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A Digital History of Anglophone Demography and Global Population Control, 1915–1984

EMILY KLANCHER MERCHANT

THE WORLD'S POPULATION grew dramatically in the twentieth century, rising from about 1.6 billion in 1900 to just over 6 billion in 2000, with 75 percent of that growth occurring after 1950. As population grew, it became the subject of a new science, demography, and the target of numerous interventions aimed at limiting its growth. While histories of global population have suggested that demography was integral to the creation of fertility control policies and programs (Connelly 2008; Hoff 2012; Robertson 2012; Bashford 2014), only a handful have explicitly examined this relationship (Hodgson 1988; Demeny 1988; Szreter 1993; Greenhalgh 1996). Demography and population control were in fact co-produced and deeply imbricated with each other in the twentieth century: as policymakers increasingly turned to scientific expertise for guidance and authority (Porter 1995), advocates of fertility control drew heavily on demography to track population growth and to justify intervention (Demeny 1988). But that is only the beginning of the story. Reading the twentieth-century demography journal literature alongside the archives of the scientists who wrote it and the individuals and organizations that sponsored them indicates that American advocates of population control also provided the funding and institutional support that established demography as an interdisciplinary scientific field in the 1920s and 1930s and that stimulated its enormous growth after World War II, both in the United States and elsewhere. Through direct patronage, projects aimed at limiting fertility gave rise to the science that guided and legitimized them.

Historians of science have long recognized patronage as a critical component of scientific activity because of the substantial costs associated with the demands of research and dissemination of ideas (Biagioli 1990; Coben 1976; Findlen 1993; Shapin 1974). The institutions that cover the costs also exert influence over which research questions get asked and which methods investigators employ to answer them. To the extent that funding agencies use the results of science to make policy recommendations or to determine future grants, they provide what Bruno Latour (1987) calls “positive

modalities”: citations of scientific claims that move those claims “downstream” toward general acceptance as fact. In the case of demography, I will argue that patrons also moved their own potentially controversial projects downstream toward public and policy acceptance through the science they funded.

An older literature examining private patronage for the social sciences in the United States between the world wars (Fisher 1993; Lagemann 1992; O'Connor 2007) and a newer literature exploring government funding for the social sciences in the second half of the twentieth century (Rohde 2013; Solovey 2013) have both drawn attention to this cyclical relationship of legitimization. The more recent literature demonstrates, moreover, that the geopolitical exigencies of the Cold War prompted massive government funding for the social sciences and directed their research toward defense and national security, as was the case also in the natural and physical sciences. The history of demography in the United States spans the interwar and postwar periods and bridges the divide between private and public patronage for the human and social sciences. As I will argue here, the philanthropies that funded demography in the first half of the century played a critical role in securing government funding in the later period.

Within scientific fields, communities of practice tend to be bounded by language (Gordin 2015), and demography is no exception. Demographers will notice a parallel with fertility regimes, which map onto linguistic borders (Coale and Watkins 1986). I focus here on anglophone demography, as the English-language demography literature is the largest, has the broadest geographic reach, and has historically had the closest ties to global population control organizations. Francophone demography, by contrast, developed in distinct institutional and political settings. Its primary sponsor was the pronatalist French government, and comparative research has demonstrated that francophone demography has long emphasized problems of low fertility in contrast to the emphasis on high fertility in anglophone demography (Marshall 2013, 2015). By the mid-twentieth century, most demographic research was published in either English or French. Among anglophone demographers, this article focuses on US-based actors for three reasons. First, although demography was an active field of research in Europe between the wars and globally after World War II, the majority of English-language articles were written by scientists either based or trained in the United States. Second, the lion's share of funding for anglophone demography worldwide, both between and after the wars, came from US sources. Finally, US philanthropies and later the US government were the largest sponsors of birth control worldwide in the twentieth century, funding research and family planning programs in many parts of the world and promoting the development of population policy at national and international levels (Connelly 2008; Caldwell and Caldwell 1986; Donaldson 1990; Harkavy 1995). Therefore, the history of anglophone demography is both

a global history and a US history: the US-based actors I discuss were at the center of global scientific, philanthropic, and policy networks.

This article combines archival research into the institutional arrangements of twentieth-century demography with computational analysis of the content of anglophone demography journals. I use institutional archives to describe how demography coalesced between the world wars when population-oriented scientists in a variety of fields attracted patronage from individuals and organizations in the United States that sought to engineer the domestic population through eugenics, birth control legalization, and immigration restriction. In the first few decades after World War II, archival sources indicate that the field grew dramatically, largely on the initiative of new and more powerful patrons who aimed to control global population through the promotion of family planning in Asia, Africa, and Latin America. I then use topic modeling, an algorithmic form of textual analysis, to assess how these institutional arrangements manifested themselves in the demographic literature. Results suggest that demographers began to take a distinctive and coherent approach to population research in the period before World War II that differed from the approach of other social scientists studying population and indicate that, both before and after the war, articles by demographers or in demography journals meshed with the concerns of the field's funders about fertility and how to control it to a greater extent than did population-oriented scholarship in the other social sciences. Together, archival research and computational textual analysis demonstrate that demography's patrons played a key role in the field's establishment and development, providing the financial support and institutional structure necessary for producing research that, in turn, informed patrons' population projects, legitimized them in the eyes of the public, and put them on the policy agendas of the United States, the United Nations, and governments in Asia, Africa, and Latin America.

Articulating anglophone demography: Networks of research and patronage

To argue, as I do here, that demography's patrons helped to develop the field between the world wars is to contend that demography did not exist prior to the end of World War I. To be sure, governments have been collecting population data and using them to analyze vital processes since at least the seventeenth century (Emigh, Riley, and Ahmed 2016). Before the 1920s, however, this activity, known as "political arithmetic" or "vital statistics," was an administrative, not a scientific one (Szreter 2015). By the 1920s, scientists had begun to analyze population data, but they did so as statisticians, biologists, sociologists, or economists; no one yet called him- or herself a "population scientist" or "demographer."¹ Demography emerged at the intersection of these fields in the late 1920s, when population-oriented

practitioners of each one began to identify themselves and one another as members of a coherent field, first described as “population science” and later termed “demography.”

In the United States, emergent population scholars included insurance actuaries Louis Dublin and Alfred Lotka, biologists Raymond Pearl and Lowell Reed, vital statisticians Walter Willcox and Frank Notestein, and sociologists Warren Thompson and William Ogburn. Despite their disparate fields, these men began to see their work turning on similar questions and drawing on similar methods to explore the dynamics of population. Their exchanges were facilitated by a small set of patrons, the most prominent being newspaper magnate Edward Scripps, the Milbank Memorial Fund, and the retired businessman Frederick Osborn.

Between the wars, scientists and their patrons participated in political debates about populations that focused both on their size and on what contemporaries referred to as their “quality”: the relative balance between wealthy and poor, educated and uneducated, white and nonwhite, foreign-born and native-born (Lovett 2007; MacNamara 2014; Allen 1991; Schneider 1990; Soloway 1990). Advocates and opponents of the population projects of the time—birth control legalization, immigration restriction, and eugenics—debated the effects such programs would have on national populations, calling on the new and still largely inchoate field of “population science” for support (Hodgson 1991; Notestein and Osborn 1971). Scientists themselves entered these debates, marshaling analysis of population data to argue for or against various population-oriented political agendas (for example, Dublin and Lotka 1925; East 1923; Kuczynski 1928; Pearl 1940). Individuals and organizations that sought to harness the intellectual power of this emerging science to their own population agendas facilitated its coalescence by hiring demographers and underwriting the establishment of the institutions that would make their aspirational professional identity a reality: professional associations, journals, and university departments.

Concerned about the geopolitical implications of population growth in East Asia, Edward Scripps established the first university-based population research center, the Scripps Foundation for Research in Population Problems, in 1922 at Miami University in Ohio (Payne 2005). He envisioned his foundation as a place where young scientists could devote themselves full time to research on population, free of the burden of teaching (Thompson 1923). The problem was finding appropriate men for the job, as nobody at that time had the right expertise. Scripps’s first hire was sociologist Warren Thompson, who had not previously worked on Asia but had recently completed a dissertation analyzing vital rates in the United States and Europe (Thompson 1915). His second hire was Pascal Whelpton, who had a background in agricultural economics but no experience with population (Thompson 1965). Scripps’s choice of relatively inexperienced scientists indicates his intention to develop a new field rather than further an

established one. In carrying out the work for which they were hired, Thompson and Whelpton began to codify the new field. After Scripps's death in 1926, their research program continued with support from the Laura Spelman Rockefeller Memorial and the Milbank Memorial Fund.

The Milbank Memorial Fund, a public health-oriented philanthropy based in New York City, began to invest in population research in 1928. Although the Fund had already begun to improve public health and reduce mortality in the rural New York communities in which it worked (Fox 2006), board member Thomas Cochran had grown frustrated with the continual outlay of resources to improve the health of an expanding poor population in the United States. He suggested that the Fund's money could be better spent distributing birth control, reducing the incidence of poverty by reducing the fertility of the poor (Kiser n.d.). This proposition was controversial, as birth control remained illegal in many states.

Cochran's plan signaled the beginning of convergence between what had previously been two separate political programs: birth control legalization and eugenics. Birth control advocates had initially emphasized the right of individuals and couples to control their fertility, not the potential for birth control to improve the "quality" of the population (Baker 2011). Meanwhile, the eugenics movement had concentrated on government-mandated sterilization (Kevles 1985; Stern 2005). Eugenacists initially opposed the legalization of birth control, which was much more widely used among the professional middle classes, whose fertility they hoped to promote, than among the poor, whose fertility they hoped to suppress (Baker 2011). But public support for eugenic sterilization programs was beginning to wane as genetic research suggested that their success would require the sterilization of "seemingly-normal" individuals who were thought to carry recessive genes for such antisocial traits as poverty and criminality (Pearl 1919), and as fascist governments in Europe increased the scope of their sterilization programs.

