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TIME SPENT IN HOME CARE TASKS RELATED TO OWNERSHIP AND
USES OF HOME CARE EQUIPMENT

by

Jeena C. H. Nilson

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Home Economics and Consumer Education

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I am indebted to Dr. Jane McCullough for her instruction and effort on my behalf. I express my appreciation to her for preparing and encouraging me in this endeavor. She has made a very frightening job conceivable.

I am grateful to my parents for their endurance, affection and enlightenment. I am obliged to my mom for her labor in behalf of me on the typing of this manuscript and multitudinous others throughout my schooling. She has lovingly given with both hands. I fondly thank Nils for sustaining me, and Benjamin for enduring the babysitters while "momma" finished her task.

Jeena C. Nilson

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ABSTRACT

Time Spent in Home Care Tasks Related to Ownership and
Uses of Home Care Equipment

by

Jeena C. H. Nilson, Master of Science

Utah State University, 1981

Major Professor: Dr. Jane McCullough
Department: Home Economics and Consumer Education

The data for this research were taken from Utah's contribution to the regional research project "An Interstate Comparison of Urban/Rural Families' Time Use." Data were collected between May 1977 and August 1978 from 210 two-parent/two-child families.

This thesis research studied the relationship between ownership and use of nine selected household appliances and time spent on the related house-keeping tasks for 208 of the families studied. Statistical analysis was done using t-tests for comparisons of time spent on the related task by owners and non-owners of each appliance. Analysis of variance was used to compare time spent on combined activities with ownership of differing numbers of appliances. The relationship between frequency of use and time spent on tasks was measured using the Pearson Product Moment correlation.

The hypotheses tested were:

1. Ownership of home care equipment is not related to the amount of time spent in home care tasks.
2. Reported use of home care equipment is not related to the amount of time spent in home care tasks.

Hypothesis Number 1 was accepted for all relationships tested with the exception of the dishwasher and time spent in dishwashing and the sewing machine and time spent in construction of clothing and household linens. The results indicated that the homemakers who owned a dishwasher spent less time in dishwashing than did non-owners. This was not true of the spouses, who spent very little time in dishwashing under either circumstance. The homemakers who owned a sewing machine spent considerably more time in construction of clothing and household linens than non-owners.

When families were grouped by the number of appliances owned, no statistically significant relationships were found to exist between the number of appliances owned and the total time spent in home care tasks. Generally, those who owned many or few of the appliances spent more time in home care activities than did owners of four or five of the appliances.

Hypothesis Number 2 was rejected for the relationships between dishwasher use and spouse time spent in dishwashing, sewing machine use and homemaker time spent in construction of clothing and household linens and use of power yard equipment and time spent in maintenance of home,

yard, car and pets. The number of times the dishwasher was reported to have been used was related to the amount of time spent in dishwashing by spouses although the time was very limited. The time spent in clothing and household linen construction increased with the number of times the sewing machine was used. This relationship would have been expected. Those who used their power yard equipment more often spent more time in maintenance of home, yard, car and pets. This was true for both the homemakers and the spouses.

The assumed relationship between appliance ownership and use and time spent on home care activities was not found to exist for most appliances. The time savings potential of appliances had not been realized. The time spent on most tasks did not differ significantly between owners and non-owners, or by the reported number of times used.

(80 pages)

INTRODUCTION

A vast increase in technology has occurred in the last few centuries and the impact on our lives has been enormous (Bell, 1967). Mankind has continually made an effort to use new knowledge to improve life. In the process of using technological knowledge to enhance the quality of life many assumptions have been made regarding the benefits of these inventions. Some of the assumptions have been tested while many have not.

Technology has not only had an impact on factories and farms, but also in homes. Many small appliances have been introduced into homes in recent years and the rate of manufacture of these labor-saving devices is still increasing rather than leveling off (Cowan, 1976; Strasser, 1980).

It is frequently assumed that an increase in equipment results in less time spent in work (de Grazia, 1964, p. 200). Many people seem to think that the new household technology requires less time for home care (Boulding, 1972, p. 113). The question that arises is whether, in fact, the time spent in home care has changed substantially as a result of new household equipment. Has the time required to carry out household tasks decreased or have there been changes in the physical labor and effort required, a change in the quality of the work accomplished, or have the tasks simply become more pleasant? Home care equipment is often advertised as, and purchased to be, time-saving; but may actually be providing other benefits such as, a saving

of human energy, ease of labor, and an increase in self-esteem because of equipment ownership.

As we face a culmination of resource problems that may cause changes in our present way of life (Brubaker, 1972), we must evaluate the benefits we believe we derive from technology and put our technological discoveries into their proper perspective. As we review the development of household appliances we should be aware of the energy and resources needed to construct and utilize them. It is important to determine whether technology has decreased home care time so that we can evaluate the benefits of new tools and perhaps re-evaluate our resource management. If increased home care equipment does not result in a decrease in time spent in home care tasks then the manufacture, distribution and use of these devices and the reasons for purchasing them need to be examined.

Purpose of the Study

The purpose of this research is to determine differences, if any, in time spent in some home care tasks in relation to ownership and reported use of related home care equipment.

Hypotheses

1. Ownership of home care equipment is not related to the amount of time spent in home care tasks.

2. Reported use of home care equipment is not related to the amount of time spent in home care tasks.

Definition of Terms

Home Care Equipment

Home care equipment consists of machinery which has been invented to assist in carrying out the manual labor necessary for a household maintenance task.

Operational Definition

Microwave oven, dishwasher, garbage disposal, trash compactor, automatic washing machine, clothes dryer, sewing machine, vacuum cleaner, yard and/or garden power equipment. Home care equipment will be the independent variable in this research.

Home Care Tasks

Home care tasks are those activities people perform in order to feed, clothe and care for the physical needs of family members, and maintain their homes and property.

Operational Definition

Common household tasks, including food preparation, dishwashing, housecleaning, care of home, yard, car and pets, care of household linens and clothing, and construction of clothing and household linens. The time recorded

in these categories by the respondents will be the dependent variable in this study.

Family

"Family" in this study is a two-parent/two-child household.

METHODS AND PROCEDURES

Research Design

The data for this study were collected between May, 1977, and August, 1978, from 210 two-parent/two-child families in Utah. This study was part of a regional project, the NE 113 family time study. Utah was one of the 11 participating states. The other states that were part of this project included California, Connecticut, Louisiana, New York, North Carolina, Oklahoma, Oregon, Texas, Virginia, and Wisconsin. The Utah study was funded by the Utah State Agricultural Experiment Station. The regional project, "An Interstate Comparison of Urban/Rural Families' Time Use," was initiated at Cornell University by Kathryn Walker.

Sample

The sample consisted of 210 two-parent/two-child families. The families were drawn randomly from population lists stratified according to the age of the younger child. The five levels were defined as follows:

- Level I: Age of the younger child less than 1 year.
- Level II: Age of the younger child 1 year.
- Level III: Age of the younger child between 2 and 5 years.
- Level IV: Age of the younger child between 6 and 11 years.
- Level V: Age of the younger child between 12 and 17 years.

Half of the sample was urban and half was rural. Families from Salt Lake County comprised the urban sample and the rural families were from Iron and Washington Counties. These areas were selected because of availability of population lists, geographic location, and population size.

A systematic random sample was drawn from the population lists. Names drawn were checked in telephone directories to obtain each family's telephone number and to determine whether they still retained residency in the county. The elimination of those who had moved into the counties after the directory had been published, those with unlisted numbers, and those without phones would tend to bias the sample to a degree.

Instruments

Time Diary

A time diary is a log of activities that individuals or groups of individuals keep over a specific period of time (Robinson, 1977). The time diary is the most commonly used method of gathering time use data for reasons of ease, expense and accuracy. It can misrepresent to some degree the time actually spent in different activities as over- or under-reporting may occur. Also, in some cases, an activity may not fit precisely into the time use categories provided and consequently there may be some distortion.

