our count is 94 itemized male inventories listing guns. There is another gun in a male estate without a sufficiently itemized inventory and a female estate with 5 guns

quality."[17] In fact, only about 9% of the guns are so listed.[18] Bellesiles claims that he included only males in his 186 Providence estates when he apparently included 17 women. He claims that all 186 estates had both wills and inventories when less than half did.[19] Indeed, intestacy was common then[20] and was frequently noted in the records.[21] Some records had no

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(thus 96 estates had guns). Our count of 94 estates includes 2 estates where the only weapons are "armes," valued high enough to be reasonably likely to include guns. Then, as in the Second Amendment, arms often (but not always) referred to firearms. One estate included a carbine (indexed as a carbine, but spelled unconventionally), which referred to a short rifle or a musket.

    17. AA at 109.

    18. Here we are referring to the number of guns, not the number of estates with guns. For most purposes, we count the number of estates with guns, not the number of guns. The count of the number of guns is greatly hampered because some inventories list "guns" without enumerating how many. Does this refer to 2 guns, 3 guns, or what? We counted them as 2 guns and suspect that Bellesiles did as well (but do not know). Also, it is unclear how Bellesiles counted gun parts. We counted a "gun without a lock" as a gun and a "gun lock" or a "gun barrel" not as a gun. Although Bellesiles' count of 90 estates with guns is close to ours, Bellesiles' gun counts in those 90 estates appear too small to have included gun parts. If we had included gun parts in our counts, the percentage of estates with old or broken guns would have been a few percentage points higher, but nothing even close to the majority reported by Bellesiles. Further, every estate with a gun part also included a gun. Because Bellesiles has no database and never did, we can't reconcile our differences case by case to determine exactly what he did.

    19. Only about 86 estates even mention both a will and an inventory in the indices to the three volumes. Both wills and itemized inventories appear in about 81 estates, of which 8 are female, leaving about 73 estates (out of 149) with both wills and male itemized inventories. Whatever the count, it is fewer than 90 estates, not 186, as Bellesiles contends. The likeliest source of the error is that Bellesiles failed to note the number of estates with wills and just assumed that there were 186 wills, mistakenly thinking that everyone leaves wills and that the Providence records are perfectly complete.

    20. See 3 JONES, *supra* note 2, at 1933 (an unweighted 494 of the 919 decedents died intestate); Alice Hanson Jones, *Estimating Wealth of the Living from a Probate Sample,* 13 J. OF INTERDISCIPLINARY HISTORY 273, 278 (1982) ("There is not a will for every inventory; inventories were made for many intestates as well as testates.").

    21. Less than half of the Providence inventories were accompanied by wills. See, e.g., most of the first few estates in volume 16 of PROVIDENCE RECORDS, *supra* note 3: ID. at 12 ("John Mathewson . . . Dyed Intestate"); ID. at 14 ("Stephen Arnold . . . dyed Intestate"); ID. at 17 ("James Appleby . . . Died Intestate"); ID. at 28 ("Jonathan Knight . . . Dyed Intestate"); ID. at 31 ("Thomas Field . . . Dyed Intestate"); ID. at 33 ("Richard Lewes . . . Dyed Intestate"). For other mentions of people dying intestate, *see, e.g.,* 7 PROVIDENCE RECORDS, *supra* note 3, at 32, 53, 45, 65, 69, 106, 109, 112, 139, 142, 145, 152, 157, 179, 205; 16 ID. at 9, 37, 45, 62, 63, 73, 92, 97, 120, 121, 124, 156, 159, 167,

inventory or only a real estate inventory, yet they apparently were included in Bellesiles' counts nonetheless, thus artificially inflating the denominator of his percentages. Bellesiles claims that "a great many inventories"[22] list "one of ye Queens Armes," when only one inventory did. In all, he misclassified over 60% of the estates on these criteria that he thought important enough to mention. Nearly everything he says about those Providence estates is mistaken.

The Providence data is only part of Bellesiles' argument about probate records. Bellesiles' much more dramatic claim is made in Table 1 of his book: he asserts that probate inventories in the 1765-1790 period had only 14.7% gun ownership nationally and only 14.2% ownership in frontier counties.[23] Bellesiles concludes that guns rose to just 17% of probate records in 1819-1821 and 20.7% in 1830-1832.[24] He argues that, as the gun culture begins to take hold, guns in probate records rise to 27.6% in 1849-1850 and 32.5% in 1858-1859.[25] Bellesiles also claims that 53% of guns in 1200 probate inventories during the 1765-1790 period on the frontier are listed as being old or in poor condition[26] and that rifles are extremely rare.[27]

Besides the Providence data, Bellesiles' main probate data are in his Table 1 in both *Arming America*[28] and in his 1996 *Journal of American History* article.[29] Here are the first four columns of identical data from Table 1 in both the 1996 article and the book:

175, 197, 199, 228, 241, 246, 248, 279, 286, 312, 316, 332, 343, 358, 366, 373, 377, 380, 425, 428, 430, 441, 446, 448, 457, 462, 467, 468).

22. AA at 109.

23. AA at 445.

24. ID.

25. ID.

26. AA at 13, 266-67.

27. AA at 13, 266-67 (mistakenly claims that there are only 3 rifles in 1200 records in frontier counties 1765-90). In fact, we have found many more than 3 rifles in just a few of those years in Washington and Westmoreland County, PA, 2 of the (apparently) 6 frontier counties in his sample. See 1 JONES, *supra* note 2 (Westmoreland County inventories); Washington County (Pennsylvania) Recorder of Deeds, *Inventories of Estates (1776-1781) and Record of Marks, Receipts, and Certificates of Freedom (1789-1790)* (Family History Library US/CAN Film 1449139 Item 1).

28. AA at 445.

29. Michael A. Bellesiles, *The Origins of Gun Culture in the United States, 1760-1865,* 83 J. OF AMERICAN HISTORY 425, 428 (1996).

Percentage of Probate Inventories Listing Firearms

	1765-90	1808-11	1819-21	1830-32
Frontier	14.2	15.8	16.9	20.4
Northern coast:				
urban	16.1	16.6	17.3	20.8
rural	14.9	13.1	13.8	14.3
South	18.3	17.6	20.2	21.6
NATIONAL				
AVERAGE:	14.7	16.1	17.0	20.7

Bellesiles presents no regional sample sizes or cell counts for this table—and has provided none after repeated requests. To work with multiple samples and not disclose sample sizes is unusual in academics. In text,[30] he gives an approximate count of 1200 inventories for the first cell—frontier inventories 1765-90.[31] In the first column—the 1765-90 period—note that only the frontier region (14.2% of inventories list guns) is below the "National Average" of 14.7%.

This national average is mathematically impossible, given the high number of inventories from the three regions above the mean. For example, we know from the Jones compilation of inventories, which Bellesiles cites,[32] that there are at least 297 inventories from 13 Southern counties in Bellesiles' study for parts of the years 1773-75[33] and 132 inventories from one northern urban county (Philadelphia) in one year alone (1774). There are about 4,000 estates in Philadelphia for the 1765-1782 period; more than half of these should contain inventories. For the 26 years of data (1765-90) he supposedly included in his table, there must be thousands of inventories (not hundreds) from the most populous regions in the country.

Given the 1200 inventories he reports[34] for the frontier's 14.2% mean, any number of Southern inventories greater than 214 at the South's mean of

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30. AA at 266-67.

31. AA at 445. ID. at 13, 266-67. He discloses that all these frontier counties in the 1765-90 were in western Pennsylvania and northern New England. Only 2 Pennsylvania and 4 Vermont counties fit this description.

32. AA at 530 n.16. See *infra* notes 37-41.

33. Most come from 1774 and a few come from 1773 and 1775. Bellesiles includes all 13 Jones Southern counties and adds 3 from Georgia, which if included in the 1765-90 period should make his Southern cell counts even higher.

34. AA at 266-67.

18.3% puts the national mean above the 14.7% Bellesiles reports[35]—and there are 297 Southern inventories for a tiny part of his 26-year period. [36] The percentages in Bellesiles' Table 1 are mathematically impossible, given known minimum sample sizes. There are no regional sample sizes for 1765-90 that he could report that would validate both his regional means and his national average. [37]

       Thus, with Bellesiles' data, things are not always what they appear. Given the impossibility that all his 1765-90 percentages are correct, it is not surprising that the data to back up his probate tables are missing. In *Arming America* Bellesiles cites absolutely nothing to support his unlikely claims. In an earlier article in the *Journal of American History*, he does cite one

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35. This is the count with the most extreme rounding in Bellesiles' favor (1249 frontier inventories rounded down to 1200; 14.15001% frontier guns rounded up to 14.2%, etc.). Without extreme rounding, any number of Southern inventories greater than 186 would make the 14.7% mean impossible. Further, there are probably 2,000-3,400 inventories from the 4,000-6,800 Philadelphia estates in the 1765-90 period; any number of Philadelphia inventories greater than 634 would make the 14.7% mean impossible, even if there were no Southern inventories.

       Bellesiles says that his method was just to do simple counts; he says nothing about the national mean being population weighted, which would be unlikely with just a running tally. Since the 6 frontier counties Bellesiles examines are small compared to the rest of the country, a population-weighted or wealth-weighted national mean would only make things worse for his 14.7% mean. Further, there are probably 2,000-3,400 inventories from Philadelphia in the 1765-90 period; any number greater than 634 Philadelphia inventories would make the 14.7% mean impossible, even if there were no Southern inventories.

36. Bellesiles includes all 13 Jones Southern counties and adds 3 from Georgia, which should make his cell counts for 26 years even higher. Averaging just one inventory per year per county, there would be 416 Southern inventories, well above the 215 needed to render his national mean for 1765-90 impossible.

37. Given that a weighted average of 69% of male Southern inventories in the Jones database list guns, Bellesiles would need over 1,000 Southern inventories to get this 69% down to the 18.3% he claims for the South, even if every inventory not in the Jones database lacked a gun. Bellesiles needs large numbers of inventories with no guns in the 1765-90 period to offset the high gun ownership in the 1774 Jones inventories, but if he has those, his national average is impossible. In other words, if his 1765-90 regional percentages apply to even moderate numbers of inventories from the South or Northern urban regions, then his national mean is mathematically impossible. On the other hand, if his 1765-90 regional percentages apply to small numbers of inventories, then his regional means are erroneous, given the high percentages of guns in the 1774 Jones database. Given known sample sizes and our gun counts from the Jones database, either Bellesiles' regional averages are impossible or his national average is impossible (or both are erroneous).

source for some of his 1765-1790 data—Alice Hanson Jones' classic collection of 919 colonial inventories from 1774.[38] In that 1996 *JAH* article, Bellesiles wrote, "Integrating Alice Hanson Jones's valuable probate compilation into this general study and examining counties in sample periods during the eighty-five years from 1765 to 1850 reveals a startling distribution of guns in early America."[39] Except for a small group of New York 23 estates, Bellesiles included exactly the same 26 counties Jones used.[40]

Without data, without counts, mostly without sources, Bellesiles has not done a "study" of probate records in the conventional sense. Bellesiles has no database of probate records. He has no list of cases examined or any cites to them. He does cite the Jones compilation and disclose that he used it in his 1996 *JAH* article, a disclosure that he has now cast doubt on.[41] The

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38. JONES, *supra* note 2; Michael A. Bellesiles, *The Origins of Gun Culture in the United States, 1760-1865,* 83 J. OF AMERICAN HISTORY 425, 428 (1996).

39. Id. at 428.

40. The only Massachusetts counties Bellesiles used for 1765-90 were first used by Jones for 1774: Essex, Hampshire, Plymouth, Suffolk, and Worcester. The only Connecticut counties Bellesiles used for 1765-90 were first used by Jones for 1774: Litchfield and New Haven. The only New Jersey county Bellesiles used was used by Jones: Burlington. The only Delaware county Bellesiles used was used by Jones: Kent. The only Maryland counties Bellesiles used were used by Jones: Queen Anne and Anne Arundel. The only Virginia counties Bellesiles used were used by Jones: Charlotte, Halifax, Southampton, Brunswick, Mecklenburg, Chesterfield, Fairfax, and Spotsylvania. The only North Carolina counties Bellesiles used were used by Jones: Halifax and Orange. The only South Carolina county Bellesiles used was used by Jones: Charleston. Three of the five Pennsylvania counties Bellesiles used were used by Jones: Northampton, Westmoreland, and Philadelphia. Outside of New York, every Jones county was among those used by Bellesiles.

41. After learning from an earlier draft of this article that we determined that the Jones' data were seemingly inconsistent with some of his percentages, Bellesiles has cast some doubt that he used even this source that he had previously disclosed as having integrated into his data. We do not want to take the step of suggesting that he may not have read the inventories in data sources he claimed to have used in his book or in his 1996 *JAH* article, but in response to our criticisms he has recently been saying as much himself. Since he has not made this claim in writing to us and there have been some significant inconsistencies in his public and private claims since we began our replication, we have decided to go by his published claims on the sources he used—as of the time this article was submitted for publication.

Whether he used the Jones published data or not, about 896 of the Jones inventories should have been in his study since they were in Bellesiles' counties during his 26-year period. See *supra* notes 37-40. If they are included, the regional averages are

sources for the rest of the data in his probate tables have never been disclosed. He gives no numbers about how many probate inventories have or do not have guns for any period or type of county.

Our efforts to get Bellesiles to release his totals for any groups of counties for any period and to release his lists of counties for each period has yielded no direct answers to our specific questions. Instead, he sent several friendly responses, some quite lengthy, describing how he kept his background records on legal pads, how the sheets got flooded and were in his attic still wet, and what were his general criteria for deciding which counties are frontier counties.[42]

Of course, we should not have to speculate what his totals are. Under the ethics of the history profession, Bellesiles should release his counts and citations.[43] It is odd that his article in the *Journal of American History* and his book were published without counts of any kind for his main table of probate data. He is, after all, using samples to infer information about a larger population (in his words, the "national average[44]").

We start our partial replication with two sources of colonial probate data that Bellesiles cites in his book—Providence town records 1679-1729[45] and Alice Hanson Jones' superb national probate database of 919 inventories

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highly implausible and, if the regional averages are true, then the national average is impossible.

42. Instead of revealing which counties were frontier counties, Bellesiles responded that he counted a county as frontier for the first 30 years after settlement. This would appear to leave Washington County, Ohio and Knox County, Indiana fitting into no categories by 1819-21 period—just one of the unexplained anomalies in his main probate data table (AA at 445). Both counties would not fit easily into the "Northern coast" category after they left the frontier category.

43. The American Historical Association's *Statement on Standards of Professional Conduct* (revised May 1999 edition): provides: "Historians should carefully document their findings and thereafter be prepared to make available to others their sources, evidence, and data . . . ." Our first request for data was made shortly before *Arming America* appeared in print. As a reason for not giving us any citations to his data sources, he has mentioned the wet records. He has not given us any answer to our repeated requests for the counts in his tables—though of course wet records may also be involved there as well, though less obviously so, since there should be many intermediate copies of tables, especially tables whose percentages were revised for his book.

44. We think that a national average is possible if the subsamples are carefully weighted to reflect the size of their strata, see text *infra* at note 125, but Bellesiles appears to weight small frontier colonies more than the largest counties in the country (AA at 445).

45. PROVIDENCE RECORDS, *supra* note 3.

mostly from 1774.[46] Bellesiles also cites a symposium on the use of probate records,[47] which contained an article that counted guns along with other common items.[48]

> We have carefully analyzed these data sources, as well as others. We can say with confidence that gun ownership in probate inventories was high throughout colonial America in 1774—especially if one compares the ownership of guns with other common items. By 1774 gun ownership in inventories (54% of propertied white males) was already much higher than the 32.5% rate Bellesiles finds for 1858-1859. By his amorphous standards for what he calls a "national gun culture,"[49] perhaps we already had a national gun culture in 1774.

II
Controlling for Missing Information in Probate Records

1. The Incompleteness of Probate Records

Bellesiles is virtually alone among historians who work with probate records in thinking that they are more or less complete:

> It is vital to emphasize that these probate inventories scrupulously recorded every item in an estate, from broken glasses to speculative land titles to which the deceased claimed title, including those that had already passed on as bequests before death.[50]

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46. JONES, *supra* note 2. See *supra* notes 37-41.

47. Peter Benes, ed., EARLY AMERICAN PROBATE INVENTORIES, DUBLIN SEMINAR FOR NEW ENGLAND FOLKLORE: ANNUAL PROCEEDINGS 1987.

48. See Anna Hawley, *The Meaning of Absence: Household Inventories in Surry County, Virginia,* 1690-1715, in Benes, *supra* note 47.

49. Bellesiles' book raises many questions that we are not going to try to answer here, including: What is a "national gun culture"? How do we know when we had it or didn't have it?

50. AA at 109. In *Arming America*, as you can see from the quotations in the text, he raises few hints that probate inventories are not complete. Here is an eloquent general comment about the limitations in using quantitative records (AA at 262):

> Inevitably there are problems attached to the use of statistics in history. Unarguably we can never be certain how accurate or thorough are any of the records upon which we draw, no matter what the agency or its province and level of authority. Clumsiness and corruption, public resistance and noncompliance,

Probate records list every piece of personal property, from acreage to broken cups. . . . Obviously guns could have been passed on to heirs before the death of the original owner. Yet wills generally mention previous bequests, even of minor items, and only four mentioned firearms. [51]

Some inventories are more meticulous than others, though they all reported each and every object, piece of property, debt, and credit belonging to the deceased.[52]

In response to critics of his extreme position on the completeness of probate inventories, Bellesiles argues:

One critic explained the paucity of firearms in probate inventories by stating that "it is well known that the inventory of an estate is what is left after family members pick over the items." Maybe that is the way people behave in his family, but it was and remains highly illegal to ransack an estate before a court-appointed executor can conduct an inventory. Anyone who works with the probate court records from this early, perhaps more honest, period knows that exact reference was made to every item, no matter how trivial, that has been passed on to a friend or family member before the death of the testator.[53]

The *New York Times* described a similar response to a critic of Bellesiles' heavy reliance of the completeness of probate inventories:

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laziness and vague categories, the changing meaning of words and mathematical incompetence on the part of the original collectors of information—all impair our ability to claim statistical accuracy. Yet the most careful critics of quantitative methods agree that there is no real alternative to employing these records, with the proper caveats inserted. Without such efforts at quantification, we are left to repeat the unverifiable assumptions of other historians, or to descend into a pointless game of dueling quotations—matching one literary allusion against another. Far better to match an entire collection of documents with other primary materials; for instance, probate and militia records.