American eugenacists turned to birth control as a more socially acceptable means of engineering population. Birth control advocates eagerly welcomed them to the fold, as eugenics had more popular support and scientific credibility at the time than did birth control (Baker 2011). However, there was as yet no empirical evidence that the legalization and spread of birth control would have any effect on population size or composition at the aggregate level. For this reason, the board of the Milbank Memorial Fund decided to launch its contraceptive efforts by establishing a research division, which it did in 1928. Following Scripps's example, the Milbank Memorial Fund hired young scientists, beginning with Frank Notestein, who had recently completed a Ph.D. at Cornell University under the direction of Milbank trustee Walter Willcox. In 1931, Notestein was joined by Clyde Kiser, who was then finishing a dissertation in sociology at Columbia University.

The Milbank Memorial Fund was demography's most generous patron before World War II. In 1927, it provided funds for a World Population Conference, which laid the groundwork for the establishment of the International Union for the Scientific Investigation of Population Problems (IUSIPP, now the International Union for the Scientific Study of Population or IUSSP). The IUSIPP fostered an international network of population scientists, with representatives from North and South America, Australia, Europe, and Asia (IUSSP 1985). The Milbank Memorial Fund paid the bulk of the IUSIPP's operating expenses during its first decade and funded the 1931 establishment of the Population Association of America (PAA), which remains demography's professional association in the United States (Hodgson 1991). When PAA began its first journal, *Population Literature* (subsequently *Population Index*) in 1935, the Milbank Memorial Fund footed the bill. Milbank sponsored annual conferences on population beginning in the 1930s, and its journal, *The Milbank Memorial Fund Quarterly*, was a major outlet for demographic research until the early 1970s.

In the 1930s, Milbank patronage for demography expanded under the influence of trustee Frederick Osborn. The long-term secretary of the American Eugenics Society, Osborn viewed demography as a potential ally in the Society's efforts to disassociate American eugenics from European fascism. Osborn publicly repudiated the overt racism that had characterized the eugenics practiced by other US organizations, such as the Eugenic Record Office at Cold Spring Harbor (Allen 1986; Grossner 1967), though he clung to socioeconomic status as a proxy for genetic quality (Osborn 1935a, 1935b; Ramsden 2008). What was unique about Osborn's eugenic program was that it aimed to put the means of eugenic selection into the hands of the public through the universal availability of birth control. To ensure that the public would use this power appropriately, Osborn hoped to create an environment of social control that would encourage the wealthy and well-educated to choose large families and the poor and less-educated to choose smaller families. Osborn viewed the emerging science of demography as a resource for identifying and manipulating the factors associated with individual childbearing decisions and promoted it as a scientific basis for his eugenic program (Osborn 1933, 1959).

Demographers, like other scientists of their time, incorporated the basic tenets of eugenics into their worldviews and scholarship. However, as Italian and German demographers began to provide scientific support for their governments' fascist and, in the latter case, ultimately genocidal population programs (Ipsen 1996; Köhl 1994), the field began to split along national lines, with demographers in the United States and the United Kingdom describing the work of their Italian and German colleagues as ideological rather than scientific (Glass 1935). The US and UK delegations of IUSIPP officially boycotted planned conferences in Rome in 1931 and Berlin in 1935, opening a rift that nearly destroyed the organization (Pitt-Rivers

1931; Lorimer 1935; MacKellar and Hart 2014). But American and British demographers did not abandon eugenics altogether. Instead they embraced Osborn's version (termed "reform" eugenics by Daniel Kevles [1985]), represented in the UK by C. P. Blacker, as a more respectable alternative. This new eugenics program also afforded access to patronage. The Eugenics Society of Great Britain, of which Blacker was secretary, then provided nearly all of the funding for the UK's Population Investigation Committee (Grebenik 1991), and Osborn became an important advocate for demography in the United States.

Osborn's patronage blurred the boundaries between demography and its funders. Osborn often presented himself as a population scientist and has been described as such both by his contemporaries and by more recent scholars. He was a founding member and later a president of PAA, but held neither an advanced degree nor an academic affiliation nor a post in a statistical organization, at a time when such credentials were becoming increasingly important. Although he did co-author some publications with demographer Frank Lorimer, Osborn gained access to the field less through his intellectual contributions than through his ability to secure funding on its behalf, for which Notestein dubbed him "Demography's Statesman" (Notestein 1969). Osborn's involvement in the PAA and his close personal and working relationships with Frank Lorimer, Frank Notestein, and other demographers resulted in frequent contact between demographers and their patrons.

Osborn seems to have devoted little of his own substantial wealth to demography, but, serving on the board of several philanthropic organizations, he was adept at linking funders to projects. In 1936, he arranged for the establishment of the Office of Population Research (OPR), an interdisciplinary research and graduate training center for demography, in Princeton University's School of Public and International Affairs. OPR received no institutional support from Princeton, but funding from Milbank supported the OPR's operations and provided graduate fellowships (Poole 1935a, 1935b, 1936; OPR 1939). Osborn selected Notestein to direct OPR, and his staff consisted entirely of other young scholars: Irene Taeuber, who had completed a Ph.D. in sociology at the University of Minnesota in 1931; Henry Shryock Jr., who was finishing a dissertation at the University of Wisconsin; and Dudley Kirk, then a graduate student at Harvard University. Osborn coordinated the work of OPR with that of the Milbank Memorial Fund and the Scripps Foundation. In the late 1930s, he secured a grant from the Carnegie Corporation, of which he was also a trustee, for a study involving all three research centers on the social and psychological correlates of childbearing, known informally as the Indianapolis Study. Fertility in the United States had declined precipitously during the Great Depression, and Osborn expected the results of the Indianapolis Study to inform policies that would stimulate population growth by increasing the fertility of only

the middle and upper classes. In Notestein's words, Osborn "did an enormous amount of mining of resources" and "practically forced us into the Indianapolis Study" (Van Der Tak 2005, v.1: 12).

Between the world wars, a small group of population-oriented scientists and the individuals and institutions that funded them began to build the interdiscipline that we now know as demography. Practitioners shared with their funders anxieties about population size and composition at the national and global levels and a belief that science held the solutions. Together they fashioned demography nearly whole-cloth. Certainly, established scientists such as Raymond Pearl were instrumental in drawing the attention of potential funders to the nascent field, and more senior scholars such as Alfred Lotka and Robert Kuczynski contributed demography's methodological foundations. But as patrons established the new field's institutions, they hired young scientists to direct them. Even though older scientists led the PAA and the IUSIPP in their early years, it was the young scientists whose work came to characterize the field (Hodgson 1991). Frank Notestein was only 34 years old when he became director of the world's only demography graduate training program, a position through which he quickly came to be recognized as the world's foremost authority on population. As topic modeling will demonstrate, Notestein and other young demographers were taking a new approach to population research and focusing their scholarship on questions of fertility and contraception—the issues at the intersection of birth control legalization and eugenics—to a greater extent than were social scientists who were not affiliated with the institutions established by demography's interwar patrons. By funding young scientists, demography's patrons nurtured a generation of scholars attuned to their particular issues; by building disciplinary institutions around them, patrons endowed their clients with scientific authority.

Globalizing anglophone demography after World War II

During and after World War II, demography acquired powerful new benefactors who globalized the field and encouraged it to focus on slowing rapid population growth in Asia, Africa, and Latin America, the parts of the world that were becoming the focal points of the Cold War. Postwar patrons sponsored a remarkable expansion of demography, funding new population research centers, not just at US universities, but also in Asia and Latin America. They sponsored the publication of demography journals and provided graduate fellowships to expand the field by recruiting promising students. By the late 1960s, they had helped demography secure the patronage of the US government, which stimulated further expansion.

Concern with the rate of population growth in Asia, Africa, and Latin America—and efforts to halt it—were new in the postwar period.

Population had traditionally grown very slowly in those regions, with high mortality balancing high fertility, and data were largely unavailable to demographers in the US and Europe. During the war, OPR entered into contracts that expanded its demographers' horizons. First, the League of Nations, with funding from the Carnegie Corporation of New York, commissioned studies on the demographic past and future of Europe (Griffith 1941). In the course of this research, OPR demographers coined the phrase "demographic transition" to describe a pattern they noticed occurring at different times in most of the countries they examined: mortality decline followed by fertility decline with rapid growth in between, all driven by modernization (Kirk 1944; Davis 1945; Notestein 1945). Several demographers had previously advanced elements of what would come to be known as demographic transition theory (Hodgson 1983; Szreter 1993; Kirk 1996), but in their wartime work OPR staff articulated the theory for the first time and formalized it as a basis for population projections (Notestein et al. 1944).

During World War II, OPR also contracted with the US Department of State to acquire and analyze demographic data for "the major non-European regions of the world so that it could be in a position to supply information promptly on any section of the world" (OPR 1942). The agreement allowed for the pooling of resources and research between State Department and League of Nations projects. OPR demographers discovered that, in parts of Asia, Latin America, and the Middle East, mortality was beginning to decline, resulting in population growth. Unlike in the European countries they had analyzed, this mortality decline was not a result of modernization or industrialization, but rather of imperialism (Notestein 1944; Davis 1944). Colonial governments had provided a modicum of relief from famine, disease, and violence, reducing mortality enough to produce sustained population growth. But colonial governments also blocked and even reversed industrialization in these areas, preventing the economic development that would have stimulated the demographic transition (Hodgson 1983). Writing in 1944, Frank Notestein and Kingsley Davis, both at OPR, warned that continued population growth outside of the demographic transition framework would swell the number of people living on the margins of subsistence, leaving the populations of poor countries more vulnerable to economic shocks and natural disasters and increasing the vulnerability of the world to violent unrest.

