

Housework Takes *Much* Less Time**Housework Now Takes *Much* Less Time: 85 Years of us Rural Women's Time Use**Jonathan Gershuny and Teresa Attracta Harms , *University of Oxford*

Based on her analysis of published tables from US homemakers' 1924–32 week-long time use diaries collected by the US Department of Agriculture, Vanek (1974) concluded that housework time had not declined over the previous half-century—despite the diffusion of many “time-saving” home technologies. Although frequently challenged, this claim still survives in parts of the sociological literature; we use newly available evidence to refute it. Analysis of the original USDA diaries (many of which have now been recovered from the US National Archives), alongside more recent diary microdata from the American Heritage Time Use Study, reveals a pair of clear and contrary trends: a continuing decline in women's core housework (cooking and cleaning), partially offset by an increase of time in childcare and shopping. Names and addresses attached to the original diaries allow the identification of more than 93 percent of the USDA diarists in one or both of the 1920 and 1930 US Federal Censuses. Analysis (Oaxaca decomposition) of the household- and individual-level information from this source shows that most of the historical time shifts result not from changes in family demography or women's growing attachment to paid work over this period but from “behavioral” change, reflecting in part the spread of labor-saving domestic technology.

The “Housework Time Paradox”***Changes in Time Use over Historical Time***

The “housework time paradox” was formulated by Vanek on the basis of a secondary analysis of published tables from the 1925 *Purnell Act* homemaker diary studies: “As one might expect, working women spend less time in housework than their mothers and grandmothers did some fifty years ago. Women who are not in the labor force however, spend just as much time” (1974, 116). What,

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then, is the impact of supposedly “labor-saving” equipment and materials in the home? Vanek’s (1974) *Scientific American* article has been well-publicized and widely debated. It parallels a somewhat more nuanced secondary analysis of similar historical materials by Converse and Robinson (1974).

Mokyr (2000) terms this “just as much time” phenomenon the “Cowan paradox,” referring to Schwartz-Cowan’s *More Work for Mother* (1980), although Schwartz-Cowan herself cites Vanek’s work only marginally. He adds to Cowan’s own explanation of the phenomenon, in terms of the spread of middle class standards of domestic comfort, an additional household-level reflection of the public understanding of the importance of sanitary improvements and personal hygiene in maintaining good health (Mokyr 2000). Neither Cowan nor Mokyr, however, provide any direct empirical evidence of historical change in time use.

Several researchers, most recently Ramey (2009) and Bittman, Rice, and Wajcman (2004), express concerns about this historical account of unchanging time devoted to housework. The figures presented by Vanek in her 1974 article are themselves not entirely supportive of the popular version of this thesis. In particular, there is an uncomfortable slide from the more specific term “housework” (i.e., cleaning, cooking, and laundry) used in the previously quoted opening sentence of the article, which has an obvious and direct relation to domestic equipment and materials, and the more general category “household work,” which emerges as the subject of the later statistical section of her paper. Unquestionably, the household work or *domestic production* (equivalent to the *unpaid work* identified by the “third person criterion” (Reid 1934; Hawrylyshyn 1976) is of considerable importance for the well-being of the populations of advanced economies. This, however, is a much broader category than “housework.”

Household work, in Vanek’s (1974) analysis, adds childcare and other caring activities, domestic management, domestic travel, and shopping time to housework—activities that have a much less straightforward connection to household equipment and materials. We note that Vanek’s later, more extended but much less widely cited (1978) analysis of the same materials, contains neither the elision of unpaid work categories nor the claim of constancy of housework. Unquestionably, in Vanek’s transcription of the original published tables, in the work of subsequent researchers using the published tables (e.g., Bryant 1996; Ramey 2009) and in our own reanalysis of the reconstructed individual data, time in *nonhousework* domestic production has increased substantially since the 1920s. The issue remaining to be resolved relates to the specific category “housework.”

Irrespective of the housework/household work issue, the basis for Vanek’s assertion of nonemployed women spending “just as much time” (1974, 116) is rendered problematic, as Ramey (2009) observes, by two connected statistical issues: unobserved heterogeneity and subsample selection. Vanek’s claim rests on the assumption that the time devoted to unpaid work activities of nonemployed “homemakers” over the period from the 1920s to the 1960s remained constant. However, over this period the number of women moving into paid employment

increased dramatically. Less than 10 percent of married US women had paid jobs in the 1920s, while more than 40 percent had jobs in the late 1960s, and the proportion has continued to rise.

We may sensibly hypothesize that the heavier the burden of household work (based on the number and age of children, size and condition of home and garden, etc.), the greater the disincentive for women taking on the additional burden of paid employment. As more married women entered the workforce, the average characteristics of the *remaining* homemakers' households changed. We suspect that this implies a regular historical increase in the proportion of dedicated homemakers who have larger houses and gardens, younger and more demanding children, and so on—a species of “selection effect.” The range and scale of tasks undertaken by dedicated homemakers becomes, as a result, progressively broader and more comprehensive. We infer, on this basis, that the average homemaker remaining outside waged work in 2010 carried heavier household responsibilities than did her unwaged counterpart in 1925.

The historical changes in the process of “selection” into homemaking, implying changes in the household circumstances of the average homemaker, mean that homemakers' housework (as opposed to *household* work) time totals are not strictly comparable over successive points in time. What we see in Vanek's (1974) historical comparison, in essence, may be an intertemporal race between the labor-saving effects of domestic equipment and the increasing average burden of cooking, cleaning, and laundry on a diminishing group of increasingly hard-pressed housewives. Schwartz-Cowan's (1983) and Mokyr's (2000) inference that, given the diffusion of labor-saving equipment over this period, the observed constancy in household work time is attributable to meeting higher standards takes no account of this progressive historical selection of homemakers into ever-more burdensome households. Even if we were to find evidence of Vanek's historical constancy in nonemployed women's housework, the comparison would be problematic because of un-controlled-for heterogeneity.

However, we do not in any way deny the proposition that standards of provision may have risen as a result of the availability of domestic labor-saving equipment. Standard economic theory suggests that higher labor productivity rates in private households may, under some circumstances, induce growth in household output. To use Ramey's (2009, 6) terminology, technological advance (e.g., increasing the efficiency of laundry equipment) might lead either to *scale effects* (increasing home laundry work) or *substitution* effects (e.g., increasing childcare time). Nevertheless, despite the indeterminacy of the theoretical predictions, we consider it unlikely that the former category should permanently outstrip the latter. The twin tub washing machine (together with wash-and-wear fabrics) may have induced our grandfather to ditch his detachable collars and wear a clean shirt each day, thereby increasing this part of our grandmother's work four-or five-fold. But the advent of the automatic washing machine a few years later would not induce him to wear four or five shirts a day! The usefulness of domestic technology for each specific area of provision diminishes at the margin as particular wants are progressively *satiated*.

