Time Use and the Impact of Technology
Examining workspaces in the home

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ABSTRACT. Times have changed. The distinctions between work time and household time are no longer limited by the constraints of physical space. Indeed, the boundaries of time and space between the home and the outside world have been blurred by home computers, faxes, email, pagers, and other technologies, bringing home into the workplace and work into the home space. The purpose of this manuscript is to re-examine the time–space relationship as new patterns of time use are necessitated by home workspaces. My particular interest lies in proposing and developing a conceptual schema that helps researchers to examine the intra-household time interactions that result when workspaces are integrated within the home space. In the present study, I develop a set of research propositions and a conceptual framework for analytical use. KEY WORDS • time use • workspaces • work at home • leisure • polychronicity • time regimes

Introduction

Times have changed. The distinctions between work time and household time are no longer limited by the constraints of physical space. Instead, the boundaries of time and space between the home and the outside world have been gradually blurred by the advances of 'modernity', as new 'times' emerge through the forces of capitalism, the growth of industrialism, non-conventional organizational structures, and technological innovations (Friedland and Boden, 1994;

Daly, 1996). The purpose of this manuscript is to re-examine the time–space relationship in response to the increase in home workspaces and to propose a framework for analyzing new time intersections in the home.

Increasing numbers of people all over the world carry out part or all of their work activities in the home, often leading them to create workspaces within their homes (Perin, 1998; Tietze and Musson, 2002). Some carry out manual jobs such as assembling piecework for industry, while others may stuff envelopes, perform child care, conduct computer analysis, and conduct home office work (see Felstead and Jewson (2000) for a detailed overview of homeworking activities around the globe). While manual and agricultural home production have existed for decades, the introduction of electronic technologies has greatly increased the possibilities for integrating business work into the home space, together with the new capabilities for transmitting information back to the actual employer or client (see edited volume on teleworking by Jackson and van der Wielen, 1998).

For some, the home workspace represents their one and only 'office', often equipped with telephones, computers, and a variety of other professional equipment. For others, the office may be a temporary space that 'becomes' an office when needed, utilizing cell phones and laptop computers. Moreover, the distinction between a 'workspace at home' and a 'workspace at work' is often not 'distinct'. Fifteen million persons in the USA who have home offices are also regular telecommuters who also have an office at another location (Kirk, 2001). Forecasts tell us that such trends will continue to grow. Kanellakis (2002) cites a Gartner Group study that indicated that there would be approximately 137 million teleworkers worldwide by 2003. In addition, a study by the Institute for Employment Studies (2002) forecast that the number of individual e-Workers (people using new information and communication technologies to work from home or on the move) could reach over 27 million in Europe by 2010.

This large-scale integration of household space and workspace demands new types of 'segmentation, coordination, utilization, and synchronization of time' (Tietze and Musson, 2002). It also demands broadened frameworks to represent them, since traditional models of the household have not been developed with such integration as a fundamental possibility. Theories in home economics and marketing emphasized and examined 'work' in the home as separate and mutually exclusive from 'work' in the workplace (Arndt et al., 1981). As industrialization created a distinct separation from home and employment, research on time use took a similar approach (Hornik, 1984; Juster and Stafford, 1985; Hirschman, 1987). Basically, time in the workplace and time in the home were considered to be distinct with no overlap or possible intersections. Interactive technologies have enabled the household–work separation to be bridged once again.

My position in this manuscript is that traditional theories of time do not pro-

vide a useful conceptual framework to analyze and study the intersections between the workspace and the homespace when constraints of physical space have been relaxed. That is, 'the time discipline that was shaped by the advent of industrial capitalism and has since dominated management thought may be challenged in the information age as many temporal (and spatial) constraints are transformed and transcended by technological developments' (Lee and Liebenau, 2002: 129). The primary emphasis in the conceptual development of time has been the examination of time in the workplace or time in the home but little attention has been paid to extending theory to represent work at home (Perin, 1998). As a result, 'home located production and homeworking remain under-researched and conceptually confused' (Felstead and Jewson, 2000).

The structure of the manuscript is as follows: (a) multidisciplinary time frameworks and concepts related to the work/home contexts will be reviewed; (b) a broadened set of assumptions will be proposed and discussed; (c) a conceptual framework will be proposed depicting several types of household 'time' dynamics integrating the work time domain with the household time domain; and (d) implications and propositions for future research will be discussed.

Background to the problem

This multidisciplinary review will focus on five key building blocks of time theory that can be used in the proposed homespace/ workspace analysis. They are: (1) the analysis of objective economic time in the workplace; (2) the studies of household production; (3) the development of workspaces in the home; (4) the notion of 'temporal regimes'; and (5) two selected aspects of time, polychronicity and time processing.