Initially, Notestein and Davis argued that birth control was neither necessary nor sufficient to slow population growth in colonial territories. They recognized that the European and American middle classes had begun to limit the size of their families at a time when birth control was rudimentary and generally illegal, using such well-known and universally available techniques as abstinence and withdrawal. They also noticed that, as condoms, diaphragms, and spermicides became more readily available between the wars, they were not used to any great extent in Europe or the United States

by the poor or by rural dwellers, who lacked the socioeconomic incentives for small families that had motivated fertility control among the urban middle classes (Stix and Notestein 1940). Notestein and Davis reasoned from the experience of Western Europe and the United States that reducing fertility would require the economic development that would complete the demographic transition. Absent economic development, the spread of modern contraceptives would have little effect (Notestein 1944; Davis 1944, 1945). Attributing high fertility to the poverty perpetuated by continued imperialism and economic domination by the countries of Europe and North America, Notestein and Davis recommended political and economic independence and the development of indigenous middle classes and civil societies as the most rapid route to fertility decline.

Within just a few years, however, Notestein and Davis began to shift their analysis, describing poverty as the result of rapid population growth rather than its cause, and suggesting that the right contraceptive technology could reduce fertility in advance of economic development (Davis 1946, 1950a, 1950b; Notestein 1948, 1950). This new perspective, the emergence of which has been well described and explained by Hodgson (1983, 1988) and Szreter (1993), suggested that an as-yet-nonexistent new form of birth control could provide a relatively quick and cheap solution to the problem of rapid population growth—and the poverty that was now seen as its effect rather than its cause—that did not require any change in existing social, political, or economic structures. The shift coincided with investments in demography by a new patron, John D. Rockefeller 3rd, and helped demography to attract the support of the Ford Foundation, which was just beginning its work in international development.

John D. Rockefeller 3rd (grandson of Standard Oil and Rockefeller Foundation founder John Davison Rockefeller) had long been interested in the legalization of birth control, following in the footsteps of his father, who had funded the scientific and political activities of Margaret Sanger and Clarence Gamble through the Bureau of Social Hygiene, the National Committee on Maternal Health, and the National Research Council's Committee for Research in Problems of Sex (Harr 1988, pp. 455, 459). Between the wars, the Rockefeller Foundation, of which Rockefeller became a trustee in 1931 and chairman in 1952, had supported demography only indirectly, through funding for the American and British Eugenics Societies (Harr 1988; Grebenik 1991). By the late 1930s, Osborn, a friend of Rockefeller's father and a trustee of the Rockefeller Institute, had begun to impress upon Rockefeller the close relationship between birth control, eugenics, and demography (Harr 1988, p. 457). In 1944, the Rockefeller Foundation made its first grants in demography, just over \$17,000 to the Scripps Foundation and \$200,000 to OPR (Rockefeller Foundation 1944).

Rockefeller Foundation officials took Notestein and his OPR colleague Irene Taeuber on a tour of East Asia in 1948. This experience, together with

the 1950 Communist victory in China's long-running civil war, further solidified Notestein's opinion of the dire threat posed by population growth and the potential for new contraceptive technologies to reduce that threat (Szreter 1993). By 1952, however, it had become apparent that the Rockefeller Foundation was not willing to support the development of new contraceptives or their overseas application, despite Rockefeller's succession to the position of chairman (Notestein and Osborn 1971). That spring, Rockefeller called a meeting of experts at his family's Williamsburg Inn that laid the foundation for the establishment of the Population Council (National Academy of Sciences 1952). Notestein, Davis, and Osborn were present. By then, these three men, together with Rockefeller, had a fully developed vision for the new organization. It would support biomedical research to develop simple contraceptive technologies, technical assistance to overseas family planning programs that would distribute the new contraceptives, and demographic research to determine how to stimulate the adoption of birth control in agrarian societies. Davis drifted out of the Population Council's orbit when he relocated to the University of California, Berkeley in 1955, and would begin to publicly criticize the Council's work in the late 1960s (Davis 1967). Notestein and Osborn remained in leadership positions, with Osborn serving as the Council's first president and Notestein succeeding him in 1959. Throughout that decade, the Council was demography's largest and most influential patron, although Notestein's high status in the profession as well as the organization meant that this influence operated in both directions.

In the Cold War context of the early 1950s, the Population Council promoted its activities as critical to preventing the global spread of Communism, since US interests worried that developing countries with large poor populations would be particularly vulnerable to revolution (Moore 1954; Donaldson 1990). The Council provided a vehicle through which the Rockefeller Foundation and members of the Rockefeller family could invest in population control as a means of promoting economic development, and thereby containing Communism, in what was coming to be known as the "Third World," while avoiding direct involvement in the development and spread of contraception, which remained controversial. The Ford Foundation, too, recognized the Council's utility and by the mid-1950s had become its largest donor. When the Ford Foundation entered the population field in 1952, its leaders solicited input from demographers, including Notestein, Davis, Thompson, Whelpton, and Irene Taeuber's husband, Conrad, then at the US Bureau of the Census (Harkavy 1995, p. 12). These men emphasized the importance of demographic research and training, both to better understand population dynamics and to generate support for family planning programs in high-fertility countries (Ford Foundation 1953). In 1963, the Ford Foundation launched its own population program, which included funding for demographic research and training in support of overseas

family planning activities (Harkavy 1995; Caldwell and Caldwell 1986). This program was closely coordinated with that of the Population Council, of which the Ford Foundation remained a major donor, contributing \$88 million between 1954 and 1993 (Harkavy 1995, p. 13). Until the late 1960s, Oscar Harkavy, director of the Ford Foundation's population programs, and Bernard Berelson, director of communications for the Population Council, controlled the majority of funding for demography. Although they were not demographers themselves, they made regular appearances at PAA meetings and consulted with demographers, continuing the close contact and mutual influence between patrons and clients initiated by Frederick Osborn between the wars.

By the early 1960s, contraceptive research funded by the Population Council had begun to pay off with the development of new intrauterine contraceptive devices, or IUDs, the most widely used being the Lippes Loop. IUDs had been in use since ancient times, but the Lippes Loop was new in the sense that it was made of flexible plastic, cost pennies to produce, and could be inserted by staff with only minimal training, after which it would prevent conception until removed. Moreover, women who accepted IUDs could not easily remove them or choose not to use them (Takeshita 2012). Scientists associated with the Population Council viewed the Lippes Loop as the tool of modernization Rockefeller had envisioned when he founded the Council (Berelson 1964a; National Academy of Sciences 1952): one that offered a technological solution to the geopolitical challenges of the postwar period. Berelson described the Loop as "a tremendous contribution to the welfare of individual families and national communities, with all that this means for the economic prosperity, the political stability, and the freedom of mankind" (Berelson 1964b, p. 13). With this statement, Berelson linked the IUD not only to individual health and welfare, but also to national economic development and the international containment of Communism.

Even with the IUD in hand, however, neither the Population Council nor the Ford Foundation expected promoting contraception abroad to be a straightforward task. Many heads of state and leaders of nationalist movements worldwide maintained the pre-World War II view of population growth as a source of geopolitical power, as did those in the United States who hoped to control global population growth as a means of preserving the geopolitical order. The geneticist Hermann Müller feared that citizens of target countries would recognize the Council as an American organization "wanting them to change their ways in order to give us an advantage relative to the Communists," and that such recognition "would tend to throw them still further toward the Communist camp" (Müller 1957). The Population Council consulted with international public opinion experts, who warned that "materials that appear to be preaching from the outside can backfire dangerously" (Barrett 1956). Demographers too understood the delicacy of the situation. Irene Taeuber, a specialist on population in Asia,

warned Osborn that “a fear that the United States was urging a decline in births” there could stimulate “adverse propaganda” about the US more generally (Osborn 1953). Notestein was reputedly fond of prophesying that “coercive measures to force contraceptive practice are more likely to bring down the government than the birth rate” (Van Der Tak 2005, v2, p. 160). The Population Council managed this dilemma by avoiding any direct affiliation with the United States government. It also funded demographers researching the perceived dangers of population growth and potential for birth control to limit growth, thereby depoliticizing its fertility-control programs and making them palatable to potential clients and to heads of state in high-fertility countries.

In the 1950s and 1960s, the Population Council and the Ford Foundation leveraged their resources into an international infrastructure for population training and research. Following up on the achievements of demography’s interwar patrons, postwar patrons built population research centers around a new cohort of demographers who were already involved in research on fertility and its control, such as Ronald Freedman at the University of Michigan, who had previously worked on the Indianapolis Study. They also took over the sponsorship of such existing centers as Philip Hauser’s Chicago Community Inventory at the University of Chicago, which became the Population Research and Training Center (now the Population Research Center). Centers such as these became nodes in an international network of demography. The Ford Foundation and the Population Council drew faculty into population research centers with funding that ensured high salaries and light teaching loads, and attracted students from both the United States and high-fertility countries with generous graduate fellowships. Alumni of these programs became faculty members at other centers or started new ones with funding from the Ford Foundation and the Population Council. Graduates from high-fertility countries were expected to return home to establish research and training centers in their own countries, with US demographers serving in an advisory capacity. Fellows who did not remain in academia often took up positions as government statisticians or family planning administrators. Graduate fellowships were key to the expansion of the field: several of the most prominent demographers of the twentieth century had no interest in population research until they received a fellowship from the Population Council, the Ford Foundation, or, earlier, the Milbank Memorial Fund (Van Der Tak 2005).