51. AA at 13.

52. AA at 266 (as this quotation suggests, this discussion in his book includes some qualifications about probate inventories, but they appear to refer to how meticulously the inventories describe the condition of the goods, not their existence).

53. AA at 484-85 n.132.

As for Mr. Kleck's criticism, Mr. Bellesiles said, the probate records he examined appear to record every bequest and gift of value, including those made during the life of the deceased.[54]

Bellesiles is mistaken.[55] First, land (or "acreage") was so rarely included in inventories in the South and Middle Colonies that some experts claim that it was never included.[56] The general absence of land from inventories in the South and Middle Colonies has been widely noted by historians[57] and should be obvious to anyone who has read a substantial number of inventories.

Second, inventories are far from complete lists of property owned at death, a fact noted by *every* historian we have read who works in the area[58]—and again obvious to anyone who has read a substantial number of inventories. For example, 23% of the inventories in the leading colonial

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54. Anthony Ramirez, *The Nation: The Lock and Load Myth; A Disarming Heritage*, NEW YORK TIMES (April 23, 2000), s.4, at 3, col. 1.

55. His misuse of the words "personal property" and "bequests" are not significant to our inquiry. The only significant qualification he makes is one about source material generally (AA at 262): "Unarguably we can never be certain how accurate or thorough are any of the records upon which we draw, no matter what the agency or its province and level of authority." When challenged specifically on the completeness of probate records, however, Bellesiles responded with the words, quoted in text *supra* at note 36.

56. Jones, *Estimating Wealth*, *supra* note 20, at 278 ("Real estate is not shown in the inventories of the Middle Colonies or the South.").

57. See id.; Peter H. Lindert, *An Algorithm for Probate Sampling*, 11 J. OF INTERDISCIPLINARY HISTORY 649, 657 (1981).

58. See, e.g., Hawley, *supra* note 48, at 28; Jones, *Estimating Wealth*, *supra* note 20, at 280 (1982); Lois Green Carr & Lorena S. Walsh, *Inventories and the Analysis of Wealth and Consumption Patterns in St. Mary's County, Maryland, 1658-1777*, 13 HISTORICAL METHODS 81 (1980); Daniel Scott Smith, *Underregistration and Bias in Probate Records: An Analysis of Data From Eighteenth Century Hingham, Massachusetts*, 32 WM. & MARY QUARTERLY 100 (1975); Ross W. Beales, Jr., *Literacy and Reading in Eighteenth-Century Westborough, Massachusetts*, in Benes, *supra* note 47; Bruce C. Daniels, *Probate Court Inventories and Colonial American History: Historiography, Problems, and Results*, 9 SOCIAL HISTORY 387 (1976); Lindert, *supra* note 57; Gary B. Nash, *Urban Wealth and Poverty in Pre-Revolutionary America*, 6 J. OF INTERDISCIPLINARY HISTORY 545 (1976); Jacob M. Price, *Quantifying Colonial America: A Comment on Nash and Warden*, 6 J. OF INTERDISCIPLINARY HISTORY 701 (1976); Kevin M. Sweeney, *Using Tax Lists to Detect Biases in Probate Inventories, in Benes*, *supra* note 47; Barbara McLean Ward, *Women's Property and Family Continuity in Eighteenth Century Connecticut*, in Benes, *supra* note 47, at 74-76.

database of 919 inventories include no clothes of any kind.[59] Unless at their deaths 23% of the wealthholding males and females in colonial America were *nudists every day all day long*, inventories do not scrupulously record "every item in an estate."[60] Further, it is not that estates without clothes were too poor to own them, because estates without clothes are wealthier on average than those with clothes listed.

Third, although inventories occasionally list assets no longer in the estate, there is no reason to suppose that inventories or wills mention even a substantial percentage of lifetime gifts, let alone most of them. Bellesiles offers no support for his odd supposition. Most inventories do not even list all assets in an estate; why would they list most of the assets no longer in an estate? Similarly, most wills do not even itemize all the assets being conveyed by will, why would they list most of the lifetime gifts given before making the will? Bellesiles offers no support for his farfetched ideas about what inventories and wills contain.

As Peter Lindert noted:

> Faced with the impressive detail of many inventories, one might be tempted to think that decedents' assets and liabilities have been well covered. They have not. Not only is real estate missing from most inventories, but there is also good evidence that the appraisers missed or misleadingly labeled significant parts of personal estate (i.e. total estate minus land and buildings) and most debts owed by the deceased.[61]

Appraisers might miss property, exclude it as not worth listing, or lump it with other items.[62]

Families might treat some items as family heirlooms or family property. Some items might be removed from the estate after death but

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59. Lindert, *supra* note 57, at 657 (claims incorrectly that 28% do not have clothes, when the unweighted number of estates without clothes is 22%. The weighted percentage of all wealthholders is 23% without clothes and 21% of itemized male estates without clothes).

60. Id. (makes a comment on nudism, though his % is incorrect).

61. Id. at 657.

62. See Hawley, *supra* note 48, at 28 (discussing the possibility of collusion with appraisers).

before appraisal.[63] Indeed, 70% of estates in 1774 had no cash at all, not even one penny.[64] Since very few farms were really self-sufficient, at least some cash must have been owned by most estates. Even considering poverty and a well-known shortage of money in circulation, Lindert speculates: "This probably reflected not so much the chronic colonial shortage of specie as the frequency with which cash was simply allocated informally among survivors even before probate took place."[65]

2. Anna Hawley's Study of Incompleteness in Inventories

One scholar, Anna Hawley, has suggested that guns might have been excluded by law as well as by custom.[66] She notes that because guns were required by law to be supplied by adult males as part of their militia service, in at least one state's statutes (Virginia's[67]), guns were not subject to distress or execution by law. Thus, guns might not have been required to be listed on probate inventories, since they were not available to creditors in any event.[68]

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63. See id. at 28 (discussing criminal concealment); but see Lindert, *supra* note 57, at 658 (both downplaying criminal concealment and arguing that cash was removed from estates).

64. Lindert, *supra* note 57, at 657-658 (1981).

65. Id. at 657-658.

66. Hawley, *supra* note 48, at 27-28 (Guns, on the other hand, were probably exempt by law rather than custom. . . . All free males from sixteen to sixty years of age were liable for militia duty and required by law to provide themselves with arms, powder, and shot. The act requiring this provision specified that the arms and ammunition were exempt from impressments, 'distresse, seizure, attachment or execution.' Appraisers in Surry County may have selectively omitted the guns of poor men from their inventories so that their heirs could meet their civic responsibility."). We do not know whether she is correct about appraisal practices.

67. See 3 Walter William Hening, THE STATUTES AT LARGE, BEING A COLLECTION OF ALL THE LAWS OF VIRGINIA 13-14, 335-42 (1823), cited in Hawley, *supra* note 48, at 28 n14.

68. Oddly, Bellesiles notes that guns were not subject to being seized by creditors, but says that they were nonetheless required to be probated, AA at 79-80, even though the protection of creditors was the main purpose of probate (along with title-clearing). While it is quite possible that Bellesiles is correct, his contention is not supported by evidence in the book.

Two other biases in probate records are usually noted: age bias and class bias.[69] Older people die more frequently than younger adults and may own more and different assets. Richer decedents are more likely to have their estates probated, though even the richest decedents may not have their estates probated or their inventories recorded.

Many researchers, such as Alice Hanson Jones in her study of 919 inventories from 1774, try to minimize these biases by weighting their samples.[70] Jones weights older estates less than younger estates, and adjusts her weights to try to reflect all wealthholders, not just those likely to be probated.[71] Further, presenting results by social class allows us to understand, at least partially, the influence of wealth on gun ownership. On balance, Jones thinks that inventories understate assets: "I believe that the

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69. Bruce C. Daniels, *Probate Court Inventories and Colonial American History: Historiography, Problems, and Results*, 9 SOCIAL HISTORY 387, 393-395 (1976) (biggest problem is to correct for biases—"exclusion bias" and the fact that decedents were older); Lindert, *supra* note 57, at 660 (biased samples overestimate wealth because of underrepresenting the poor); Daniel Scott Smith, *Underregistration and Bias in Probate Records: An Analysis of Data From Eighteenth Century Hingham, Massachusetts*," 32 WM. & MARY QUARTERLY 100, 104 (1975) (42% of men inventoried and 4% of women); Gary B. Nash, *Urban Wealth and Poverty in Pre-Revolutionary America*, 6 J. OF INTERDISCIPLINARY HISTORY 545, 548 (1976); Kevin M. Sweeney, *Using Tax Lists to Detect Biases in Probate Inventories*, in Benes, *supra* note 47, at 32-39; Jacob M. Price, *Quantifying Colonial America: A Comment on Nash and Warden*, 6 J. OF INTERDISCIPLINARY HISTORY 701, 701 (1976) ("Probate inventories do, however, present two basic problems: (1) how complex was the individual inventory and (2) how representative of all estates were the inventories which were recorded and survived."); id. at 701-702 ("Completeness is apparently less of a problem in the colonies."); Ross W. Beales, Jr., *Literacy and Reading in Eighteenth-Century Westborough, Massachusetts*, in Benes, *supra* note 47, at 41-42; Lois Green Carr & Lorena S. Walsh, *Inventories and the Analysis of Wealth and Consumption Patterns in St. Mary's County, Maryland, 1658-1777*, 13 HISTORICAL METHODS 81 (1980).

Less frequently noted is gender bias in probate, perhaps because it is too obvious. See, e.g., Barbara McLean Ward, *Women's Property and Family Continuity in Eighteenth Century Connecticut*, in Benes, *supra* note 47, at 75; Smith, *supra*, at 104; Sweeney, *supra*, at 36-37; Beales, *supra* at 42. The great majority of probated estates are from men, and the great majority of wealth was owned by men.

70. See JONES, *supra* note 2.

71. Jones, *Estimating Wealth*, *supra* note 20, at 282 ("My 1774 study weighted down the influence of the older decedents to estimate patterns for all living probate-type wealthholders, for which the calculation of confidence intervals is appropriate. Further extension to estimates for the living nonprobate-type wealthholders required use of death rates and assumptions about how their wealth differed from that of probate-type living wealthholders.").

American colonial inventories, at least in 1774, are more likely under- rather than over-statements of total wealth."[72]

An underused approach to assessing the frequency of individual items is to compare them with items known to have been widely owned. This is a partial solution to the problems of undercounting, grouping assets in classes, and assets disappearing from estates before counting. A substantial majority of propertied white males should have owned most of the following: Bibles, books, cups, chairs,[73] hats, knives, axes, and lighting (candles, candlesticks, or lanterns). Using control variables should allow us to determine if Bellesiles is correct that estate inventories are good places to determine ownership during life and to assess what is really a small percentage.

Although Anna Hawley's article is not about guns, she compared the frequency of common items in 221 probate inventories in Surry County, a relatively poor agricultural Virginia county, 1690-1715. She notes that in this county, the staple crops—tobacco and corn—needed to be hoed several times a year,[74] yet only 34% of Surry estates list any hoes.[75]

Hawley found that guns were the most commonly listed of the six items she counted.[76] In the middling to affluent groups (the 60% of estates ranked from the 30th to the 90th percentiles), there were the following percentages of these common items:

guns	(63-69%),
tables	(50-64%),
seating furniture	(40-68%),
hoes	(35-41%),
axes	(31-33%),
sharp knives	(18-20%).

Among the wealthiest 10%, only 4% of estates had sharp knives, but 74% had guns. None of the six items she counted were as common as guns, which appear to have been present in 50% or more of estates overall.[77]

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72. Jones, *Estimating Wealth*, *supra* note 20, at 280 (1982).

73. There is some uncertainty about how common chairs or stools actually were, especially in earlier periods.

74. Timothy H. Breen, TOBACCO CULTURE: THE MENTALITY OF THE GREAT TIDEWATER PLANTERS ON THE EVE OF THE REVOLUTION 48 (1985).

75. Hawley, *supra* note 48, at 28-29.

76. Hawley does not indicate what she considered to be a sharp knife. Id.

77. Hawley does not give an overall percentage for any item except hoes, but the number of guns (~50%) can be approximated from the numbers she does report. Id. at

As Anna Hawley argues in her analysis of Surry County, it would be a mistake to conclude that 18th century decedents did not own any particular item of property, simply from its absence in a probate inventory. To her analysis, we would add that, unless one compares the frequency of guns to other common items, one would confuse the incompleteness of inventories with a lack of ownership. In a general way, guns are very commonly listed in inventories compared to the listing of clothing, money, lighting, chairs, axes, hoes, books, Bibles, swords, and knives.

III
Counting Guns in Providence Probate Records

1. The Providence Probate Records

Three volumes of Providence probate records are part of a 21-volume set of *Early Records of the Town of Providence* published from 1892 to 1915. They are transcribed into typeset with most inconsistent and archaic spellings apparently intact and interlineations marked. As was the pattern in historical transcriptions a century ago, they are meticulously indexed at the end of each volume, including a good list of estates[78] and their contents and a good index of items mentioned, including books, knives, and guns. It would have taken a researcher only a few minutes to discover that guns were more common in the inventories than Bibles or knives or any other item primarily used as a weapon.[79] The Providence probate records are in three volumes (6, 7, and 16) starting in 1679[80] and ending in 1729, though the last inventory is for a man who died in 1726.[81]

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28. In the poorest 30% of estates, 19% of the estates of poor non-householders list guns, and 32% of the estates of poor householders list guns.

      78. The names are sometimes spelled a bit differently in the appendices.

      79. See PROVIDENCE RECORDS, *supra* note 3. The Providence records are now available on CD-ROM from HeritageBooks.com for slightly more than the cost of Bellesiles' book, making our claims (and his) easy to check.

      80. Bellesiles reports them as 1680-1730, but the last inventory in book 16 was from 1726, though the records go through 1729. We think he was just giving the approximate dates for the records he looked at. In addition, the Providence town council in 1683 asked that one earlier estate, that of Resolved Waterman who died in 1670, be added to the record book in the 1680s, which it was (6 PROVIDENCE RECORDS, *supra* note 3, at 105-107).

Bellesiles asserts about the Providence records:

[1] These 186 probate inventories from 1680 to 1730 are all for property-owning adult males, or the top quarter of Providence society. [2] Ninety of them mention some form of gun, from pistols to "a peice of a Gun Barrill." [3] More than half of these guns are evaluated as old and of poor quality. [4] Two-thirds of those inventories containing guns fall into the last 20 years of this fifty-year period, after the distribution of firearms by the British government to the New England militia in Queen Anne's War. [5] A great many inventories explicitly list "one of ye Queens armes," which officially still belonged to the government. . . . [6] Fifty-one of these ninety men owned one gun of some kind, twenty-five owned two, nine held three, three owned four guns, and two owned five guns. [7] Four of the five men holding four or five guns were militia officers. [8] If one could imagine these 186 men as a militia company, half would be unarmed and a third armed with guns that were broken or too old for service. . . .

[9] It is hard to imagine that Epenetus Olney felt a strong attachment to his only gun, "an old short Gunn without a lock," or John Whipple to his only weapon, "a pistol without a lock." [10] Nor could William Ashley give his "Queenes Arm" to his son, since it officially remained government property. [11]Just two of the 186 wills accompanying these probate files specifically mention a gun . . . .[82]

Nearly every statement in this passage is mistaken or misleading. The first sentence contains three errors—the number of inventories, the dates of those inventories, and the gender of the decedents. Bellesiles appears not to have noticed that 17 of the decedents leaving inventories were females.[83]

There are also a few probate records scattered through the other 18 volumes in the series, but there is only one inventory in those other volumes, an inventory without a gun that we included in our analyses (but probably wasn't in Bellesiles' study) (Estate of John Mathuson, 13 PROVIDENCE RECORDS, *supra* note 3, at 32).

81. As Bellesiles probably did, we also include the Waterman inventory from 1670.

82. AA at 109-110.

83. In just volume 16 of the PROVIDENCE RECORDS, *supra* note 3, see the estates of Mary Borden (at 60), Sarah Clemance (at 420), Abigail Hopkins (at 410), Joanna Inman (at 236), Mary Inman (at 146), Tabitha Inman (at 238), Ann Lewes (at 429), Rachal Potter (at 346), Elizabeth Towers (at 278), Hannah Wailes (at 165), Anna

The 2nd sentence (finding 90 estates with guns) is not far from our careful count of 94-96[84] estates with guns, but any implication that including gun pieces increased the number of estates would be unwarranted. Every estate with a gun piece also had a gun. Further, the implicit proportion of estates with guns—90 of 186 (48%) male estates with inventories recording each item of personal property—is far from the 94 of 149 such estates (63%) that we find.[85]

The 3rd sentence is grossly mistaken. The majority of guns are not listed as old or in poor condition. Only 10% of itemized male Providence estates listing guns list any of them as old or broken, comprising about 9% of the total guns.[86] The next sentence implies that gun ownership was rising at the end of the period, when it was falling.[87] The final third of estates (1720-1726) had the lowest gun ownership rates.[88]

The 5th sentence says that "A *great many* inventories explicitly list 'one of ye Queens armes,'"[89] when only one estate listed any.[90] In the 6th and 7th sentences, the counts of guns in Providence estates are mistaken, but are close enough to suggest that Bellesiles indeed read the records. Among the 7 estates with 4-8 guns, however, only two decedents are listed as military officers and another one is a woman who owned 5 guns, Freelove Crawford.