The objective view of economic time: time as money

During the early days of industrialization, mass production became the key to efficient output. Workers, equipment, and resources were gathered in central spaces (factories, mines, quarries, and so forth) where effort and skills were synchronized and coordinated (Lewis and Weigert, 1981; Jackson and van der Wielen, 1998). Punctuality, precision, and scheduling were needed in order to create concentrated effort and efficient output. Time was an essential input that was 'valued' in terms of a specified wage. In essence, time in the workplace became equated to 'money' since wages were calculated based on the amount of work time that was contributed. As a result, time was conceptualized as a currency that was earned, paid, and spent, and perhaps used wisely or wasted (Feldman and Hornik, 1981; Hornik, 1982). Since time in the workplace was tied to a wage, time became considered to be a relatively uniform commodity

viewed much like money. Extra pay could be earned by contributing more time and effort. The workplace developed its own time systems that enabled productivity to be achieved. Time at work was considered to be quite different from time at home.

Work and home as mutually exclusive
With the growth of industrialization, work and home became spatially distinct areas. Home timestyles were adjusted to work timestyles so that household members could synchronize with their employers. At the time, there were no appreciable effects by the household on the workplace; work schedules were simply developed, communicated, and conformed with. Not surprisingly, time was conceptualized in terms of two major divisions: work and leisure (Becker, 1965). Leisure time was defined as discretionary in that the individual was not constrained by specific workplace obligations and was free to choose how that time would be used. In applying the 'new' economic approach to consumer behavior (Gronau, 1977), another classification was also proposed which recognized that obligations also occurred in the home. It contained 'four mutually exclusive time groupings (work, necessities, home work, and leisure)' (Feldman and Hornik, 1981; Hornik, 1982; see also Jacoby et al., 1976). In a similar manner, Arndt et al. (1981) proposed a typology including career-oriented activities, home-oriented activities, and leisure activities. A fundamental similarity among these typologies is that since the total amount of daily time is fixed to 1440 minutes a day, 'an increase in one time-use category implies a corresponding decrease in other time-use categories' (p. 9). Table 1 presents a summary of several of the time classifications based on the household–labor market dichotomy.

Theoretical frameworks adopted this economic view of time, analyzing time in terms of amounts available, efficient use, and assessing 'deficits' or pressures which result from having too little time (Becker, 1965; Voss, 1967; Schary, 1971; Gronau, 1977; Arndt et al., 1981; Hill, 1985). This perspective is echoed in the workplace literature, in which the industrializing workplace came to depend on a highly rational, highly structured, quantitative, and formal approach to accounting for time spent in one's employment (Becker, 1965; Linder, 1970; Zerubavel, 1982). There was no apparent need to build theory that integrated time processes into the home, since work was moving away from the home and into the factory.

Work at home as temporary or as a response to emergencies
Traditional studies of time that based their frameworks on the distinctions between work and leisure were characterized by an important set of assumptions regarding time and space. Basically, work from one's employment was assumed to be separate from one's home. A designated home workspace was not typical,

TABLE 1
Time classifications drawing on household production theory

Authors	Time is divided into . . .
Becker (1965)	Production in the market and consumption (including leisure and housework).
Voss (1967)	Paid time, obligated time, and discretionary time.
Gronau (1977)	Work in the market, work at home, and leisure; home time was defined as non-market time. Work at home was combined with leisure. Work in the market is away from home.
Beutler and Owen (1980)	Home activities consist of household production, non-replaceable home production, and consumption.
Arndt et al. (1981)	Career-oriented activities, home-oriented activities, and leisure activities.
Feldman and Hornik (1981)	Work and non-work (necessities, home work, and leisure).
Lewis and Weigert (1981)	Self-time, interaction time, institutional time, societal-cultural cyclic time.
Hornik (1982)	Four mutually exclusive time groupings: work, necessities, home work, and leisure.
Nickols and Abdel-Ghany (1983)	Dichotomous classification of work and leisure, with leisure indicating all activity except market work; mention other classifications into paid work, unpaid work, and leisure.
Hill (1985)	Market work is normal work at the main job, plus unemployment actions, second job, non-work activities such as conversations, coffee and lunch breaks, and travel to work.
Juster and Stafford (1991)	Work time, personal care, and leisure activities; work time is subdivided into market work and household work.

and architectural designs were not likely to incorporate formal office space into the home. Work areas in home instead tended to be located in temporary corners, basements, and parts of unused bedrooms, rather than deliberately planned into the layout of the home. Work was not brought home by choice, but instead was brought home only if necessary to complete an unusual demand or deadline. Interestingly, 'market work' included many non-work activities at the place of employment, such as coffee and lunch breaks (Hill, 1985), plus commuting time (Juster and Stafford, 1991). A major assumption based on the home/work separation seems to be that individuals traveled in some way to their market work due to the separation of workspaces from homespaces.

Household production studies and working wives

Households were traditionally studied in order to understand the relationships among the time, money, talents, information, and space resources that could contribute to household production. Studies in home economics considered the household as a production center, analogous to a factory (Gronau 1977; Beutler and Owen 1980). In particular, the workload of married women was considered (Walker and Woods, 1976; Hefferan, 1982; Peskin, 1982), examining the sequences of activities, amounts of time, and even number of steps undertaken, suggesting alternative approaches in order to improve efficiency and time savings.