A Fallacy: Cross-Sectional Differences Do Not Imply Historical Changes

The problem is made more confusing by the cross-sectional version of the Vanek-Cowan paradox, which can be traced back to a slightly earlier source. [Robinson, Converse, and Szalai \(1972\)](#) identified a weak or even negative cross-sectional association between national averages of time devoted to housework and the nationally available levels of domestic equipment, which emerged from the 1965 United Nations Education, Scientific and Cultural Organization (UNESCO)-funded twelve-nation cross-national time use study. They remarked that “there might well be a fully counter-intuitive relationship between the efficiency of domestic technology and the amounts of time given over to household obligations” ([Robinson et al. 1972](#), 125). Somewhat similar claims, based on cross-sectional comparisons, also emerge in some of the 1930s USDA Bulletins (e.g., [Wilson 1929](#)). But it would be fallacious to infer from this relationship that any future diffusion of labor-saving equipment would be accompanied by increases in housework time.

More recent debates on the cross-sectional version of the thesis—that households with greater access to domestic technology spend more time in housework—illustrate the nature of the fallacy. For example, [Bittman et al. \(2004\)](#) claim that owning specific items of domestic equipment causes household members to spend more time (or at least fail to significantly reduce time in) various domestic tasks, irrespective of whether or not those tasks are directly associated with the particular equipment. They suggest, for example, that owning a lawnmower or edge-trimmer increases the amount of time men allocate to gardening (by nine minutes per day, one hour per week) and housework in general (fifteen minutes per day, one hour forty-five minutes extra housework per week) “even when the type of dwelling (for example, free-standing bungalow versus apartment) is held constant” ([Bittman et al. 2004](#), 410) (table A3).

We view this as a mis-statement of the likely causal priority: it is more probable that some aspect of the household circumstances leads *both* to the acquisition of domestic equipment *and* to a higher level of housework time. Apartments and houses, as well as any gardens attached to them, may be of any size, just as one three-year-old child may impose very different burdens from another and the extent of housework required may vary independently of household income. So merely entering the type of housing, level of income, numbers and ages of children, and so on, as controls in a regression equation predicting housework nevertheless leaves heterogeneity *insufficiently* controlled for.

Straightforwardly, it is likely to be the on-average larger houses and gardens of owners of dishwashers, lawnmowers, and so on, that lead to the extra housework or gardening, and emphatically *not* their access to the equipment. At any and each point in historical time, owners of more labor-saving equipment might spend longer in housework than do owners of less equipment. Nevertheless, we conjecture that, as time passes and more labor-saving equipment diffuses across households, *average* housework time might still be declining. Indeed, in what

follows, we demonstrate unambiguously such a decline among US rural women since the 1920s.

We will see that the story for those *other* activities—childcare and shopping—that make up the margin between Vanek’s “housework” and her “household work” is quite different. Childcare time requirements have been transformed by perceived (or perhaps misperceived) escalating risks to child safety, needs for higher levels of parental investment in children’s human capital, and associated processes such as “cohort crowding,” resulting in a parental “arms race” in the provision of credentials for college entry (Bianchi 2000; Sayer, Bianchi, and Robinson 2004; Sayer, Gauthier, and Furstenberg Jr. 2004; Ramey and Ramey 2010, 1).

Technical and organizational change in shopping behavior occurred most dramatically in the United States in the period between the 1920s and the 1970s survey periods (and in Europe ten to twenty years later). In the 1920s, aside from the self-provisioning customary in farm households, small items might be purchased from relatively local fully serviced stores, with storekeepers selecting goods, often with associated delivery services, while other specialized or larger items would be purchased from catalogues. But by the mid-1970s, much more of the shopping would have been carried out from self-service “supermarket” stores, which require shoppers to locate and select items themselves and then queue to pay for them—consequently increasing their time in the store. Furthermore, the larger the supermarket, the longer, on average, both the journey to it—implying increasing reliance on private automobiles—and the walk from the parking lot to the store, again increasing the time taken by each shopping event. This is a feature of the “self-servicing” predicted by Gershuny (1978) and subsequently observed from the cross-national comparative historical evidence in Gershuny (2000).

Data and Sample Reconstruction Methods

Original Data Collection: Farm and Nonfarm Rural Women

We have been working on materials sometimes referred to as the “Purnell Act Time Diary Studies” (Ramey 2009) collected by the United States Department of Agriculture (USDA), which are the very earliest time diaries collected in the United States (Records of the U.S. Department of Agriculture). Bevan (1913), who is sometimes misidentified in the literature as the pioneer researcher in this field, did not in fact use a true diary method. The time use diary data first reported by the chief of the Economics Division of the of the USDA Bureau of Human Nutrition and Home Economics, Hildegard Kneeland (1929), formed the basis for academic sociological studies during the 1930s (e.g., Lundberg et al. 1934, Sorokin and Berger 1939).

The women participating in Kneeland’s rural homemaker studies were asked to complete a detailed record of their time use for seven consecutive twenty-four-hour periods. The time devoted to various homemaking tasks by other household members, as well as paid help, was also recorded. The homemakers described activities in their own words, listing them consecutively as they

occurred throughout the day, with a minimum interval of five minutes (USDA 1944). The USDA material uses several versions of the activity coding fame (1925, 1926, and 1928), with only a few minor differences. The fifty-eight activity codes include thirty-one relating to unpaid work, eighteen to personal care and leisure, and nine to farm and other paid work. The only rural homemaker information recovered to date is the researcher-produced diary-based weekly minutes “summary records” (time budgets) derived from diaries completed by homemakers living in fifteen states, with the largest numbers residing in New York, California, and Michigan.

We matched over 93 percent of the names and addresses of the 566 researcher-prepared farm and nonfarm rural households “summary records” to Census records. The primary information source was US Federal Census microdata from 1920 to 1940 (accessible because of the relatively short seventy-year embargo in the United States, as compared with one hundred years in the United Kingdom and elsewhere). Variations in the spelling of family and given names and household relocations both complicated the matching process, and we frequently made use of additional sources to resolve problems of identification (including birth, death, and marriage indexes; voting registers; social security numbers; city directories; military draft records; immigration and travel documents; and other material, such as obituaries and newspaper articles).