According to Robinson (1977) the time diary has many advantages. Time use data are recorded while activities can still be accurately recalled as the diary is usually filled out within 24 hours of the actual events. A second

advantage is that terminology used is familiar to the public. Robinson also pointed out that a time diary can be designed to measure both primary time, time requiring the individual's attention; and secondary time, an activity not requiring the individual's attention.

Reliability of the time diary has been supported by the agreement among studies concerning time use in other parts of the world. Activity measurements taken in 12 countries using the time diary, showed how closely time use reports correlated. The use of time for many activities, such as sleep time, meal preparation, and eating, was very much the same across the many cultures studied (Robinson, 1977; Szalai, 1972; Walker, 1979). Comparisons of time diary results have also been made with "observational" records of time use and have supported time diaries as a valid method of gathering time use data (Robinson, 1977).

The NE 113 research project used as its methodology a record of how many minutes per day each family member, age 6 and over, spent doing a particular activity. Time of day, broken into 10 minute segments, was listed horizontally across the time diary chart and 18 categories of time use were listed vertically (Appendix). No attempt was made to assess the "quality" of time, motives for doing certain activities nor the feelings associated with them.

Questionnaire Booklet

The questionnaire booklet was developed and pre-tested at Cornell University (Sanik, 1979). It was used to gather information about work

patterns, demographic data, goods and services provided from within the household and equipment owned and used. The information from the questionnaire booklet that was used in this study included questions about goods and services provided within the household and equipment. Demographic data was used to describe the sample.

Data Collection Procedures

Professional interviewers were hired to collect the data. They attended a training session on the Utah State University campus in which the data collection instruments and interviewing procedures were explained and clarified. There were four interviewers, two in Salt Lake County, one in Iron County and one in Washington County. A research director was available to provide additional information when the interviewers needed help.

After the names of possible subjects had been drawn from population lists, the initial contact with the families was made by the interviewers by telephone. After it was determined whether the family was a two-parent/two-child family, the homemaker was asked if the family would be willing to participate in the study. If so, an appointment was then made for an interview between the homemaker, defined as the person with primary responsibility for household tasks, and the interviewer.

In order to avoid interviewing families from the same age level on the same day of the week, specific days were chosen for interviews according to the age of the younger child. To take into account seasonal as well as

daily variation, data were collected over a full calendar year and each day of the week was represented equally.

In the first meeting the interviewer helped the homemaker fill out a time diary recording time use of the family "yesterday" and explained the other survey instruments. A questionnaire booklet and a time diary for "tomorrow" were then left to be filled out. It was requested that other members of the family review the records for accuracy. Activity dictionaries were provided to aid the respondents in placing their activities in the proper time use categories.

The second interview was set-up for the day after "tomorrow." During the meeting the time diaries were checked for completeness, and the interviewer aided the homemaker in filling in missing information in the questionnaire booklet. Completed instruments were then mailed to the researcher at Utah State University.

Statistical Analysis

The number of appliances owned and used by the families was analyzed. Descriptive analysis consisted of measures of central tendency and dispersion, specifically, average time spent on each task (\bar{x}) and standard deviation.

Relationships between the independent variables; home care equipment owned and number of times used, and the dependent variable; amount

of time spent on home care tasks was analyzed. Specific relationships investigated include:

- A) Mean time spent on the related task by those who own a particular piece of equipment compared to mean time spent on the same task by those who do not own the equipment. This was done separately for the homemaker and for the spouse. A t test was used for the analysis. A t test is used to draw inferences about the mean of a single population based upon N. This tests the null hypothesis and determines whether the differences are due to chance.

In the use of the t tests there may have been some disparity of estimation on the variance because of the large difference in the ns. Since this was a survey and not a controlled population experiment, the sizes of groups were determined by uncontrollable factors. These givens have been dealt with in the best way possible (Post, 1981).

- B) Families were grouped according to the total number of home care appliances owned. Analysis of variance was used to determine if significant differences exist between the time used for household care and the number of appliances owned. This was done for the homemaker, for the spouse, and for total family time, using only families in Levels IV and V so that the number of family members was the same. Time use data were not

recorded for children less than 6 years old. ANOVA permits the null hypothesis to be tested using the means of three or more samples. One way ANOVA deals with one independent variable on different levels and determines the strength of the relationship. Total variance is measured on two levels, between groups when the means are not equal.

- C) The relationship between frequency of use of equipment and time spent on related household tasks was measured using the Pearson Product Moment Correlation. The time analyzed was an average of the 2 days' time diary recordings. Pearson r tests the relationship between two variables. This measure of linear correlation and direction of the relationship does not necessarily prove causation (source).

Assumptions

1. A time diary approach is an accurate method of gathering data regarding how people use their time.
2. The time diary kept by the homemaker is an accurate reflection of the time use of all family members.
3. The interviewers carried out the data collection as they had been instructed to do.
4. The coding of the time diary was done accurately.

5. Time is a necessary input in the process of achieving family goals, including the performance of household tasks.
6. A comparison of equipment ownership and use among families with different amounts of equipment can be made in order to evaluate time used in home care tasks as that equipment varies.

Limitations

1. Categories were provided in the time diary which forced subjects to make their activities fit one of the activities listed.
2. Considering primary time only and not secondary time may limit accuracy of time spent on home care tasks. Primary time is the time recorded for a task that requires the respondent's attention. Secondary time is time used for tasks that occur simultaneously with primary time use and require no attention or very limited attention. A given task may, at different times, require primary or secondary time.
3. Results are reported in mean minutes per day which may present a picture of exactness exceeding that which should be attributed to the data.
4. A finding of no significant differences in time use between the groups studied does not decrease the probability of a relationship existing between equipment owned and/or used and an increased level of cleanliness, sanitation, or satisfaction.

5. Time data in this research were reported by the wife which may have caused under-reporting of the husband's contribution to household tasks.

REVIEW OF LITERATURE

Studies concerning time devoted to home care tasks and its relationship to the home care equipment owned and used are limited. There are two types of research which have been most often used to analyze this relationship. They are historical and contemporary comparisons and cross-sectional studies.

Comparisons between historical and contemporary studies are often made to clarify the effects of household equipment on time used in home care. Comparisons made between early studies of household care time and more recent studies usually assume that an increase in equipment has occurred over time. Many insights can be gained by comparing differences in earlier lifestyles to the present and these can increase one's understanding of the actual effects of technology (Klienberg, 1976).

A second type of study which is often used to investigate the relationship between home care equipment and time spent doing home care tasks uses a cross-sectional approach. In a cross-sectional study people are surveyed at the same point in time. Families who own a specific home care appliance and those who do not can then be compared regarding how much time was spent doing the home care task related to the equipment. The total home care equipment owned can also be studied in relationship to total household work time.

The Diffusion of Technology

Technology has not only had an impact on factories and farms, but also on homes. The diffusion of technology to the household has changed the house and its appearance, and has had an impact on family members as well (Cowan, 1976). Year by year recordings of household ownership of appliances, begun after World War I by the Conference Board of the Bureau of Labor Statistics, revealed increasing adoption, first of the electric iron, then the vacuum cleaner, after these the electric toaster, the mechanical washing machine, the electric range and electric refrigerators. Gas stoves were adopted by a few families as early as 1919. At the same time increasing numbers of homes were wired for electricity making the use of the new technological devices possible for more families (Bell, 1967).

