INFORMATION TECHNOLOGY AND SOCIAL TIME DISPLACEMENT

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ABSTRACT

The Internet and other information technologies represent a significant departure from previous communication technologies by combining features of both interpersonal communication and mass communication. According to the "functional equivalence" argument that has been applied to the diffusion of earlier communication technologies, one should expect decreases in both types of communication activities as Internet use increases. An effective and comprehensive method for testing which activities are most affected by the Internet is through the 24-hour time-diary studies, in which all daily activity is recorded

When the time-diaries of Internet users and non users in a combined 1998-2001 national sample are compared, few consistent differences in the social lives of Internet users are found. This raises questions about whether the Internet acts more to enhance communication behaviors rather than to displace behavior – which seems to be the case for television as predicted by the functional equivalence hypothesis.

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Claims concerning the revolutionary nature of the Internet and other information technologies (IT) invite historical comparison to other technologies about which similar claims have been made. This analysis examines the ways in which new technologies, particularly IT, seem to have affected daily time in various social relations. It examines these results in the context of the "functional equivalence" hypothesis related to the influence of television, and in relation to recent evidence and arguments about the impoverished social life brought about by the Internet.

Earliest communication technologies, like simple conversation that evolved into more long-distance forms with the development of postal mail, illustrate the basic nature of one-to-one targeted communication. In the case of mail, people could initiate communication by composing a message and turning it over to a postal service, which delivered the message to whomever it was addressed. In return, the person who received the message could decide whether to read the message and if, when and how to respond. The commercial telegraph formed the basis of the United States' first, national system of long-distance communication, but this format is perhaps most clearly exemplified today by the telephone.

Not long after, however, mass "broadcast" forms of communication began to emerge, with a centralized capacity to originate communications. The communication itself is mass because the technology to receive that communication is so widely dispersed. Such highly centralized, broadcast communication began with the cinema and later the radio, but is perhaps most prominent today in the form of television.

Figure 1 shows these two contrasting formats in its two off-diagonal cells, in the chronological order of their initial diffusion. The two-way, personal format appears in the upper right cell of Figure 1, and the contrasting one-way, mass formats in the lower left cell.

Figure 1, then, shows that one-way communications have been primarily the province of "broadcast" media. Radio, television, newspapers and the like are broadcast to those people or groups of people who choose to receive them. In contrast, two-way communications are based on interactions between senders and receivers and are typically person-to-person. So, people conversed by telephone or corresponded by mail. (The few one-way personal forms of communication in the upper left-hand corner of Figure 1 include soliloquies and monologues; the comparatively small number of two-way broadcast forms are dominated by open radio modalities such as citizen's band or ham radio).

If one uses this four-fold typology to think about the Internet, what does one see? The quadrant representing two-way discriminate communication is interesting simply upon inspection, precisely because it appears logical to locate some newer Internet-based forms of communication, such as email and instant messaging there. At the same time, however, it is not unreasonable to locate communication via the Internet in the two-way indiscriminate as well as one-way indiscriminate quadrants. One need only think of chat and Web

Figure 1. Pre-Internet Communication Media Typology

	One-Way	*Two-Way*
Discriminate	Soliloquy Pager	Conversation Mail Telegraph Telephone
Indiscriminate	Books Journals Newspapers Movies Radio Television	Ham Radio Citizens Band Radio

publishing, respectively. What stands out is the ability of the Internet to combine and meld the functions and features of both one- and two-way, discriminate and indiscriminate forms of communication. When one turns to the question of the impact of Internet use on daily activities and social relations in particular, then, one hypothesis becomes clear: Insofar as Internet usage becomes an end in itself, its capacity to displace alternative activities becomes more substantial.

THE FUNCTIONAL EQUIVALENCE ARGUMENT

As implied in Figure 1, IT has not arrived in a social vacuum, so it is instructive to see how the technologies that preceded it played a role in changing communication and other behavior patterns. The most prominent and accepted framework in which to describe and understand these impacts of earlier technologies is that of *functional equivalence.*

When television first appeared in the U.S., it was immediately clear that it was having major impacts on other mass media. Audiences abandoned their radio sets, movie theaters closed and magazines that featured the type of content now prevalent on television (such as the light fiction in *Collier;s* and the *Saturday Evening Post)* ceased publication. The general explanation that was offered for these effects was in terms of the *functional equivalence* of television content now performing these functions more efficiently for its audiences (Weiss 1969). Both Coffin (1954) and Bogart (1956) documented how times spent on the movies, radio and print fiction were displaced by television, with Coffin's study being based on a pre-post panel design that is ideal for measuring social change.