No direct evidence of the USDA’s general methods of sample selection, or of the sampling frame for the 566 week diaries from rural (farm and nonfarm) women in the surviving sample, has as yet come to light (the recruitment mode for the seventy-seven “College Women” is set out below). We have chosen to interpret the materials straightforwardly, as Kneeland suggests in her 1929 article, as a representative sample of US rural women.

Although no diary records or “supplementary information” (household questionnaires) for the rural women have yet been discovered, work to locate them in Experiment Station and land grant university archives is underway. On the basis of our supposition that the 566 records discussed here are drawn from the 808 reported by the USDA (1944), it is possible that 242 “summary records” are missing (see further discussion in our Methods section below).

Vanek (1974) also referred to a parallel “College Women” study, collected by Kneeland in 1930 and 1931. These diarists were drawn from the 1880 to 1893 alumnae of the socially exclusive “Seven Sisters” East Coast US colleges. Approximately 2,000 (all of the contactable alumnae) were invited to contribute week-long diaries, although only seventy-seven complete data sets from what might better be considered an “elite” sample have survived. We suspect that this is close to the achieved sample—including the original seven-day diaries, detailed “supplementary information” records (individual/household questionnaire), and associated summary records, which will permit future methodological work. This group (for which we achieved over 95 percent Census matching) is excluded from the present analysis on the grounds of its essentially unrepresentative nature. We note, however, that the initial totals of housework time for this group of women are broadly similar to those of the rural women.

Reconstructing the Rural Sample Characteristics Using US Federal Census Data

To date, we have identified (from the 566 rural diaries) 904 Census matches for 528 diaries; seven from 1910, 390 from 1920, 404 from 1930, and seven from 1940. All of the 528 successfully matched diarists have information from at least one of the 1920 or 1930 Censuses. For our analysis, we have relied mainly on information from the available Census closest to the diary date. Since the majority of the diaries were collected in 1928, we have used mainly the 1930 Census materials, calculating the diarist's and other household members' ages by subtraction. To simplify the task of household reconstruction, we checked that no deaths or separations occurred between the diary date and the subsequent Census. In the case of 1924 diaries, we identified household members born after 1920 from the 1930 Census, wherever this was available. These methods enabled us to identify an under-representation of women aged twenty to twenty-nine and fifty to fifty-nine years in the 528 cases, so we reweighted the sample to approximately reproduce the 1920s rural women's age distributions while maintaining the same overall sample size.

The recovered diary materials provide some internal evidence suggestive of what may have happened to the missing 242 summary records. These were painstakingly calculated by USDA or Experiment Station researchers, who first coded the diarists' own-words descriptions of their activities into the fifty-eight activity categories and then summed the hours and minutes in each category to produce the individual "summary sheets" (time budgets).

Completing any form of continuous time diary is onerous, and the seven consecutive days of recording required by the USDA diarists must have been particularly demanding. On the basis of experience with other time use surveys, we would expect approximately one-third of the diaries to have some substantial amount—perhaps thirty minutes out of the 1,440 minutes of the day—of unclassified, unclassifiable, or otherwise missing time. In our reconstruction, however, only six of the 528 Census-matched cases have thirty or more minutes of missing time, and we suspect that at least some of these cases are undetected results of our own transcription errors.

We also have some direct evidence from the more complete College Women's records in the form of letters sent from Kneeland to the diarists, thanking them for their participation but remarking that their diaries had been excluded from the study because of missing data. A considerable number of the rejected College Women's diaries are stored in the US National Archives, but, unaware of their significance at this early stage in our research, we neglected to count or record them. Our tentative conclusion is that the surviving 566 summary records represent only the perfect or near-perfect seven-day records selected from the original 808 responses.

Comparator Studies from the American Heritage Time Use Study

In what follows, we compare the 528 Census-matched seven-day time-budgets (i.e., derived from 3,696 sample days) with two sets of later materials drawn

from the American Heritage Time Use Study (AHTUS) (Fisher and Gershuny 2015). We do not draw on the 1965 materials used for this purpose by Vanek (1974). The original 1965–66 “Robinson-Converse” material (drawn from Alexander Szalai’s 1972 UNESCO-funded multinational comparative study) used by Vanek comes, as she herself notes, from a study of urban households with at least one member in paid employment: the parallel 1965 US National Time Diary Study includes only 249 days of data from rural women aged eighteen to sixty-five years (Appendix table A.1).

However, the 1975 University of Michigan Time Diary Study provides 982 rural women’s days, which just about reaches the minimum sample size usually required for this sort of comparison (Harvey 1993, 204), and the modern American Time Use Study provides 6,939 rural women’s days over the period 2003–11. The consequence of this analytic decision is that we cannot properly distinguish whether the changes took place before the 1960s or between 1965 and 1975. However, informal comparisons of our three time point estimates with the mixed urban and rural 1965 data suggest that changes occurred through both the earlier and the later periods. The compensating advantage from this approach is that we reduce the uncertainty associated with the mostly urban sample (or, alternatively, the much higher standard error associated with the small rural part) of the 1965 sample. Unlike previous attempts to establish long-term estimates based on the Purnell studies, our three time point 1920s–1975–2000s version relies on a reasonably consistent sample base.

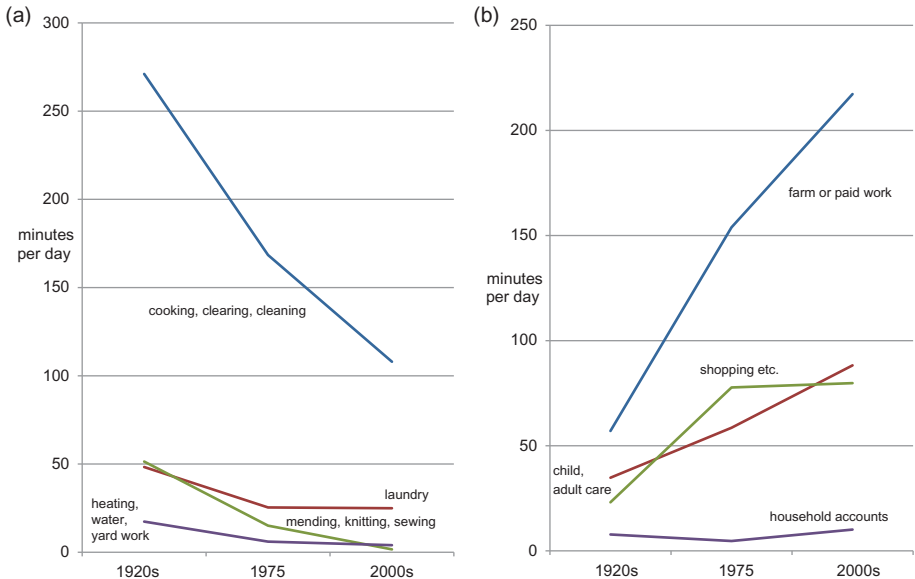
Results

Changes in Means of Time Devoted to Work

The two panels of figure 1 report 1925–2011 changes in mean times devoted by rural women to eight categories of paid or unpaid work, together with 95% confidence intervals calculated from simple standard errors. The changes that emerge are sufficiently large that statistical significance can be read off directly from the standard errors in all cases where there are any substantial trends.