Strasser's (1980) writings reveal how life improved over the years because of added and improved equipment in the household. For example, the introduction of home freezers eliminated obtaining ice to keep food from spoiling. It also eliminated the time required to exchange the blocks of ice and clean up the water. New furnaces fueled by natural gas or heating oil eliminated obtaining coal, building fires and taking out the ashes. The time required to travel to stores and back was reduced when automobiles were developed. Automobiles do not necessarily mean that the total time spent shopping was reduced. Families may have increased the frequency of their shopping trips or lengthened the time spent in the store (de Grazia, 1964).

Working class women were not as often afforded improved domestic equipment as were women in middle class families. The Depression Era saw great differences in comfort and pleasant living between working and middle class women. Working class women were kept tied to the older, more laborious methods of housework, when other women were substituting machine labor, primarily because of the scarcity and irregularity of employment and the resulting low wages (Klienberg, 1976). These women necessarily delayed purchase of equipment prior to the Depression and were not able to purchase during these hard times. These factors are important to remember when reviewing the actual results of changing technology.

The revolutionary cleanliness from central heating, toilets, washing machines, the cleaner fuels that replaced coal, paved roads, sewers, municipal water systems, was phenomenal. The cleanliness of the environment increased with the introduction of technology (Klienberg, 1976).

Household Equipment and Time Use

Time Savings

de Grazia (1964) pointed out that some of the important, commercially exploited inventions of the 20th century were regarded as labor-saving devices. The wave of enthusiasm for equipment was evident as it appeared to save both labor and time. The fear, however, that machines would save too much time and put everyone into unemployment has not been realized. De Grazia questioned the assumption of some futuristic publications

that more equipment led to a decrease in time spent doing work. He summarized these authors' beliefs about equipment in general, by stating, "It is clear that time and the machine are linked: the machine saves time, gives us time" (de Grazia, 1964, p. 287).

Some individuals, such as Boulding (1972, p. 113) have claimed that an increase in household equipment brought about a decrease in household work time. Boulding proposed the existence of an inverse relationship, that as equipment increased, time used in household care decreased.

The washing machine, the drier [sic.], the vacuum cleaner, the dishwasher or similar devices seem to have the same kind of impact on the household as the combine harvester [had on farm work] . . . the release of women into the labor force . . . My grandmother worked, I suppose, about fifteen hours a day as a housewife. My wife works at most an hour and a half a day in the house, but her product in the household is almost as much as my grandmother's.

Although this is somewhat complimentary to the wife it raises a question of validity and accuracy of perceptions and assumptions as it is not supported by Boulding's writings.

Klienberg (1976, p. 71), writing about differences in working class and middle class homes of the 1930's stated, "The purchase of domestic technology was the purchase of leisure time for the women of the household." Those that could afford to do so purchased the appliances that they determined would make housework easier.

Stafford and Duncan (1977) worked on a prediction of the ownership of time-saving appliances in husband-wife families where the wife was employed

in the labor market. The dishwasher, washer, dryer, and microwave oven were listed as time-saving appliances. The study made no direct comparison between the time spent on work and the equipment owned or used, but rested on the common assumption that there is a correlation.

In Wilson's 1929 time study it was reported that a time savings could be realized by purchasing labor-saving devices. The devices she referred to were specifically indoor plumbing and electrical wiring. Other than Wilson, no research based on actual studies of time use, that demonstrated a decrease in household work time related to an increase in equipment, could be found.

No Time Savings

The results of some studies have shown that "There is no apparent tendency for the family with more automatic home appliances to spend less time on housework activities" (Morgan, 1966, p. 111). The conclusion is contrary to the popular assumption that appliances save time.

Data from an early study where homemakers kept detailed time use records for 7 consecutive days, stated that household operations were not shortened in time where labor-saving equipment was used. The equipment listed in this early study included hot and cold running water, hand washer, power machine, rub board, hand irons, gasoline or electric irons, hand sweepers, brooms, power sweepers and hand water pumps (Arnquist & Roberts, 1929, pp. 26, 27).

Wilson (1929) found a decrease in time spent on home care tasks in homes with plumbing and wiring. She also found that in some cases the homemaker with a well-equipped house devoted as much time to a specific household activity as the homemaker whose house was not so well-equipped. Wilson did not specify the equipment in a "well-equipped house" and a not "well-equipped house."

Gries and Ford (1932) analyzed some of the early time use studies funded by the Bureau of Home Economics and various State Experiment Stations and concluded that there was little difference in the time spent doing household tasks by homemakers with good equipment and those with poor equipment. In trying to explain the lack of difference they stated, "The explanation undoubtedly lies, in part, in the tendency of homemakers to use the improved equipment to raise their standards of housekeeping rather than to save time . . . [or] . . . in lessening the fatigue or discomfort of the task" (p. 31).

In 1929-31, rural homemakers in eight communities in Montana kept daily records of their time use for 7 consecutive days. Forms for recording the data were obtained from the Bureau of Home Economics, United States Department of Agriculture. In summarizing his findings, Richardson (1933, p. 23) concluded that, "The acquisition of equipment for homemaking work does not appear to shorten the time for performing the task, if anything, there is a tendency to devote more time to the work."

In 1972, Szalai reported data that were collected in the late 1960's. This 12 nation study was conducted in Olomouc, Czechoslovakia; Hoyerswerda, German Democratic Republic; Lima-Callas, Peru; Kazanlik, Bulgaria; Győr, Hungary; Kragujevac, Yugoslavia; Belgium; Osnabriick, Federal Republic of Germany; USA (national); Jackson, Michigan, USA; Maribor, Yugoslavia; Six Cities, France; Federal Republic of Germany (national); Torun, Poland; and Pskov, USSR. The efforts were coordinated by Szalai. A time diary was used, therefore, the time spent in household tasks was analyzed. The countries represented were countries with varying degrees of household mechanization.

Szalai (1972) concluded, after examining time-budget surveys from 12 countries, that the time spent on household work did not vary greatly regardless of the degree of mechanization. He suggested that non-rational mechanization, which he defined as highly specialized devices with limited capabilities, might actually increase housekeeping time.

Vanek (1974) compared some of the early Bureau of Home Economics time use data to data gathered by the Survey Research Center in 1965-66. She found a slight increase in time spent in housekeeping and in laundry tasks during the approximately 50 years covered by her research. In commenting on her unexpected results she stated,

One would suppose, in view of all the household appliances that have been introduced over the past 50 years, that American women must spend considerably less time in housework now than their mothers and grandmothers . . . [investigation has shown] . . . that the generalization is not altogether true. (Vanek, 1974, p. 116)

Schumacher, commenting on mechanization in general, summarized his observations from the years he spent in developing countries, and supported the idea that time and technology are related but not in the way most people assume. He stated (1975, p. 140), "The amount of real leisure a society enjoys tends to be in inverse proportion to the amount of labor-saving machinery it employs."

Szinovacz (1977, p. 37) summarized the findings of his Austrian study regarding the relationship between time and equipment by stating,

Although it is often assumed that further technological advancement as indicated by the increased amount and quality of household appliances significantly reduced women's household work and led to a decrease in time spent with household activities, clear empirical evidence for this assumption does not exist. . . . This does not mean, of course, that labor saving technology proved to be entirely ineffective in reducing women's work at home.

Robinson (1980) reviewed the results of the Survey Research Center's 1964 and 1975 time use surveys. He concluded that there was "no systematic tendency for women with household technology to spend less time doing housework" (p. 63). The only appliance which made a difference in time was the microwave oven and the decrease was only 5% and was not statistically significant.

Robinson further explained that today's homemaker, with access to technology in the household, is expected to organize time more efficiently and thus minimize the routine and mundane aspects of housekeeping. Robinson (1980, p. 54) compared early time use studies to be his own 1972 study and concluded that "women both in and out of the labor market reported virtually

the same amount of time doing housework in the 1960's as they had 10, 20 or 40 years previously, when much less technology was available" (p. 63).