University-based population research centers were generally not degree-granting units, so demographers continued to receive training in other fields, predominantly sociology. Nonetheless, the distinct physical space of population research centers largely kept demographers separate from other social scientists, and new demographic journals funded by Rockefeller, Ford, and the Population Council—including *Population Studies* (1947), *Demography* (1964), and *Population and Development Review* (1975)

—provided demographers with their own peer-review channels for publication (Greenhalgh 1996). Most population research centers were located outside of academic departments and therefore relied almost exclusively on external funding, which, prior to the entry of the United States Agency for International Development (USAID) and the National Institutes of Health (NIH) into the field in the late 1960s, came mainly from the Ford Foundation and the Council. Even population centers that did not receive direct funding from the Population Council felt its influence.²

Research supported by the Population Council and the Ford Foundation advanced their patrons' interests in the spread of birth control in several ways. Taking as its starting point the idea that population growth was the major cause of global poverty and inequality, and that birth control was a prerequisite for economic development,³ research on fertility and family planning validated these assumptions by focusing on the next question: how to reduce fertility. Demographic research at times involved direct fertility interventions (Riedmann 1993; Mamdani 1973; Freedman and Takeshita 1969). Fertility surveys informed both respondents and local research staff about birth control, and some surveys included the distribution of spermicidal tablets or coupons for reduced-price IUD insertions. Demographic research that evaluated family planning programs deemed them successful to the extent that they reduced fertility, largely ignoring questions about whether reducing fertility improved welfare at the individual level or promoted economic growth at regional or national levels.

Demographic research also helped to place population control on the policy agendas of the United States, the United Nations, and some high-fertility countries. The leaders of the Population Council pointed to the findings of demographic studies to successfully lobby the US government to support family planning programs and demography both at home and abroad, providing substantial additional funding for the population research and fertility control projects of the Council and the Ford Foundation through USAID and NIH. Demographic research also helped to convince the United Nations of the necessity of reducing population growth. Fertility surveys that showed demand for contraception in high-fertility countries provided empirical support for a statement drafted by the Population Council, signed by 12 heads of state in 1966 and presented to the United Nations on Human Rights Day, classifying family planning services as a human right (Harkavy 1995). The United Nations Fund for Population Activities (UNFPA) was established in 1969 following the recommendation of a Rockefeller-chaired committee of the United Nations Association. The majority of UNFPA's funding was supplied by USAID. Acceptance of the Population Council's resolution and the establishment of UNFPA further legitimized the global population control programs of the US government and US-based organizations, but it was through population research centers that US-based organizations most directly influenced policy in high-fertility countries. Returning

students were expected to serve as “a source of local authority on the population problems of each major country or region of the underdeveloped areas” (Population Council 1958). In these positions, some Council fellows did successfully convince local policymakers of the necessity of fertility intervention (Caldwell and Caldwell 1986; Concepción 2004).

In the 1950s and 1960s, the Population Council and the Ford Foundation sponsored demography’s rapid expansion, and demography both guided and provided scientific legitimacy for its patrons’ fertility control objectives. As the second half of this article will demonstrate, demographers were uniquely attuned to questions of fertility and family planning during those decades. Their research contributed to the success of efforts by the Population Council and the Ford Foundation to promote family planning worldwide. At the end of World War II, birth control was still nearly unmentionable in the United States and largely unavailable in the countries where population was beginning to grow rapidly. By the end of the 1960s, family planning was part of the official policy of the United States, the United Nations, and numerous countries worldwide. But although demography overlapped with fertility control, it was never limited to fertility or family planning. During the 1960s, the Ford Foundation poured more money into demography than could possibly be absorbed by fertility research alone and placed few restrictions on how the money could be spent. Although centers with active programs on international fertility received more money, Ford funding also supported research on other demographic issues, such as mortality, migration, and social stratification (Caldwell and Caldwell 1986). Some population centers, such as those at Brown University and the University of Wisconsin, received little or no money from the Ford Foundation or the Population Council. The US government began funding demographic research in the second half of the 1960s, providing sponsorship for research that the private foundations had not directly supported. While grants made by USAID continued to emphasize research on international fertility and family planning, those made by NIH focused on the United States and further diversified the field, particularly after the establishment of the National Institute on Aging in 1974. By that time, spending by the US government on family planning abroad and demographic research at home far eclipsed that of private foundations, which began to reduce their commitments in these areas. Demography continued to grow with government patronage and continued to expand beyond its earlier focus on fertility.

The archival research presented here has suggested the importance of demography’s patrons in establishing the field’s institutional structure between the world wars, stimulating its growth in the first few decades after World War II, and orienting it around questions of fertility and its control. In the following sections, I turn to computational analysis of the demography journal literature to demonstrate that the new field of demography did, in fact, take a distinctive approach to population studies between the

world wars, and that demographic research paid more attention to fertility and ways to control it than did population-oriented research in the neighboring social sciences. Demography's emphasis on fertility and its control began with the entry of the Milbank Memorial Fund into the field in 1928, increased after the establishment of the Population Council in 1952, and began to decline when the US government replaced private foundations as demography's main patron. Assessing the character of the demographic literature and comparing the prevalence of patrons' concerns between demography and other social science literature requires attention to the entirety of this literature over the period of analysis.

Surveying the demographic terrain: Corpus and method

The method I use to examine the content of demographic research across the twentieth century is Latent Dirichlet Allocation (LDA). LDA is one of a set of distant reading algorithms commonly described as "topic modeling," and I will use the phrase topic modeling interchangeably with LDA (Blei, Ng, and Jordan 2003). Computational modes of textual analysis are well suited to the history of science because science is in many ways a textual practice. New ideas, methods, and theories emerge and are tested and validated through writing, peer review, and publication. Moreover, publication is only the beginning of the process of scientific knowledge production. Through the intertextual activity of citation, scientists either enshrine ideas or theories as facts, reject them, or simply ignore them. Along with laboratories, professional meetings, and graduate training programs, scholarly journals are a critical site for the production of scientific knowledge. Unlike other sites, journals leave a record that is accessible to historians and tractable to computational analysis (Mimno 2012; Riddell 2014; Goldstone and Underwood 2012).

The corpus for this study is drawn from JSTOR Data for Research. It includes all English-language research articles published between 1915 and 2004 that are classified as "population studies" at the article level and "social science" at the journal level.⁴ This selection process yielded over 50,000 articles. JSTOR's category of "population studies" is much more capacious than what is now recognized as demography. The corpus therefore includes the academic demography literature, as well as population-related articles in sociology, anthropology, geography, family planning, public health, education, library science, political science, law, and policy.

Topic modeling relies on the assumption that articles are crafted from vocabularies that are shared among articles addressing similar concepts. By examining which words appear together at the article level, the algorithm identifies the underlying, or latent, vocabularies that comprise them. Topic modelers refer to these vocabularies as "topics," but one should note that

TABLE 1 Topic frequency for “A Comparison of the Determinants of White and Nonwhite Interstate Migration,” *Demography*, 1971

Proportion (percent)	Topic
23	white negro nonwhite whites negroes nonwhites race census color median
20	variables analysis variable significant results effect regression table relationship factors
18	migration migrants move mobility net residence place movement destination migrant
8	state county counties states Carolina Florida Texas nonmetropolitan department north
31	all other topics

“topic” in this usage is a technical term that describes a probability distribution over the words in the corpus, not necessarily a coherent theme in the literature. Topics returned by the model do not inevitably correspond to a conventionally recognizable vocabulary. In topic modeling, the topics are generated from and specific to the corpus under analysis. The user specifies the number of topics that should be returned, but LDA is a form of unsupervised machine learning, which means that the user does not provide any information about the corpus, about what the topics should look like, or about what kind of words they should contain. The algorithm does not know what the words mean or the order in which they appear in the articles. It simply identifies words that appear more often in the same article than would happen randomly with respect to the corpus. For this article I modeled 200 topics to represent the diversity of the corpus over time and across the disciplines it includes, while keeping the model tractable to interpretation (DiMaggio, Nag, and Blei 2013; Wallach, Mimno, and McCallum 2009).⁵ All results reported here are from a single 200-topic model spanning the entire corpus for the years 1915–2004.

The model yields two outputs: a list of topics, each consisting of a probability distribution over words; and the distribution of topics across each article in the corpus. As an example, Table 1 summarizes the output for a single article, “A comparison of the determinants of white and nonwhite interstate migration,” published in 1971 in the journal *Demography* (Greenwood and Gormely 1971). It shows the proportion of the article accounted for by its four most prevalent topics, identifying each of those topics by its ten most prevalent words. Each topic is a unique probability distribution over all of the words in the corpus. In this table, I list the ten most prevalent words in each, but these ten words do not exhaust the topic.