The two panels of figure 1 show, respectively, the four work-related activity categories that have increased over the period and the four activities that have decreased for the entire reweighted rural women’s sample.

First, and most dramatically, we see the decline in time devoted to cooking, clearing, and general household cleaning. The 1920s sample had a mean of 271 minutes per day (95% confidence interval plus or minus six minutes). By 1975, this had fallen by nearly one-and-three-quarter hours to 168 minutes (plus or minus nine minutes), and by the 2000s it had fallen a further hour per day to 108 minutes (plus or minus three minutes), a clear, monotonic, unambiguously significant decline in a core domestic task. Laundry time was nearly halved, from forty-eight minutes/day (plus or minus two minutes) in the 1920s to twenty-five minutes (plus or minus three minutes) in 1975 (again a clearly significant decline), but then no change (again twenty-five minutes, plus or minus one minute) in the 2000s.

Figure 1. US Farm and Small Town Married Women 1920s to 2000s

Note: (a) Decreasing work-time categories. (b) Increasing work-time categories. 95% confidence intervals are provided in text.

Other aspects of clothing or textile care (mending, knitting, and sewing) also show a significant monotonic trend over the eighty-five-year period, falling from fifty-one minutes (plus or minus four minutes) in the 1920s to fifteen minutes (plus or minus three minutes) in 1975, and to two minutes per day (plus or minus one minute) in the 2000s. This self-provisioning activity, which loomed so large at the beginning of the last century, has now virtually disappeared. Similarly, time devoted to running and maintaining basic utilities such as heating, water, and waste disposal fell from seventeen minutes per day (plus or minus two minutes) in the 1920s to six minutes per day (plus or minus three minutes) in 1975 and, again, although less unambiguously significantly, to four minutes (plus or minus one minute) in the 2000s.

We have no sound basis for estimating the husband's contribution to household work in general in the 1920s—although [Gershuny and Robinson \(1988\)](#) and many subsequent analyses have shown that these increased only marginally from the 1970s onwards. At present, we have no direct measures of levels of access to domestic equipment for the 1920s rural sample (although we are still searching for the original supplementary records that collected this information, and we already have this for the 1930–31 college sample). Nevertheless, given the low levels of availability of domestic equipment in rural homes prior to the electrification programs of the 1930s (and electricity's subsequent widespread diffusion), it would seem perverse not to assume that, in aggregate terms, overall domestic standards of cleanliness and comfort at least have not *fallen* over the period covered by our data.

On this basis (and holding to one side the issue of labor market participation discussed in the next subsection of the paper), we take the view that, in each of the four cases, these historical changes reflect, at least in part, various sorts of “labor-saving” technology. In the case of household cleaning, the historical change reflects the diffusion of electric vacuum cleaners and similar equipment combined with improved space-heating methods that produce less dust, as well as more easily maintained floor and other surface coverings (vinyl, wall-to-wall carpeting, and durable synthetic laminates). For cooking, the changes reflect more efficient stoves and improvements in food storage (first canning, ice coolers, then gas or electric refrigerators and freezers) combined with the increasing availability of processed food products. Laundry work was reduced by the introduction of electric (and later fully automatic) washing machines combined with wash-and-wear fabrics, although the leveling-off post-1975 presumably reflects a growing tendency for daily replacement of soiled clothing. Sewing and mending clothing has now been almost entirely supplanted by manufactured, easily to replace “off-the-rack” apparel.

Child and adult care time (second panel of figure 1) by contrast has increased, again quite dramatically, from thirty-five minutes per day (plus or minus four minutes) in the 1920s, to fifty-nine minutes (plus or minus five minutes) in 1975, and again to eighty-eight minutes (plus or minus four minutes) in the 2000s. The reasons for this increase, well-substantiated for the more recent period but revealed here also for the earlier, are widely discussed in the literature (e.g., Bianchi et al. 2000). Two distinct explanations for this growth are advanced in the case of childcare. First, declining completed family size: smaller families may have led to Mark Twain-type “put all your eggs in one basket, and then watch that basket” overprotectiveness. Second, a growing pressure for extra parental time investment in children’s social and cultural capital, exerted by the growth of meritocratic selection into privileged educational institutions, and experienced disproportionately by middle class households (Sayer, Bianchi, and Robinson 2004; Sayer, Gauthier, and Furstenberg Jr. 2004). Public health and medical advances leading to increased longevity also tend to increase adults’ time devoted to elder care.

And we would add that—particularly apparent to diary researchers who are able to look at the detailed record of simultaneous activities and “multitasking”—the historical processes of domestic mechanization and automation may lead to the *unmasking* of household caring activities that might previously have been hidden by the simultaneous cooking, cleaning, or laundry tasks (e.g., “scrubbing clothes while watching the children playing”).

Rural women’s time devoted to household management does not seem to have changed substantially; around eight minutes per day in the 1920s and ten minutes in the 2000s. Both shopping and associated travel time have been affected by major technical and organizational changes. Part of the growth over the initial part of the period can be explained simply as a volume effect, an enormous growth in the range and quantity of consumption of retail goods, coupled with the previously noted decline in self-provisioning. But from the 1930s to 1960s onwards, neighborhood stores (perhaps with mail order or delivery

services) have been progressively replaced by increasingly distant self-serviced supermarkets, requiring substantial increases in shopping and related travel time. We see that these increased remarkably over the first part of the period, from twenty-three minutes per day (plus or minus two minutes in the 1920s) to seventy-eight minutes (plus or minus six minutes) in 1975. Subsequently, the trend leveled off, to just eighty (plus or minus three) minutes in the 2000s.