Perception of Time Savings

The relationship of time use and technology as reported in the literature is inconsistent. Some researchers have concluded that household equipment does not reduce time spent doing household tasks. Other writers conclude it does and usually support their claim with "commonly accepted logic" rather than research. The relationship that exists between home care equipment and housework time is of much practical and theoretical interest "since at present the reduction of time used for housework is transformed into the main source of free time and becomes the central sphere of technological and social progress" (Szalai, 1972, p. 469).

Although no time use studies to date have found that increased household appliances reduce household work time, the assumption is still made by many individuals. An aspect of appliance ownership that cannot be ignored is the perception of saved time.

Wilson, in her 1929 time study, found that, except for plumbing and electricity, household technology did not decrease housekeeping time. She presented several possible explanations as to why "labor-saving" equipment may not reduce time.

When the homemaker with the well-equipped house devotes as much time to a specific household activity as the homemaker whose house is not so well equipped, there are several possible explanations:

a). That no time reduction is possible, and the equipment is of value because it makes the job more pleasant or because it reduces energy requirement.

b). That time habits tend to persist, with the result that the family living standard is raised by the introduction of improved equipment. The purchase of the power washing machine, for example, may mean more frequent changes of linen.

c). That the homemaker spends more time on the parts of the task which she most enjoys doing.

d). That time given by other members of the family or by hired help is reduced rather than her own time. (pp. 38-39)

In a mid-1930 study by the Bureau of Labor Statistics reported by Bell (1967), homemakers considered new appliances to be valuable, and pinpointed their value in more pleasant living,

It is striking that a higher percentage of all families surveyed reported purchase of electric refrigerators and electric washing machines than of any item of furniture. . . . The great contribution of these items to lightening the housewife's tasks and facilitating more pleasant living for the entire family is witnessed by these figures . . . In purchasing such substantial items, the families tend to pay as much as they think is required to obtain an article of reasonably good durability, and large enough for the family needs, if necessary extending their payments over a longer period of time. (Bell, 1967, p. 34)

In a study of ownership of household equipment done in the early 1950's, homemakers reported that "The washing machine and the vacuum cleaner were considered the most time saving . . . other equipment reported [was] the electric mixer, electric range, ironer and pressure cooker or saucepan" (Wiegand, 1954, p. 12). It seems illogical to suppose these devices might not have an impact on housework, but whether time spent was actually altered was not studied. It is likely that when a savings of time was

reported in these early recordings that in actuality an effort savings was being experienced.

Richardson (1933) commented on the benefits equipment may have to the household. While not supporting the idea that equipment saves household work time, he pointed out that it reduced the homemaker's energy expenditure which may have made the work more enjoyable. Consequently, the worker may spend more time doing the task than formerly.

An assumed increase of extra time belonging to the modern homemaker may be reported by observers who are aware of only a portion of daily activity performed by the homemaker. The housewife may appear to have more leisure than she really has merely because many of her work hours come when others are not present (Reid, 1934, p. 198).

Attitudes towards the purchase of some appliances have also tended to become more positive because of claims made in advertisement schemes. One may purchase an appliance supposing it will save wondrous amounts of time and it might remain unused, therefore, "Owning appliances does not necessarily result in increased efficiency" (Braegger, 1977, p. 2).

An indepth analysis of kitchen arrangement and equipment made by Harrison (1972) shows that changes have taken place that make the perception of time-savings much more likely. The introduction into homes of pressure-cookers, extractor fans, refrigerators, spin dryers, dishwashers, washing machines and floor polishers that accompanied the prosperity of the fifties and sixties created a kitchen that is an easier place in which to work. All of

the added equipment makes the work more pleasant and creates the perception that one is saving time.

"The motivation for buying the litany of new appliances and household equipment does not appear to be closely linked to increased efficiency in household work but rather to satisfaction attributed to an accumulation of goods" (Hogan, 1980, p. 10). The feeling of accomplishment in gathering an array of devices may provide satisfaction and could make the appliances seem to accomplish a time savings they actually do not.

Although machines could decrease the amount of time and human energy necessary for housework the gains are perhaps offset by a change in the standard of living. It does seem that some type of reasoning is necessary to determine why a direct and causal relationship does not consistently exist between time spent in home care and technological devices. The relationship assumed by many people has not been supported by the results of time use studies.

Summary

We often hear that there is little work to be done in the home since we have added numerous household appliances. Whether there has been an actual or significant time change for household work over the last 60 or 70 years depends to a great degree on what kind of questions are asked concerning appliances, what definitions of time are used and what is meant by appliances. Whether the sample selected is representative of any particular

group should also be a question of concern if one is going to use a study in generalizing beyond the group studied. The assumptions made by some individuals and the results of studies in the last 6 decades are ample indication that the relationship between time and equipment is a matter of interest, but likenesses and differences among research methods both must be accounted for. It would be well to investigate the specific devices referred to as labor-saving or time-saving before a comparison to the present or past or another study is made or relied upon. Major differences may exist in appliances and their use which would make time comparisons unreliable.

Presently, becoming aware of the kind of time/technology relationship that exists is more than a satiety of curiosity, it is a matter of economic and ecological importance as we seriously ponder and attempt to manipulate our changing energy and social situations. There is ample evidence that technology has been felt to have been an asset in home maintenance but the benefits may be leveling off, reaching a point wherein time necessary to accomplish a task cannot be reduced. If it can be determined where our benefit/expenditure is at optimum levels it would be wise to increase our home care equipment items, or decrease them accordingly, with their real value in mind, not just an assumed time savings.

RESULTS AND DISCUSSION

The data analyzed were collected from a regional research project, NE 113. The regional project, "An Interstate Comparison of Urban/Rural Families' Time Use," was initiated by Kathryn Walker at Cornell University. The Utah Study was funded by the Utah State Agricultural Experiment Station. Utah was one of the 11 participating states. The data for this study were collected between May, 1977, and August, 1978, from 210 two-parent/two-child families in Utah.

Half of the sample, studied in this research project, was urban and half was rural. Families from Washington County and Iron County were classified as rural and the Salt Lake County respondents were classified as urban.

Some of the data gathered for Utah's contribution to the NE 113 research project were analyzed for this research to determine if any significant differences existed in time spent in some home care tasks in relationship to ownership of home care equipment. Reported use of home care equipment related to time spent in home care tasks was also analyzed.

Description of the Sample

The sample consisted of 210 two-parent/two-child Utah families. The demographic data collected included family income, educational level, age and occupation.

Family Income

The reported household incomes before taxes, for the previous 12 months, ranged from the category "under \$1,000" to the category "\$50,000 and over." The urban families' incomes were, on the average, higher than those of the rural families. The median income for the rural families was in the category "\$12,000-\$14,999" with urban families' median income in the "\$15,000-\$19,999" category (see Table 1). This was similar to estimates calculated by the Bureau of the Census for 1975 (Population estimates and projections, 1979). Salt Lake County per capita income for 1975 was \$4,780 or \$19,120 for a family of four. The estimate for Iron County was \$3,500 per capita with \$14,000 per family and Washington County was \$3,373 per capita and \$13,492 per family. The average income for Utah for a family of four in 1975 was estimated to be \$17,240.

Education

As shown in Table 2, the educational levels of the wives ranged from grade school through master's degrees. On the average, husbands had completed more years of education than had the wives in the sample.