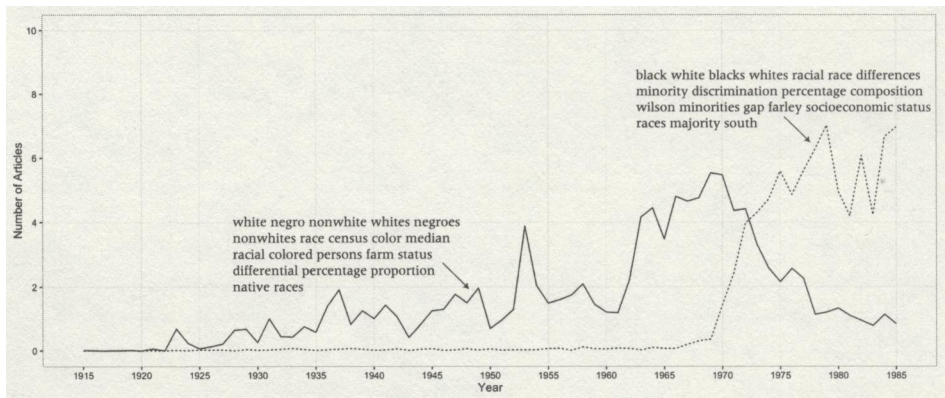
These results indicate that 23 percent of the article is comprised of a vocabulary of racial inequality in the United States, 20 percent of a vocabulary of quantitative analysis, 18 percent of a vocabulary of migration, and

8 percent of a vocabulary of state-level analysis in the United States. These labels—for example, “racial inequality” and “quantitative analysis”—are descriptions I have ascribed to each topic on the basis of the relative frequency of words it contains. The four topics listed above account for 69 percent of the words in the article. The remaining 31 percent comprise some combination of the remaining 196 topics in the model. Similarly, each article in the corpus can be modeled as a combination of these same 200 topics. As this example demonstrates, LDA allows articles to display multiple topics, which is an advantage over other forms of text clustering (such as k-means) that assume thematic coherence within a document. The ability to identify multiple distinct vocabularies in an article is particularly useful for analysis of scientific texts, as it allows an analyst to tease apart methodological and substantive language. Topic modeling facilitates the identification of substantive differences in articles that use similar methodological vocabularies and the identification of methodological differences in articles that use similar substantive vocabularies.

Topic modeling allows for both polysemy (the capacity for a word to have multiple meanings) and changes in the way words are used over time by allowing the same word to appear in multiple topics and by allowing multiple topics to represent similar concepts. With topic modeling, the meaning of words in a topic comes from the entire probability distribution that comprises the topic, rather than the specific permutations of letters that comprise the words themselves. For example, the word “development” can refer to child cognitive development when it appears in a topic with words like “scores,” “outcome,” “early,” “home,” and “childhood,” or to national economic development when it appears in a topic with words like “economic,” “national,” “industrial,” and “output.” Although the algorithm does not recognize this semantic difference, LDA generally does a good job of allocating words in meaningful ways, such that a topic model would likely identify the presence of both of these hypothetical topics in an article on early child development in states with developing economies (for a similar example, see Underwood 2012).

Topic modeling also reveals how vocabularies change over time, though the topics themselves are constant across the period of analysis. Figure 1 graphs the prevalence of the racial inequality topic from Table 1 in the whole corpus over time, along with the prevalence of another topic from the model that also refers to racial inequality. The vocabulary in the first topic appears more dated to a current reader, using the word “negro” instead of “black,” which appears in the second topic. The y-axis indicates the sum of the fractions of articles accounted for by each topic in each year. The figure indicates that the vocabulary in the first topic began to go out of use in the 1970s, just as the vocabulary in the second came into use, presumably reflecting the effects of the civil rights movement on social scientific scholarship.

FIGURE 1 Vocabularies of racial inequality

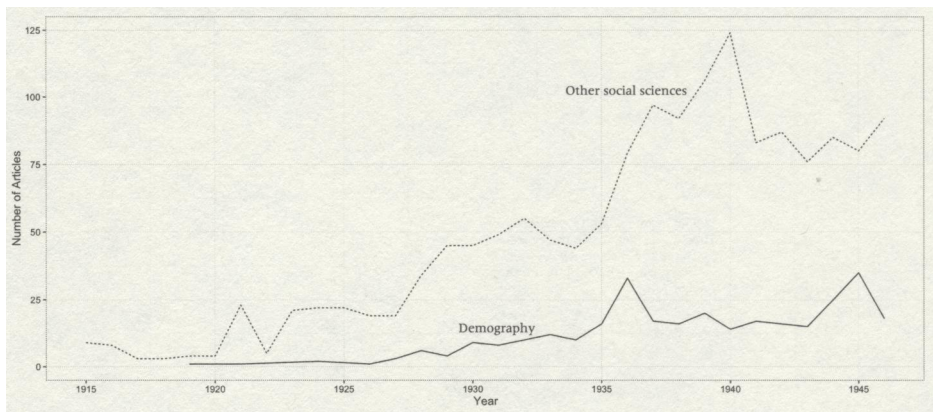


One important limitation of topic modeling is that it does not necessarily identify the argument of a given article. Two articles might display the same distribution of topics but use those same vocabularies to make very different kinds of statements. The real power of topic modeling comes from aggregating the fractions of articles that represent each topic up to the level of the journal or the corpus as a whole to track the prevalence of each vocabulary or topic across documents over time and between fields. The following discussion focuses on those topics that pertain to the question at hand: how the demography journal literature differs from other social science literatures on population and whether the concerns of demography’s funders are reflected in the demographic literature to a greater degree than they are in population-related research in neighboring social science fields.

Tracing the changing content of demographic research

I examine the content of demographic articles in two distinct periods: from 1915 to 1946, when demography coalesced as an interdisciplinary scientific field; and from 1947 to 1984, when demography expanded dramatically. The break point is determined pragmatically. Prior to 1947 the only English-language journal specific to demography was *Population Index*, which was mainly a bibliography and published very few research articles; 1947 saw the launching of *Population Studies*, an international journal of anglophone demography managed by the UK Population Investigation Committee. Its circulation was sponsored in part by the Rockefeller Foundation in its initial foray into patronage of demography and therefore represents the beginning of postwar foundation funding. The period of analysis in this section of the article is slightly longer than that in the previous section, extending back to

FIGURE 2 Population-related articles by author field, 1915–1946



1915 and forward to 1984, in order to identify transitions into and out of the heyday of private patronage for demography.

In each period, I compare scholarship in the field of demography to population-oriented scholarship in neighboring social science disciplines. As described earlier, most academic demographers worked in population research centers outside of traditional academic departments and depended heavily on external funding, the majority of which came from the Milbank Memorial Fund before 1944, the Population Council and the Rockefeller and Ford Foundations between 1944 and 1965, and the US Agency for International Development and the National Institutes of Health after 1965. Although these organizations also funded social science scholarship outside of demography, disciplinary social sciences, such as sociology and economics, had more diverse funding sources and were therefore less dependent on sponsors with specific population interests.

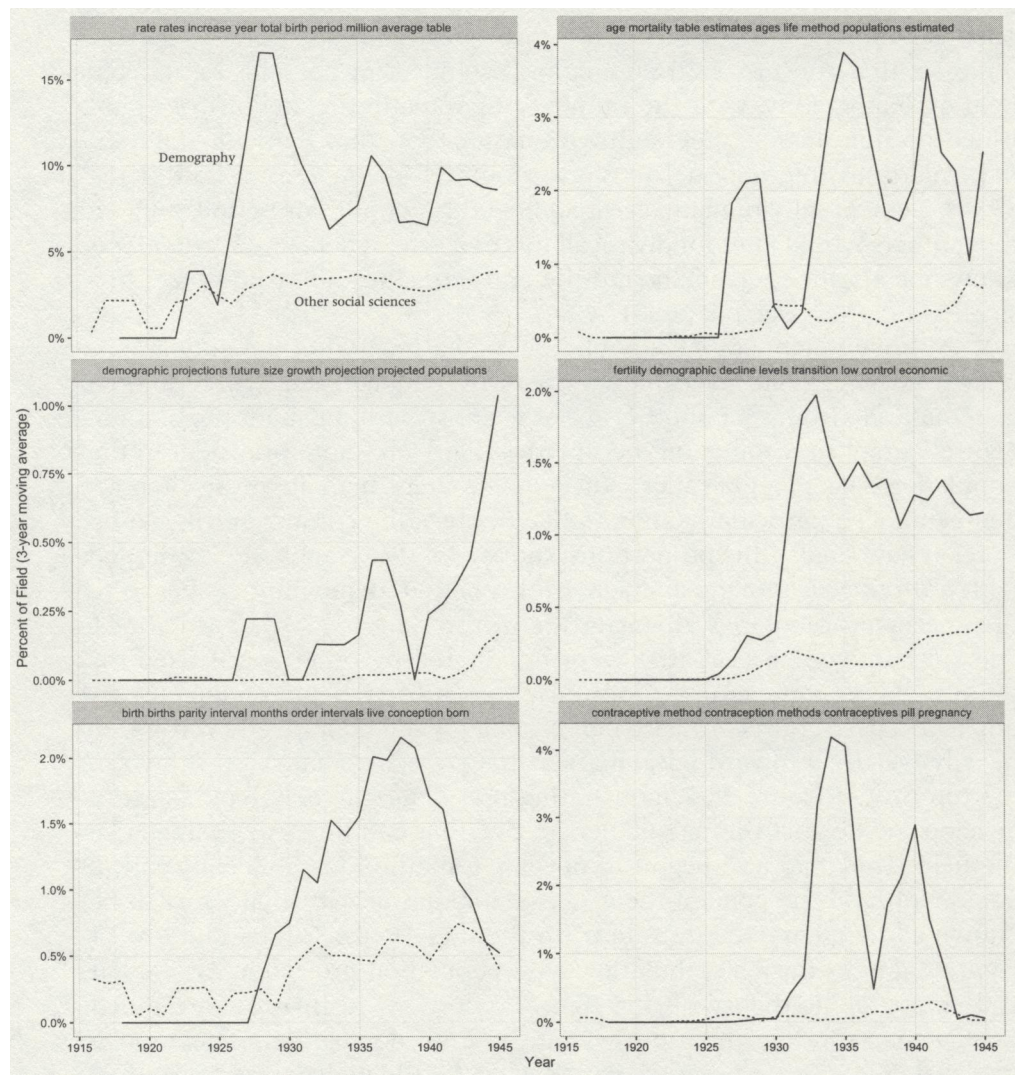
In the period 1915–1946 I distinguish between the work of demographers and that of other social scientists on an individual basis, identifying as demographers 67 individuals who worked in one of the new research centers described above or served as an officer of a national or international population research association. Many of these individuals were trained in sociology and published mainly in sociology journals, as well as in the *Milbank Memorial Fund Quarterly*.⁶ Figure 2 graphs the number of articles in the corpus for the period 1915–1946 published by demographers and other social scientists. Over the period, less than 20 percent of population-related social science literature was published by individuals who were coming to be associated with the new field of demography. Very few population-related articles were published before 1919, and none by those who would come to be identified as demographers. If demography had already been a thriving field prior to receiving funding from its inter-war patrons, the scholars who received that funding would have already

published population-related research. The fact that they had not supports my contention that demography's interwar patrons nurtured young scientists rather than advancing the careers of established ones. Figure 2 indicates that concern with population extended far beyond the nascent field of demography, with the number of population-related articles published by non-demographers growing faster than that by demographers, particularly as international tensions mounted in the second half of the 1930s. Demography remained a small field throughout this period, and demographers would later fondly recall this as a time when all PAA members knew one another personally and the entire organization could meet in a single room (Van Der Tak 2005).