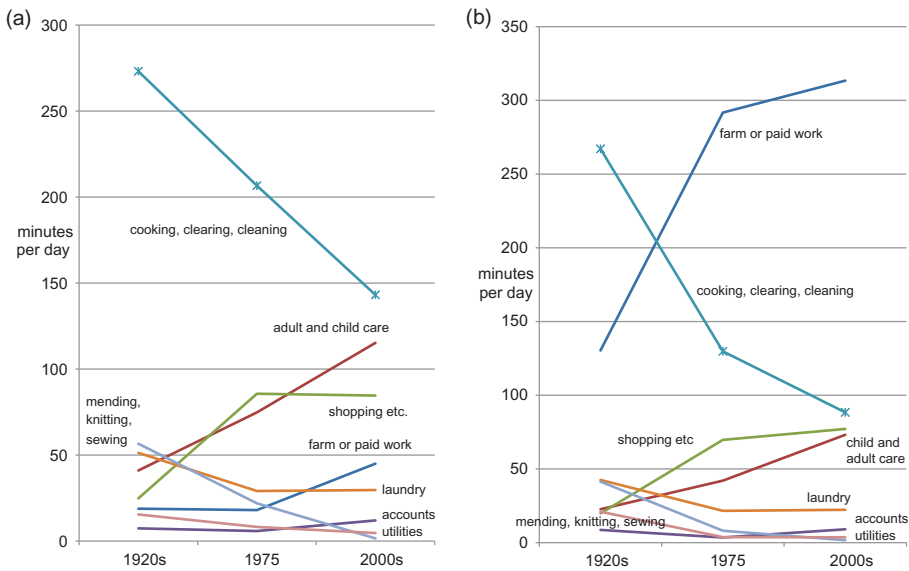
The eighth category, work in the farm or the general labor market, was of some importance to the rural women of the 1920s, with a mean of just less than one hour per day (fifty-seven minutes, plus or minus six minutes). But for the equivalent group in 1975, the mean of paid work was more than two-and-a-half times higher (154 minutes plus or minus fourteen minutes) and by the 2000s had reached 217 minutes per day (plus or minus seven minutes). The two later comparator surveys, with no specific focus on agriculture, may well classify some unpaid farm work elsewhere in the activity coding lexicon, so the real means of paid work time for 1975 and the 2000s may in fact be a little higher than these estimates. Broadly, we see a four-fold increase in market-related work over this period.

The dramatic increase in the means of market work time represents the rapidly increasing proportion of women in paid labor. In what follows, we adopt a minimal definition of paid labor force inclusion of just one hour or more per day. Based on this highly inclusive criterion, 35 percent of the rural women in our sample had a substantial part-time or full-time job (or substantial unpaid farm work) in the 1920s, 50 percent in 1975, and 66 percent in the 2000s (with a further 10 percent having between four and seven hours of weekly paid work). This shift, from slightly more than one-third of women in employment to fully two-thirds, has an obvious potential relationship to time devoted to the various sorts of work. Are these simple plots of means of time in activity misleading us about historical processes? Do the historical changes discussed so far disappear once we control for changes in labor force participation?

The Influence of Labor Force Participation

The two panels of figure 2 show the eight work-related activity categories, but now plotted separately for rural women placed, according to our seven hours per week definition, inside and outside the labor force, respectively.

The simple constraint of time availability means that at each of our three points in history, the nonemployed women devoted more time to each of the seven categories of unpaid work than their employed counterparts. But aside from the absolute levels, the historical trends for women in the two employment categories are closely similar. We cannot, however, rest the analysis at this point. Both the (falling) capital costs and the (improving) performance characteristics of the various sorts of domestic equipment—and the increased participation of their husbands in household production—mean that otherwise similarly placed women making decisions about whether or not to take paid work might have made different decisions at the successive time points. And co-incident changes in family size decisions (again partially reflecting changes in reproductive

Figure 2. US Farm and Small Town Married Women 1920s to 2000s

Note: (a) Women with seven or fewer hours paid or farm work per week. (b) Women with more than seven hours paid or farm work per week.

technology) and in public sentiments about gender roles, may have had parallel effects on women's labor market decisions.

In short, the changing processes of selection between the two employment categories mean that the historical comparisons may still be misleading. We cannot remedy this completely, but we can go some way toward this with the information now available.

Modeling Unpaid Work Time 1925–2011

To control for the influences of these selection processes to the fullest extent possible, we need *first* to model the influences of the various demographic and other characteristics that influence time use patterns and *then* to reconsider the historical trends, holding those characteristics as far as possible constant by considering various representative instantiations of the models.

We use fairly standard ordinary least squares (OLS) models of the sort used, for example, by Bianchi et al. (2000, 210, table 2). Our model estimates age and period effects but has no higher education measure (very few of the rural women reported any). We use more comprehensive information on numbers and ages of children and more interactions between these characteristics and the survey period to allow for the possibility of historical changes in the relationship of the effects of particular family statuses (e.g., ages of youngest children) on time in various activities. The R^2 statistic of 0.18 for the “all unpaid work” model is

just slightly higher than the equivalent 0.16 score in the Bianchi et al. (2000) result, reflecting the longer time period covered in our paper.

Table 1 gives an abstract from the full regression results. It shows the crucial historical change and period*employment status coefficients for five sorts of unpaid domestic work, as well as the overall model for all unpaid work. (Note—a pleasing and useful characteristic of OLS—the regression coefficients of the subcategories sum precisely to the “all unpaid” coefficients). Controlling for virtually all of the heterogeneity that our combined data sets currently allow, we see (from the increasingly negative coefficients for 1975 and 2003–11) that time spent in cooking, other domestic (cleaning and clearing), and clothes care (laundry, sewing, and knitting) show monotonic declines, while “shopping and household administration” and “care of children and adults” exhibit monotonic increases. Sum these carefully controlled component coefficients to get the overall historical change stripped of the effects of all the other measured compositional changes, and we find a one-hour reduction in all unpaid work from the 1920s to 1975, and a *further* hour’s reduction from 1975 to the 2000s. Essentially, this is an unchanged headline story from that derived from the historical comparisons of means in the previous two subsections.

Digging a little deeper, however, the story becomes just a little more complicated. Note the somewhat nonmonotonic behavior of the period*employment interaction coefficients. For example, considered on its own, it might appear that nearly half of the reduction in cooking time for employed women between the 1920s and 1975 was reabsorbed into cooking between 1975 and the 2000s. But, of course, in order to understand what is really happening over this period, we need to consider some more comprehensive instantiations of the regression models.

The left-hand panel of figure 3 shows a representative set of full instantiations of the cooking and cleaning models. We take in each case women aged forty years (the model specification excludes age*period interactions because of problems of multicollinearity with family status*period interactions). We look separately at economically “active” and “inactive” women (using our one hour per day criterion), and five distinct family situations with (at least by supposition) increasing levels of burden; from women in households with no children to women in households with three children, of whom the youngest is younger than age three years.