A complementary set of studies attempted to identify how 'balanced' individuals felt that their allocations of time actually were. The 'time crunches' that emerged were documented through scale measurement, such as the Index of Role Overload (Reilly, 1982) or through the types of strategies that employed women adopted (Fox and Nickols, 1983; Nickols and Fox, 1983; Strober and Weinberg, 1980; Kaufman et al., 1991). A more recent study demonstrated that the 'juggling lifestyle' is experienced by young women in the USA (the 'baby boom generation'), as they try to balance employment and home demands in a system of conflicting ideologies (Thompson, 1996).

Researchers focused their attention on the substantial migration of stay-at-home wives into the workplace, marking a significant shift in how time was used. Household members were expected to use durables such as automatic dishwashers, microwave ovens, and home laundry in compensation for time shifted to the workplace, reducing perceived role conflicts and time pressure (Strober and Weinberg, 1980; Reilly, 1982). Using traditional theory, households using such products would presumably require less effort to produce the same or similar outputs. For instance, freezers were sold as convenience appliances that reduced the pressures of coordination and synchronization in households (Shove and Southerton, 2000). Paradoxically, even though these modern technologies are associated with 'speed, tempo, velocity, and flexibility', reports indicate that people may have less time and more stress than before, especially since higher output standards have often accompanied the time-saving durables (Thompson, 1996; Hornung et al., 1999).

The development of workspaces in the home

Even though some theorists had based their assumptions on the separation of work and home, that traditional segmentation has become less representative of the realities of home life. The culturally different contexts of 'work' and 'home' are becoming more integrated, given increased flexibility in the workplace (Hochschild, 1997; Kanellakis, 2002; Tietze and Musson, 2002). Many workers

around the world have relocated their work into their homes, requiring them to integrate two different temporal regimes, while blending them with the timestyles of other household members (Kirk, 2001).

Technologies extend workplace boundaries beyond the constraints of physical space to settings defined by electronic communications (Silverstone, 1993). For instance, both skilled and unskilled work can be done using a computer in one location for use at other sites. Thus, a 'new workplace' is thought to be emerging that is not constrained by the former limits of linear time and separable space (Holder and McKinney, 1992), establishing some homes as 'cyberhouseholds' (Venkatesh, 1996).

Rather than adopting the time/space constraints of the prior studies, theorists such as Giddens (1991) conceptualized 'time/space distanciation', defined as 'the ways in which social practices and institutions have become "stretched" over larger (and smaller) spans of space and time. New technology homeworkers are indeed separate in this sense from both their managers and their fellow workers' (p. 449). In other words, theorists like Giddens do not constrain work time to occur only in the workplace. Particularly notable are the intersections of family time with work time, leading to possible conflicts. Public and private times and spaces may necessarily intersect, leading to potential conflicts (Silverstone, 1993). Since families are systems of interacting individuals, 'households order their lives through time according to rhythms over many of which they have little control' (p. 287). When some work from one's employment comes home, 'new forms of organization [are needed that] . . . recast the relationship between "home" and "work", necessitating the individual to engage reflectively with both spheres' (Tietze and Musson, 2002: 315).

The matching and blending of temporal regimes

Household and workplace 'temporal regimes' represent the time-related structures, practices, and rules of using time in a particular context (Hall, 1959; Levine, 1987, 1988; Manrai and Manrai, 1995). Individuals generally are part of several regimes with similar or perhaps substantially different uses of time. Households, for instance, can develop unique orientations toward time by selecting, maintaining, and emphasizing the past, the present, or the future in their approach to daily living (Graham, 1981). That is, some may emphasize tradition and connections to the past, while others may emphasize planning for the future (Daly, 1996). Household members interact with school systems, organized around clocks, calendars, minutes, hours, and years in order to produce a standardized educational 'product' within a commonly agreed upon time. In western countries, education is highly structured, as time is synchronized, measured, allocated, and carefully matched with activities that must be completed, 'producing good work fast' and wasting time only when permissible

(Adam, 1995: 63–4). Levine (1987, 1988), however, cautioned that time, tempo, and pace of life can be relatively fast or slow, depending on the collective timestyles found in specific cultures.

Workplaces routinely establish their own practices of punctuality, scheduling, maintenance of deadlines, policies toward break and vacation time, and so forth, forming organizational time regimes or 'time cultures' (Lewis and Weigert, 1981; Bluedorn and Denhardt, 1988; Bluedorn et al., 1992). In fact, organizations routinely construct specific timetables, an acceptable pace of work, and time-related schedules as part of their 'organizational time personality' (Kaufman et al., 1991). As a result, 'the largest part of Western industrialized everyday life is timed', balanced, and matched against common employment schedules (Adam, 1990: 104). Work, school, and societal schedules define who is early and who is late, when certain activities 'should' take place, and what the ideal sequence of activities should be. While efficiency and speed have been emphasized throughout many years, recent work in management finds that 'faster is not always better', and in fact, working at a slower pace might bring higher quality results (Bluedorn, 2002).

The complex mix of individuals' times occurs due to membership in numerous societal groups, each with their own social processes of embeddedness, stratification, and synchronicity (Lewis and Weigert, 1981). Time use is assumed to be embedded in the place where that activity takes place; certain types of time use may take precedence to others, in a stratified fashion; and time in various activities may need to be matched with other specific timetables or schedules, so that activities are synchronized rather than random. However, as a 'consequence of modernity', Giddens (1991) argues that time may become disembedded or separated from the space in which activities originate. That is, activities become independent of the locations associated with them and are no longer defined by the location for which the activity is performed.