Although demographers published only a fraction of the population-related social science research during this period, their work differed systematically from that of other social scientists writing about population. Figure 3 graphs six topics or vocabularies that were more prevalent in the population-related publications of demographers than in those of non-demographers, particularly after 1928.⁷ Because the corpus for this period is relatively small, the proportions shown in the graphs are smoothed with a three-year moving average. In this period, demographers began to use specific vocabularies characteristic of the new field's data, methods, and substantive concerns that were not shared by other social scientists writing about population. In contrast to scholarship on population by other social scientists, research published by demographers was more heavily weighted toward vocabularies of age-specific vital rates, shown in the top row of Figure 3, demonstrating that demographers had begun to develop the distinctive analytic perspective that continues to characterize the field. They had also begun to develop a method for projecting future population and the general theory of population growth that came to be known as "demographic transition" in the mid-1940s. The middle row of Figure 3 graphs these vocabularies, with population projection on the left and demographic theory on the right. Proportions in this row are much smaller than those in the top row, but those for demographers rise above the level of 0.5 percent that we would expect if the topics were distributed randomly across the corpus, while proportions for non-demographers do not. The patterns demonstrated in the first two rows of Figure 3 confirm that individuals affiliated with the new research centers and professional organizations were, in fact, taking a new methodological and theoretical approach to the study of population.

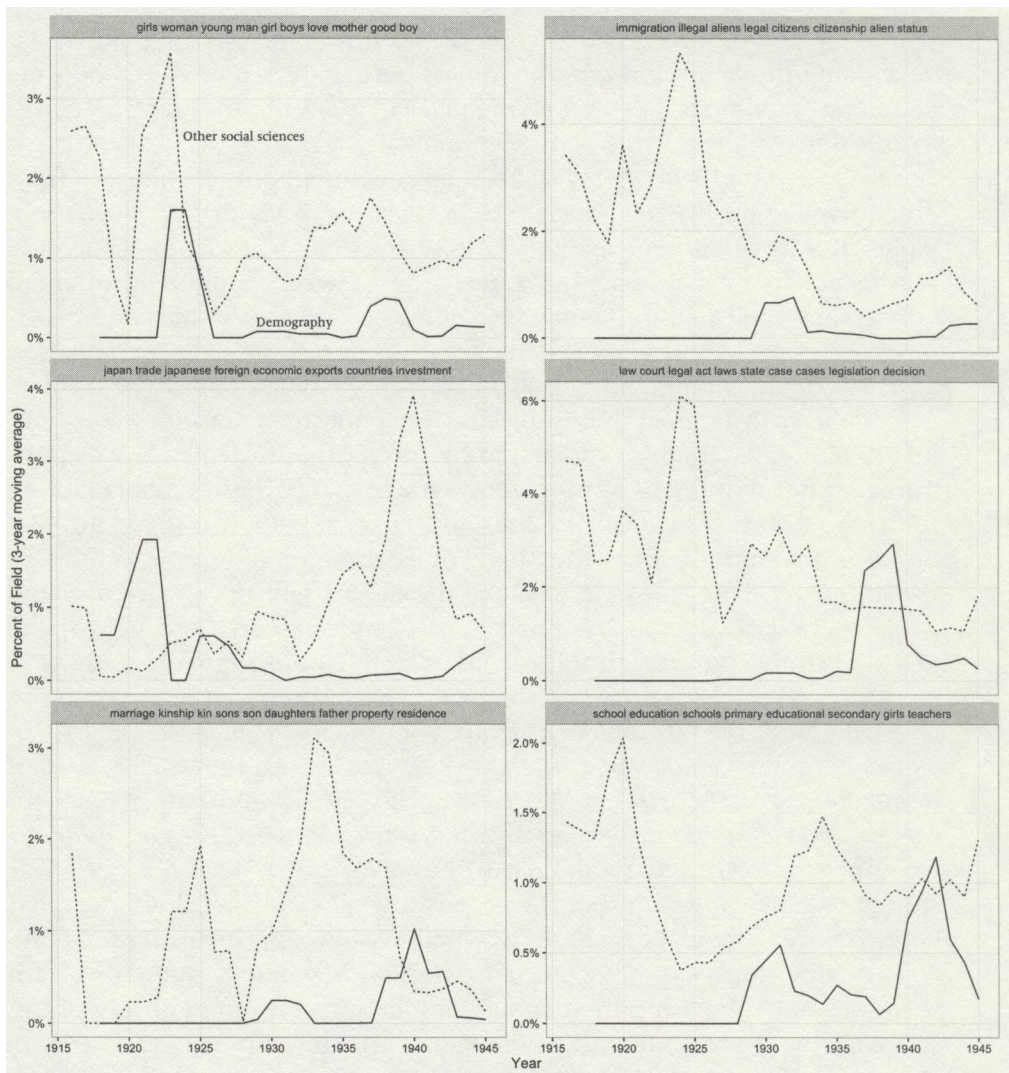
The bottom row of Figure 3 indicates that the scholarship of demographers featured more frequent use of vocabularies of fertility (left) and contraception (right),⁸ which were closely associated with the concerns of the Milbank Memorial Fund and with Frederick Osborn's eugenics program. These fertility and birth control topics reflected Milbank's interest in birth control research and Osborn's concern with socioeconomic fertility

FIGURE 3 Topics more prevalent in demography, 1915–1946



differentials and support for birth control as a vehicle for eugenics. The fact that they occur more than twice as frequently in the work of demographers than in that of other social scientists writing about population suggests that the young scientists sponsored by the Milbank Memorial Fund and associated interwar patrons were more highly attuned to their patrons' population concerns. It is certainly possible that the work of any given demographer could have reflected these concerns before he or she was hired by or began to receive funding from demography's interwar patrons, but on the whole the vocabularies displayed in these topics entered the

FIGURE 4 Topics more prevalent in other social sciences, 1915–1946



literature after such scholars as Thompson, Whelpton, and Notestein had established the contours of the field through their work for Scripps and Milbank.

Figure 4 graphs the topics that appear more frequently in the work of other social scientists studying population than in the work of demographers.⁹ This figure, too, represents a three-year moving average. It indicates that population-oriented social scientists who were not affiliated with the new institutions of demography wrote more frequently about (from left to right and top to bottom) the affective bonds of family, immigration, international trade, the legal system, kinship, and education.

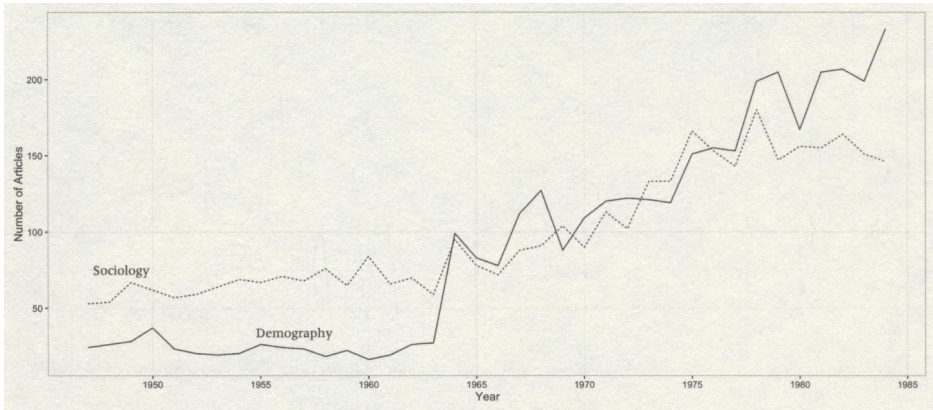
Together, these figures suggest that, after about 1928, scientists associated with the Milbank Memorial Fund and the institutions it sponsored began to take a new approach to the social scientific analysis of population, developing the analytical and theoretical perspectives that would become hallmarks of demography and giving particular attention in that new field to questions of fertility and contraception.