The instantiations produce clear and understandable cross-sectional differences and regular, monotonic historical trends. For each historical period and family status, those women out of the labor market do more cooking and cleaning than those in paid employment. (It appears also that the difference made by employment is much larger in the latest period than in the earliest—but this may reflect a change in the unobserved differences within the categories, of a sort that we discuss below.) We see, at least in the earliest and latest cases, that three older children are associated with more cooking and cleaning than are three younger ones. And we see that, in general, women in smaller households with no children devote the least time to these activities. But most importantly, we see an entirely consistent historical trend; time devoted to these core household activities

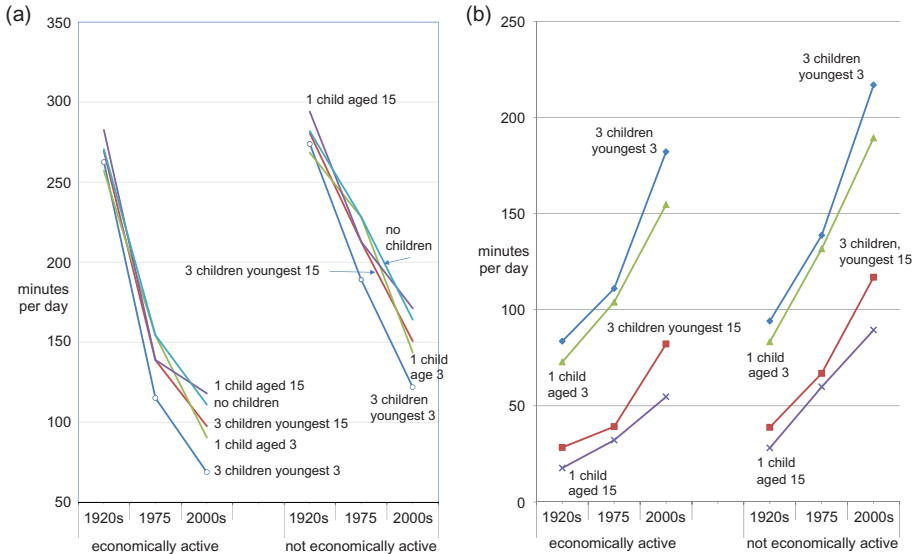
Table 1. OLS Models of Minutes per Day in Rural Married Women's Unpaid Work

	Cooking	Other domestic	Clothes care	Shop, admin	Care of persons	All unpaid
Multiple R	0.46	0.31	0.34	0.16	0.50	0.42
(also controlling for age, age squared, N of children, age youngest child, interactions; see table A1)	—	—	—	—	—	—
Economically active	-2.3	-9.1	-28.4***	-3.8	-10.5	-54.1**
Economically active 1975	-29.0***	-33.4**	7.0	-15.8	-17.2	-88.6***
Economically active 2003–11	-14.0*	-27.7**	21.6***	-8.0	-24.3*	-52.5**
Surveyed in 1975	-40.7***	-44.2***	-65.1***	69.8***	24.6*	-55.6**
Surveyed in 2003–11	-77.3***	-74.7***	-83.5***	76.8***	36.5*	-122.2***
(Constant)	96.2***	126.3***	87.5***	25.7	-18.7	317.1***

Note: OLS = ordinary least squares.

* $p < .05$ ** $p < .005$ *** $p < .0005$

Figure 3. Estimated Cooking, Cleaning, and Care Time: US Married Rural Women Aged 40 Years



Note: (a) Estimated cooking and cleaning time. (b) Estimated child and adult care time.

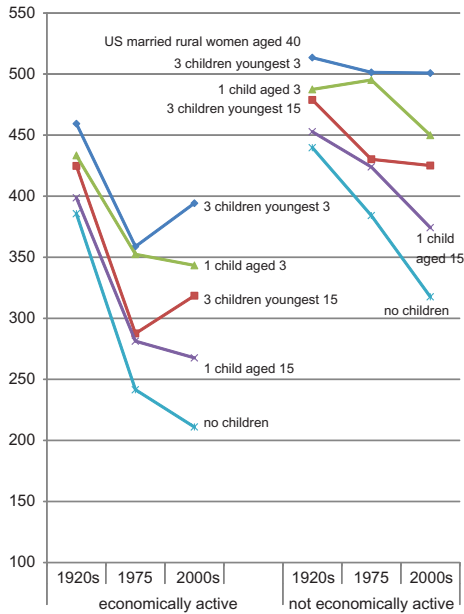
reduces dramatically overall through the eighty-five-year period and over both the earlier and later historical periods.

The consistent cross-sectional differences and historical trends are also found in the right-hand panel instantiation of the child and adult care trends in figure 3. Again, point for point, the nonemployed women spend more time in care activities than do their employed counterparts by a margin that increases regularly—both generally over time and in absolutely strict inverse ratio to what (we may presume to be) the level of burden imposed by the family status. Figure 3, together with table 2, demonstrates that throughout the eighty-five-year period, nonemployed women with the least burdensome family responsibilities spend substantially less time in childcare than nonemployed women with the most family responsibilities *and* show a much larger *margin* of time in childcare over employed women with equivalent levels of responsibility. By contrast, those nonemployed women with the highest levels of family responsibility have the most childcare time *and* show substantially the smallest *margin* of difference when compared to equivalently placed employed women.

The two panels of figure 3 are representative of the historical trends of the four decreasing unpaid work activity categories (cooking, cleaning, laundry, sewing, and utilities, respectively) of the left panel of figure 1 and the three increasing unpaid work activities (childcare, shopping, and domestic management) of the right panel of figure 1. Over historical time, these two opposing patterns of change in time allocation, in effect, race against each other to produce the model-based estimated trends of unpaid work totals for women in the same ten employment and family circumstances, as shown in figure 4.

Table 2. Change in Family Care Time by Family Status

	Panel 1			Panel 2			
	Nonemployed/employed ratio			Change in minutes of care time/day			
				Employed		Nonemployed	
	1920s	1975	2000s	1920s–1975	1975–2000s	1920s–1975	1975–2000s
3 children, youngest 3 years	1.13	1.25	1.19	27	71	45	78
1 child aged 3 years	1.14	1.27	1.22	31	51	48	58
3 children, youngest 15 years	1.37	1.71	1.42	11	43	28	50
1 child aged 15 years	1.59	1.86	1.64	15	23	32	30

Figure 4. Estimated Total Unpaid Work Time, US Married Rural Women Aged 40 Years

Consider first the nonemployed women. Having controlled for heterogeneity to the fullest extent possible given our current knowledge of the circumstances of the sample members, the five groups of women all show some reduction in work time over the 85 year period. Those with no or relatively few family responsibilities show the largest reductions. But the larger the family and, more particularly, the younger the children are, the smaller the historical reduction in unpaid work time. Why?