The 8th sentence contains three mistakes: the number of male estates, the percentage with guns, and especially, the condition of those guns. While

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Whipple (at 370), Susanna Whipple (at 174), Mary Whiteman (at 70), and Lydia Williams (at 341). These are obviously women, not men. Yet Bellesiles tells us, "These 186 probate inventories from 1680 to 1730 are all for property-owning adult males . . . ." (AA at 109).

84. Our count is 94 itemized adult male inventories listing guns. There is another gun in a male estate without a sufficiently itemized inventory and a female estate with 5 guns (thus 96 estates had guns).

85. A small portion of the difference is due to our exclusion of four estates that were not sufficiently itemized.

86. We counted 15 guns listed as old or broken in 9 estates, out of roughly 168 guns in the 149 itemized male inventories. In addition, there were also 2 guns in an estate without sufficient itemization (Estate of B. Hearnden, 7 PROVIDENCE RECORDS, *supra* note 3, at 93) and 5 guns in a female estate (Estate of Freelove Crawford, 7 ID. at 117)—all 7 additional guns were not listed as old or broken.

87. See *infra* at Chart 1.

88. See *infra* at Chart 1.

89. AA at 109 (emphasis added).

90. 6 PROVIDENCE RECORDS, *supra* note 3, at 188 (O. Browne). Browne's estate also has 3 other guns.

literally true, the 9th sentence is misleading. The two examples of broken guns quoted by Bellesiles (which are presented as illustrative of the supposedly mostly old or broken guns) are the *only* broken guns in over 160 guns in the Providence Records.[91] As to the 10th sentence, William Ashley did not have a Queen's Arm in his estate; only Obadiah Browne had a Queen's Arm (and his will, if any, is not recorded)—and he had three other guns to pass to his family.

Bellesiles' last sentence states that just two of the 186 wills accompanying the probate files list a gun. Although there are actually three wills (not two) listing a gun,[92] the staggering misstatement is that there were 186 wills. Most people in the Providence Records did not leave a will printed in the records. Of the 149 itemized males inventories, about 73 left wills.[93] Indeed, intestacy was common then[94] and was frequently noted in the records.[95] It is hard to see how Bellesiles could have miscounted so many wills. How does one see intestate estate after intestate estate and see dozens of wills where there are none and never were? Bellesiles' mistakes go, not only to trivialities, but to the heart of the matter—the frequency and condition of guns and the sorts of people who owned them.

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91. There are an additional 13 guns listed as old.

92. See 7 PROVIDENCE RECORDS, *supra* note 3, at 173 (W. Vinsent); 16 ID. at 179 (J. Jenckes); 16 ID. at 188 (J. Whipple).

93. Only about 86 estates even mention both a will and an inventory in the indices to the three volumes. Both wills and itemized inventories appear in about 81 estates, of which 8 are female, leaving about 73 estates (out of 149) with both wills and male itemized inventories. Whatever the count, it is fewer than 90 estates, not 186, as Bellesiles contends. The likeliest source of the error is that Bellesiles failed to note the number of estates with wills and just assumed that there were 186 wills, mistakenly thinking that everyone leaves wills and that the Providence records are perfectly complete. Our counts here are approximations, since wills were not part of our analyses.

94. See 3 JONES, *supra* note 2, at 1933 (494 of the 919 decedents died intestate); Jones, *Estimating Wealth*, *supra* note 20, at 278 ("There is not a will for every inventory; inventories were made for many intestates as well as testates.").

95. Less than half of the Providence inventories were accompanied by wills. See, e.g., most of the first few estates in volume 16 of PROVIDENCE RECORDS, *supra* note 3: ID. at 12 ("John Mathewson . . . Dyed Intestate"); ID. at 14 ("Stephen Arnold . . . dyed Intestate"); ID. at 17 ("James Appleby . . . Died Intestate"); ID. at 28 ("Jonathan Knight . . . Dyed Intestate"); ID. at 31 ("Thomas Field . . . Dyed Intestate"); ID. at 33 ("Richard Lewes . . . Dyed Intestate"). For other mentions of people dying intestate, *see, e.g.,* 7 PROVIDENCE RECORDS, *supra* note 3, at 32, 53, 45, 65, 69, 106, 109, 112, 139, 142, 145, 152, 157, 179, 205; 16 ID. at 9, 37, 45, 62, 63, 73, 92, 97, 120, 121, 124, 156, 159, 167, 175, 197, 199, 228, 241, 246, 248, 279, 286, 312, 316, 332, 343, 358, 366, 373, 377, 380, 425, 428, 430, 441, 446, 448, 457, 462, 467, 468).

2. Widespread Ownership of Guns in Providence

Besides some guardianships and miscellaneous matters, there are about 186 decedents' estates.[96] Of these, 17 of the decedents leaving inventories are female[97] (only one of whom owns guns[98]). Over a dozen decedents' estates contain no inventory at all or no personal property inventory. One reason for having only a real estate inventory[99] besides bad record-keeping or inconsistent law enforcement is what today is called ancillary probate. If you die as a resident of another state but still own real estate in your former town, you would probate your personal assets in your new home state, but still need ancillary probate of your real estate in your former home. It would have been a mistake to list guns on real estate inventories and none are in Providence.

There were actually only 153 male estates with personal property inventories (not 186).[100] One of these is explicitly listed as incomplete, since the estate was looted by the father-in-law of the decedent.[101] Three others do not have any substantial itemization of personal household goods.[102] Thus,

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96. As stated before, precisely how many decedents' estates there are depends on how you count them—that is, how much has to be in a record to count it.

97. See, e.g., 16 Providence Records, *supra* note 3: Mary Borden (at 60), Sarah Clemance (at 420), Abigail Hopkins (at 410), Joanna Inman (at 236), Mary Inman (at 146), Tabitha Inman (at 238), Ann Lewes (at 429), Rachal Potter (at 346), Elizabeth Towers (at 278), Hannah Wailes (at 165), Anna Whipple (at 370), Susanna Whipple (at 174), Mary Whiteman (at 70), and Lydia Williams (at 341).

98. Estate of Freelove Crawford, 7 PROVIDENCE RECORDS, *supra* note 3, at 117-120.

99. See, e.g., 16 ID. at 322 (J. Crawford); 16 ID. at 126-127 (R. Waterman); 6 ID. at 31 (T. Suckling); 6 ID. at 30 (W. Fenner).

100. We excluded a few cases missing inventories, which had some form of partial property list as a property distribution or account. See, e.g., 16 ID. at 421 (a second R. Waterman); 16 ID. at 128 (J. Dexter).

101. Estate of Jonathan Randall, 16 PROVIDENCE RECORDS, *supra* note 3, at 359-360.

102. One does not itemize any personal property beyond cattle, corn, and feed, using only general language for three rooms of household goods. Estate of James Mathuson, 6 PROVIDENCE RECORDS, *supra* note 3, at 70-71. In its first inventory, another estate itemizes a few pieces of agricultural business property, but not any household property, using the broad general language: "household goods." In a supplemental inventory, a gun was added. Estate of Benjamin Hearnden, 7 ID. at 93. Even though that estate listed one gun, the estate lacked sufficient itemization to include

of the 153 adult males estates with personal property inventories, 149 had usable responses meeting Bellesiles' general description of the Providence estates: all adult males with inventories purporting to be nearly complete itemized lists of personal property.[103]

Counting only guns, there are 94 estates (63%) out of 149 that have guns of some kind. If we included gun parts, such as "a peice of a Gun Barrill," the numbers would not change—still 94 of 149 estates have guns. Only nine estates have any guns listed as old or in poor condition; one of those estates also has four apparently working guns.[104] Thus, fully 91% of the estates with guns and 58% of the 149 estates have guns that are not listed in pejorative terms. Of course, that does not mean that these guns were actually in good working condition, only that they were not listed as old or in poor condition.

Bellesiles also implied that the probate records show increasing gun ownership over time.[105] Contrary to Bellesiles' interpretation of the Providence data, gun ownership drops slightly over the period of the Providence records.[106] As Chart 1 shows, guns are more common in the earlier years of the period (63-71% of estates) than in the later years. The 50 estates after 1720 contain only 52% guns.

Using exploratory data analysis to determine preliminarily which wealth levels were associated with owning guns, we determined that estates under £50 (the smallest 19% of estates) had fewer guns, but wealth had no

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it in our study. Another lists land, bonds, and "apparrill," but has no itemized personal estate. Estate of John Steere, 16 ID. at 367.

103. We included the Estate of Toleration Harris, 6 PROVIDENCE RECORDS, *supra* note 3, at 38-39, 95-96, where not all the personal property had been collected or valued, but they did attempt to itemize it; further, although one might rationally seriously doubt the completeness of such an estate, there is no actual statement that the property listed is incomplete, just not yet collected, viewed, or appraised.

104. Nearly 10% of estates have any guns listed as old or broken; about 9% of total guns were so listed.

105. AA at 109-110 ("Two-thirds of those inventories containing guns fall into the last twenty years of this fifty-year period, after the distribution of firearms by the British government to the New England militia in Queen Anne's War.").

106. Compared to the earlier period, gun ownership drops significantly in the last 20 years (1707-1726) of inventories (from 66% of estates to 62% of estates). The two decades from 1711 to 1730 show an insignificant 1% drop in guns from the earlier period.

Chart 1: Frequency of Estates Listing Guns by Time Period and by Value of Estate

149 Providence Itemized Male Inventories, 1670, 1679-1726

Category	% of estates with guns
1670, 1679-1699 (n=21)	67%
1700s (n=16)	63%
1710s (n=62)	71%
1720s (n=50)	52%
Assets <£50 (n=28)	32%
Assets >£50 (n=121)	70%

% of estates with guns
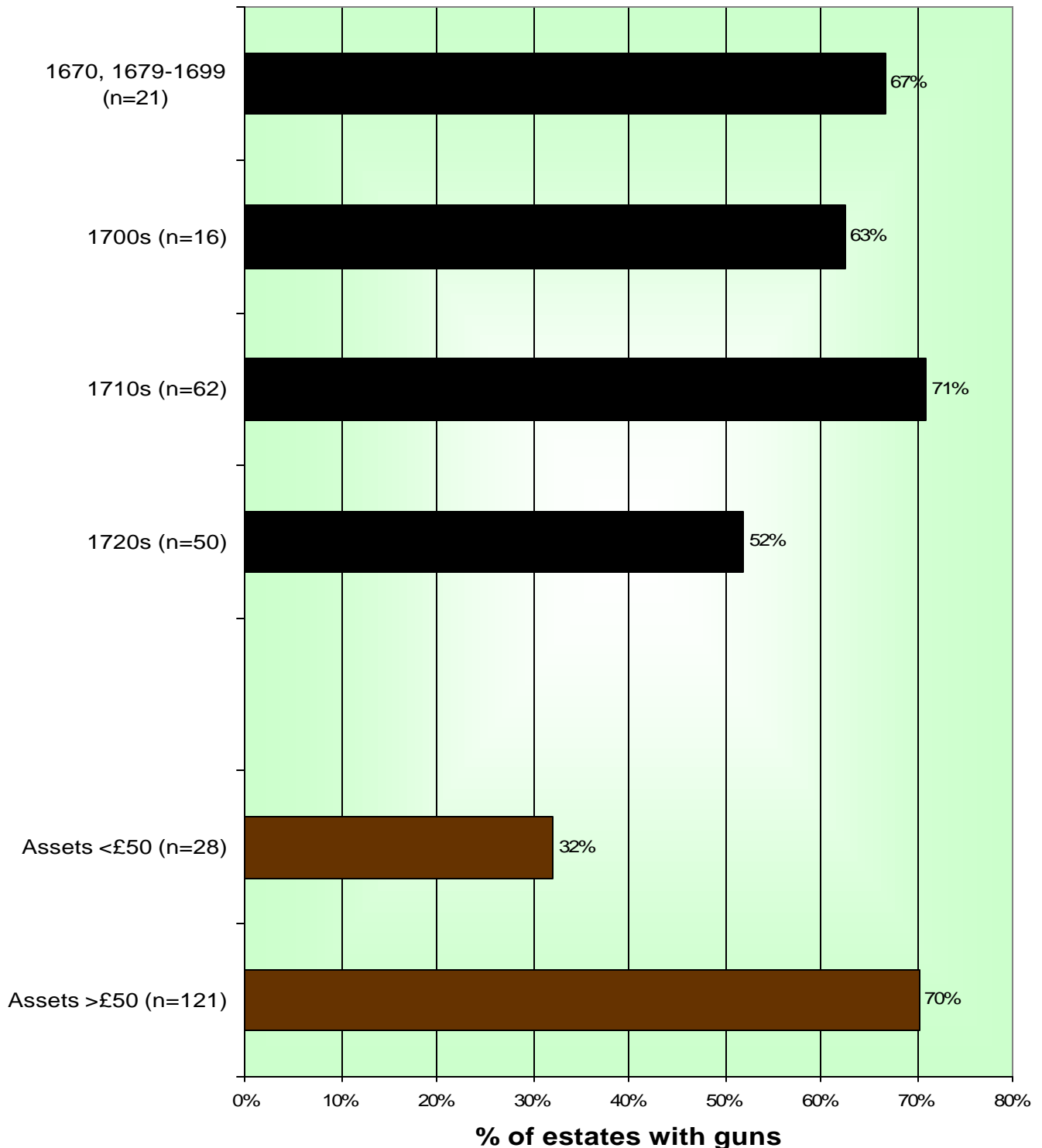
large effect above that low threshold level.[107]   We then recoded all Providence estates into two groups—those with less that £50 in assets and those with more.

Chart 1 also shows that only 32% of inventories for the poorest fifth[108] of estates listed guns among the assets. Among the other 4/5[ths] of estates, 70% listed guns. This suggests that gun ownership among the poorest property-owners was moderate, while guns were extremely common among the bulk of Providence estates. These data are consistent with an interpretation that guns were not a luxury good, but rather an expensive staple that only a third of the poorest estates could afford, but that a solid majority (70%) of middle and upper class estates owned.

One troubling aspect of Bellesiles' interpretation of gun ownership, which cuts across his discussions of probate records and gun censuses is his conversion of the gun ownership percentages of white males to the general population. He is correct that only about one-quarter of the population in Providence were white males age 16 or older (25.3% in 1790). What he fails to discuss is that another quarter of the population are white males under the age of 16 (22.3% in 1790), who in 20 years or less will own guns in approximately the same percentages as their elders did.[109] You would not assess the level of marriage or land ownership in early America by counting children who would marry or own land when they were adults as not marrying or owning land. The question of gun ownership is relevant not for the issue of ownership but for access.

The average family size in the 1790 census in Providence was 6.1 people and it ranged from 5.7 to 6.2 throughout the Northern states in 1790.[110] Thus, in Providence there were more than twice as many white

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107. For this analysis, we used the totals in the inventories themselves, recoding them into five groups. Where it could be easily done, we totaled short lists of assets and added assets in supplementary inventories. We did not total long inventories, where the inventories themselves did not do so. Because of supplementary inventories, probable inconsistencies in adding real estate assets to estate totals, and the confusion of subtotals in their texts, our exploratory analysis should not be considered reliable. Once the decision was made to dichotomize the asset variable, all estates were fairly reliably assigned into the two groups, notwithstanding the classification problems mentioned.

108. Actually, it is the poorest 19% of estates—with assets below £50 in value.

109. U.S. Census, 1790.

110. Id. It appears that family sizes were even larger early in the 18th century. Duane A. Ball, *Dynamics of Population and Wealth in Eighteenth-Century Chester County, Pennsylvania*, 6 J. OF INTERDISCIPLINARY HISTORY 621, 633 (in Chester County, PA, average family size declined by more than two persons from the beginning of the 18th to the end of the 18th century).

males over the age of 15 as there are families. If white males were evenly distributed among families, the average family would have three white males, half of them over the age of 15. If at least 63% of adult white males owned guns and they were distributed about evenly across households (which they would not be), nearly all families in Providence had guns, since very few people lived in families of one (less than 1% of people in 1790 Providence). Further, most adult females and most children of both sexes lived in households with adult white males.

The fact that a typical Providence household had three white males may also explain why these probate records show as few guns, knives, chairs, candles, candlesticks, and Bibles as they do. Why not treat some of these things as belonging to the family or household, rather than to the decedent? A possible partial corrective for this problem, using controls, is explored in the next section.

3.   Introducing Control Variables: Other Common Items

As historians using probate records have often noted, probate inventories are incomplete. Quite aggressively, Bellesiles claims that items were not often removed from estates after death; that people made few lifetime gifts not mentioned in wills or inventories; that inventories itemize each item of personal property; and that early Americans owned axes, knives, and books, but few guns.[111] These claims can be explored by comparing gun ownership to that of other commonly owned items.

It is widely believed that many propertied white males were religious and could read, especially in the later colonial period,[112] so Bibles should be common and other books even more common, though not necessarily as universal as the other items. Also, Bibles have the heirloom quality that the pro-gun scholars sometimes claim that guns had. Thus, if Bibles are much more common than guns in these probate inventories, the heirloom explanation for the absence of guns would fall.

Bellesiles says that early Americans used knives, swords, and axes as weapons because they owned few guns. It is therefore instructive to look at swords and rapiers, as well as knives, axes, and hatchets.

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111. See text *supra* at notes 50-77.

112. Jon Butler and others have inquired just how religious Americans were. See Jon Butler, RELIGION IN COLONIAL AMERICA (2000); Jon Butler, THE REVOLUTION BEFORE 1776 (2000). See also Frank Lambert, INVENTING THE "GREAT AWAKENING" (1999).