The focus on media, rather than social, activities was largely true of academic research into television's effects as well (Schramm, Lyle and Parker 1959).

This leads to the question, how similar is the Internet in its social effects to television? If it is like television, the perceived impact on time-use should be greater than if the Internet is more like, say, the telegraph. Regardless, the time of daily activities may be measured reasonably well and help us understand the relationship between new communication technologies and time-use.

When full time-diary data covering all daily activity became available in the 1965 Multinational Time-Budget Research Project, it was clear that television's apparent impact extended well beyond these directly functional equivalent activities. These first diary data were collected from more than 25,000 respondents in twelve countries where the diffusion of television ranged from 28 percent to 95 percent (Bulgaria and the United States, respectively).

As shown in Table 1 (reprinted from Robinson 1972), there were systematic differences in the daily activities of television owners vs. non-owners. These differences, replicated in almost each country, show major declines in the most functionally equivalent activities. Thus, radio listening was 60 percent lower, movie attendance 52 percent lower, book reading 41 percent lower and magazine reading 28 percent lower.

Of more direct sociological concern here, however, was the difference in the social lives of individuals and families after acquiring a television. It can be seen in Table 1 that the out-of-home socializing of television owners was lower by 33 percent and conversation in the home lower by 25 percent, with the combined 16+ minutes of lower social life in these two activities almost equaling the 19-minute decline in other mass media use. Offsetting this decrease was about a three minute increase in at-home visiting, presumably a function of friends and others watching television in their homes, but that was dwarfed by the above-noted declines in other social life (the seven minutes of viewing by non-owners appears a result of others in the household owning a set or respondent misreports of having a set.)

If the functional equivalence argument is applied, this suggests that television was performing some of the functions of social life. Of course, it is possible that this may have been due to people talking with others about what was on the screen, talking back directly to their television sets or engaging in other quasi-social behaviors. It is still common for people to leave their sets on simply for "the company" the set provides. Perhaps surprisingly, but notably, Table 1 shows other free-time activities were not as significantly different between television owners and non-owners. That provides further support for the functional equivalence argument—that those displaced are the ones to which the technology offers a functional equivalent.

Other declines are even more difficult to defend from the functional equivalence perspective, however, such as the declines in grooming, laundry and pet/garden care. To be sure there is less need to be personally clean, have clean clothes or tend to plants or pets when more time is spent with

Table 1: Differences in Activities of TV Owners vs. Non-Owners, 1965
(in minutes per day, international data)

	TV Owners	Non-Owners	Difference
Non-Free Time Activities			
1. Main Job	254.2	253.2	1.0
2. Second Job	3.7	4.1	-0.4
3. At Work Other	10.6	10.8	-0.2
4. Travel to Job	28.2	28.4	-0.2
Total work			0.2
5. Cooking	55.0	56.7	-1.7
6. Home Chores	57.9	58.1	-0.2
7. Laundry	27.9	32.9	-5.0*
8. Marketing	18.1	18.1	0.0
Total Housework			-6.9
9. Animal, Garden	11.5	17.6	-6.1*
10. Shopping	7.7	6.4	1.3
11. Other house	19.1	20.8	-1.7
Total Household Care			-6.5
14. Personal Care	55.0	59.5	-4.5*
15. Eating	84.7	84.6	0.1
16. Sleep	479.3	491.8	-12.5*
Total Personal Needs			-16.9
17. Personal Travel	18.4	19.0	-0.6
18. Leisure Travel	16.4	20.5	-4.1*
Total Non-Work Travel			-4.7
Free Time Actvities			
19. Study	15.7	18.1	-2.4
20. Religion	3.5	6.2	-2.7*
21. Organizations	5.3	3.6	1.7
Total Study and Participation			-3.4
22. Radio	5.2	13.2	-8.0*
23. TV (home)	86.5	7.3	79.2*
24. TV (away)	1.1	4.0	-2.9
25. Read Paper	15.2	15.3	-0.1
26. Read Magazine	3.9	5.4	-1.5*
27. Read Books	8.3	14.1	-5.8*
28. Movies	3.1	6.5	-3.4*
Total Mass Media			60.0
29. Social (home)	14.6	11.7	2.9
30. Social (away)	22.4	33.9	-11.5*
31. Conversation	14.5	19.5	-5.0*
32. Active Sports	2.4	2.6	-0.2
33. Outdoors	15.8	17.5	-1.7
34. Entertainment	3.9	3.9	0.0
35. Cultural Events	1.0	1.1	-0.1
36. Resting	23.8	24.8	-1.0
37. Other Leisure	16.7	21.9	-5.2*
Total leisure			-21.8
Total Minutes Per Day	1440.0	1440.0	0.0