The category checked most often by the wives as their highest level of education was "high school diploma." Forty-three of the women had earned either a bachelor's degree or a master's degree. The category of education indicated most often by husbands was completion of a bachelor's degree. The

Table 1
Household Income

Category	Rural	Urban	Total
Under \$1,000	1	0	1
\$1,000-\$1,999	0	0	0
\$2,000-\$2,999	0	0	0
\$3,000-\$3,999	1	1	2
\$4,000-\$4,999	1	0	1
\$5,000-\$5,999	0	0	0
\$6,000-\$7,499	6	1	7
\$7,500-\$9,999	17	1	18
\$10,000-\$11,999	14	8	22
\$12,000-\$14,999	20	18	38
\$15,000-\$19,999	15	33	48
\$20,000-\$24,999	14	16	30
\$25,000-\$49,999	10	22	32
\$50,000 and over	2	3	5

Table 2
Education of Respondents

Category	Wives	Husbands	Total
Grade School (1-8)	1	2	3
Partial High School (9-11)	10	6	16
High School Graduate	85	55	140
Vocational or Technical Training	5	6	11
Partial College, no degree	63	55	118
Associate's Degree	3	6	9
Bachelor's Degree	38	57	95
Master's Degree	5	12	17
Doctorate	0	4	4
Professional Degree	0	7	7
Total	210	210	420

percentage of respondents who held high school diplomas or above was 85.4 of the husbands and 85.6 of the wives.

The median years of education of Utah residents 18 years and over was 12.8 in 1976. Of Utahns 24 years old and over, 79% of males and 77.7% of females were high school graduates or above (Fjeldsted & Hachman, 1979).

Among the respondents, 96% of the husbands and 95.5% of the wives had completed high school or above. This was a larger percentage than was true of Utah's population. One reason for this difference could be the ages of the husbands and wives in the sample. The respondents were a relatively young group of individuals because two-thirds of the families had to have a child 5 years old or younger. Generally, younger persons have a higher level of education.

Age

The ages of respondents ranged from the 21-25 category to the 56-60 category (see Table 3). The median age for the husbands fell in the 31-35 category and the median age of the wives was in the 26-30 category. This sample was, expectedly, relatively young, due to the age of the younger child being a criterion of sample selection.

Occupation

Sargent (1978) reported that in 1977, 48.4% of Utah's women 16 years of age and older were in the labor force. This included those either having or looking for a job. The wives in this study were much like the state's female population with 57% being full-time homemakers and the remainder being employed part or full-time.

The occupations listed by the 90 women respondents who were employed were much like those reported for the state in the 1970 census. There were more respondents, however, in the categories "professional,

Table 3
Ages of Respondents

Category	Wives	Husbands	Total
21-25	43	26	69
26-30	67	54	121
31-35	37	47	84
36-40	24	26	50
41-45	15	24	39
46-50	12	15	27
51-55	4	6	10
56-60	1	4	5
Missing	7	8	15
Total	210	210	420

technical and kindred" in the sample than reported in the census. There were fewer in "sales" and "operatives" in the sample than indicated for the female population of the state (PC (1)-C46). The women were generally employed in occupations thought to be traditionally women's jobs (see Table 4).

The largest percentage of men in this study reported that their occupations were in the "professional, technical and kindred" category. In comparison to the distribution reported in the census of 1970, this was an

Table 4
Occupations of Wives

Category	1970 Census	Study Respondents
Professional, technical and kindred	.17	.22
Managers and administrators	.04	.02
Sales workers	.08	.19
Clerical and kindred	.38	.33
Craftsmen, foremen and kindred workers	.02	.02
Operatives	.09	.03
Laborers	.01	.00
Service workers	.21	.22
Total	1.00	1.03

over-representation. Men's employment in the category "sales workers" was also an over-representation with the category "clerical and kindred" being under-represented (see Table 5).

There were three husbands who were not employed at the time of this study. One reported being a full-time student and two were unable to work in the labor market because of disabilities.

Table 5
Occupations of Husbands

Category	1970 Census	Study Respondents
Professional, technical and kindred	.17	.28
Managers and administrators	.12	.13
Sales workers	.07	.13
Clerical and kindred	.07	.01
Craftsmen, foremen and kindred workers	.22	.24
Operatives	.16	.12
Laborers	.08	.05
Service workers	.08	.04
Total	.97	1.00

Appliance Ownership

The ownership and use of nine household appliances by the families were investigated in this research. The appliances included were microwave oven, dishwasher, garbage disposal, trash compactor, automatic washer, clothes dryer, sewing machine, vacuum cleaner and power yard equipment.

The appliances studied were those which might be assumed to be related to the amount of time spent by families doing household work.

The number of appliances owned by each family was tallied and is summarized in Table 6. Few families owned all nine appliances and few owned less than four of the appliances. The mean was slightly over 5 and there was little difference between the urban and rural families in the number of appliances owned. One urban and one rural family did not complete the questionnaire.

Table 6
Number of Appliances Owned

Number of Appliances	Urban Families ^a	Rural Families ^a	Total
1	0	0	0
2	1	1	2
3	2	3	5
4	7	16	23
5	17	24	41
6	31	21	52
7	37	33	70
8	5	6	11
9	4	0	4
Mean	5.37	5.09	5.23

^aN=104, 1 urban and 1 rural family did not complete the questionnaire.

The number of families who owned each of the nine appliances was also tabulated. It is interesting to note that almost all families surveyed owned an automatic washer and a vacuum cleaner. This could indicate that people consider these items as near necessities. Out of the 208 families who reported, just 20 owned a microwave oven and 17 owned a trash compactor (see Table 7).

Table 7
Appliances Owned

Appliance	Urban	Rural	Total
Microwave	11	9	20
Dishwasher	72	65	137
Garbage disposal	67	59	126
Trash compactor	11	6	17
Automatic washer	103	101	204
Clothes dryer	99	90	189
Sewing machine	91	95	186
Vacuum cleaner	104	100	204
Power yard equipment	84	75	159

The families interviewed had been stratified into five levels by the age of the younger child. The five levels were defined as:

Level I: Age of the younger child less than 1 year.

Level II: Age of the younger child 1 year.

Level III: Age of the younger child between 2 and 5 years.

Level IV: Age of the younger child between 6 and 11 years.

Level V: Age of the younger child between 12 and 17 years.

The number of appliances owned was computed by age level. The totals are presented in Table 8.

Table 8
Appliance Ownership by Families by Age Level^a

Appliance	Age Level of Younger Child					Total
	I	II	III	IV	V	
Microwave	1	2	2	5	10	20
Dishwasher	19	25	26	35	32	137
Garbage disposal	19	26	26	26	29	126
Trash compactor	2	2	3	6	4	17
Automatic washer	40	41	41	41	41	204
Clothes dryer	35	37	38	39	40	189
Sewing machine	33	38	40	37	39	187
Vacuum cleaner	41	40	40	42	41	204
Power yard equipment	25	28	31	35	40	159

^aThere was a possibility of 42 families in each cell, except for levels 4 and 5 where 41 was possible.

There did appear to be more families in levels 4 and 5 who owned power yard equipment, dishwashers and microwave ovens than levels 1 and 2 families. It might be safe to assume that this was due to the longer length of marriage of levels 4 and 5 families. They would have had a longer time period in which to accumulate appliances. It is also possible that the higher average incomes of the levels 4 and 5 families (Appendix) might have enabled them to purchase more appliances.

Table 9 indicates appliance ownership according to the wives' hours of employment. It is often assumed that the families of employed women purchase household appliances to supplement time spent in household work. This measure includes an air conditioner in addition to the appliances that were contained in this study, making a possibility of 10 appliances. The wives who were employed full-time, 35 hours or more per week, did not own considerably more or less appliances than full-time homemakers or wives who were employed part-time.