Chart 2: Frequency of Estates Listing Various Items
149 Providence Itemized Male Inventories, 1670 & 1679-1726

Item	Percentage
Chairs, Stools, and Furniture	79%
Chairs or Stools	73%
Axes and Hatchets	65%
Any Books	64%
Guns	63%
Candles and Lighting	60%
Knives	36%
Bibles	32%
Edge Weapons	30%
Cups, Mugs, and China	21%
Hats and Caps	15%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90%
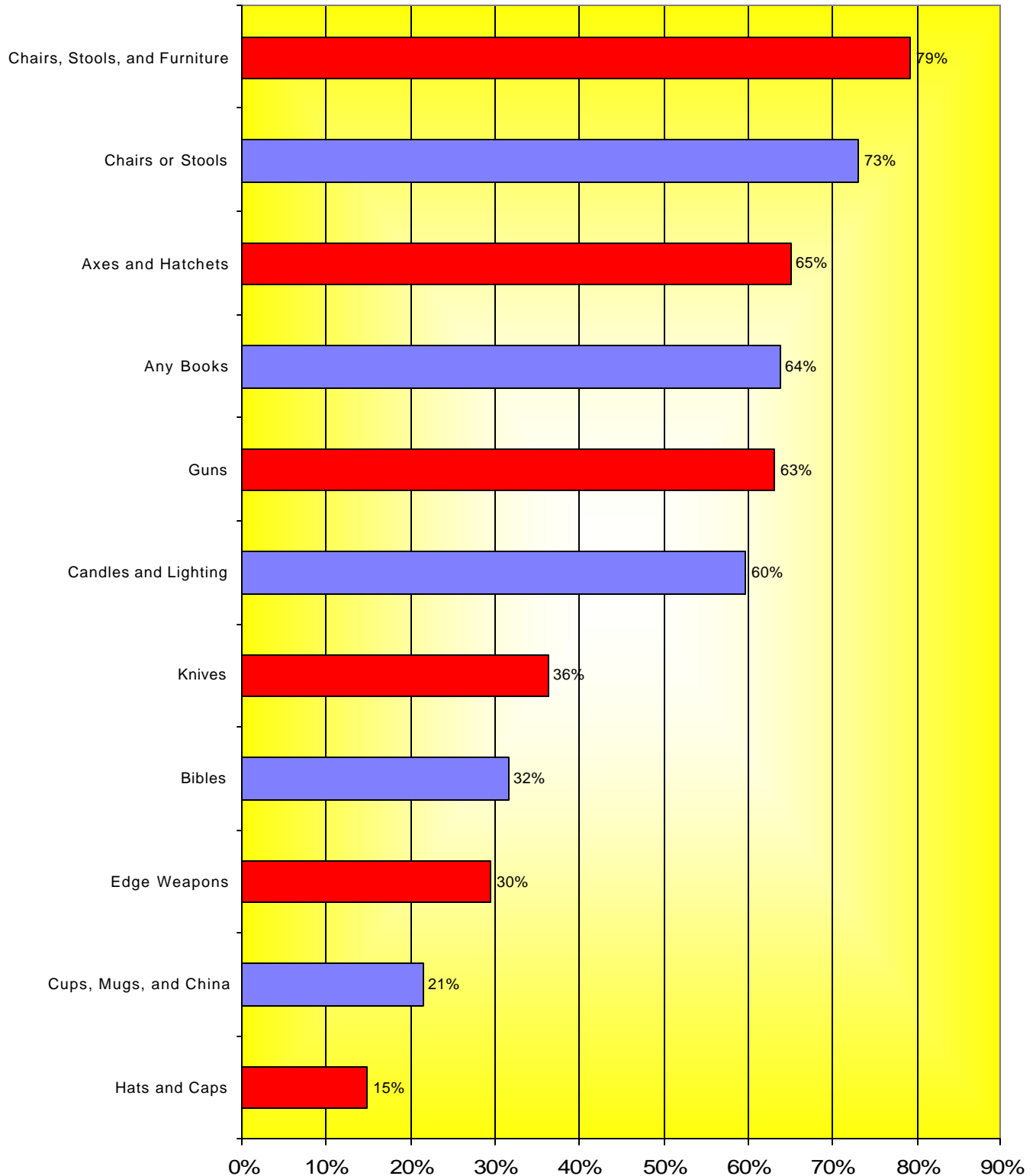
As Chart 2 shows, guns are extremely likely to be listed in Providence estates (63% of itemized male inventories list them), compared to other commonly owned objects. Thus if axe and knife ownership was near universal in Providence, then gun ownership was probably near universal as well, since guns are as commonly listed as axes (65%) and more commonly listed than knives of all kinds, including table knives (36%). If one compares gun ownership (63%) with the ownership of swords, cutlasses, bayonets, and other edge weapons (30%),[113] the difference is particularly striking. Indeed, the odds of finding a gun in a colonial Providence inventory are 4.1 times as high as the odds of finding a sword or other edge weapon.[114]

Guns were as commonly listed in Providence estates (63%) as all lighting items combined (60%): candles, tallow, candlesticks, oil, lamps, and lanterns. Gun ownership is as common as book ownership (62%) and much more common than the ownership of Bibles (32%). It should be noted that the low totals for hats and caps (15%) are mostly the result of the very common use of general language (e.g., wearing apparel) in describing clothes. As for chairs and stools, even when we include the general language "furniture," the percentages remain lower than expected (79%).

The high but far from universal itemization of most of these extremely common items of personal property suggests that Providence probate

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113 . Here we are treating axes, hatchets (which were much less common than axes), and knives, not as edge weapons, since this was not their primary purpose. Bellesiles presents a small amount of evidence to support his conclusion that axes were frequently used as weapons, but far less than he provides that guns were weapons, evidence that he vigorously discounts. Unlike hatchets, which can be wielded with one hand and thrown, axes required two hands and were probably used almost exclusively for attacking stationary targets, such as trees and logs—but we could be wrong. Our classification of axes, hatchets, and knives is the conventional one, since neither Alice Hanson Jones, nor the Gunston Hall database, classify them as weapons. (Very few knives are listed in terms suggesting that they were used for hunting.) Tomahawks, of course, are always treated as weapons. We might be wrong to follow the conventional classification of experts on colonial property items. Yet most of the sources Bellesiles cites in his book do not support his claim that people favored axes over guns for hunting and battle. We hope that this open question will be resolved by other researchers.

114. Odds-ratios (and log odds-ratios) are the staple of categorical data analysis in the social sciences—being the heart of both logistic regression analysis and of more sophisticated categorical techniques, such as hierarchical loglinear analysis. Although less intuitive than percentages for all but frequent gamblers, odds-ratios and log odds-ratios have more powerful statistical properties for modeling ratios. Computing the odds-ratio expressing the ratio between 63% gun ownership (1.7 to 1 odds) and 30% edge weapon ownership (.42 to 1 odds) is: $((.63/(1-.63))/ (.30/(1-.30)) = 1.7/.42 = 4.1$.

inventories probably do not accurately reflect the actual ownership patterns of decedents, at least without using control variables. Untethered, free-floating estimates of the ownership of particular items, such as Bellesiles' gun estimates, are (in our opinion) a misuse of this fallible source. Only relative numbers make much sense. When Bellesiles says that people in early America used knives because they had few guns, you would think that knives (which almost every propertied household must have owned for non-weapons uses) would be in 80-95% in the inventories, if inventories were complete records of property owned at death. At least in Providence, only 36% of the records show knives.

We then performed multivariate analysis to determine which variables predicted listing guns in probate inventories. Tables 1 and 2 show the results of hierarchical loglinear modeling. This is a sophisticated modeling technique that tries to fit the simplest model accounting for almost all of the variation shown between variables. It involves fitting a model with interactions between all levels of all variables in the model and then backing out the insignificant and meaningless interactions.

This technique has several advantages, even compared to most other multivariate techniques (such as logistic regression).[115] First, it tests all interactions at all levels of all variables, not just a defined set of 2-way interactions between predictors, then successively removes insignificant or meaningless multiple interactions to yield the final model. Second, with hierarchical loglinear modeling, researchers often use a Bayesian criterion (BIC) to eliminate statistically significant but weak relationships. Since statistical significance is so dependent on sample sizes, it is good to have an objective criterion (BIC) to aid researchers in their ultimate (non-statistical) task of assessing theoretical importance. Third, highly complex models can be expressed in extremely simple notation.[116]

Both tables report results of models predicting whether an itemized male inventory in Providence contains a gun. Table 1 shows that the odds of listing a gun in the richest 81% of estates (those with assets exceeding £50)

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115. In sophisticated demographic research, loglinear analysis has become more common than regression analysis.

116. Although simple, the notation is opaque to the uninitiated. For example, consider the model: YF,YA,FEDCBA. Although the specification of this model is brief, it actually specifies one dependent variable Y, two direct predictor variables A and F, and dozens of 2-way, 3-way, 4-way, 5-way, and 6-way interaction variables between the six possible predictor variables A, B, C, D, E, and F. A model that would normally take a full page to list all its dozens of interaction variables takes only 10 letters and 2 commas to specify.

is 5 times as high as the odds of the lowest 19% of estates listing a gun (controlling for all interactions between the predictor variables). None of the other variables make a meaningful direct contribution to accounting for the variance in the data.

After converting the year variable from four categories to two, in Table 2 we show that two variables are significant and meaningful. The odds of having a gun are 5 times as high if an estate has more than minimal assets (>£50) than if it doesn't and about 2 times as high[117] if an estate is from the decades before the 1720s rather than from the 1720s. None of the other variables make a meaningful direct contribution to accounting for the variance.

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117. This is actually based on the exponent of the absolute value of the result for being from the 1720s. Thus, it is approximate. More precisely, based on the model actually fit, the relative odds of a 1720s estate listing a gun are only 49% as high as the odds for earlier estates.

Table 1
Hierarchical Loglinear Modeling
Providence Male Itemized Estates

Sample: N=149 males, 1670, 1679-1726

Dependent Variable:
       Y: gun (None, Listed)

Independent Variables:
       A: years (<1700,1700s,1710s,1720s)
       B: value of assets (<£50,> £50)
       C: axe or hatchet (None, Listed)
       D: chair or stool (None, Listed)
       E: cup, mug, or china (None, Listed)
       F: edge weapon (None, Listed)

Most Parsimonious Model: [YB][FEDCBA]   **G^2=74.4, 126 df, p<1.00**

- Testing the Deletion of YB (gun-assets):
  [FEDCBA][Y]
  G^2=88.1, 127 df, p<1.00 Change: 13.7, p≫.000, G^2/df:13.7

	Log-odds Ratio	**s.d.**	**Exponent (Relat. Odds)**
YB (gun-assets)	**1.61**	**.45**	**5.0**

Interpretation: Controlling for all interactions between the predictor variables, the odds of listing a gun are 5 times as high if an estate has more than minimal assets (>£50) than if it doesn't. None of the other variables make a meaningful direct contribution to accounting for the variance.

Table 2
Hierarchical Loglinear Modeling
Providence Male Itemized Estates

Sample: N=149 males, 1670, 1679-1726

Dependent Variable:
       Y: gun (None, Listed)

Independent Variables:
       A: years (<1720, 1720s)
       B: value of assets (<£50, > £50)
       C: axe or hatchet (None, Listed)
       D: chair or stool (None, Listed)
       E: cup, mug, or china (None, Listed)
       F: edge weapon (None, Listed)

Most Parsimonious Model: [YA][YB][FEDCBA] G^2**=37.9, 61 df, p<.99**

- Testing the Deletion of YA (gun-years):
   [FEDCBA][YB]
    G^2**=45.5, 62 df, p<.94**   **Change: 7.6, p<.006,** G^2**/df:7.6**

- Testing the Deletion of YB (gun-assets):
   [FEDCBA][YA]
    G^2**=55.3, 62 df, p<.71**   **Change: 17.4, p**➹**.000,** G^2**/df:17.4**

	Log-odds Ratio	s.d.	Exponent (Relat. Odds)	Exponent (of Abs. Value)
YA (gun- years)	**-.71**	**.36**	**.49**	**2.0**
YB (gun-assets)	**1.60**	**.45**	**5.0**	**5.0**

Interpretation: Controlling for all interactions between the predictor variables, the odds of having a gun are 5 times as high if an estate has more than minimal assets (>£50) than if it doesn't and about 2 times as high if an estate is from before the 1720s than if it is from the 1720s. None of the other variables make a meaningful direct contribution to accounting for the variance.

Comments on additional models: Examining only the 121 estates (~4/5[ths] of estates) with over £50 in assets and controlling for all interactions between the same predictor variables, the odds of having a gun are about 2.5 times as high for the 2/3[rds] of the estates in decades before the 1720s than for the 1/3rd of the estates from the 1720s. None of the other variables make a meaningful direct contribution to accounting for the variance.

IV
Counting Guns in 1774 Colonial America

While the Providence data are excellent for showing high levels of gun ownership in one New England town in one period, the more relevant question is: What was the pattern of gun ownership throughout the country? Fortunately, we can build on the extraordinary collection of 919 probate inventories from 1774[118] that Alice Hanson Jones published in 1978. Not only is this a large collection of published inventories transcribed from handwritten records, but Jones took extraordinary steps to achieve a representative sample of the entire wealthholding population of the country in 1774.[119] She then weighted each inventory to account for her sampling design, the age distribution of the population, and the likelihood of being probated. This allowed her to generate wealth and property ownership estimates for the wealthholding population and the probate-type wealthholding population. Since the entire wealthholding population is a larger part of the U.S. population than the probate-type wealthholding population, we have used weights for the wealthholding population (even though this results in about 2% lower gun ownership than if we used the probate-type population). The counts and percentages in our charts are weighted to match the wealthholding population of the Thirteen Colonies in 1774.

In *Arming America,* Bellesiles cites Jones' book[120] but does not disclose that he included her data in his totals in his Table 1 for 1765-90.[121] In his 1996 *Journal of American History* article,[122] however, he gives exactly the same percentages in each cell for the 1765-90 period as he republished in his book, saying in the 1996 article that he included the Jones

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118. See JONES, *supra* note 2. For a few counties, her sample includes some inventories from 1773 and 1775 (and in New York, 1772), but the overwhelming majority come from 1774.

119. The sampling consisted mostly in selecting which counties to sample. It appears that in only one of the counties in her study (Suffolk, MA) did she select less than all the inventories within her date window. There she apparently used a random number table to select at random 100 inventories to study. There were also 102 inventories from Essex, MA, which might have resulted from random selection.

120. AA at 530 n.16.

121. AA at 445.

122. Michael A. Bellesiles, *The Origins of Gun Culture in the United States*, 1760-1865, 83 J. OF AMERICAN HISTORY 425, 427-428 (1996).

data,[123] as well as data from other unnamed sources. From Bellesiles' list of counties used,[124] it appears that he indeed used the Jones data, using exactly the same 26 counties as Jones did for every state, adding a few counties from other states (some presumably for later years): Vermont, Georgia, Ohio, Indiana, California, and two additional counties in Pennsylvania. Bellesiles, however, apparently excluded one set of 23 estates in Jones' database, her small sample from the entire state of New York. Thus, probably 896 of Jones' 919 inventories should have been included as part of Bellesiles' low count of only 14.7% 1765-90 estates listing guns.

The picture that Bellesiles paints of less than 15% gun ownership in the 1765-1790 period does not match the Jones data for 1774. Guns were common in 1774 estates, even in admittedly incomplete probate records—overall, 50% of all wealthholders in the Thirteen Colonies in 1774 owned guns.[125] Among male probate-type wealthholders, 54% owned guns listed in their estates. Moreover, guns were mostly in good condition. About 87% of itemized male estates with guns listed at least one gun that was not listed as old or in poor working condition.

Not all of these estates have itemized inventories of personal property including household property. For example, an estate that lists only real estate or "house and its contents," or only crops and farm implements, is not sufficiently complete to count as an itemized estate. If one sets aside just these 30 estates without substantial itemization and the 81 female estates,[126] that leaves 813 itemized male estates.[127] Charts 3-5 set out characteristics[128] of these itemized male estates.

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123. Id. at 428 ("Integrating Alice Hanson Jones's valuable probate compilation into this general study"). See text and notes *supra* at notes 37-41.

124. AA at 445.

125. In all, 52% of male colonial wealthholders in 1774 had guns, while 18% of female wealthholders had guns. If we exclude estates that have no significant itemization of personal property, 54% of male wealthholders' estates have guns, and 19% of female wealthholders' estates have guns.