entertaining television content, but the functional equivalences involved here are far from obvious. Why not tolerate a dirtier house, skip over meals or leave early or show up late for work? Yet, none of the latter activity shifts can be found in Table 1—which have been adjusted in each site for respondent gender, education, age, marital status, employment status and presence of children (so that the greater child care times, or their activity differences in Table 1 of television owners are not a simple function of television owners having more children).

The television differences in Table 1, nonetheless, are taken from single-time surveys, so that they can hardly be taken as causal evidence—although many are consistent with Coffin's (1954) panel results. The unanswered question remains whether these were pre-existing differences before television was acquired underlying the differences in the table. At the same time, the differences are consistent across countries with widely varying access to television—and widely differing broadcast philosophies about viewer choice of television programming.

At the same time as many of the activity differences in Table 1 do not fit under the functional equivalence umbrella, many of the changes predicted by it are found. One should not be surprised, then, to find the present data on the Internet to have uneven predictive power.

PREVIOUS STUDIES OF INTERNET IMPACT ON SOCIAL LIFE

Speculation in initial publications on the impact of the Internet have tended to focus on two of the areas where most change is found in Table 1, and where most change is anticipated from Figure 1. These concern social life and personal communication on the one hand, and existing mass communication on the other. Again, the content of communication in both types of channels can be seen to be equivalent, and more effectively or attractively conveyed by the Internet, so that there are many reasons to expect the same sorts of differences as found in Table 1. Specifically, one should find declines in usage of mass media among Internet users, but more of interest here, declines in visiting and socializing both at home in one's family and in the homes of others.

Two widely publicized studies of early Internet impact reported results consistent with that hypothesis. Both Kraut *et al.* (1998)—a study of 169 residents of the Pittsburgh, Pennsylvania area—and Nie and Erbring (2000; reprinted in this issue)—a national study with more than 4,000 respondents— suggest declines in social life. Both samples were unusual, consisting largely of households that were given the new technology as an enticement for participating in the study.

Kraut *et al.* (1998) followed a panel of respondents across a one to two year period and found significant Internet use for communication purposes. At the same time, greater use of the Internet was "….associated with declines in communication with family members, declines in social circles and increased loneliness and depression" (1998: 1). However, questions have been raised about

the representativeness of a sample that was given the technology before they accepted it wholly on their own.

Similarly, the same issue arises with the Nie-Erbring sample, along with other methodological concerns that have been raised about their study. Their survey questions required respondents to report retrospectively on the *changes* occurring in their life, rather than simpler questions on their basic behavior. It is recognized that it is quite difficult for survey respondents to act as objective psychologists in perceiving changes happening in their lives. (Robinson and Godbey 1999). Indeed, most Nie-Erbring respondents reported that they could see no change in their lives. It is likely that respondents who reported change would realize that if they reported more Internet use, they would have to find reductions in other activities to appear consistent with the survey questions.

Studies that have used a less ambitious set of questions and research design have produced the opposite result. The Pew Center for Public Opinion Research has been conducting national surveys related to IT since 1995, with periodic updates on certain questions on almost a monthly basis. Its most complete surveys were conducted in 1995 and 1998 with nearly 3,000 respondents in 1995 and nearly 4,000 respondents in 1998 (response rate information is unfortunately not provided for these surveys). One value of these data is that they ask intensive questions about media and social activity "yesterday", as well more generally.