In the period 1947–1984, I distinguish demographic scholarship from other population-oriented social science on the basis of the journals in which it was published, as demography by then had begun to acquire journals of its own. I focus on comparison between population-oriented scholarship published in demography journals and that published in sociology journals, as sociology is demography's closest disciplinary neighbor. The majority of demographers hold degrees in sociology, and many scholars who publish in demography journals also publish in sociology journals. Identifying demographic scholarship by the journal in which it was published, rather than by its author, allows me to compare that scholarship to research published in sociology journals, potentially by the same authors but for different audiences and aimed at establishing different disciplinary credentials. It is not possible to make the distinction on this basis for the earlier period, as demography had no dedicated research journals in the first half of the century. In the corpus of population-oriented scholarship identified by JSTOR for the period 1947–1984, I compare the vocabularies of articles published in such demography journals as *Population Studies*, *Demography*, and *Population and Development Review*¹⁰ with the vocabularies of population-related articles published in such sociology journals as *American Journal of Sociology*, *American Sociological Review*, and *Social Forces*,¹¹ employing the same 200-topic model used to analyze the 1915–1946 period. It should be borne in mind that the corpus includes only articles designated by JSTOR as “population studies,” whether they appear in demography or sociology journals, or in journals specific to other disciplines.¹² I am therefore not comparing the demography literature to the entirety of the sociology literature, only to the population-oriented subset.

Figure 5 graphs the number of articles in the corpus by field over time. It indicates a sharp increase in the size of the demographic literature in the early 1960s, corresponding to the establishment of *Demography* and two journals specific to migration. The size of the demography journal literature began to exceed that of the population-oriented sociology literature in the late 1960s and did so consistently from the late 1970s onward. Steady increases after the mid-1960s in both fields reflect their growth and the addition of new journals.

Figure 6 graphs by year the percent of demography and sociology journal content represented by six topics that indicate the population concerns of demography's patrons.¹³ The vocabularies identified in these topics are related to fertility, family size preferences, reproductive physiology,

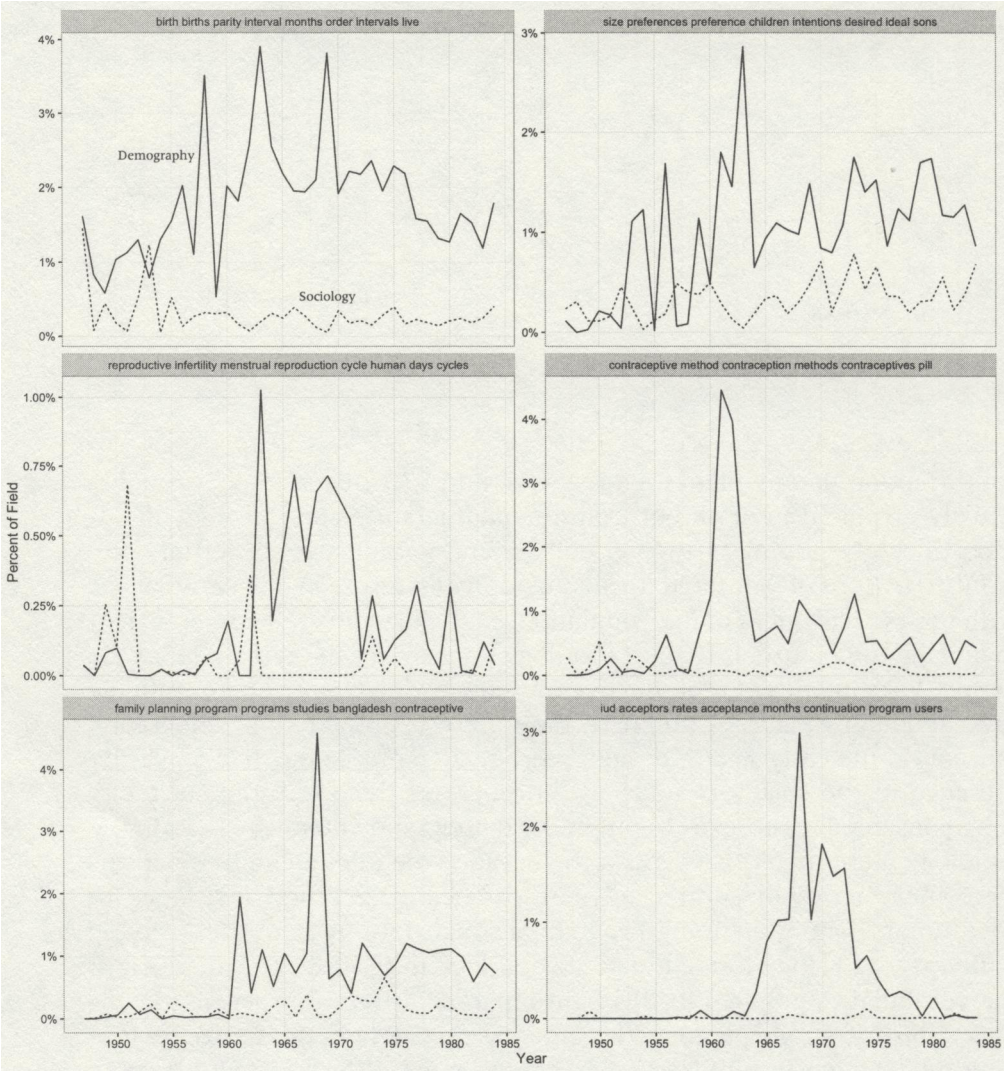
FIGURE 5 Population-related articles by journal field, 1947–1984



contraception, family planning programs, and IUDs. Each topic is roughly equally prevalent in or absent from the demography and sociology literatures at the beginning of the period. General vocabularies of fertility and family size (top row) entered the demography literature by the early 1950s, with the establishment of the Population Council, and were more prevalent in demography journals than in sociology journals for the remainder of the period. Vocabularies of reproductive physiology and contraception (middle row) and family planning and IUDs (bottom row) entered the demography journals in the early 1960s, though reproductive physiology had an earlier presence in the sociology journals. Throughout the 1960s, all six topics were considerably more prevalent in the demography literature than in the sociology literature. This was also the decade when demography’s patrons were most active in contraceptive research and technical assistance to government family planning programs in high-fertility countries, relying on the research they funded to guide and legitimize those activities. All of the vocabularies graphed in this figure, particularly those specific to contraception and family planning, became less prevalent in the 1970s. By that time, many high-fertility countries had adopted official family planning programs, and the US government had replaced private foundations as the major sponsor of demographic research. Although USAID continued to rely on demographers for evaluations of its international family planning program, NIH sponsored a broader research portfolio and emphasized research on the United States. Throughout this period, topics related to fertility and family planning had much less purchase in the sociology journals, indicating that the two fields focused on different population questions from the late 1950s to the early 1970s.

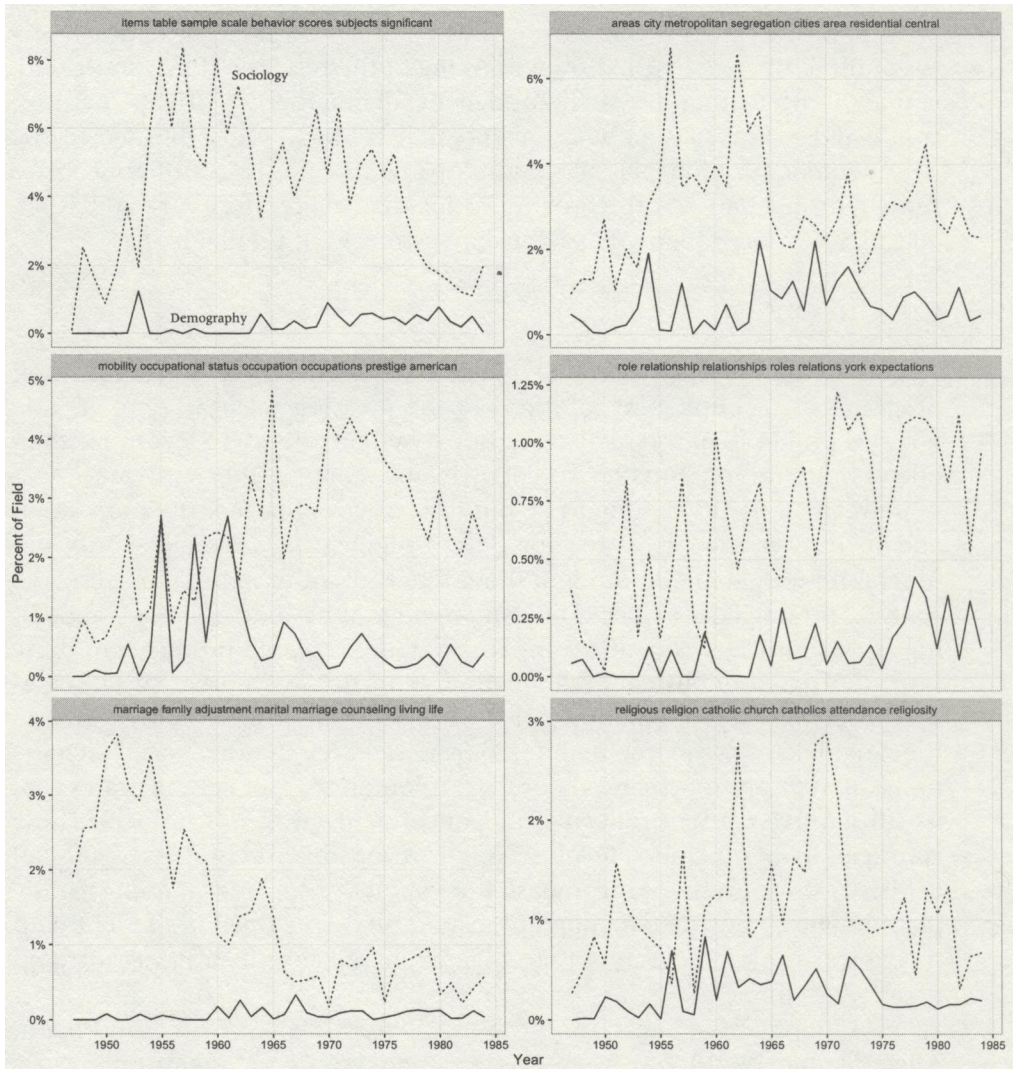
Figure 7 graphs topics that were more prevalent in the sociology literature on population than in the demography literature.¹⁴ These include vocabularies of attitude measurement, residential segregation, occupational

FIGURE 6 Topics more prevalent in demography, 1947–1984



mobility, interpersonal relationships, marriage, and religion. This figure generally shows a greater congruence between the demography literature and the population-oriented sociology literature in the late 1940s and early 1950s, with the two fields diverging in the late 1950s and early 1960s, and converging in the late 1970s. That the divergence coincides with the period in which the Population Council and the Ford Foundation were demography’s primary funders suggests that fertility and family planning were concerns specific to demography and the fertility control interests that supported it, and were not shared by the social sciences more broadly,

FIGURE 7 Topics more prevalent in sociology, 1947–1984



nor were the social structural concerns of sociology explored as readily in the demography journals.