Use of Appliances

Respondents were asked, "on how many of the last 7 days has it [this appliance] been used for your household work?" The garbage disposal and dishwasher were used most often. The garbage disposal was used 7 out of the 7 days by 78% of those who owned one. Out of the 137 families who owned a dishwasher, 72, or 53%, reported using it every day. Sixteen reported not using the dishwasher in the past 7 days. No questions were asked

Table 9

Appliance Ownership According to Wives' Employment

Number of appliances	Full-time Homemaker		Part-time Employed		Full-time Employed	
	Number	%	Number	%	Number	%
2	1	.8	1	1.8	0	0.0
3	4	3.1	1	1.8	0	0.0
4	14	10.8	6	10.9	3	15.0
5	32	24.6	8	14.6	1	5.0
6	31	23.9	14	25.5	6	30.0
7	37	28.5	22	40.0	9	45.0
8	8	1.2	2	3.6	1	5.0
9	3	2.3	1	1.8	0	0.0
Total	130	100.0	55	100.0	20	100.0

concerning condition of the appliances, quality of their performance or feelings about the functions of the appliances.

Table 10 indicates that the automatic washer, clothes dryer and vacuum cleaner were typically used three times a week. The sewing machine and power yard equipment were rarely used. Data were gathered over the entire year and because of Utah's climate, yard work and use of the related equipment would vary with the weather. Seasonal variations could, then, account for the low usage of power yard equipment.

Table 10

Number of Times Appliances Had Been Used During the Past 7 Days

Appliance	0	1	2	3	4	5	6	7	N ^a
Microwave oven	1	0	2	0	1	1	2	13	20
Dishwasher	16	4	4	11	9	13	8	72	137
Garbage disposal	7	6	1	4	4	4	2	98	126
Trash compactor	4	0	0	1	1	0	2	9	17
Automatic washer	9	15	34	52	23	22	22	27	204
Clothes dryer	13	22	33	46	19	22	13	20	189
Sewing machine	73	52	34	14	5	5	1	2	186
Vacuum cleaner	11	17	44	43	22	8	19	40	204
Power yard equipment	75	62	17	4	0	0	0	1	159

^aNumber who owned the appliance.

Hypotheses

Hypothesis Number 1

Ownership of home care equipment is not related to the amount of time spent in home care tasks.

A t-test was done to determine if a significant difference existed in time spent on a related task by those who owned a particular appliance compared to those who did not own the appliance. It was assumed that the task

was related to the appliance. The time spent doing household tasks had been recorded in the time diaries that were completed by the study's respondents. The appliances and the related household tasks are listed in Table 11.

Table 11
Appliances and Related Tasks

Appliance	Task
Microwave oven	Food preparation
Dishwasher	Dishwashing
Clothes dryer	Care of clothing and household linens
Sewing machine	Construction of clothing and household linens
Power yard equipment	Maintenance of home, yard, car and pets

The garbage disposal and trash compactor were not analyzed because there were no task categories that would be directly related to their use. The automatic washer and vacuum cleaner were owned by 204 out of 208 families, therefore, valid statistical analysis could not be done. Consequently, the automatic washer and vacuum cleaner were omitted from this analysis. Records for the spouses' use of the sewing machine and corresponding clothing and household linen construction were too limited for statistical analysis.

The homemakers who owned microwave ovens spent slightly more time on food preparation than those who did not own a microwave. The spouses' time spent for food preparation was more than twice as much for those who owned a microwave oven than those who did not have a microwave (Table 12). Neither difference, however, was statistically significant. The spouses' increase in food preparation time could possibly be accounted for in several ways. Perhaps cooking was more enjoyable or interesting to the microwave oven owners and so they voluntarily increased food preparation time. Possibly more food was prepared and consumed. Those who enjoyed food preparation may have purchased a microwave oven and spent more time in food preparation for pleasure. If family members used the appliance in order to prepare foods to eat at different times, preparation time might have increased.

The employment status of the wife had little to do with microwave oven ownership. Of the wives employed full and part-time, just seven owned a microwave oven. Only one wife out of the 20 in the study who were employed full-time owned a microwave oven (Appendix).

In families who owned dishwashers, homemakers spent approximately 6 1/2 minutes less per day in dishwashing than did non-owners (see Table 13). This difference was statistically significant. The time spent in dishwashing was slightly higher for spouses in households with dishwashers than in those without them. The difference was less than 1 minute per day and was not statistically significant.

Table 12

Time Spent in Food Preparation by Owners and Non-Owners
of Microwave Ovens

Status	N	Mean min/day	S. D.	t-test	2-Tail Probability
<u>Homemakers</u>					
Owners	20	84.25	55.34	-.62	.54
Non-Owners	190	77.63	44.47		
<u>Spouses</u>					
Owners	20	12.88	25.56	-1.17	.26
Non-Owners	190	6.11	11.38		

Table 13

Time Spent in Dishwashing by Owners and Non-Owners
of Dishwashers

Status	N	Mean min/day	S. D.	t-test	2-Tail Probability
<u>Homemakers</u>					
Owners	137	29.02	19.05	1.97	.05
Non-Owners	73	34.86	22.96		
<u>Spouses</u>					
Owners	137	2.43	6.84	-.24	.81
Non-Owners	73	2.19	6.29		

There were 21 families who did not own a clothes dryer. The homemakers in these families spent only .44 minutes per day more in clothing and household linen care than did owners. Although spouses spent very little time in this activity, those in families without a clothes dryer did contribute more than those in owner families. Differences for spouses and homemakers were not statistically significant (see Table 14).

Table 14
Time Spent in Care of Clothing and Household Linens by
Owners and Non-Owners of Clothes Dryers

Status	N	Mean min/day	S. D.	t-test	2-Tail Probability
<u>Homemaker</u>					
Owners	189	23.37	33.78		
Non-Owners	21	23.81	22.72	.08	.94
<u>Spouses</u>					
Owners	189	.53	2.81		
Non-Owners	21	1.91	7.66	.82	.42

Time used in construction of clothing and household linens was higher among those who owned a sewing machine than among non-owners and the difference was statistically significant. Construction would not commonly be done without a sewing machine, so the large time difference between owners and non-owners was a result that would have been expected. Spouses' time recorded in construction of clothing and household linens was extremely limited and, therefore, could not be analyzed.

Table 15

Time Spent in Construction of Clothing and Household Linens
by Owners and Non-Owners of Sewing Machines

Homemakers	N	Mean min/day	S. D.	t-test	2-Tail Probability
Owners	186	17.15	41.03	-4.28	.000
Non-Owners	24	2.60	7.78		

Owners of power yard equipment, both homemakers and spouses, spent more time in maintenance of home, yard, car and pets than did non-owners (see Table 16). Spouses who owned power yard equipment spent approximately 23 minutes per day more in this activity than did non-owners. The difference was not statistically significant. The analysis did not control for the size of the yard so it is possible that families with larger yards could have spent more time than non-owners because of yard size alone. Those

Table 16

Time Spent in Maintenance of Home, Yard, Car and Pets by
Owners and Non-Owners of Power Yard Equipment

Status	N	Mean min/day	S. D.	t-test	2-Tail Probability
<u>Homemakers</u>					
Owners	159	30.46	55.93		
Non-Owners	51	25.15	63.06	-.57	.57
<u>Spouses</u>					
Owners	159	50.68	82.61		
Non-Owners	51	33.58	57.67	-1.64	.10

who enjoyed yard work may have purchased equipment and spent more time on their yards for pleasure. Perhaps those who had power yard equipment kept their yards in more meticulous condition. It is also a possibility that power yard equipment took more time to operate than non-power equipment.

Families were grouped according to how many of the nine household appliances they owned. The nine appliances included were the microwave oven, dishwasher, garbage disposal, trash compactor, automatic washer, clothes dryer, sewing machine, vacuum cleaner and power yard equipment. Analysis of variance was used to determine if any significant differences existed between the time used for household work and the number of appliances owned. The time used in food preparation, dishwashing, care of clothing

and household linens, construction of clothing and household linens and maintenance of home, yard, car and pets were combined to yield a measure of total household work time. This was done for the homemaker, spouse, and for total family time. Only levels 4 and 5 families were used in the analysis of the total family time. These were the only families in which time had been recorded for four family members as data were not recorded for children less than 6 years old.