The Pew studies have included two questions about social interaction to contrast with the Kraut *et al.* and Nie-Erbring results. Here, the results differ in that Internet and IT users are more likely to engage in social visiting or calling friends "yesterday", and that result is largely found in both the 1995 and 1998 Pew studies and holds after multivariate controls. Moreover in the 1998 study, Internet users were more likely to report higher trust in people and being part of networks of friends. Much the same was reported by Uslaner (2000) in his analysis of the relation between Internet use and social connections in the 1998 National Election Study.

These re-analyses of large national survey data, then, provide little support for Internet users being any less active in their being less social either in their behavior or their attitudes toward others. At the same time, these results are based on single time surveys that have limited capacity to identify causal processes or to monitor dynamic relations between IT use and other activity, as the two earlier studies did.

Moreover, they provide no clue about what other activities are being replaced by the Internet and IT. This time must be coming from some other activities that has not been covered in these studies. Perhaps the ideal data source then is one that covers all daily activity. The 1998-2001 time-diary study described below has such a feature, although it too is a single survey that does allow examination of the cross-time dynamics of activity displacement. These above results shape one's hypotheses and expectations, away from simple time displacement.

STUDY METHODOLOGY

The source of the time-use evidence in the present article is a comprehensive set of time-diary data on how people spend their time, as reported by a 1998-2001 national probability survey of 1775 respondents aged 18 to 64 in the form of 24-hour recall time diaries, the first half done in one 1998-99 survey and the second half done with a parallel but separate 2000-2001 diary sample. Comparisons of the two data sets showed remarkably similar results across the two years, which forms the basis for using the combined file in the analyses below.

In these 1998-2001 diary accounts, cross-sectional samples of the American public provide complete accounts of what they do on a particular day—and for the full twenty-four hours of that day. Respondents in these surveys take the analyst step-by-step through their day, by describing when they went to bed when the got up and started a new day, and all the things they did throughout the day until midnight of that day. In the 1998-2001 diary accounts, the analyst also learns about where these people spent their day, who they were with, and what other activities they were doing to accompany these activities. Because they represent complete accounts of daily activity, diary data collected from cross-section samples allow one to generate estimates of how much societal time is spent on the complete range of human behavior—from work to free time, from travel to time spent at home.

FEATURES OF THE TIME DIARY AND A SAMPLE DIARY

The measurement logic behind the time diary approach follows from that employed in the most extensive and well known of diary studies—the Multinational Time Budget Study of Szalai (1972). In that study, roughly 2,000 respondents aged 18-64 in employed households from each of twelve different countries kept a diary account of a single day. The same diary procedures and activity codes were employed in each country in 1965. Respondents were chosen in such a way that each day of the week was equivalently represented; in subsequent U.S. studies all seasons of the year were covered as well.

Figure 2 shows how the diary filled out by one (non-Internet) respondent in the study. It can be seen that this respondent was watching television at midnight as the new day began and that she went to pick up her daughter between 12:15 and 12:30 a.m. She then got ready for bed and got to sleep at 12:50. She then woke up to make breakfast and lunches for her son and husband from 4 to 4:30 a.m. She then got ready for work and left at 4:55 a.m., arriving at 5:00 a.m. She took a work break at 8:00 for fifteen minutes with a friend who worked nearby. She returned to work and took fifteen minutes to eat lunch and then continued to work until 1:30 p.m., at which time she drove home, arriving home at 1:35. Here, she visited with a neighbor in the back yard for twenty-five minutes, before doing a marathon three and one-half hour house