The topic modeling presented here indicates that the claims made in this article on the basis of archival research are borne out in analysis of the demography literature as a whole. Archival evidence demonstrates that patronage of demography by Scripps, Milbank, and Osborn between the wars and by the Rockefeller and Ford Foundations and the Population Council in the first few decades after World War II was integral to these patrons' population projects, the majority of which focused on fertility and its control. Results of LDA indicate that the research these patrons

funded was concerned with fertility and its control to a greater extent than was other population-oriented research. While topic modeling does not provide direct evidence of patrons' influence on the field of demography (or of the influence on their own thinking of the research they sponsored), it does indicate that research funded by demography's private patrons, conducted in the new population research centers, and published in the new demography journals was more attuned to the issues of concern to those patrons than was the broader social science literature on population, and that this focus followed patrons' investments in the field.

Conclusion

Twentieth-century advocates of population engineering presented their programs as technological solutions to the pressing social, economic, and political problems of their day, and they relied on science to legitimize their efforts and promote broader acceptance and support. But that science was not already at hand waiting to be put into service. Instead, the individuals and institutions that promoted population engineering also helped bring demography into being by funding the establishment of population research centers, professional associations, and demography journals. Topic modeling allows for the systematic comparison of the research produced in these institutions and published in demography journals with other social scientific scholarship on population. Such comparison indicates that research in the new field of demography differed from research in other social sciences in its analytic approach and theoretical orientation, and demonstrates that its substantive content reflected the concerns of the field's funders. These concerns always included fertility and birth control, and in the second half of the century grew to encompass the evaluation of international family planning programs. The demographic literature developed in tandem with the concerns of demography's patrons, while the sociological literature on population did not.

As population began to grow rapidly in Asia, Africa, and Latin America after World War II, US-based nongovernmental organizations began to consider how to manage population in the international arena. In the postwar period of decolonization and Cold War alignment and non-alignment, exercising influence over intimate matters across national borders required the resources of the United States government, the consent of the governments of target countries, and the symbolic approval of the United Nations. By funding research that largely skipped over the question of whether population growth was a threat and to whom, demography's patrons reframed the policy debate surrounding population, transforming it from a political question about the causes and consequences of population growth into a technological question about how to most effectively reduce global fertility. Understanding the broad acceptance of international

efforts by US-based actors to limit world population growth in the twentieth century therefore requires understanding how those population control projects gave rise to and stimulated the growth of the science that guided and legitimized them.

Notes

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1 The histories of demography's predecessor fields have been amply described in the literature. For vital statistics, see Anderson (1988), Cole (2000), Desrosières (1998), Glass (1973), Hacking (1990), Schweber (2006); for life insurance, see Alborn (2009), Bouk (2015), Clark (1999); for biology, see Kingsland (1995); for sociology, see Bannister (1987), Bulmer (1984), Lepenies (1988), Ross (1991), Smith (1994).

2 As described in 1971 by Paul Demeny, then director of the Population Institute at the East-West Center in Hawaii, and a former Population Council fellow:

The Council's influence is present in every facet of our work from abundant use of Council publications in training to continuously encountering Council-supported programs and projects in our contacts in Asia. Former Council Fellows include not only the Director, but also the Assistant Director for Professional Study and Training, the Assistant Director for Institutional Cooperation, and two additional members of the Institute's research staff. Our support does not come from the Council, but without the Council our

Institute would probably never have existed. (Demeny 1971)

3 The negative relationship between population growth and economic development is generally thought to have been established in Coale and Hoover (1958), a study funded by the World Bank and the Population Council. Even before its publication, the field generally turned away from the question of whether fertility decline was necessary to stimulate economic development and toward the question of how fertility decline could be achieved in advance of economic development.

4 JSTOR Data for Research classifies articles in two ways: "subject" is an article-level classification determined by JSTOR through an LDA process; "discipline" is a journal-level classification determined by the publisher of each journal. The corpus for this article includes articles classified as "population studies" in the subject and "social science" in the discipline.

5 To generate the topic model, I used the Mallet package for R (Mimno 2013). Pre-processing of texts was done in Python, and figures and tables were made in R. R code for topic modeling. Tables and figures are publicly available at https://github.com/eklanche/Digital_History_US_Demography.

6 The individuals I identify as demographers in the period 1915–1946 are: Alberto Arca Parro, O.E. Baker, Frank G. Boudreau, Ernest W. Burgess, Alexander M. Carr-Saunders, Robert E. Chaddock, S. Chandrasekhar, Enid Charles, Francis Stuart Chapin, Charles Close, Leonard S. Cottrell Jr., Kingsley Davis, Harold F. Dorn, Louis I. Dublin, Halbert L. Dunn, John D. Durand, Hope Tisdale Eldridge, Henry Pratt Fairchild, Corrado Gini, David V. Glass, Paul C. Glick, Sidney E. Goldstein, Margaret Jarman Haggood, C. Horace Hamilton, Frank H. Hankins,

Paul K. Hatt, Philip M. Hauser, Joseph A. Hill, Reuben Hill, Norman E. Himes, Ellsworth Huntington, Edward P. Hutchinson, Abram J. Jaffe, Bernard D. Karpinos, Dudley Kirk, Clyde V. Kiser, Louise K. Kiser, Robert R. Kuczynski, Frank Lorimer, Alfred J. Lotka, Wilbert E. Moore, Radhakamal Mukerjee, Frank W. Notestein, William Fielding Ogburn, Frederick Osborn, Raymond Pearl, G. Pitt-Rivers, Lowell J. Reed, Henry S. Shryock Jr., Jacob S. Siegel, Joseph J. Spengler, Mortimer Spiegelman, Alexander Stevenson, Regine K. Stix, Samuel A. Stouffer, Edgar Sydenstricker, Conrad Taeuber, Irene B. Taeuber, Dorothy Swaine Thomas, Warren S. Thompson, Christopher Tietze, Leon E. Truesdell, Rupert B. Vance, Pascal K. Whelpton, Walter F. Willcox, A.B. Wolfe, T.J. Woofter Jr.

7 Topics were eligible for selection for Figure 3 if, over the period as a whole, they were at least 2.5 times more prevalent in the demography literature than in the other social science literature and if their presence in the demography literature reached at least the level of 0.5 percent that would be expected if topics were distributed randomly throughout the corpus. Of the ten eligible topics, the four that were not selected were very similar to other topics that were selected.

8 The topics reflect words that generally appear together over the entire period of analysis, 1915–2004. The topics returned by the algorithm do not change over time, which means that not every word in the top ten will appear in every year. The word “pill” in Figure 3 occurred in conjunction with such words as “contraception” and other words related to birth control over the period as a whole, but would not have appeared in literature published during the first half of the century, except perhaps in prospective ways.

9 Selection criteria are the same as for Figure 3.

10 I have designated the following as demography journals: *Demografia y Econo-*

mia, Demography, European Demographic Information Bulletin, In Defense of the Alien, International Migration Digest, International Migration Review, Journal of Population, Journal of the Australian Population Association, Population and Development Review, Population and Environment, Population Index, Population Research and Policy Review, Population Studies. Journals specific to family planning are excluded.

11 I have designated the following as sociology journals: *Acta Sociologica, American Catholic Sociological Review, American Journal of Economics and Sociology, American Journal of Sociology, American Sociological Review, American Sociologist, Annals of the American Academy of Political and Social Science, Annual Review of Sociology, Berkeley Journal of Sociology, British Journal of Sociology, Canadian Journal of Sociology, Contemporary Sociology, Historical Social Research, International Journal of Sociology, International Journal of Sociology of the Family, International Review of Modern Sociology, International Review of Sociology, Kansas Journal of Sociology, Mid-American Review of Sociology, Midwest Sociologist, Pacific Sociological Review, Social Analysis, Social Forces, Social Problems, Social Research, Sociological Analysis, Sociological Focus, Sociological Methodology, Sociological Perspectives, Sociological Quarterly, Sociological Theory, Sociology of Education, Sociometry, Symbolic Interaction, Teaching Sociology, Theory and Society.*

12 Journals specific to other disciplines are included in the corpus and in the LDA model, but are not shown in Figures 5–7.

13 Over the period as a whole, each of these topics is at least three times more prevalent in the demography journals than in the sociology journals. Of the 27 topics that met this criterion, those most relevant to this article were selected.

14 Over the period as a whole, each of these topics is at least three times more prevalent in the sociology journals than in the demography journals. Of the 32 topics that met this criterion, those most prevalent in sociology over the period as a whole were selected.

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