Time spent by homemakers did not follow a consistent pattern when computed according to the number of appliances owned. Owners of nine appliances spent more time on housework than any other group. Homemakers who owned eight appliances spent the least amount of time on household tasks, almost 100 minutes per day less than the four homemakers who owned all nine appliances. There were no statistically significant differences in the time homemakers spent on home care tasks among owners of different numbers of appliances (Table 17).

Spouse time in household work ranged from 26 minutes in families who owned four appliances to 114 minutes in the families who owned all nine appliances. The second largest time contributions to household work came from the two husbands in families that owned just two appliances. The largest amount of time spent on household tasks by the husbands was in the families who owned all nine appliances. This was the same result that had been found for wives. As there were just four families in this category, it is not safe to

Table 17
 Mean Minutes Per Day Spent in Household Activities by
 Homemaker and Number of Appliances Owned

Number of Appliances Owned	Mean Minutes*	N	
2	310	2	
3	301	5	
4	247	23	
5	263	41	
6	240	51	
7	262	69	
8	229	11	
9	322	4	
Mean	256	Total 206	
	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Between groups	>	60394.5842	8627.7979
Within groups	199	2552743.4688	12827.8564

* Sig. = .70. F = .67.

generalize from this finding. However, this result is not consistent with popular assumptions about the relationship between household appliances and time spent doing housework (Table 18).

Families who owned seven appliances spent the least time in household work, but just 2 minutes less than owners of five appliances. Again, owners of all nine appliances spent a great deal more time in household work than any other group, over 2 hours more per day than any other group. There

Table 18
 Mean Minutes Per Day Spent in Household Activities
 by Spouse and Number of Appliances Owned

Number of Appliances Owned	Mean Minutes*	N	
2	98	2	
3	47	5	
4	26	23	
5	47	41	
6	68	51	
7	68	69	
8	82	11	
9	114	4	
Mean	60	Total 206	
	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Between groups	>	61423.3410	68774.7627
Within groups	198	1257314.0605	66350.0708

* Sig. = .22. F = 1.38.

were no statistically significant differences between family members' household work time and number of appliances owned (Table 19).

Hypothesis Number 2

Reported use of home care equipment is not related to the amount of time spent in home care tasks.

The Pearson correlation coefficient was used to determine the relationship between the use of home care equipment and the time spent in the related home care tasks. The number of times the appliance was "used in

Table 19
 Mean Minutes Per Day Spent in Household Activities
 by Families and Number of Appliances Owned^a

Number of Appliances Owned	Mean Minutes*	N	
4	424	5	
5	400	9	
6	426	20	
7	398	37	
8	454	8	
9	602	3	
Mean	420	Total 82	
	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>
Between groups	5	3130849.4652	26169.8926
Within groups	76	3364992.4141	44276.2148

^aFamilies = levels 4 and 5 only. * Sig. = .71. F = .59.

the last 7 days" for household work was correlated with the time recorded in the time diaries for the related task (see Table 10). The time analyzed was an average of the time recorded for the specific tasks for the 2 days. The results are reported in Tables 20-24.

The relationship between the number of times the microwave oven had been used and food preparation time was positive, but not statistically significant. The common assumption that a negative relationship exists between the two variables was not supported by the weak positive correlation.

Table 20

Frequency of Microwave Oven Use and Food Preparation Time

Homemakers		N	Spouses	
r	P sig.		r	P sig.
.21	.18	22	.11	.31

This suggests that the microwave oven may be used more for convenience than for its time saving potential (Table 20).

There was a negative relationship for homemakers and spouses between the number of times they reported using their dishwasher and the time spent in dishwashing. Those who used their dishwashers more times during the week spent less time in dishwashing. This was statistically significant for the spouses at .04. It was, however, a weak correlation at -.15. Spouses on the average, spent very little time in dishwashing (see Table 23) just 2.43 minutes per day. Homemakers' use of the dishwasher and time spent in dishwashing was a negative, but not statistically significant relationship (Table 22).

There was no statistically significant relationship between clothes dryer use and time spent in clothing and linen care. Table 22 indicates that the correlations were weak for both the homemaker and the spouse.

All correlations between number of times appliances were used and time spent in the related tasks were positive except those between the

Table 21

Frequency of Dishwasher Use and Time Spent in Dishwashing

Homemakers			Spouses	
r	P sig.	N	r	P sig.
-.04	.33	139	-.15	.04

Table 22

Frequency of Clothes Dryer Use and Time Spent in Care of
Clothing and Household Linens

Homemakers			Spouses	
r	P sig.	N	r	P sig.
-.06	.20	191	-.10	.09

dishwasher and dishwashing time, and the clothes dryer and care of clothing and household linens time. This is reasonable, as the dishwasher and clothes dryer are appliances that are loaded and then left to do their work. They do not require attention as they function. Time spent in other tasks would normally increase with the number of times an appliance was used because most other appliances require an input of the operator's time in order to perform their function.

The number of times the sewing machine was used in relation to time spent in construction of clothing and household linens produced a relatively

strong positive correlation which was statistically significant. The homemakers who had used their sewing machines more often spent more time in clothing and household linen construction. This confirms what would commonly be assumed. Recordings of spouses' time in construction of clothing and household linens were too limited for statistical analysis to produce meaningful results (Table 23).

Table 23
Frequency of Sewing Machine Use and Time Spent in
Construction of Clothing and Household Linens

r	Homemakers	
	P sig.	N
.39	.001	188

The correlations for both the homemaker and the spouse between power yard equipment use and time spent in maintenance of home, yard, car and pets were statistically significant. Homemakers and spouses spent more time in the activity as they used their equipment more often (Table 24).

Table 24

Frequency of Power Yard Equipment Use and Time Spent in
Maintenance of Home, Yard, Car and Pets

Homemakers		N	Spouses	
r	P sig.		r	P sig.
.15	.03	162	.18	.01

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study attempted to determine the relationship between ownership and use of selected appliances and time spent on the related housekeeping tasks. The sample consisted of 208 families, half from Salt Lake County and half from Iron and Washington Counties. A time diary was completed by the homemaker in each family to record 2 days' of time use by family members 6 years of age and older. The homemaker also completed a questionnaire from which data on ownership of appliances and their use were taken. Table 25 contains a listing of the appliances considered in this study with the corresponding household tasks.

Table 25
Appliances and Corresponding Tasks

Appliance	Task
Microwave oven	Food preparation
Dishwasher	Dishwashing
Clothes Dryer	Care of clothing and household linens
Sewing Machine	Construction of clothing and household linens
Power yard equipment	Maintenance of home, yard, car and pets

Ownership of appliances did not differ considerably between the urban and rural samples, among families in different age level categories nor according to the wife's hours of paid employment. Most families owned an automatic washer, a clothes dryer, a sewing machine and a vacuum cleaner. Few families owned a microwave oven or a trash compactor.

Statistical analysis was done using t-tests for comparisons of time spent on the related task by owners and non-owners of each appliance. Analysis of variance was used to compare time spent on combined activities with ownership of differing numbers of appliances. The relationship between frequency of use and time spent on tasks was measured using the Pearson Product Moment correlation. Table 26 is a summary of the hypotheses, the method of testing, and the results of those tests.

The results indicated that the homemakers who owned a dishwasher spent less time in dishwashing than did non-owners. This was not true of the spouses, who spent very little time in dishwashing under either circumstance. The homemakers who owned a sewing machine spent considerably more time in construction of clothing and household linens than non-owners. None of the other relationships tested yielded statistically significant results.