When work is taken into the home, employees are working at the location and time of their choosing within a temporal regime established by the household. The success of work at home may depend on the compatibility of the household and organizational time regimes. As a result, 'organizational time and space regimes are no longer so easy to delineate in spatial and temporal terms' (Brocklehurst, 2001: 445). Workplace schedules may lose their prior importance, since deadlines may be impacted by household activities, or conversely, household activities may be changed in order to establish synchronization with the company. Such work at home 'recasts the relationship between work and home, and redraws the boundary line' (Brocklehurst, 2001).

These concepts can be integrated into a set of temporal regime interactions, shown in Box 1, outlining several ways that households might approach negotiating the temporal regimes brought from the workplace with the temporal regime that has been established at home.

BOX 1
Interaction within temporal regimes

1. Individuals, groups, and cultures form their own rules, norms, and practices about time.
   - Individuals have their own subjective time preferences based on their time personalities;
   - Households negotiate a collective schedule and pace of time based on consensus of its members and their external demands;
   - The employer establishes a workplace time regime including schedules and responsibilities that the individual may interpret and fit into the home time regime, creating an individualized schedule.

2. All social acts are fitted within other larger social acts; thus the acts of individuals fit within the schedules of groups and the norms of culture. This is called time embeddedness.
   - Recent separations of time and space result in time disembeddedness since time can be spent on activities that are related to another environment;
   - The individual must balance the embeddedness of on-site work activities with the disembeddedness of 'at home' work activities;
   - 'At home' work activities become embedded in a physical space environment of which they are not a part, leading to possible conflict.

3. Because of their interdependence, activities in homes and in workplaces in modernized societies are synchronized so that their order of operation might optimize production.
   - Recent separations of time and space allow activities to be performed at separate locations with performance required by specific deadlines;
   - Because of the time separation of different time zones, activities may be synchronized electronically so that activities start and end at the same moments in time, but actually take place at different clock times.

4. Activities are stratified in terms of their relative importance within households and workplaces. Typically, work obligations take precedence over those at home, with the exception of household-determined priorities or emergencies.
   - The household priority schema must be integrated with the workplace priority schema when work is brought into the home;
   - Activities are stratified in terms of a blend of importances of home and workplace when work is brought into the home. Relatively unimportant household activities may take precedence over important work activities due to the flexibility and integration of both regimes.

5. The globalization of communications, organizations, and societies disturbs the predictability of 'local' time, and instead requires a conformance to 'world time'.

The potential differences inherent in the household time regime and the workplace time regime set the stage for the temporal interactions that are thought to occur when work is brought into the home. These interactions are new to time theory, which traditionally viewed and valued workplace time as separate and distinct from time spent at home.

Flexible work schedules and the opportunity to telework from home ideally 'should' provide more time convenience to persons who have obligations at home, such as caring for young children. However, just the opposite has been found in some empirical research (Garhammer, 1995). Interestingly, workplace flexibility resulted in increased stress for those people working non-standard schedules, since they were frequently isolated from weekend social events in which their families participated. Paradoxically, people who could bring work home reported choosing to spend more time at work in order to avoid the schedule conflicts at home, the juggling of tasks at home, and the lack of rest when trying to accomplish work and home responsibilities (Hochschild, 1997). It may have been easier for workers to conform to a collective worktime plus a collective leisure time.

Participants in recent studies report experiencing increased stress and time pressure, feeling harried and caught in a 'time squeeze' (Southerton, 2003), although aggregate totals of free time have shown an increase (Garhammer, 1995; Robinson and Godbey, 1996; Hochschild, 1997; Kaufman and Lindquist, 2003). That consequence is thought to be related to the increased pressures to 'do it all', incorporating high-tech home appliances side by side with home faxes, computers, cell phones, scanners, and day planners, enabling and perhaps constraining the individual to stay in touch with work while they are at home. Placing such technologies in our homes allows individuals to combine activities in the same clock block that were physically 'uncombine-able' in the past due to limitations of time and space. Thus, today's home finds individuals capable of doing the laundry while faxes are going out to business associates and pagers are calling them back to work. While doing one's laundry requires some skill and attention to the activities being done, the demands of employment are now able to intrude on and capture part of a formerly distinct and separate amount of household time.

When individuals bring their work home on a regular basis, the boundaries between the workplace and the home become blurred. Household members must adjust to workplace-defined rhythms that become part of daily home life. Schedules must be renegotiated with all household members, and workspaces may potentially intersect with relaxation and entertainment space. The established 'clocking' of the household may be challenged by new work demands, affecting the sequence, frequency, and pace of household activities (Silverstone, 1993). Members may become out of phase with each other when the nature of household interaction changes, such as new demands placed by children and/or

teenagers, household members entering or exiting the workforce, or household members choosing to work at home.