This reflects arithmetically the accelerating historical trend in the marginal effects of family responsibilities as shown in panel 2 of table 2 (for example, the twenty-seven-minute increase for employed women with three children under age three between the 1920s and 1975 becomes a seventy-one-minute increase between 1975 and the 2000s). This acceleration (which corresponds to the increasing gradients in the figure 3 “caring” plots) is seen in seven of the eight comparisons in this panel—the single exception being the nonemployed women with children aged fifteen years.

Behind this arithmetic lies differential selection. Over both of the periods, women in each of the family size and age-of-youngest-child categories became progressively more likely to enter the paid labor force. A mother with three children, including (at least) one toddler, was more likely to have at least a part-time job in 1975 than in 1925, and in 2005 than in 1975. To the extent that labor force participation reflects family burdens, we can assume that those women with three children including two toddlers (not controlled

for in the model), are less likely to enter the labor force than those with only one.

So this is the selection effect: nonemployed women's family responsibilities *within* each of the measured categories become more burdensome over time in ways that are not measured (or at least, not included in the model). And, by the same argument, the mean level of family responsibilities becomes heavier for each category of employed women as well since, for example, some of those women with two toddlers who would not have been in employment in 1975 would be more likely to consider employment in 2005.

Similar considerations apply to each of the categories of nonmarket work. To the extent that women are still responsible for a larger proportion of unpaid work than their partners, the larger the household or the home, the more dependent children or elders, the more extensive the weekly shop, and so on, the larger the consequences of the "unobserved" historical change effects on the various sorts of women. The consequences of selection are smallest for women with no children (who live, on average, in smaller houses and with smaller numbers of coresidents). So in figure 4, the women, in and out of paid employment, with no children, show the clearest effects of household automation (since other sources of variation are most effectively controlled for). Those women with three children, including a toddler, who remain nonemployed in the 2000s have on average much heavier domestic burdens than their 1920s counterparts. A case of unobserved (or at least uncontrolled-for) heterogeneity!

Change in Behavioral Propensities versus Compositional Effects

Do the substantial historical trends discussed in this section reflect changes in *the makeup of the households* (family size, children's ages, women's labor-market engagement, etc.) or changes in the *behavior associated with particular household characteristics* (effects of new social norms, of the diffusion of new equipment, materials, and technical infrastructure)? To answer this question, we deploy the straightforward Oaxaca Decomposition technique, suggested for just this purpose in [Bianchi et al. \(2000\)](#).

This technique relies on the observation that the sources of historical change in the value of a dependent variable between two time points that are explained by a set of independent variables can be broken down into four components:

$$\begin{aligned} &\text{historical change in means of time in an activity} \\ &= \text{intercept change effects} + \text{coefficient change effects} \\ &\quad + \text{means change effects} + \text{interaction change effects} \end{aligned}$$

With dependent variables $Y_{t=\text{time point}}^i$ and n independent variables X_t^i in an OLS regression ($\bar{X}_t^i = \text{mean of } X_t^i$):

$$\begin{aligned}
\text{change in means of time in activity} &= \dot{Y}_{t=1}^i - \dot{Y}_{t=0}^i \\
\text{intercept effects} &= \text{int}_{t=1}^i - \text{int}_{t=0}^i \\
\text{coefficient effects} &= \sum_{i=1}^n \left(\dot{X}_{t=0}^j * (b_{t=1}^{ij} - b_{t=0}^{ij}) \right) \\
\text{mean effects} &= \sum_{i=1}^n \left(b_{t=0}^{ij} * (\dot{X}_{t=1}^j - \dot{X}_{t=0}^j) \right) \\
\text{interaction effects} &= \sum_{i=1}^n \left((b_{t=1}^i - b_{t=0}^i) * (\dot{X}_{t=1}^j - \dot{X}_{t=0}^j) \right),
\end{aligned}$$

where change is estimated from $t = 0$ to $t = 1$. Intercepts plus coefficients together constitute what Bianchi et al. (2000, 211) call “behavioral propensities,” and interaction effects are that part of the overall variance explained as the joint product of coefficient changes and changes in the means of the independent variables.

We base our estimation on a version of the cross-time OLS regressions excerpted in table 1, but now, in effect, fully saturated with interactions between the historical period and the other independent variable—in the form of separate regressions for each period. These eighteen individual regressions are set out in table A1, while the means of the independent variables, together with an example of the Oaxaca calculations, are set out in table A2.

It emerges that the great majority of all the change over this extended period is explained neither by changes in the size and composition of families nor by women’s increasing levels of commitment to paid work, but straightforwardly by changes in behavior (table 3). We arrive at this interpretation reasonably unproblematically since in every case less than 10 percent of all the explained variation in the time use categories is associated with interaction (and hence unattributable—the fact of generally small positive interaction coefficients meaning that the behavioral proportions are slightly underestimated). In fact, the proportions in excess of 100 percent imply that the compositional effects would, had there been no compensating behavioral shifts, have led to historical trends in the opposite direction.

Discussion

What is the nature of these behavioral shifts? In straightforward contradiction of the claims made by Vanek, Cowan, Mokyr, and less directly by Bittman et al., and others, we do not find any convincing evidence of increases in

Table 3. Proportion of All Historical Change in Time Use Related to Behavioral Propensities

	1920s–1975(%)	1975–2000s(%)	1920s–2000s(%)
Cooking	90	94	95
Other domestic	120	83	173
Clothes care	96	97	99
Shopping	110	129	105
Child and adult care	139	111	129

housework time, irrespective of any normative shifts—whether toward higher standards of housing or superficial cleanliness or hygienic practices. On the contrary, the straightforward downward shift in women’s time devoted to cooking, cleaning, laundry, and other housework—first identified in cross-time comparisons of microlevel diary survey data (for the United States and the United Kingdom) by Gershuny and Robinson (1988) and substantiated over the longer-term for the United States by Bianchi et al. (2000, 2012)—now emerges as fully consistent with our much longer-term evidence for the United States.

We nevertheless have little doubt (although we present no evidence) that US norms have indeed shifted in the direction proposed by Vanek and her successors. Simply, we infer (although we present no direct evidence) that “labor-saving” materials and equipment, together with associated infrastructural improvements, have increased domestic labor productivity at a rate that exceeds the evident growth in the quantity and value of housework-type domestic services (i.e., cooking, cleaning, clothes care, etc.). The outsourcing of various commodities that were previously produced within private households also reduces domestic labor—demonstrated directly by the virtual disappearance of time devoted to dressmaking and repair.