126. Five of these 81 female estates are unitemized.

127. This includes one free African-American who owns slaves but not a gun.

128. Jones coded each item in the Middle Colonies (except New York) in one database and the general characteristics of each estate from all regions in several other databases (including gender, apparel, and wealth). We further coded the individual items (guns, edge weapons, etc.) from the inventories of New England, New York, and the South ourselves, but used Jones' coding and description of individual items (including guns) for the Middle Colonies from her itemized database. We then combined these data into a single database, using her weights for each estate as well as her data. Our statistics assume that her stratified probability sample was as effective as a simple random sample

Chart 3: The Frequency of Various Items in Itemized Male Estates, 1774

Source: Alice Hanson Jones, 1978, n=813

Item	%
gun	54%
gun (not old)	47%
edge weapon	14%
clothes	79%
cash	30%
any book	62%
any religious book	27%
bible	25%

% of estates owning an item
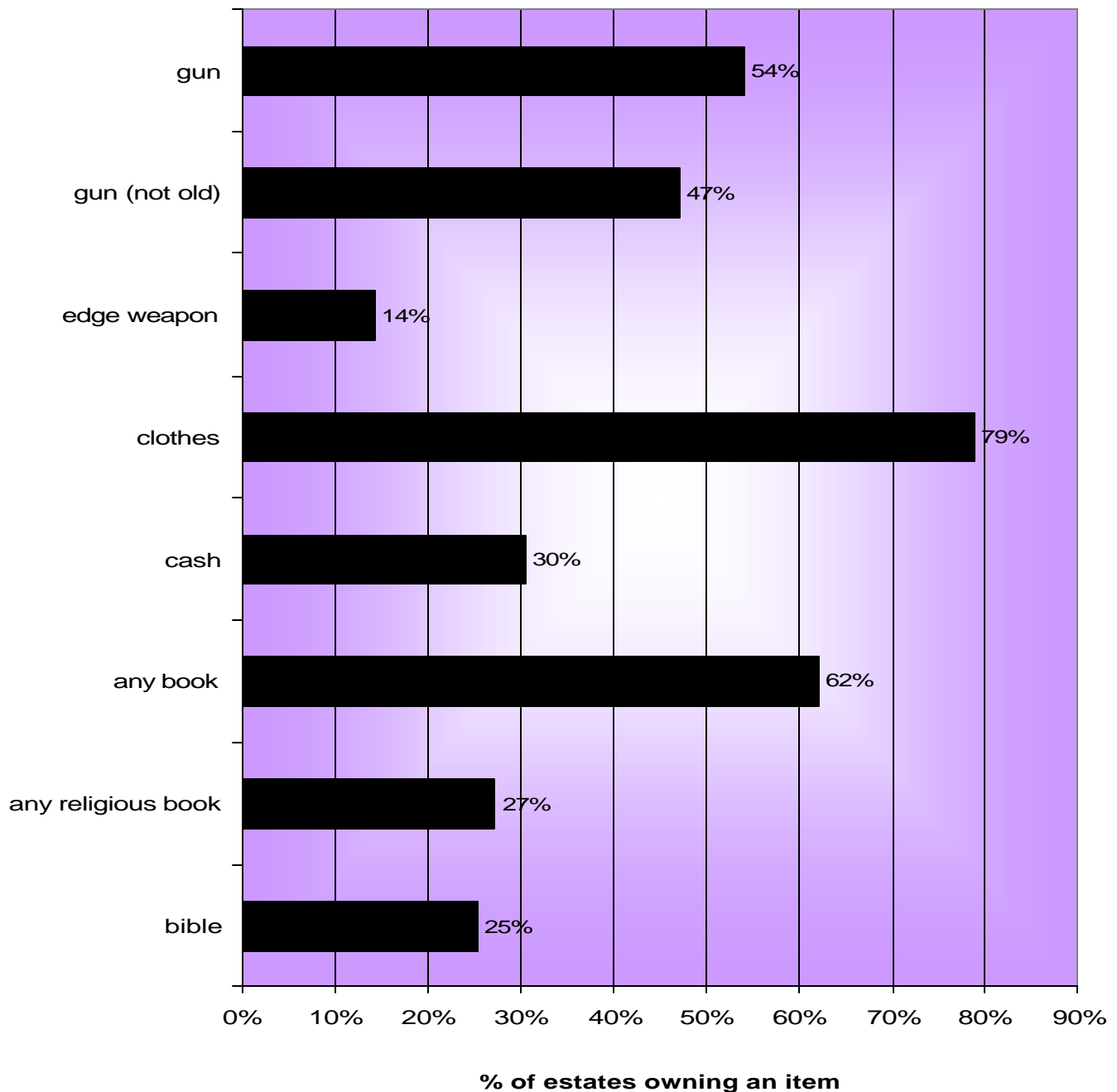
(SRS) (since no design effect was noted), but our hierarchical loglinear modeling applies a higher test (BIC) for effects large enough to be meaningful. Because her sample is very probably less effective than a SRS (especially for the estimates of wealthholders rather than probate-type wealthholders), one should look more at the strength of relationships than at statistical significance.

Chart 4: The Frequency of Guns in Itemized Male Estates
by Various Characteristics, 1774
Source: Alice Hanson Jones, 1978, n=813

Category	% of estates with guns
prod. durables>£27.5 (n=437)	69%
few durables (n=376)	37%
age unknown (n=117)	46%
25- (n=39)	40%
26-44 (n=454)	56%
45+ (n=202)	58%
slaves (n=146)	81%
slaves <£825 (n=85)	46%
no slaves (n=581)	48%
livestock (n=676)	60%
no livestock (n=137)	22%

% of estates with guns
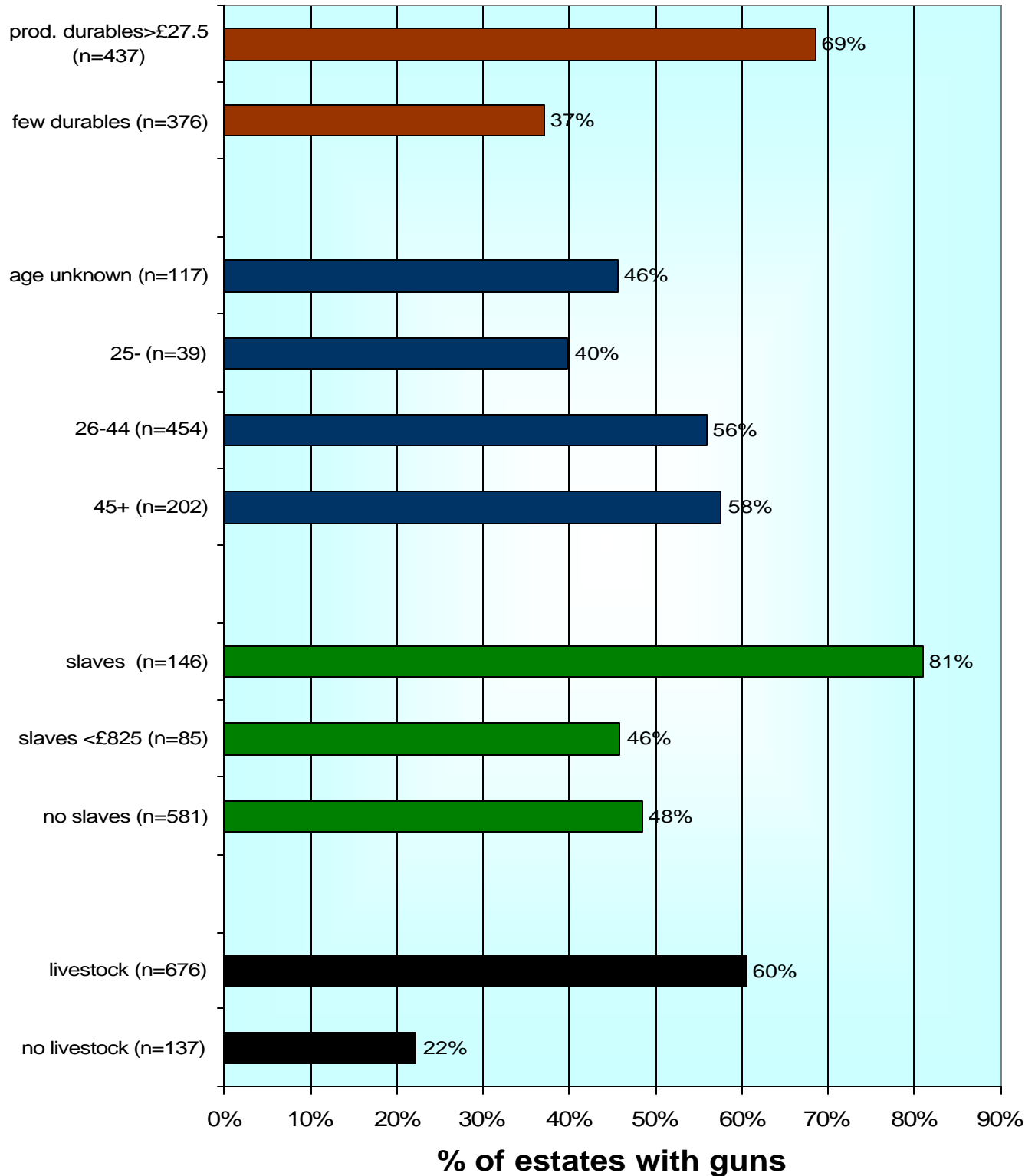
As Chart 3 shows, 54% of itemized male estates in 1774 have guns; 47% of estates have guns not listed as old or in poor condition. This compares with a higher rate of books (62%) and much lower percentages of Bibles or religious books (27%). Given Bellesiles' arguments, almost as surprising as the high level of gun ownership is the low level of swords, cutlasses, bayonets, and other blade or edge weapons (14% of estates). Indeed, based on probate records, in colonial America in 1774 the relative odds of a male wealthholder owning a gun was 7.0 times as high as the odds of him owning an edge weapon.

In early America, gun ownership is higher in rural areas than in urban areas (56% to 45%). Moreover, 60% of estates that list livestock also list guns, compared to only 22% of estates not owning livestock—owning livestock being a strong indicator of current (rather than past) farming activity. Although estates with few slaves owned no more guns (46%) than estates without slaves (48%), gun ownership among the bulk of slave-owning estates (with slaves valued >£825) was very high—81%. Indeed, the odds that large slaveholders would own guns is 4.3 times as high as the odds of gun ownership for estates without large numbers of slaves.

There are some differences between colonies and regions (Charts 5-6). Southern estates have many more guns than other regions (69%). The lowest gun ownership was observed in a string of states from Connecticut and New York[129] to New Jersey and Pennsylvania, all of whom had only 35-44% guns (Chart 6).

Among occupations (Chart 7), farmers have slightly more guns (58%) than other occupations. Those with missing occupations have many fewer guns (only 9%), suggesting that incompleteness of probate inventories is an important possible reason for an inventory lacking guns, even among male estates with itemized inventories. Total personal wealth is related to gun ownership, with 74-78% of the most elite estates having guns and only 7% of the poorest probate estates owning guns.

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129. There were 23 New York estates, all male. Because of the small sample size for New York, Jones reduced the weighting of those cases, thus yielding a weighted n shown in Chart 6 of only 9 estates.

Chart 5: The Frequency of Gun Ownership in Itemized Male Estates by Region and Urban/Rural, 1774
Source: Alice Hanson Jones, 1978, n=813

New England (n=283) — 50%

Middle Colonies (n=247) — 41%

South (n=283) — 69%

Rural (n=682) — 56%

Urban (n=131) — 45%

TOTAL (n=813) — 54%

0% 10% 20% 30% 40% 50% 60% 70% 80%

% of Estates With Gun
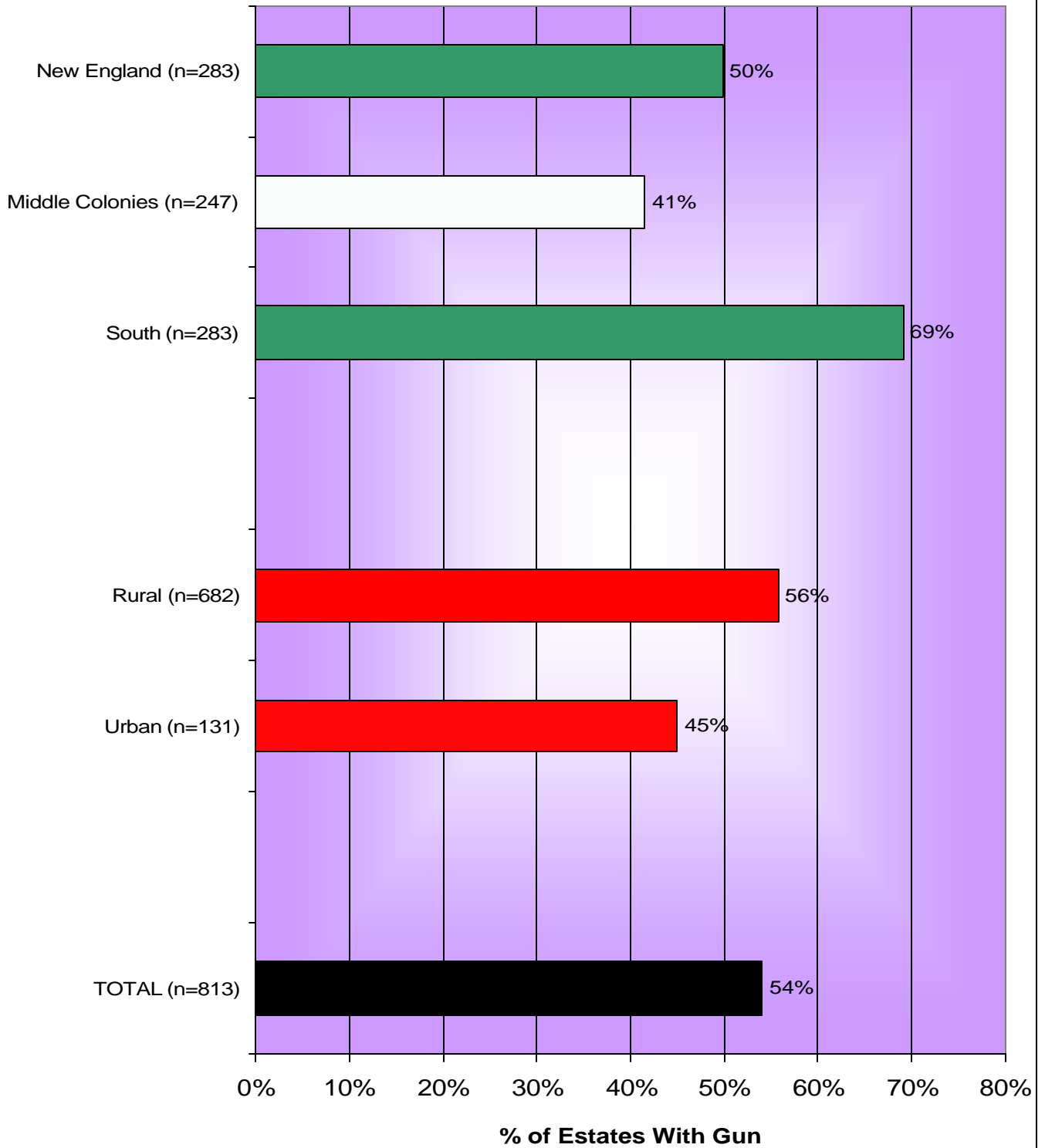
Chart 6: The Frequency of Gun Ownership in Itemized Male Estates by Colony, 1774
Source: Alice Hanson Jones, 1978, n=813

Colony	% of estates with guns
South Carolina (n=34)	70%
North Carolina (n=73)	77%
Virginia (n=107)	68%
Maryland (n=69)	62%
Delaware (n=56)	55%
Pennsylvania (n=125)	38%
New Jersey (n=57)	35%
New York (n=9)	43%
Connecticut (n=80)	44%
Massachusetts (n=203)	52%

% of estates with guns
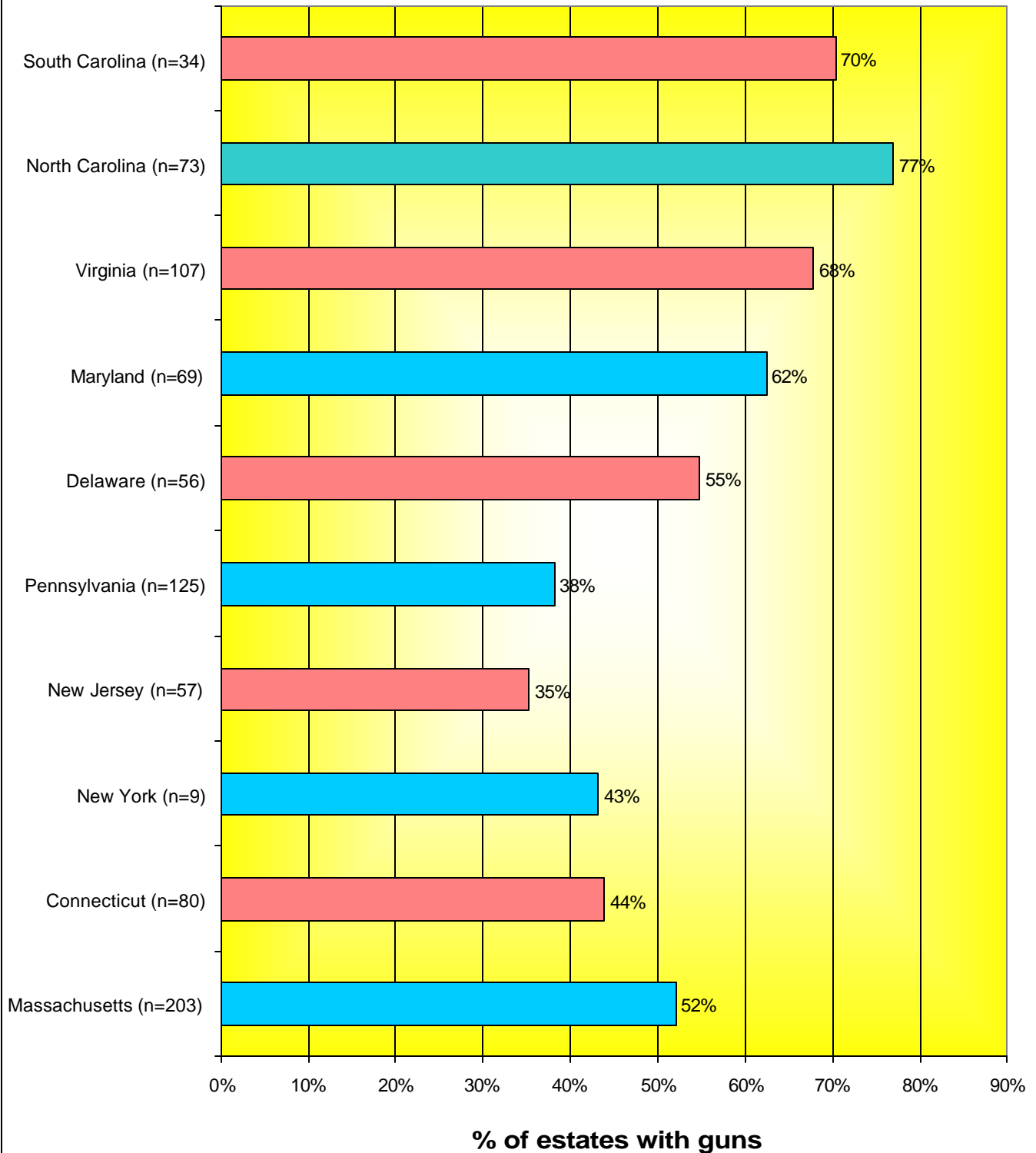
Chart 7: The Frequency of Guns in Itemized Male Estates
by Occupation and Personal Wealth, 1774
Source: Alice Hanson Jones, 1978

Category	% of estates with guns
farmers (n=555)	58%
merchants, profssnls (n=61)	51%
other occup. (n=174)	48%
missing occup. (n=23)	9%
>£10000 (n=79)	78%
<£10000 (n=77)	74%
<£5000 (n=285)	51%
<£2000 (n=129)	64%
<£1000 (n=81)	51%
<£500 (n=128)	39%
<£100 (n=34)	7%