Families were grouped by number of appliances owned. No statistically significant relationships were found to exist between the number of appliances owned and the total time spent in home care tasks. This was true for the homemakers' time, the spouses' time and the total family time. Generally, those who owned few of the appliances and those who owned many

Table 26

Summary of Hypotheses

Relationship	Statistical Treatment	Level of Significance	Findings	Table No.
<u>Hypothesis 1. Ownership of home care equipment is not related to the amount of time spent in home care tasks.</u>				
Microwave oven ownership				
Homemaker	t-test	.54	Accepted	12
Spouse	t-test	.26	Accepted	12
Dishwasher ownership and dishwashing time				
Homemaker	t-test	.05	Rejected	13
Spouse	t-test	.81	Accepted	13
Clothes dryer ownership and time for care of clothing and household linens				
Homemaker	t-test	.94	Accepted	14
Spouse	t-test	.42	Accepted	14
Sewing machine ownership and time for construction of clothing and household linens				
Homemaker	t-test	.000	Rejected	15
Power yard equipment ownership and time for maintenance of home, yard, car and pets				
Homemaker	t-test	.57	Accepted	16
Spouse	t-test	.10	Accepted	16
Number of appliances owned and time spent per day on combined household tasks				
Homemaker	Analysis of Variance	.70	Accepted	17
Spouse	Analysis of Variance	.22	Accepted	18
Family	Analysis of Variance	.71	Accepted	19

Table 26. Continued

Relationship	Statistical Treatment	Level of Significance	Findings	Table No.
<u>Hypothesis 2. Reported use of home care equipment is not related to the amount of time spent in home care tasks.</u>				
Microwave oven use and food preparation time				
Homemaker	Pearson r	.18	Accepted	20
Spouse	Pearson r	.31	Accepted	20
Dishwasher use and dishwashing time				
Homemaker	Pearson r	.33	Accepted	21
Spouse	Pearson r	.04	Rejected	21
Clothes dryer use and time for care of clothing and household linens				
Homemaker	Pearson r	.20	Accepted	22
Spouse	Pearson r	.09	Accepted	22
Sewing machine use and time for construction of clothing and household linens				
Homemaker	Pearson r	.001	Rejected	23
Power yard equipment use and time for maintenance of home, yard, car and pets				
Homemaker	Pearson r	.03	Rejected	24
Spouse	Pearson r	.01	Rejected	24

of the appliances spent more time in home care activities than did those who owned four or five of the appliances.

All correlations between the number of times an appliance had been used and time spent doing the related task were positive with the exception of dishwasher use and dishwashing time, and clothes dryer use and time for care of clothing and household linens. These results would be expected as use of the dishwasher and clothes dryer do not require constant attention by the user. The relationships, however, were not statistically significant. Sewing machine users spent more time in clothing and household linen construction. This relationship was statistically significant. Those who used their power yard equipment more often spent more time in maintenance of home, yard, car and pets. This was true for both the homemakers and the spouses and was statistically significant.

Conclusions

The assumed relationship between appliance ownership and use and time spent on home care activities was not found to exist for most appliances. The time savings potential of appliances had not been realized. Perhaps the tasks had become more pleasant, easier, or more tolerable; but the time spent on most tasks did not differ significantly between owners and non-owners, or by number of times used for most of the appliances. The dishwasher seemed to have provided some saving of time from dishwashing. The

sewing machine and power yard equipment owners, on the other hand, had spent more time in the related activities than non-owners.

If the consumer is to be realistic when buying appliances, he or she should consider what the appliance can do. If the appliance is designed to decrease drudgery or increase pleasure but does not have the potential to save time for the user, then the equipment should be purchased in that light. The buyer should realize that ownership of appliances will not necessarily decrease time spent in the related tasks.

Recommendations

1. Time diary information should be gathered so that time used for tasks related to the appliance is clearly identified. Both primary and secondary time might be considered in future research.
2. Questions concerning the owners' feelings toward an appliance, ability of owners to operate, what they consider to be the functions of the appliance, concern about energy use, and the appliance's condition should be included in future studies. Those who owned an appliance but did not enjoy operating it, or who owned equipment that was inoperable might have influenced the results of the current study so that it did not present an accurate picture of appliance use.

3. Appliances that were not included in this study and that are currently popular, such as the crock pot, the blender, the food processor or the electric can opener, could be studied in relation to time used for household work.
4. The potential of appliances to save household work time might be tested in an equipment laboratory. Comparisons could be made of the time spent on a task using different models of the same appliance or different methods using a given model.
5. Measurements other than "time" might be used to determine the usefulness of appliances. Perhaps quality of work, perceived labor savings or enjoyability of work might become variables instead of time.
6. Few families in the study owned microwave ovens, but they are becoming increasingly popular. A future study could concentrate on food preparation time in families who own microwave ovens compared to families who do not.

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APPENDIX

	12 midnight	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm	
FOOD	Food Preparation Dishwashing												Food Preparation Dishwashing
SHOPPING	Shopping												SHOPPING
HOUSE	Housecleaning Maintenance of Home, Yard, Car, and Pets												HOUSE
CLOTHING AND HOUSEHOLD LINENS	Care Construction												CLOTHING AND HOUSEHOLD LINENS
HOUSEHOLD MEMBERS	Physical Care Nonphysical Care												HOUSEHOLD MEMBERS
MANAGEMENT	Management												MANAGEMENT
WORK (other than household)	School Paid Unpaid												WORK (other than household)
NONWORK	Organization Participation Social and Recreational Activities Personal Care (of self)												NONWORK
PERSONAL MAINTENANCE	Personal Care (of self) Eating Other												PERSONAL MAINTENANCE
OTHER	Other												OTHER

Figure 1. Time Diary.

Table 27

Ownership of Appliances by Wives' Time Spent in Paid Employment

Appliance	Sig. *	Less than 1 hour	1-35 hours	35+ hours
Microwave oven	.74	12	6	1
Dishwasher	.23	80	40	15
Garbage disposal	.65	77	36	11
Trash compactor	.37	12	5	0
Automatic washer	.51	129	53	20
Clothes dryer	.55	117	52	18
Sewing machine	.44	119	47	19
Vacuum cleaner	.08	130	52	20
Power yard equipment	.04	97	41	20
Total		133	55	20

*Analysis of Variance.

Table 28

Mean Annual Family Income

Age Level	Rural	Urban
Under 1 year	10,575.00	16,845.23
1 year	10,625.00	20,023.80
2-5 years	19,142.85	20,587.50
5-11 years	18,475.00	24,950.00
12-17 years	25,130.95	28,904.76

Table 29

Time Used in Home Care Tasks by Wives' Time Spent in Paid Employment

Activity and Hours of Employment	Homemaker		Spouse	
	Mean Minutes	Sig. ^a	Mean Minutes	Sig.
<u>Food Preparation</u>				
Less than 1 hour	83.41	.0037	5.67	.2585
1-35 hours	76.86		8.23	
35 hours	47.38		10.00	
<u>Dishwashing</u>				
Less than 1 hour	34.76	.0012	1.70	.0849
1-35 hours	25.77		2.96	
35+ hours	20.5		5.00	
<u>Housecleaning</u>				
Less than 1 hour	83.61	.0114	1.90	.1377
1-35 hours	75.09		6.14	
35+ hours	43.63		3.88	
<u>Maintenance of Home, Yard, Car and Pets</u>				
Less than 1 hour	34.81	.1301	42.43	.5169
1-35 hours	21.68		52.23	
35+ hours	11.63		60.63	
<u>Care of Clothing and Household Linens</u>				
Less than 1 hour	22.83	.1595	.77	.4668
1-35 hours	28.77		.09	
35+ hours	12.63		.75	
<u>Construction of Clothing and Household Linens</u>				
Less than 1 hour	18.59	.2974	.11	.7592
1-35 hours	10.41		.00	
35+ hours	8.50		.00	

^a Analysis of Variance.