The subjective view of time: time is not money

Time regimes must be negotiated and renegotiated as work is brought and fit into household routines. How they are negotiated depends upon the timestyles that were established both by the workplace and by the household, attempting to achieve 'time congruity' as each type of timestyle must be balanced against the other (Kaufman et al.,1991). However, objective durations, schedules, and pace are not the only aspects of time that may bear negotiation. The subjective, or experiential aspects of time, are chosen, experienced, and perceived by individuals based on their own innate characteristics. They are valued in and of themselves based on their inherent worth, rather than valued as money in the context of wages (Hirschman, 1987). Although it has been paralleled to money, there are many important distinctions between time and money. For instance, time cannot be stored and invested like money. Instead, accumulating the passing of time in one's life represents 'aging', while accumulating money indicates that wealth is being accrued (Adam et al., 2002). In addition, individuals may have specific preferences for certain types of time experiences based on their own characteristics, the characteristics of the activity, or some interaction of each. Individuals may want to spend more time in certain pleasurable activities rather than use time efficiently in all circumstances. While there are numerous aspects of experiential time that can be considered, this article will review two that are likely to be relevant to the work–home time regime negotiation. These are polychronicity and time processing.

Polychronicity

Polychronic time use, or polychronicity, can be defined as an individual's tendencies to combine activities within the same time block, or to switch among two or more activities. 'Polychrons' are typically very flexible with their time, and are quite comfortable with interruptions and juggling multiple tasks. Monochronic time use, in contrast, represents the preference to engage in activities one at a time, completing one task before beginning the next. People who prefer this approach are called 'monochrons' and are much more likely to schedule their activities very precisely, knowing when each will start and finish. Such behavior was observed in anthropology by Hall (1959), in marketing (Kaufman et al., 1991), and in organizational behavior (Bluedorn and Denhardt, 1988; Bluedorn, 2002). These studies called for the inclusion of polychronic time in research, and began to develop measures and methods of examining these behaviors. More recently, scale refinement and applications in management were profiled in a special issue of the *Journal of Managerial Psychology* (1999).[1]

While apparently natural in human behavior, polychronic time was notably absent from many of the typologies of behavior reviewed earlier. The work–non-work distinction effectively defined away any possible blending of work and other activities. However, technological development and growth of home electronics have enabled potential new categories of time use to emerge. For instance, individuals can combine work and home obligations right in their homes if they prefer to work polychronically. Given the reach provided by the internet, faxes, pagers, and wireless telephones, an individual at work can oversee activities in the home and accomplish home-related tasks interactively (Kaufman and Lane, 1996, 1997).

Home economists and time budget analysts, who studied early household division of labor, add another concept to the way that separable activities are described by considering 'dovetailing' (Hendrix et al., 1979). While it is sometimes included in the definition of polychronicity, I propose that dovetailing is a unique time-use approach in which one activity is begun and then monitored while another is actively pursued. Such a definition is in contrast to strict polychronicity, in which several activities can actually be ongoing at the same time, such as shopping while socializing with one's friends. Thus an important distinction can be made in that strict polychronicity characterizes two ongoing activities, while dovetailing is composed of one ongoing activity and one that occurs intermittently, or two activities that are interchanged, rather than simultaneous.

Examples abound in the household, such as starting one's laundry, and completing another task while monitoring the laundry's progress. Thus, the main activity can be started (such as the washer or the oven), and other activities can be fitted into the time spent waiting for the wash to finish or the food to cook to a certain level of doneness. The analogy can be drawn to the dovetailing of furniture, in which grooved slats of one piece are fitted and interspersed with the slats of an adjoining piece. That is, they do not occupy the same space, but instead, one begins where the other one leaves off.

Time-processing patterns

Time can also be analyzed based on how it is processed (Hall, 1959; Graham, 1981; Bluedorn, 2002). Perhaps most familiar are theories associated with western industrialization that tend to emphasize activities that can be discretely divided into blocks or units of time that can be scheduled, undertaken, and completed in predictable ways. Such 'linear, separable' time use emphasizes that activities take place one after the other, and tend to be completed before the next one is begun. Time flows chronologically as a succession of moments, moving from past through present to future (Cottle, 1976). These assumptions are found in the priority-setting discussions in the time-management literatures (Drucker, 1966; Slaven and Totterdell, 1993).

However, anthropologists identify other patterns of time that characterize various cultures (Hall and Hall, 1987). One such pattern involves 'cyclical time', in which patterns of activities are repeated and may follow the natural rhythms of nature (Hayden, 1987). While closely identified with agricultural and harvest cycles, birth and death, and the seasons of the year, cyclical time essentially involves activities that are repeated throughout one's day. This approach contrasts with industrial linear separable time, driven by orderliness and schedules.

Linear processing has been linked with behaviors that are monochronic in nature (Bluedorn, 2002). That is, when activities are done one at a time, one task tends to follow another, often in a highly scheduled manner. In contrast, dovetailed and polychronic behaviors are often started, stopped, and switched, interspersed with each other, and can follow cyclical patterns of repetition and multiple enactment. Bluedorn characterizes such interspersed tasks as involving multiple visits to the various tasks that are grouped within a time period.