% of estates with guns
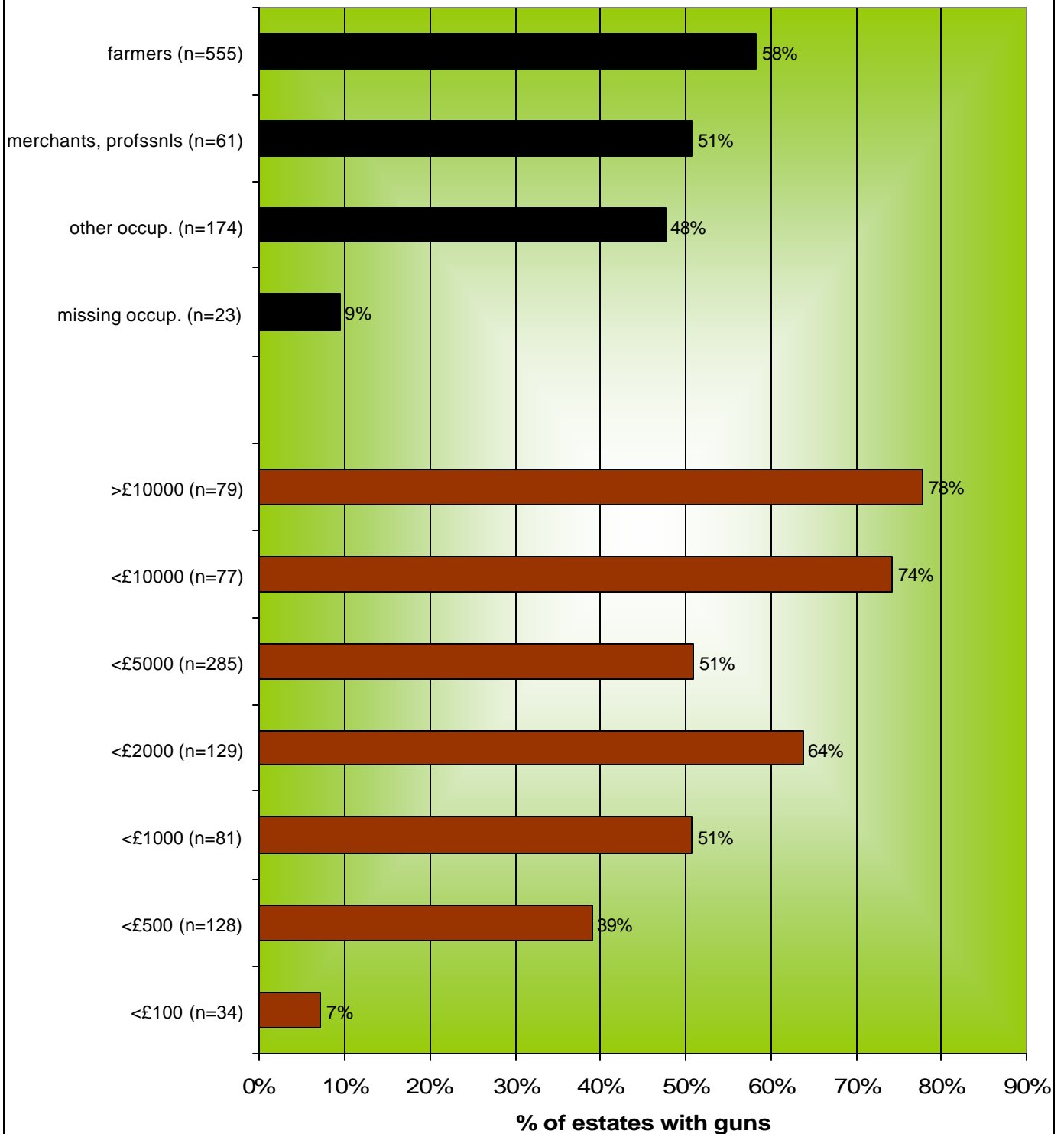
Next, we used hierarchical loglinear modeling to predict whether an estate would list a gun. In Table 3, we used all estates, including those without itemized inventories and female estates.

Table 3
Hierarchical Loglinear Modeling
1774 Colonial Estates

Sample: N=919 (including 81 female estates and 31 estates without itemized personal property)

Dependent Variable:
    Y: gun (None, Listed)

Independent Variables:
    A: gender (Male, Female)
    B: itemization of personal household property (Some, Almost none)
    C: personal wealth (<£100,£100-499,£500-999,£1000-1999,
                  £2000-4999,£5000-9999,>£10,000)
    D: livestock (None, Livestock)
    E: slaves (None or slaves valued at <£825, Slaves valued at >£825)
    F: region (South, New England, Middle Colonies)

Most Parsimonious Model: [FEDCBA][YB][YD][YA][YE] G^2=165.6, 331 df, p<1.00

- Testing the Deletion of YA (gun-gender):   **[FEDCBA][YB][YD][YE]**
    G^2=183.7, 332 df, p<1.00   **Change:**   **18.1, p≫.000, G^2/df:18.1**
- Testing the Deletion of YB (gun-itemization):   **[FEDCBA][YD][YA][YE]**
    G^2=199.7, 332 df, p<1.00   **Change:**   **34.1, p≫.000, G^2/df:34.1**
- Testing the Deletion of YD (gun-livestock):   **[FEDCBA][YB][YA][YE]**
    G^2=227.9, 332 df, p<1.00   **Change:**   **62.3, p≫.000, G^2/df:62.3**
- Testing the Deletion of YE (gun-slaves):   **[FEDCBA][YB][YD][YA]**
    G^2=212.3, 332 df, p<1.00   **Change:**   **46.7, p≫.000, G^2/df:46.7**

	Log-odds Ratio	s.d.	Exponent (Relat. Odds)	Exponent (of Abs. Value)
YA (gun-gender):	**-1.59**	**.34**	**.20**	**4.90**
YB (gun-itemization):	**-5.31**	**2.45**	**.005**	**202.35**
YD (gun-livestock):	**1.90**	**.21**	**6.69**	**6.69**
YE (gun-slaves):	**1.46**	**.20**	**4.31**	**4.31**

Interpretation. **Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher for men (4.9X as high), those owning large numbers of slaves (4.3X), and those who own livestock (6.7X). Inventories with no itemization have no guns. Personal wealth and region are not meaningful direct predictors of guns in this model.**

In Table 3, the most parsimonious model that fits the data suggests strong relationships between gun ownership and several predictor variables. Men have 4.9 times as high odds of owning a gun as women. Large slave-owners have 4.3 times as high odds of owning a gun as small slave-owners or those who own no slaves. Those who own livestock have odds of gun-owning that are 6.7 times as high as those who do not. This suggests that active farming and large slave-owning are good predictors of owning guns. Inventories with no itemization have no guns. Personal wealth and region are not meaningful direct predictors of guns in this model.

Tables 4 and 5 show models for 813 male itemized estates, excluding female estates and those without itemization. Both tables show high odds of gun ownership for Southerners, livestock-owners, and those whose estates contain substantial amount of producer durables. Producer durables include livestock, guns,[130] other weapons, wagons, wheelbarrows, harnesses, plows, hoes, shovels, sickles, axes, saws, hatchets, mills, grindstones, bags, buckets, bushels, spinning wheels, tools, lumber, nails, and fishing equipment. The odds that inventories contain guns are 11.6 times as high if they record an occupation as when they don't. Personal wealth and slaveholding are statistically significant in this modeling, but not meaningful direct predictors of guns using the BIC criterion.

In Table 5, controlling for all interactions between the predictor variables, the odds of having a gun are several times higher for Southerners, those who own livestock, and those whose personal wealth exceeds £100. Inventories are much more likely to contain guns if they record an occupation and list more than small amounts of producer durables (valued at £27.5 or greater). The direct relationship between large slaveholding and guns is statistically significant, but not meaningful using the BIC criterion.

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130. One reason for dichotomizing a level of producer durables larger than the value of guns in virtually all estates is so that the same gun data are not both a predictor variable and the dependent variable.

Table 4
Hierarchical Loglinear Modeling
1774 Colonial Male Estates

Sample: N=813 (male estates with itemized personal property)
Dependent Variable:
      Y: gun (None, Listed)
Independent Variables:
      A: personal wealth (<£ 100,£ 100-499,£ 500-999,£ 1000-1999,
                    £ 2000-4999,£ 5000-9999,>£ 10,000)
      B: region (South, New England, Middle Colonies)
      C: slaves (None or slaves valued at <£ 825, Slaves valued at >£ 825)
      D: livestock (None, Livestock)
      E: producer's durables (None or <£ 27.5, Producer's durables >£ 27.5)
      F: occupation missing (Unknown, Occupation known)

Most Parsimonious Model: [FEDCBA][YD][YF][YE][YB] G^2=162.6, 330 df, p<1.00

- Testing the Deletion of YB (gun-region):   [FEDCBA][YD][YF][YE]
   G^2=196.1, 332 df, p<1.00 Change: 33.5, p≫.000, G^2/df:16.7

- Testing the Deletion of YD (gun-livestock):   [FEDCBA][YF][YE][YB]
   G^2=189.4, 331 df, p<1.00 Change: 26.8, p≫.000, G^2/df:26.8

- Testing the Deletion of YE (gun-durables):   [FEDCBA][YD][YF][YB]
   G^2=181.0, 331 df, p<1.00 Change: 18.4, p≫.000, G^2/df:18.4

- Testing the Deletion of YF (gun-occupation missing):   [FEDCBA][YD][YE][YB]
   G^2=174.9, 331 df, p<1.00 Change: 12.2, p≫.000, G^2/df:12.2

	Log-odds		Exponent	Exponent
	Ratio	s.d.	(Relat. Odds)	(of Abs. Value)
YB (gun-south/new eng.):	- .82	.18	.44	2.27
(gun-new eng./middle):	- .31	.17	.73	1.36
(gun-south/middle):	-1.13	≫.18	.32	3.09
YD (gun-livestock):	1.79	.23	5.99	5.99
YE (gun-durables):	1.29	.15	3.63	3.63
YF (gun-occup. missing):	-2.45	.72	.09	11.59

Interpretation. Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher for southerners (2.3X to 3.1X as high) and those who own livestock (6.0X). The odds that inventories contain guns are several times higher if they record an occupation (11.6X as high) and list substantial producer durables (valued at £ 27.5 or greater) (3.6X). Personal wealth and slaveholding are statistically significant, but not meaningful direct predictors of guns using the BIC criterion.

Table 5
Hierarchical Loglinear Modeling
1774 Colonial Male Estates

Sample: N=813 (male estates with itemized personal property)
Dependent Variable:
      Y: gun (None, Listed)
Independent Variables:
      A: livestock (None, Livestock)
      B: occupation missing (Unknown, Occupation known)
      C: slaves (None or slaves valued at <£825, Slaves valued at >£825)
      D: producer's durables (None or <£2.75, Producer's durables >£2.75)
      E: personal wealth (>£100, <£100)
      F: south (New England or Middle Colonies, South)

Most Parsimonious Model: [FEDCBA][YA][YE][YB][YD][YF] G^2=30.1, 58 df, p<1.00

- Testing the Deletion of YA (gun-livestock):   [FEDCBA][YE][YB][YD][YF]
    G^2=48.1, 59 df, p<.84   Change: 18.0, p»·.000, G^2/df:18.0

- Testing the Deletion of YB (gun-occupation missing):   [FEDCBA][YA][YE][YD][YF]
    G^2=39.3, 59 df, p<.98   Change: 9.3, p<.002, G^2/df:9.3

- Testing the Deletion of YD (gun-durables):   [FEDCBA][YA][YE][YB][YF]
    G^2=46.8, 59 df, p<.88   Change: 16.7, p»·.000, G^2/df:16.7

- Testing the Deletion of YE (gun-personal wealth):   [FEDCBA][YA][YB][YD][YF]
    G^2=39.2, 59 df, p<.98   Change: 9.1, p<.003, G^2/df:9.1

- Testing the Deletion of YF (gun-south region):   [FEDCBA][YA][YE][YB][YD]
    G^2=56.6, 59 df, p<.57   Change: 26.5, p»·.000, G^2/df:26.5

	Log-odds Ratio	s.d.	Exponent (Relat. Odds)	Exponent (of Abs. Value)
YA (gun-livestock):	1.72	.22	5.58	5.58
YB (gun-occup. missing):	-2.50	.75	.08	12.18
YD (gun-durables):	1.31	.15	3.71	3.71
YE (gun-personal wealth):	-3.00	.73	.05	20.09
YF (gun-south region):	.96	.16	2.61	2.61

Interpretation. Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher for southerners (2.6X as high), those who own livestock (5.6X), and those whose personal wealth exceeds £100 (20.1X). Inventories are much more likely to contain guns if they record an occupation (12.2X) and list substantial amounts of producer's durables (valued at £27.5 or greater) (3.7X). The direct relationship between large slaveholding and guns is statistically significant, but not meaningful using the BIC criterion.

Thus, the picture that emerges from a careful analysis of the 1774 Jones database is directly contrary to the picture that Bellesiles paints for the 1765-1790 period, including the Jones database.[131] In the Jones database, guns are common (not rare). Guns are apparently in good condition (not usually listed as old or damaged). Women own guns at higher rates (18%) than Bellesiles says men own guns (as opposed to his claim that no women owned guns[132]). In rural areas, guns are more common. Edge weapons are much less common than guns (not more common).

V
Maryland and Virginia, 1740-1810—
The Gunston Hall Probate Inventory Database

At George Mason's home, Gunston Hall Plantation in rural Virginia, the museum's staff has collected and analyzed a database of 325 estate inventories from selected counties in Virginia and Maryland.[133] For these 325 inventories, they catalogued over 65,000 individual objects named in the inventories, a database that we analyzed statistically. Michael Bellesiles did not analyze this database, though at least a few of the Gunston Hall inventories should have shown up in Bellesiles' counts.

The staff of Gunston Hall originally started this enterprise because they had no probate inventory for George Mason himself. Thus, they collected records for counties in the two states in which Mason did business. Nothing about the selection process was directly concerned with guns, so there should be no bias for or against estates with guns, except as gun ownership is related to other criteria for selection (which it probably is). These 325 estates, nonetheless, are far from a random sample. The process of selection was purposely weighted in favor of estates with food service items, particularly forks. The process was also weighted in favor of more detailed inventories, particularly ones listing items room by room. That these are highly detailed inventories is evidenced by the extremely high percentage (97%) of estates listing some goods related to lighting, such as candles, candlesticks, lanterns, and so forth.

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131. Bellesiles apparently leaves 23 New York estates out of the 919 estates.
132. AA at 267.
133. Gunston Hall Plantation, PROBATE INVENTORY DATABASE, CD-ROM (2000) (325 individual inventories are available for downloading at gunstonhall.com, where you can purchase a CD-ROM of the coded database and the inventories).

The User's Manual for the database explains the selection process[134] and their division into social classes, based mostly on food service items. They classified the four social classes from "Old-Fashioned" (having no forks[135]) through "Decent" and "Aspiring" to "Elite" (dinner service for 20 guests).[136]

The subtext of the modern historical inquiry into the frequency of gun ownership is the original meaning of the Second Amendment, which recognizes the right to bear arms. The Gunston Hall database may be relatively unimportant for determining the absolute level of gun ownership in 18th century America, though it is still relevant for determining the ownership of guns relative to other weapons.

While this database might not particularly interest cultural historians, it is interesting to intellectual and legal historians.[137] This database might be good for determining the experience of Constitutional framers and the

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134. See User's Manual, at 2 ("For further details on the criteria for inclusion see Barbara Carson, *Ambitious Appetites: Dining, Behavior, and Patters of Consumption in Federal Washington* (Washington, D.C.: The American Institute of Architects Press, 1990, particularly pages 30-52.)").

135. Forks were important markers of social status. See generally Norbert Elias, THE CIVILIZING PROCESS (reprint ed. 1994).

136. The User's Manual states, at p. 2-3, 7-8: "Using microfilm of original court records from Fairfax, Prince William, and Stafford counties in Virginia and Charles and Prince George's counties in Maryland [among other counties], probate inventories were selected according to predetermined criteria, primarily the presence and amount of food service items, especially forks. . . . Considered of particular importance, the selected counties reflect jurisdictions in which George Mason owned land and/or was known to have transacted business. . . . Classifications used in the Gunston Hall Inventory Database are: . . .

> E: (Elite) The economic designation for inventories of the wealthiest decedents which exceed in quantity and quality all the criteria of the "Aspiring" classification. These inventories contain sufficient knives, forks, spoons, and other accouterments to serve twenty guests at a seated dinner.
> A: (Aspiring) Economic designation for inventories deemed to have extensive households that include spoons, knives, and forks, as well as enough equipage to entertain and give dinner parties for ten or more people.
> D: (Decent) The economic designation for inventories that include spoons, knives, and forks, but without enough equipage to seat a dinner party for ten persons. It is more likely that these people would have entertained at tea.
> OF: (Old Fashioned) The economic designation for inventories that lack forks, some of which might otherwise be considered aspiring or elite."

137. For example, one intellectual historian thought that this was the most interesting database in the article because of the light it shed on what George Mason might have been thinking when he assumed a fully armed citizenry.

prominent anti-federalists who gave rise to the Bill of Rights. The estates were selected to reflect the experience of a particular prominent politician and theorist—to reflect in part his world. Thus, to the extent that probate records can be assumed to reflect the world that at least some prominent framers walked around in, this is a good database to explore, better for that limited purpose than databases more representative of the general public. Most estates in the Gunston Hall database are from social classes below the presumably elite class of George Mason, though these lower classes in the database would have included many free white males from social classes with whom he interacted.