Household work trends in the broader sense, however, tell a quite different story. Childcare time, all are agreed, has grown consistently through this period, which must relate at a general level to changes in norms. We advance two main explanations: “positional competition,” encouraging parents to devote ever more time to enhancing aspects of their children’s human capital so as to improve their future earnings and social status; and growing protectiveness with respect to environmental threats, perhaps related to smaller completed family sizes. There may, however, also be a contribution as an indirect consequence of technological change. The previously mentioned reduction in housework may, in effect, reveal childcare activities that were previously masked as secondary accompaniments to activities described primarily as cooking, cleaning, or laundry. Some careful re-analysis of the complete primary plus secondary (where available) activity records in the AHTUS is called for here.

The increased volume of purchases (more disposable income, less self-provisioning for food and clothing) is part of the explanation for the rising historical trend in shopping. Also, until recently, retailers’ pursued economies of scale and reduced service provision through ever-larger warehouse-type self-service outlets, which in effect exports much of the transport and service work previously associated with sales occupations into the unpaid work—time traveling to and from, and movement and queueing within shops—of domestic consumers.

Will newly emerging internet-based sales and home delivery services reverse the historical trend in shopping time? We must wait on future time diary data collection to answer this question.

Supplementary Material

Supplementary material is available at *Social Forces* online, <http://sf.oxfordjournals.org/>.

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References

- Bevan, George Esdras. 1913. *How Workingmen Use Their Time*. Reprint of a 1913 Columbia University PhD thesis, Whitefish, MT: Kessinger Legacy Reprints, 2010.
- Bianchi Suzanne M. 2000. "Maternal Employment and Time with Children: Dramatic Change or Surprising Continuity?" *Demography* 37(4):401–14.
- Bianchi, Suzanne M., Melissa A. Milkie, Liana C. Sayer, and John P. Robinson. 2000. "Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor." *Social Forces* 79(1):191–228.
- . 2012. "Housework: Who Did, Does or Will Do It, and How Much Does It Matter?" *Social Forces* 91(1):55–63.
- Bittman, M., J. M. Rice, and J. Wajcman. 2004. "Appliances and Their Impact: The Ownership of Domestic Technology and Time Spent on Household Work." *The British Journal of Sociology* 55(3): 401–23.
- Bryant, W. Keith. 1996. "A Comparison of the Household Work of Married Females: The Mid-1920s and the Late 1960s." *Family and Consumer Sciences Research Journal* 24:358–84.
- Converse, Philip E., and John P. Robinson. 1974. "Daily Activities Reflected in the Use of Time." In *The Human Meaning of Social Change*, edited by Philip Converse, 1–16. New York: Russell Sage Foundation.
- Cowan, Ruth Schwartz. 1983. *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*. New York: Basic Books.
- Fisher, Kimberly, and Jonathan Gershuny. 2015. *American Heritage Time Use Study, Release 7*. Oxford: Centre for Time Use Research.
- Gershuny, Jonathan. 1978. *After Industrial Society? The Emerging Self-service Economy*. Basingstoke, UK: Macmillan.
- . 2000. *Changing Times: Work and Leisure in Post-industrial Society*. Oxford: Oxford University Press.
- Gershuny, Jonathan, and John P. Robinson. 1988. "Historical Changes in the Household Division of Labor." *Demography* 25(4):537–52.
- Hawrylyshyn, Oli. 1976. "The Value of Household Services: A Survey of Empirical Estimates." *Review of Income and Wealth* 22 (2):101–3.
- Harvey, Andrew S. 1993. "Guidelines for Time Use Data Collection." *Social Indicators Research* 30(2–3): 197–228.
- Kneeland, Hildegard. 1929. "Woman's Economic Contribution in the Home." *Annals of the American Academy of Political and Social Science* 143:33–40.

- Lundberg, G. A., M. Komarovskiy, and M. A. McInerney. 1934. *Leisure: A Suburban Study*. New York: Columbia University Press.
- Mokyr, Joel. 2000. "Why 'More Work for Mother?' Knowledge and Household Behavior, 1870–1945." *The Journal of Economic History* 60(1):1–41.
- Ramey, Valerie A. 2009. "Time Spent in Home Production in the Twentieth-Century United States: New Estimates from Old Data." *The Journal of Economic History* 69(1):1–47.
- Ramey, Gary, and Valerie A. Ramey. 2010. "The Rug Rat Race." *Brookings Papers on Economic Activity* 2010 (1):129–76.
- Reid, Margaret G. 1934. *Economics of Household Production*. New York: John Wiley & Sons, Inc.
- Sayer, Liana C., Suzanne M. Bianchi, and John P. Robinson. 2004. "Are Parents Investing Less in Children? Trends in Mothers' and Fathers' Time with Children." *American Journal of Sociology* 110(1): 1–43.
- Sayer, Liana C., Anne H. Gauthier, Frank F. Furstenberg Jr. 2004. "Educational Differences in Parents' Time with Children: Cross-National Variations." *Journal of Marriage and Family* 66:1152–69.
- Sorokin, Pitirim Aleksandrovich, and Clarence Quinn Berger. 1939. *Time-Budgets of Human Behavior*. Cambridge, MA: Harvard University Press.
- Szalai, Alexander. 1972. *The Use of Time: Daily Activities of Urban and Suburban Populations in Twelve Countries*. The Hague: Mouton.
- Records of the U.S. Department of Agriculture Bureau of Human Nutrition and Home Economics, Division of Economics, Record Group 176, Boxes 640–654. "Records Relating to a 'Use of Time on Farms' Study." National Archives and Records Administration, College Park, Maryland.
- Robinson, John P., Philip E. Converse, and Alexander Szalai. 1972. "Everyday Life in Twelve Countries." In *The Use of Time: Daily Activities of Urban and Suburban Populations in Twelve Countries*, edited by Alexander Szalai., pp. 113–144. The Hague: Mouton.
- Vanek, J. 1978. "Household Technology and Social Status: Rising Living Standards and Status and Residence Differences in Housework." *Technology and Culture* 19(3):361–75.
- . 1974. "Time Spent in Housework." *Scientific American* 5(231):116–20.
- United States Department of Agriculture Agricultural Research Administration, Bureau of Human Nutrition and Home Economics. 1944. *The Time Costs of Homemaking - A Study of 1,500 Rural and Urban Households*. Washington, DC: Government Printing Office.
- Wilson, Maud. 1929. *Use of Time by Oregon Homemakers*. Corvallis, OR: Agricultural Experiment Station, Oregon State Agricultural College.