Conceptual Framework: The MDP Matrix

In this section, I propose a conceptual framework of work and non-work that can potentially be used to describe various patterns of work–home negotiations, interactions, and interruptions. The framework is based on the integration of two major concepts in time theory: polychronicity and time processing, that are readily found in time regimes. These were chosen because of their relevance to the realities of the technological world. Cell phones, beepers, and faxes, for instance, demand instantaneous attention when an individual may already be doing something else. Thus the potential for interruption and task non-completion is high.

Fundamentally, individuals' preferences for time use can differ substantially from one person to another. Subsequently, the ways that they want to organize, allocate, and use their time differs as well. Perceptions and use of time are 'directly related to individuals' time styles, comprised of their methods for analyzing available time, their time-planning tools, and their methods for estimating a match between perceived time and actual activities (Kaufman-Scarborough and Lindquist, 2003). Furthermore, consistent patterns of time experience and use are described as a time personality (Kaufman et al., 1991; Francis-Smythe and Robertson, 1999).

When work is brought into the home space, the individual is presumed to determine ways that the work time can be integrated into the home-time regime. Styles of time use that were efficient in the workplace may be considered but household regimes must also be considered in terms of their match with desired workplace times. For instance, monochronic time use is often viewed by organi-

zations as superior since it is tied to the clock, punctuality can be measured, tasks can be completed on time, and benchmarks are easy to utilize (Lee and Liebenau, 2002). In contrast, Lee and Liebenau suggest that people are more likely to work polychronically in virtual environments since the home affords personal time flexibility. In addition, some businesses allow for well-planned monochronic and polychronic work (Lee, 1999). Some workers (and some jobs) are scheduled in a predictable way; these are monochronic. Others deal with events whenever they are needed, responding to demand rather than to a planned schedule; this is more likely to be polychronic.

The negotiation of work at home into the household's schedule may cause conflict for both the individual and for the other household members (Jackson and van der Wielen, 1998), since households are 'shaped by the intersection of many temporalities' (Daly, 1996: 47). Work times demanded by one's employment may not 'fit' the established household time regime. Workers may be 'suspended between two different sets of traditions', so that they have to develop practical solutions, such as negotiate new routines and habits to try to separate out work time as distinct even though it is taking place in the home (Tietze and Musson, 2002). Workers in Tietze and Musson's sample reported doing things like 'going to work' in one's home office at a specific time, attempting to establish uninterruptible times, and creating signals like closed doors. Such efforts did not always establish a satisfactory schedule, instead resulting in significant fragmentation of activities due to home chores, children, especially for women. In addition, workers reported using the weekend as potential work time, which further eliminates or blurs the boundary between weekdays for work and weekends for leisure. In addition, their respondents reported significant instances of 'mingling of home chores with work', such as doing wash or cooking, while picking up kids (Manrai and Manrai, 1995; Daly, 1996).

The MDP matrix: an illustrative conceptual framework

Interactive technologies have eliminated the mutual exclusivity of the traditional considerations of work and non-work. When polychronicity and time processing are introduced, a more expansive set of activity combinations can be analyzed, assuming the potential for polychronic combinations of work and non-work activities. One possible array of combinations is provided in Table 2. Table 2, called the 'MDP matrix', diagrammatically represents work at home and non-work at home arrayed by three types of time use: 'M' or monochronic linear separable, 'D' or dovetailed cyclical, and 'P' or polychronic. Nine possible cells are suggested, based on the interactions among the various types of time use prevalent in the home and the way that work time is brought into the home setting.

First, consider the 'non-work at home' categories down the leftmost column.

TABLE 2
The MDP matrix: a proposed framework for home/workspace analysis

Non-work at home is seen as:	Work at home is seen as:		
	Monochronic and linear-separable time style: activities are scheduled and carried out as separate and discrete	Dovetailed time style: activities can be broken into parts, with each part completed before something else is begun; repetitive in cycles	Polychronic time style: activities can be carried out at the same time as other activities
Monochronic and linear-separable time style: activities are scheduled and carried out as separate and discrete.	A: The monochronic linear-separable household Traditional time management with activity completion discrete, linear, and separate	D: Integrated work style Possible interference of time use styles Dovetailed work/separable home	G: Interrupting work style Possible interference of time use styles Polychronic work/linear separable home
Dovetailed time style: activities can be broken into parts, with each part completed before something else is begun; repetitive in cycles.	B: Integrated home style Possible interference of time use styles Separable work/dovetailed home	E: The dovetailed household Scheduling is linear, but work and non-work are dovetailed cyclically	H: Juggling work style Possible interference of time use styles Polychronic work/dovetailed home
Polychronic time style: activities can be carried out at the same time as other activities.	C: Interrupting home style Possible interference of time use styles Linear separable work/polychronic home	F: Juggling home style Possible interference of time use styles Dovetailed work/polychronic home	I: The polychronic household Time is used in cyclical fashions, polychronically integrating parts of work and non-work in the same set of clock blocks

The three entries represent a simple set of time regimes established for home activities, presumably before workplace activities have been brought into the home. That is, we will assume three easily distinguishable patterns for household activities that do not involve work. These are (1) monochronic and linear-separable; (2) dovetailed and cyclical; or (3) polychronic. While there are many variations of time regimes that incorporate parts of each type, for the sake of discussion we will adopt these three that represent clear points on the activity continuum. A monochronic time regime would typify households in which major activities tend to be done on schedule, such as shopping, laundry, and cleaning, without interruption. The activities are done one at a time and generally one is completed before the next one is begun. In contrast, a household that dovetails activities cyclically tends to break activities into small parts that can be integrated with other activities. Parts of these activities may be done in repetitive cycles, so that the individual may easily move back and forth while interacting with each activity. Finally, the polychronic household would be likely to have several activities operating at the same time, interruptions would be acceptable, and household members would not expect to follow strict schedules.