Overall, 71% of the Maryland and Virginia estate inventories in the Gunston Hall database listed guns (Chart 8). Fully 73% of the 304 male estates listed guns. Of the 21 female estates, 8 (38%) owned guns, higher than the 18% of 1774 female estates in the Jones database that owned guns and the one gun-owning female estate in Providence.
Only 27% of the Gunston Hall estate inventories include swords, cutlasses, bayonets or other edge weapons. The odds of an estate inventory containing a gun are 6.4 times as high as the odds of having an edge weapon.[138] A quarter of the estates (25%) include an old or broken gun, but half of those also include a gun that is not listed as old or broken. Thus 59% of estates had a gun that was not listed as being old or in poor working condition.

The distribution of gun ownership by year of estate and social class is shown in Chart 9. Chart 10 displays the distribution of gun ownership for several demographic and inventory characteristics. As Chart 9 shows, in the Gunston Hall database social class is not meaningfully related to gun ownership. There are only insignificant differences between estates from the lowest social class, those with no forks (called "Old-Fashioned), and the higher social classes who had forks. There is slightly falling gun ownership from the 1750s through the early 1800s, which might reflect the relative development of Virginia and Maryland and the reduction of physical threats.[139]

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138. The odds-ratio expressing the ratio between 71% gun ownership (2.4 to 1 odds) and 27% edge weapon ownership (.38 to 1 odds) is ((.71/(1-.71))/ (.27/(1-.27) or 6.4.

139. Both the Gunston Hall and the Providence databases show slight drops in gun ownership over time (though the latter is meaningless using the BIC criterion). Bellesiles, on the other hand, shows growing gun ownership from the 1765-1790 period through the Civil War, AA at 445. We do not have data from enough areas in enough periods to make any generalizations on whether gun ownership was growing or declining in the 18th century.

Chart 8: Frequency of Commonly Owned Items in VA and MD Estates, 1740-1810
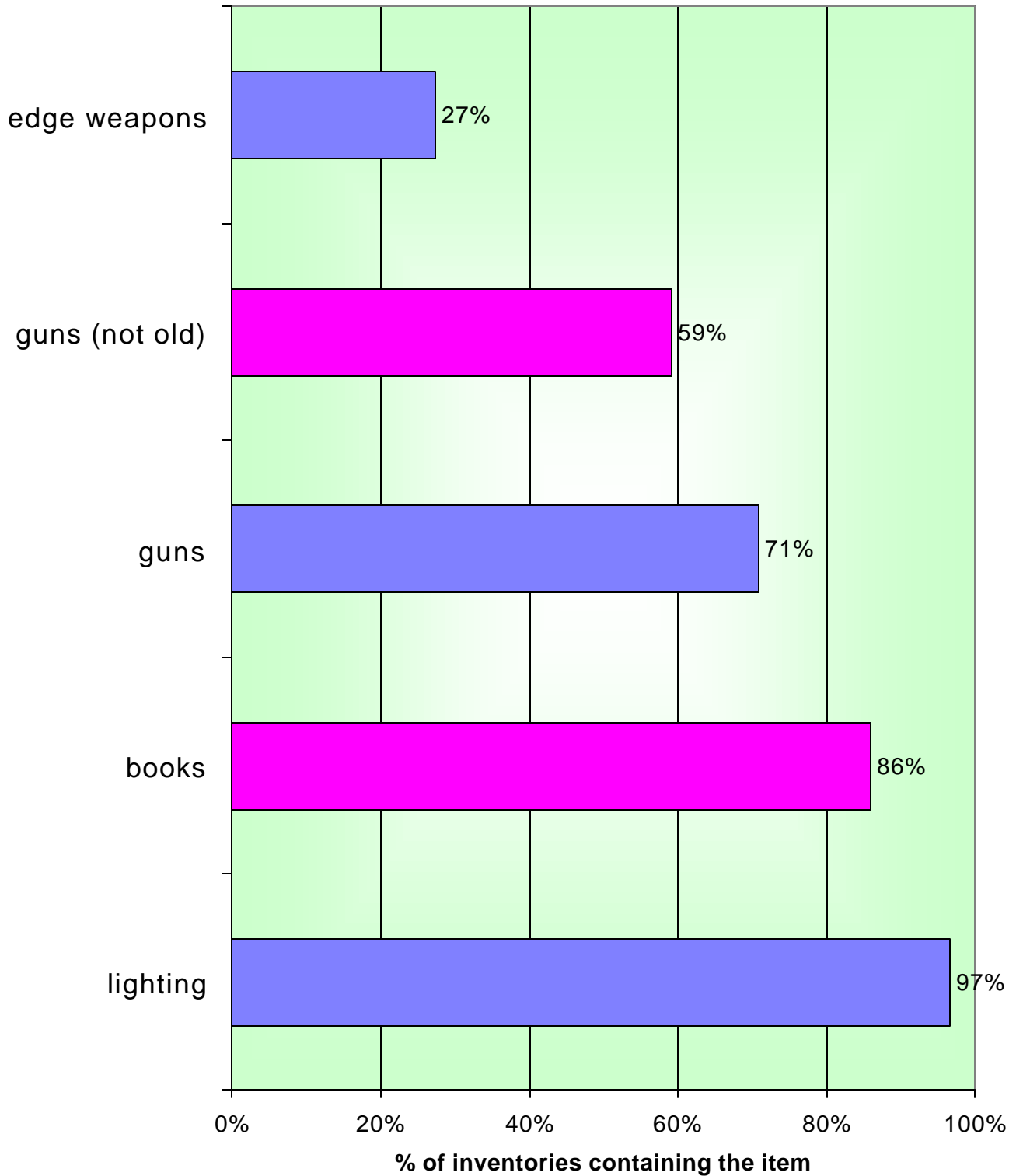
Source: Gunston Hall Database, n=325

Item	%
edge weapons	27%
guns (not old)	59%
guns	71%
books	86%
lighting	97%

% of inventories containing the item

Chart 9: The Frequency of Gun Ownership in MD and VA Estates by Year and Social Class, 1740-1810

Gunston Hall Database, n=325

Year of Estate

1740s (n=17)	65%
1750s (n=47)	87%
1760s (n=55)	78%
1770s (n=39)	77%
1780s (n=59)	68%
1790s (n=70)	63%
1800-1810 (n=38)	55%

Social Class

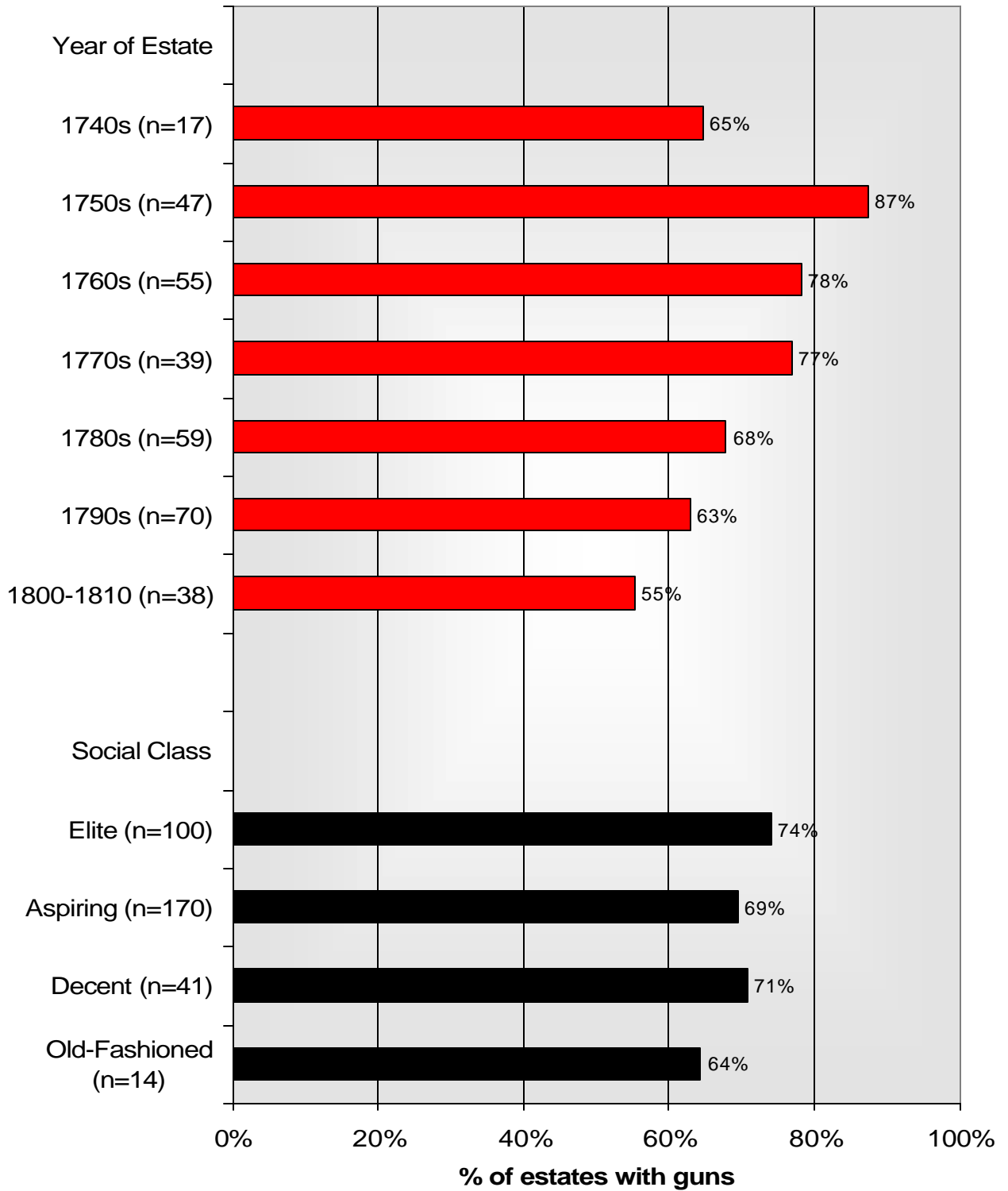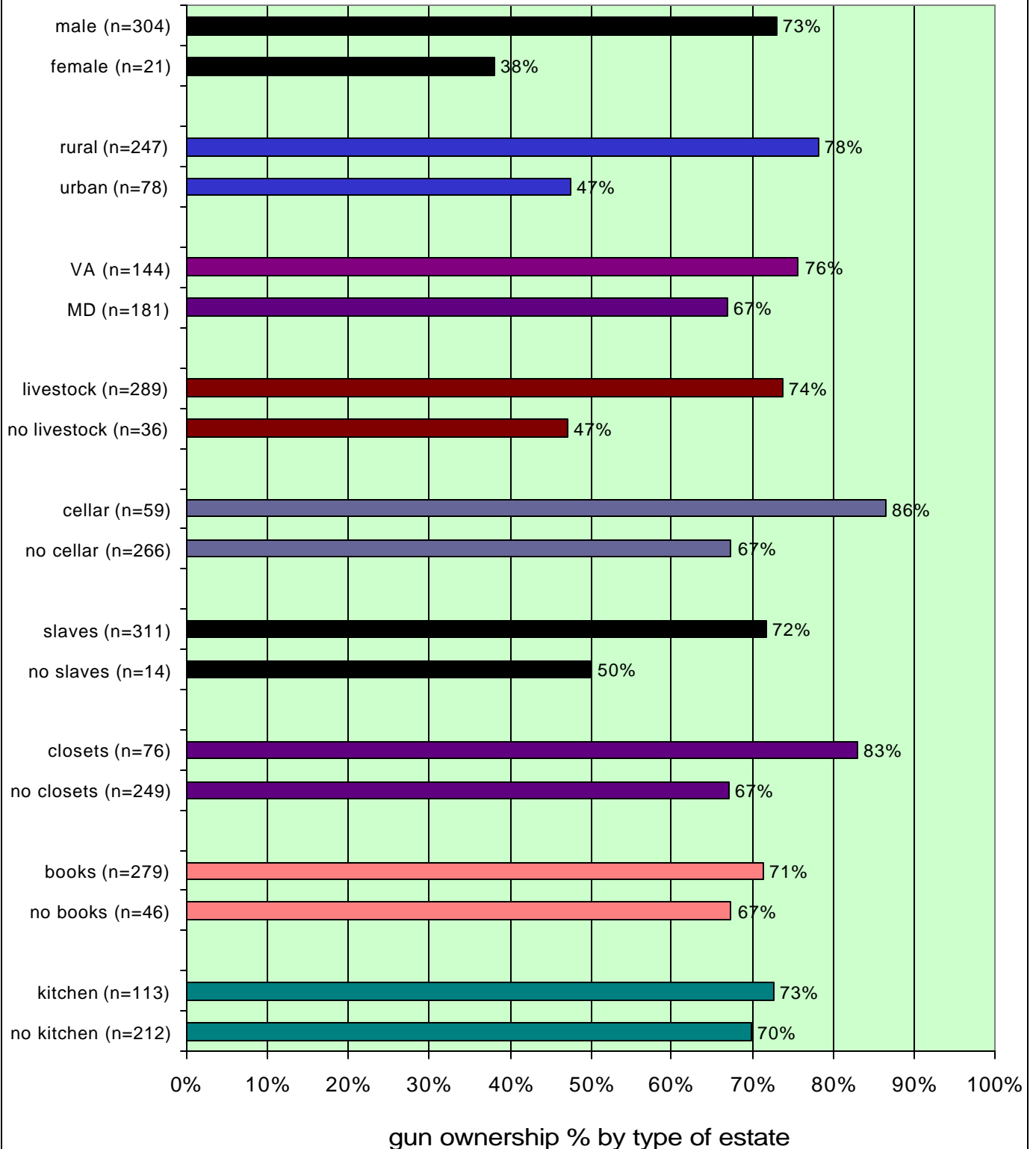|	
Elite (n=100)	74%
Aspiring (n=170)	69%
Decent (n=41)	71%
Old-Fashioned (n=14)	64%

0% 20% 40% 60% 80% 100%

% of estates with guns

Chart 10: The Frequency of Gun Ownership in MD and VA Estates by Various Characteristics, 1740-1810

Source: Gunston Hall Database, n=325

Category	%
male (n=304)	73%
female (n=21)	38%
rural (n=247)	78%
urban (n=78)	47%
VA (n=144)	76%
MD (n=181)	67%
livestock (n=289)	74%
no livestock (n=36)	47%
cellar (n=59)	86%
no cellar (n=266)	67%
slaves (n=311)	72%
no slaves (n=14)	50%
closets (n=76)	83%
no closets (n=249)	67%
books (n=279)	71%
no books (n=46)	67%
kitchen (n=113)	73%
no kitchen (n=212)	70%

gun ownership % by type of estate

In the Gunston Hall database, the best predictors of gun ownership are whether the decedent was male or lived in a rural area (Chart 10). Although it might seem obvious that rural estates would have more guns, Bellesiles implies the opposite.[140] What seems important here is not how wealthy the estates were, but how detailed the inventories were. Thus, other predictors (besides rural/urban) of listing guns are whether the contents of a cellar or closet are listed. Also slave-owning estates are more likely to have guns.

Tables 6-7 show the results of hierarchical loglinear modeling. Table 6 reports on models for the entire database of 325 estates, including 21 females. Controlling for all interactions between the predictor variables, the odds of listing a gun are about 4.2 times as high[141] if an estate is male as when it is female, 3.9 times as high if it is a rural estate as when it isn't, and 2.8 times as high if the estate has an itemized cellar as when it doesn't. In the Gunston Hall database, 38% of women own guns, and rural estates are much more likely to have guns than urban estates.

Table 7 examines the results of loglinear models for just the 304 white male estates. Here, the strongest predictors are again whether an estate is rural (3.7 times as high odds of listing a gun) and whether an estate lists a cellar (2.8 times as high odds of listing a gun). Among the variables that do not make a meaningful contribution to any of these models are state, county, social class, livestock ownership, book ownership, and decade of the estate.

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140. See AA at 109.

141. This is actually based on the exponent of the absolute value of the result for being female. Thus, it is approximate. More precisely, based on the model actually fit, the relative odds of female estates listing guns are only 24% as high as the odds for male estates.

Table 6
Hierarchical Loglinear Modeling
All Gunston Hall Estates

Sample: N=325 (304 males and 21 females)

Dependent Variable:
      Y: gun (None, Listed)

Independent Variables:
      A: rural (Urban, Rural)
      B: years (1740s,1750s,1760s,1770s,1780s,1790s,1800-10)
      C: state (VA, MD)
      D: gender (Male, Female)
      E: books (None, Listed)
      F: cellar (None, Contents Listed)

Most Parsimonious Model: [YF][YD][YA][FEDCBA]   **G^2=90.4, 220 df, p<1.00**

- Testing the Deletion of YA (gun-rural):
    [YF][YD][FEDCBA]
    G^2=112.4, 221 df, p<1.00   **Change: 22.1, p≫.000, G^2/df:22.1**

- Testing the Deletion of YD (gun-gender):
    [YF][YA][FEDCBA]
    G^2=100.4, 221 df, p<1.00   **Change: 10.0, p<.002, G^2/df:10.0**

- Testing the Deletion of YF (gun-cellar):
    [YD][YA][FEDCBA]
    G^2=97.9, 221 df, p<1.00   **Change: 7.5, p<.006, G^2/df:7.5**

	Log-odds Ratio	s.d.	Exponent (Relat. Odds)	Exponent (Absol. Value)
YA (gun-rural)	**1.36**	**.27**	**3.9**	**3.9**
YD (gun-gender)	**-1.42**	**.44**	**.24**	**4.2**
YF (gun-cellar)	**1.03**	**.38**	**2.8**	**2.8**

Interpretation: Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher if an estate is male (4.2X as high), rural (3.9X), and has an itemized cellar (2.8X).

Comments on additional models: We obtained the same outcome for each of the above predictor variables when we replaced the variables (C) state and (E) books with the variables kitchen and closets.