The other major set of categories appear across the top and represent three parallel types of work at home: (1) monochronic and linear-separable; (2) dovetailed and cyclical; or (3) polychronic. These may result from schedules imposed by the workplace, the nature of the activity, or the preference of the individual. Recall that the workplace has largely emphasized linear scheduling of activities, with some more recent acknowledgement of polychronicity as appropriate for certain tasks (Lee and Liebenau, 2002). For instance, workplace schedules may demand that a salesperson be able to juggle numerous sales calls from home in a polychronic fashion, while an accountant working at home is more likely to work efficiently on one account at a time. Theorists have provided various perspectives on work at home, supporting the distinctions among these three basic types of work at home. Perin (1998), for example, suggests that working at home can provide an environment that offers 'uninterrupted stretches of time', without office politics, meetings, and various other intrusions (p. 52). Others argue that certain types of work at home, such as telework, provide time flexibility, although their actual workplace may on occasion stipulate a specific schedule to be followed and synchronized (Haddon, 1998). In addition, women were more likely to 'fit' their work at home around or between their domestic responsibilities, adopting a dovetailing style, while men were more likely to work in a monochronic, linear style (Glennie and Thrift, 1996; Haddon, 1998; Felstead and Jewson, 2000).

The location of 'work at home' within the household also may reflect possible variations in how household members want to use their non-work time, affecting the ways that home workspaces are located and equipped. For instance, if work at home were done monochronically as a linear separable activity, a

discrete office would seem to be a logical choice if possible. If instead, work brought home can be dovetailed or interspersed with home activities, home workspaces may deliberately chosen to be part of shared family locations, such as dens, family rooms, or dining-room tables. Finally, if work brought home can be done polychronically, it can be blended in with ongoing household activities. One might expect to find work 'stations', such as computer workstations in kitchens, that are strategically located throughout the home in order to facilitate multiple simultaneous activities.

The distinction between synchronization and segregation of work at home from other household activities is an important one (Felstead and Jewson, 2000). Synchronization attempts to integrate 'work at home' so that it matches the schedules of other household members. Thus work activities are not done when household demands are made. There is an active attempt to fit and blend activities together. On the other hand, segregation establishes a work schedule that mirrors the workplace with little tolerance for interruptions. In this case, the workplace schedule is fixed and dominant over household activities. In order to carry out such schedules, some homeworkers cut themselves off from their families by retreating to their home workspaces.

This leads us to consider of the location of the workspace in relation to the integration of 'work at home' into the home. It is necessary to focus on the boundaries of time and space between the home and the outside world, plus the boundaries of time and space within the home. Some interesting gender-based contrasts have been found. For instance, Felstead and Jewson (2000) found that women's household tasks involve switching between a variety of commitments and activities that involve repetitive tasks, while men's homeworking schedules are more likely to be a linear-focused pattern more similar to work at an actual workplace.

Time congruity: a matching of timestyles and time regimes

Considering Table 2, Cells A, E, and I along the major diagonal are expected to result in successfully balanced blends of time use, in that work and non-work are found to operate using similar and presumably compatible time styles. Each will be considered in turn.

In Cell A, the 'monochronic, linear-separable household' manages its work and non-work activities by scheduling each as separate and distinct. In such households, we would expect to find home workspaces that are located away from shared household spaces in order to maintain the separation. Economic and home size constraints often necessitate the selection of less desirable spaces, such as basements, to maintain the desired separation. Additionally, home telecommunications devices are likely to need dedicated locations and be used solely for purposes of work activities, rather than shared with other family mem-

bers who may also need to use similar equipment. Portable devices, such as cell phones, PDAs, and laptop computers, can also be used to maintain discrete home workspaces, especially when electronic interfaces are limited. Households like these are likely to resemble several participants in Tietze and Musson's (2002) study, who attempted to create signals minimizing interruptions while working.

Cell E, 'the dovetailed household', instead maintains a style in which work and non-work activities are broken into smaller parts that can be deliberately interspersed with each other. It would be anticipated that a workspace might be located in close proximity to a home chore-space, allowing for both work and home activities to be stopped and started, monitored, and interspersed with each other. Dovetailed work activities might include downloading files, printing out papers, and sending faxes, which can be begun and monitored without active participation by the individual. Dovetailed homes might be expected to locate work equipment, such as faxes and business lines, within or adjacent to shared family spaces where household tasks can be easily integrated into the day's schedule. If this premise is true, we would expect to find some home workspaces located adjacent to areas such as laundry rooms and kitchens.