Table 7
Hierarchical Loglinear Modeling
Male Gunston Hall Estates

304 Male Estates

Dependent Variable:
    Y: gun (None, Listed)

Predictor Variables:
    A: rural (Urban, Rural)
    B: years (1740s,1750s,1760s,1770s,1780s,1790s,1800-10)
    C: state (VA, MD)
    D: books (None, Listed)
    E: cellar (None, Contents Listed)
    F: county (6 groups of counties)

<u>**Most Parsimonious Model:**</u> **[YA][YE][FEDCBA] G^2=115.6, 221 df, p<1.00**

- Testing the Deletion of YA (gun-rural):
    [FEDCBA][YE]
    G^2=135.6, 222 df, p<1.00   Change: 20.0, p≫.000, G^2/df:20.0

- Testing the Deletion of YE (gun-cellar):
    [FEDCBA][YA]
    G^2=122.7, 222 df, p<1.00   Change: 7.1, p<.008, G^2/df:7.1

	Log-odds Ratio	s.d.	Exponent (Relative Odds)
YA (gun-rural)	**1.33**	**.28**	**3.8**
YE (gun-cellar)	**1.14**	**.42**	**3.1**

<u>**Interpretation:**</u> **Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher if an estate is rural (3.8X as high) and has an itemized cellar (3.1X).**

<u>**Comments on additional models:**</u> **We substituted 3 variables (social class, livestock, and outbuildings) for 3 variables (state, books, and county) in the above model, with similar results. Controlling for all interactions between the predictor variables, the odds of having a gun are several times higher if an estate is rural (3.7X as high) and has an itemized cellar (2.8X). Thus, social class, owning livestock, and listing outbuildings are not meaningful direct predictors of guns using the BIC criterion.**

VI
Conclusion

Everyone makes mistakes (certainly we do), and researchers vary in their talents and interests. Beyond mistakes and individual differences, each field usually has comparative advantages in doing history. One expects quantitative historians and social science researchers to be strong on sampling, data analysis, and replicability. One expects law professors to be strong on the interpretation of legal records and the application of historical research to interpretive legal questions. On the other hand, one expects nonquantitative historians to be strong on reading archives and on faithfully recording their contents. Often historians cite with great care the archives they use, even down to the archival library and microfilm roll number. Further, one expects historians with knowledge of the period to be good at placing their results in historical context.

With Michael Bellesiles' probate gun study in *Arming America*, we appear to lack the advantages of all three fields. Unlike quantitative historians, he has no database and he tells us nothing about his regional samples, not even their size. He counted estates that have no inventories or only real estate inventories, which many social science researchers would not do. It seems that he has no idea just how high the standards are for even mediocre quantitative studies—let alone expert histories of violence.[142] Unlike law professors, he seems not to understand that most people die without wills and that most real estate inventories would have no guns.

But Bellesiles' biggest failures are within his own field—history. Reading archives carefully and recording sources and sharing those sources on request are acts that one expects historians to be particularly good at. He cites nothing to support most of his data on guns in probate estates. He has failed to supply citations and cell counts on request, as historians should. His main probate data table (Table 1[143]) does not disclose which counties are counted in which years in which categories. He entirely misses female estates with guns in both archives he does cite, even though in the 1774 Jones data, more women (18%) have guns than he claims men did in the 1765-1790 period.

Bellesiles also makes unrealistic claims about the completeness of probate inventories, claims directly contradicted by the authorities he

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142. An example of sophisticated quantitative history is Eric Monkkonen, MURDER IN NEW YORK CITY (2000).

143. AA at 445.

cites.[144] In the Providence inventories he analyzed, he apparently ignored occasional direct statements that the inventories were incomplete or the fact that some inventories itemized no personal property. It is simply ahistorical to assume that old records are perfectly complete and that everyone died with a will—and to purport to count 186 wills when half are simply not there and never were (because of intestacy).

There are some indications in the data that incompleteness is correlated with fewer guns. In the 1774 national data, the odds that men with an occupation listed will own a gun are about 12 times as high as the odds that men missing occupational information will own a gun. In the Gunston Hall database, which Bellesiles did not use, those estates listing the contents of closets and cellars have 2.4 to 3.1 times as high odds of also listing guns as estates without such lists. You find more guns when the inventories are more complete, even controlling for social class.

Further, Bellesiles fails to place his data in historical context. He claims that guns were so rare that colonial Americans had to use swords and other edge weapons, but fails to note that edge weapons were much rarer than guns in the very probate records he cites. In the male estates in Jones' 1774 database, the odds of finding a gun are 7 times as high as the odds of finding an edge weapon. For the Gunston Hall database, the odds of finding a gun are 6.4 times as high as finding an edge weapon; for the Providence database, the odds of finding a gun are 4.1 times as high.

Bellesiles also ignores the large family size in colonial America (about six people per family in 1790), a fact suggesting that the great majority of free people lived in a household with a gun. Instead of comparing his percentages to the number of households, he dilutes his percentages with children, counting white male children who would grow up to own a gun as non-owners. To take such an individualistic approach in the presence of such huge family sizes is the kind of anachronistic move that one would not expect a historian to make.

Nearly everything Bellesiles says about probate records in early America is mistaken.[145] He says that guns were rare, that no women's estates owned guns, and that most guns in Providence were listed as old or in poor condition. In fact, guns were common, even in admittedly incomplete probate records. In all, 52% of male colonial wealthholders in 1774 had

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144. See AA at 530 n.16 and text *supra* at notes 74-132.
145. See also text *supra* at notes 78-95.

guns, while 18% of female wealthholders had guns.[146] Nationally, in 1774 about 87% of itemized male estates with guns had at least one gun that was not listed as old or in poor working condition. Gun ownership was so high in colonial America (especially in comparison with other commonly owned items) that Bellesiles' claims that 18th century America did not have a "gun culture" are implausible, just as one could not plausibly claim that Americans did not have a culture of reading or wearing clothes.

In assessing Bellesiles' work, one is tempted to wonder how he could be so mistaken. If we were not citing our archives used and providing counts, our claims of defects in his work might be hard for historians to believe. But our data are consistent with other published counts of guns, such as Anna Hawley's[147] and Alice Hanson Jones'.[148] Indeed, this high level of gun ownership shows up in the earliest large set of transcribed American probate inventories, George Dow's from Essex County, MA. In the 1636-1650 period, gun ownership in probate estates was 71% for men and 25% for women.[149] We have also looked at large runs of unpublished handwritten inventories, which give the impression of being roughly consistent with the published inventories we analyze here.

Thus, everywhere and in every time period from 1636 through 1810, we found high percentages of gun ownership in probate inventories. Approximately 50-73% of itemized male inventories contained guns in all five databases we examined—Jones (National, 1774), Providence (RI, 1670, 1679-1726), Gunston Hall (MD & VA, 1740-1810), Essex County (MA, 1636-50), and Hawley (VA, 1690-1715). Guns are found in 6-38% of the female estates in each of the first four databases. We and three other

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146. These percentages include all estates in the Jones data. Combining men and women, overall 50% of wealthholders listed guns. If we exclude estates that have no significant itemization of personal property, 54% of male wealthholders have guns, as do 19% of female wealthholders.

147. See text *supra* at notes 74-77 (showing more guns in Surry County, VA than axes, knives, hoes, or chairs).

148. See 3 JONES, *supra* note 2, at 1651. Jones has itemized tables only for the Middle Colonies. Tables for the Middle Colonies—the region with the lowest gun ownership—appear to show that guns are the most common weapon, that 66 of 217 estates have guns, and that another 31 estates might have both a gun and another weapon. ID.

149. In the earliest years of those estates, 1636-1650, we count 61 probate inventories—all but two of which were sufficiently itemized to be used. Fully 25% of the 8 female inventories had guns. Among the 51 itemized male inventories, 71% contained guns. 1 PROBATE RECORDS OF ESSEX COUNTY, MASSACHUSETTS, 1635-1664, at 3-130 (George Dow ed. 1916).

historians (Alice Jones, Anna Hawley, and Harold Gill[150]) have now independently analyzed a collective 2,245 early probate inventories and nowhere do we see the patterns Bellesiles describes as being everywhere.

Before any historian jumps to Bellesiles' defense, we urge you to spend an hour or two examining some of the estates Bellesiles used in his study.[151] From the Providence data, it is clear that Bellesiles misclassified *most* of the Providence estate records he read. Either he is an extraordinarily poor reader of archival materials or he misremembered data for over 60% of the Providence estates he examined. Moreover, there is not just one mistake, but many—and they involve his main claims (the frequency and condition of guns) as well as less central matters (the completeness of records).

Moreover, Bellesiles' published percentages of gun ownership in probate records 1765-1790 are mathematically impossible, given known minimum sample sizes. Accepting the 1200 inventories he reports[152] for the frontier's 14.2% mean,[153] any number of Southern inventories greater than 214 at the South's mean of 18.3% puts the national mean above the 14.7%

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150. Joyce Malcolm reports that in 572 colonial Virginia inventories examined by the historian Harold Gill, guns are present in nearly 80% of them. This is slightly higher than any database we examined, but perhaps these exclude poorer estates. See Malcolm, *supra* note 9.

151. You might first examine the EARLY RECORDS OF THE TOWN OF PROVIDENCE, *supra* note 3. In an hour of leafing through the indices and inventories for the three probate volumes (6, 7 & 16), you will see that Bellesiles has seriously mischaracterized the number of male personal property inventories, the number of wills, the gender of decedents, and the condition of guns. For only $8 more than the cost of Bellesiles' book, the Providence Records can be purchased on CD-ROM from Heritagebooks.com.

Or you could pick up Alice Hanson Jones' three-volume collection of 919 probate inventories and spend an hour looking at them. First check the first five inventories in the following counties: Worcester (MA), Anne Arundel (MD), Southampton (VA), Chesterfield (VA), and Halifax (NC). In each of these five counties, there is a female inventory with a gun in just the first five estates. See JONES, *supra* note 2. Yet Bellesiles (who supposedly included these estates in his total percentages for 1765-1790) claims that he found no female inventories with guns in any of 11,170 probate records he examined. AA at 267. It strains credulity to think that he could have read these and other inventories and failed to notice that women owned guns.

Then you might check a fairly typical run of Southern inventories—the first 14 inventories in volume 3, which are from Charleston, SC. There are over 50 guns in the 11 estates with guns. Skimming these and other records, it will quickly be apparent that Bellesiles' count of 18% Southern gun ownership in 1765-1790 is extraordinarily unlikely to be correct.

152. AA at 266, 445.

153. AA at 445.

Bellesiles reports.[154] Yet, the Jones compilation alone has 297 Southern inventories from 13 Southern counties for the equivalent of less than two years of inventories (most come from 1774, a few come from 1773 and 1775). Bellesiles would need barely more than one inventory every other year in each of his 16 Southern counties during the 1765-90 period to render his national mean mathematically impossible.[155]

Even if there were some way for Bellesiles to find fewer inventories in a 26-year period than Jones found in little more than one of those years in a subset of the same counties, Bellesiles' *regional* means would then be impossibly low. Bellesiles needs large numbers of inventories with no guns in the 1765-90 period to offset the high gun ownership in the 1774 Jones inventories. In other words, if his regional percentages apply to even moderate numbers of inventories from the South or Northern urban regions (e.g., Philadelphia), then his *national* mean is mathematically impossible. On the other hand, if his 1765-90 regional percentages apply only to small numbers of inventories, then his *regional* means are erroneous, given the high percentages of guns in the 1774 Jones database.

Whether he used the Jones published data or not, almost all of the Jones inventories should have been in his study since they were in Bellesiles' counties during his 26-year period. If they are included, the regional averages are highly implausible, and if the regional averages are true, then the national average is impossible. Whatever arguments Bellesiles might offer in the future for his 1765-90 percentages, they cannot evade this simple error in mathematics. There is no question that his 1765-90 published probate data (like his earlier Providence data) are erroneous.

We can also say that Jones' collection directly contradicts Bellesiles' claim about no female gun ownership. Further, the line chart at the bottom of his Table 1[156] does not match the data above it. With Table 1's omissions of counts, failure to reveal which counties are in which categories, implausible heavy weighting of small frontier counties, omission of sources, and line charts not matching the data, one does not need to have looked at

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154. Bellesiles says nothing about the national mean being weighted. Since the 6 frontier counties Bellesiles examines are small compared to the rest of the country, a population-weighted or wealth-weighted national mean would only make things worse for his 14.7% mean.

155. If 16 counties of Southern data could somehow be made to disappear, there should still be more than enough probate inventories in the 4,000 1765-82 Philadelphia estates to render Bellesiles' 14.7% national mean mathematically impossible.

156. AA at 445. See text *infra* notes 28-31.

any probate inventories to see that there is something suspicious about the Bellesiles' probate data.

What would happen to the rest of *Arming America* if Bellesiles were to retract his entire discussion of probate data? In terms of pages, the probate study is only a small part of the book, a part that he appears to have intentionally downplayed. Yet it is the most dramatic and potentially persuasive evidence he offers. In a favorable article on the book, Anthony Ramirez of the *New York Times* calls probate records "Mr. Bellesiles's principal evidence."[157] John Chambers in his *Washington Post* review of *Arming America* called probate records Bellesiles' "freshest and most interesting source."[158] Edmund Morgan in his *New York Review of Books* review said, "The evidence is overwhelming. First of all are probate records."[159] In his *New Republic* review, Jackson Lears comments, "Despite his wide range, the core of his argument depends on statistics: government censuses of militia members and a sample of probate records . . . ."[160] Joyce Malcolm's review in *Reason* sates, "Bellesiles' main proof for the absence of firearms is his analysis of more than 11,000 probate inventories from 1765 through 1859."[161] A review in the *Minneapolis Star Tribune* summarizes, "Using probate records from the colonial period to 1859, Bellesiles explodes many myths about gun ownership in America."[162]

Thus, while the probate data represent only a small part of the book in pages, they are the heart of the book—the single most important class of evidence among the many classes of evidence Bellesiles discusses. Admittedly, others put more weight on this evidence than Bellesiles does—most not realizing how weak are the underpinnings of this evidence. Without

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157. Anthony, Ramirez, *The Nation: The Lock and Load Myth; A Disarming Heritage*, NEW YORK TIMES (April 23, 2000) at s. 4, p. 3, col. 1.

158. John Whiteclay Chambers II, *Lock and Load*, WASHINGTON POST (October 29, 2000), at X02.

159. Edmund Morgan, *In Love With Guns,* NEW YORK REVIEW OF BOOKS (Oct. 19, 2000).

160. Jackson Lears, *The Shooting Game*, THE NEW REPUBLIC (Jan. 22, 2001) at 35.

161. Joyce Lee Malcolm, *Concealed Weapons*, 32 REASON 47 (Jan. 1, 2001).

162. Randolph Delahanty, *Causes And Effects; Two Well-Researched And Thoughtful Books Offer Insights On A Couple Of America's Hot-Button Issues. Bang! Historian Explodes American Gun Myths*, MINNEAPOLIS STAR TRIBUNE (Sept. 24, 2000) at 16F.

the probate data, his book runs the risk of falling into the genre that Bellesiles has called "dueling quotations."[163]

Further, if one accepts what we and other probate researchers have found, the main story in *Arming America* becomes incoherent. If guns were already more common in the 17th and 18th centuries than Bellesiles says they were on the eve of the Civil War, then his narrative of how we got from low gun ownership to high gun ownership collapses into a story of going from high gun ownership to high gun ownership. A more coherent story would have been that America went from fairly ineffective guns to fairly effective guns.

Even if Bellesiles' mistakes were inadvertent, at some point serious scholars need to move on. As with cold fusion research, while responsible scholars must meet the claims of mistaken scholarship, eventually they should turn their attention to work that might make a more positive contribution to human knowledge.

Our hope here is to do more than explode the myth about gun ownership in probate records that Bellesiles appears to have invented. As we show, in probate inventories (1) there were high numbers of guns in early America, (2) guns were much more common than swords or other edge weapons, (3) women owned guns, and (4) the great majority of gun-owning estates listed no old or broken guns. Our estimates that at least 50% of male and female wealthholders owned guns in 1774 colonial America are the first carefully weighted national probate-based estimates for gun ownership in 18th century America. Given that they are based on incomplete probate inventories, unless nudity was also widely practiced,[164] these are likely to be substantial underestimates.

As to the methodology of drawing inferences from probate records, we suggest that the ownership of any item of interest should be compared to the ownership of other commonly owned items, since probate inventories are inherently and differentially incomplete. For example, guns are more common than Bibles or religious books in both the Providence and the national Jones database. Further, guns are found in nearly as many probate estates as books of any kind, a finding suggesting that guns, like books, were very commonly owned by early American families. Based on 1774 probate

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163. AA at 262 ("Without such efforts at quantification, we are left to repeat the unverifiable assumptions of other historians, or to descend into a pointless game of dueling quotations—matching one literary allusion against another.").

164. A weighted average of 23% estates in Jones' 1774 database did not include any clothes. See text at *supra* notes 59-60, 128-29.

records, the frequency of gun ownership (50%) was roughly midway between the ownership of any coins or other money (about 30%) and the ownership of clothes (about 77%).[165] If gun ownership really was about $2/3^{rds}$ of the level of clothes ownership (and about $5/3^{rds}$ of the level of cash ownership), then gun ownership was roughly as common as one would have expected before Bellesiles entered this debate.

What we urge here is open research standards, replicability of results, citations to sources, and a little common sense. When someone makes outlandish statistical claims about something, provides no sample sizes or cell counts, does not cite the sources used, and makes one implausible statement after another about the completeness of archival records, reviewers should be pointing this out, not climbing over one another to jump on the bandwagon. How could there be such a failure of the reviewing and editorial processes at the *Journal of American History* (and to a lesser extent, Knopf Press) as to publish statistical tables with no counts or sample sizes? How could so many prominent historians supply extravagant blurbs or reviews for *Arming America*? When so many were misled, no one needs to be singled out; the situation becomes less one of individual lapses and more one of collective responsibility.

We suspect that this failure of parts of the historical community to question a book whose conclusions they may have found attractive will be remembered long after Bellesiles' mistaken claims about gun ownership are forgotten. In this sad affair, we may learn more from considering why historians suspended their critical judgment than from guessing precisely how and why Michael Bellesiles published mistaken data.

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165. See text at *supra* notes 59-60, 128-29.