Finally, Cell I, 'the polychronic household', is able to combine both work and non-work into the same clock blocks, perhaps through the portability of new information technologies, such as PDAs and cell phones. Work would be expected to be brought into shared family spaces, made possible by the portability of these newer appliances and wireless computer systems. Much more elaborate integration of these spaces would be expected with ongoing sharing of time and equipment. That is, polychronic households would be expected to design family spaces that include the possibility for working while spending time with others in the household.

Time incongruity: mismatches of work and home timestyles

The remaining six cells require integration of different timestyles and may result in interference and possible conflict. Cells B and D, for instance, combine monochronic, linear separable time use with dovetailed time use, suggesting that the dovetailed activities can be broken into subparts and performed 'around' those that are preferred to be separated and distinct. Research finds that when activities are established as monochronic, each having a distinct block of time, interruptions of any kind are likely to be very disruptive (Kaufman-Scarborough and Lindquist, 1999). Work can be scheduled as non-interruptible, while home activities can be broken into parts that are completed before work is started or after it is finished. However, care must be taken within the household to establish a more traditional separation of the home workspace so that the individual can focus on their specific work tasks.

Cells C and G, on the other hand are likely to be characterized by interruptions, when combining polychronic styles with those that are monochronic and linear separable. These two cell combinations are likely to be the least successful within the household because they exist on the two opposite ends of the polychronic/monochronic continuum. Consider Cell C, the interrupting home style. In this case, the negotiated household regime includes and accepts interruptions throughout household activities. Switching back and forth between tasks and combining activities would be the norm. When one household member attempts to work at their employment tasks monochronicially with no interference, there is likely to be a high degree of frustration and possible lack of success in meeting one's work goals.

Finally, Cells F and H are labeled as 'juggling', since activities that are dovetailed into parts are integrated with polychronic activities, done at the same time. These two cells are more likely to be compatible with each other, given the similarity between dovetailing and polychronicity.

While the framework is hypothetical, and additional possibilities are numerous, the blend of diverse types of time use can prove challenging for household members, home design professionals, and technology companies. It is anticipated that a schema such as that proposed here might provide avenues for future research and theory construction representing such intersections of work and home spaces.

Implications

In the present article, a broadened framework was proposed for the analysis of new intersections of work and household time use. That framework allows for previously impossible combinations to be classified and described based on the type of work–home combination. This manuscript has examined traditional time theories and has found them to be unable to represent the households that have at least one member bringing work into the homespace on a regular basis. While popular press articles document the increase of such households around the work, a sound theoretical basis is needed to properly represent this growing phenomenon.

The framework proposed in the present article suggests one approach for organizing and analyzing these emerging patterns of home and work activity combinations. New possibilities for time use, such as working on workplace computer servers from home offices, raise conceptual questions such as how to define combinations that use resources from one site while being physically present at another.

Moreover, the subtle distinctions between dovetailing and polychronicity require concentrated attention in developing a more comprehensive understand-

ing of how individuals actually use their time, especially when employment activities are brought into the home. The research base on time studies has not been extended to examine these rich activity combinations and dovetailing strategies that are increasingly used to manage the demands of contemporary society.

Several implications for future research can be drawn: first, research is needed on the negotiations that households use when attempting to blend work time regimes into their household time regimes. Are priority systems developed? Are rules established that determine which family members utilize those family spaces that can be utilized for work? Second, research is needed examining the types of spatial arrangements that are established as a result of work being brought into the home. Are certain homespaces redefined as workspaces? Are areas of the home assigned as shared work and home spaces? Are homes remodeled in order to accommodate the needed timestyles? Third, are specific appliances and/or equipment brought into the homespace in order to accomplish the work that is brought into the home? If so, how were they chosen? Were they selected in order to utilize time in specific ways? Fourth, can the proposed framework be tested and validated among households that have brought work into their homes? Does conflict exist among the specific non-matching cells as hypothesized? Are there additional types of time regime mismatches that stimulate conflict in the household? Fifth, have 'work at home' households adopted specific strategies to build the success of the blended homespace/workspace?

As work at home moves into the homespace, formerly separate time regimes will intersect and offer rich contexts to examine whether the anticipated results of such time intersections actually do occur. Flexibility and balance for the home worker are thought to increase if there is a match, while differences in time regimes may lead to conflict and fragmentation of work due to household interruptions. Home activities may also become fragmented as household members become 'part' of the work context. Studies are needed that examine how households resolve conflicts over competing work and home demands. In addition, theorists such as Felstead and Jewson (2000) argue that persons who work at home 'must generate and maintain for themselves the temporal rhythms and spatial boundaries of their employment' through self-management, such as integrating work with home or having a separate home office. Opportunities exist to determine how household members decide whether to create workspaces within the home or reallocate existing household space, and whether they develop specific rules of use when space is shared between household and work activities. Finally, research is needed examining whether the design and location of workspaces in the home are affected by age, gender, marital status, or the presence of children.

Notes

1. The *Journal of Managerial Psychology* published a special issue on Polychronicity that was guest-edited by Allen C. Bluedorn. Eleven articles are included in Volume 14, numbers 3/4 and 5/6, published in 1999. The articles provide detailed conceptual background plus various illustrations of scale refinement.

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