FIGURE 2: SAMPLE OF COMPLETED TIME DIARY:
FEMALE, COOK, AGE 40, MARRIED WITH 2 CHILDREN; FRIDAY—12/3/65 125

What did you do? Prim'Sec'Min'With' Loc	Time Began	Time Ended	Where?	With Whom?	Doing Anything Else?	Coded
Watch TV	12:00	12:15	Home	—	No	91'00'015'00'0
Went after daughter at work	12:15	12:30	Transit	Daughter	No	49'00'015'30'4
Got ready for bed	12:30	12:50	Home	—	No	40'00'020'00'0
Sleep	12:50	4:00	Home	—	No	45'00'190'00'0
Got up—made lunches for husband and son and also breakfast	4:00	4:43	Home	—	No	10'00'030'00'0
Got ready for work	4:30	4:55	Transit	—	No	40'00'025'00'0
Left for work (car)	4:55	5:00	Transit	—	No	09'00'005'00'4
Work	5:00	8:00	Restaurant	Employees	No	00'00'225'50'1
Coffee break	8:00	8:15	Restaurant	Friend	Talked	08'96'015'50'1
Work	8:15	12:00	Restaurant	Employees	No	01'00'225'50'1
Ate lunch	12:00	12:15	Restaurant	Employees	Talked	06'96'015'50'1
Work	12:15	1:30	Restaurant	Employees	No	00'00'075'50'1
Off Work—drove home	1:30	1:35	Transit	—	No	09'00'005'00'4
Visited with neighbor	1:35	2:00	Yard	Neighbor	Talked	75'96'025'70'2
Went after daughter at school	5:15	5:45	Transit	Daughter	No	12'90'195'00'0
Took shower	5:45	6:00	Home	—	No	40'00'015'00'0
Made supper	6:00	6:25	Home	—	No	10'00'015'12'0
Ate supper	7:15	8:00	Home	Family	Talked	11'96'030'20'0
Did dishes	8:00	8:30	Home	Daughter	Talked	11'96'030'20'0
Washed clothes	8:30	9:00	Home	—	No	14'00'030'00'0
Sat down and watched TV	9:00	10:15	Home	Family	No	91'00'075'12'0
Went after daughter at work	10:15	10:30	Transit	Daughter	No	29'00'015'30'4
Got ready for bed	10:30	10:45	Home	—	No	40'00'015'00'0
Went to bed; sleep	10:45	12:00	Home	—	No	45'00'075'00'0

clean. She then went out to pick up her daughter from school, returning home to serve and eat supper until 8:00 p.m. and spent the next hour washing dishes and doing laundry. She watched television for seventy-five minutes and then went out to pick up her daughter from work. Returning at 10:30 p.m. she got ready for bed and was asleep by 10:45 p.m.

It can be seen that the task of keeping the diary may have some recall difficulties, but is fundamentally different from the task of making time estimates. The diary keeper's task is to recall all of the day's activities in sequence. This may be similar to the way the day was structured chronologically for the respondent and to the way most people store their activities in memory. Rather than having to consider a long time period, the respondent need only focus attention on a single day (yesterday). Rather than working from some list of activities whose meanings vary from respondent to respondent, the diary keepers simply describe their day's activities in their own words.

The diary procedure thus avoids most of the pitfalls of the alternative "time estimate" approach. (Robinson and Godbey 1999) There are still problems of memory, as when respondents have trouble piecing together a particular period of the day, but few diary accounts are beset by such structural reporting problems once underway.

The diary technique also presents respondents with a task that gives them minimal opportunity to distort activities in order to present themselves in a particular light. They are given no clue about a study interest in one activity or another, because the diary is intended as a simple record of any and all activities. Some respondents may wish to portray themselves as hard workers or light television viewers, but in order to do so they must fabricate the activities that precede and follow it. Further, it is only a one-day account, and on any given day respondents probably realize that they may work less or watch television more that usual. Moreover, respondents are not pressured to report an activity if they cannot recall it do not wish to repeat it.

Automatic procedures were built into the diary recording procedures that are now conducted by Computer Assisted Telephone Interviewing (CATI) to ensure accurate reporting. Whenever respondents report consecutive activities that involve different locations, they are reminded that there needs to be some travel episode to connect them. Activity periods that last more than two hours automatically involve the probe "Were you doing anything else during that time, or were you (activity) for the entire time?" And as is apparent in Figure 2, all periods across the day must be accounted for in order that the diary account total to 1,440 minutes (or twenty-four hours).

As in earlier diary surveys, these largely open-ended diary reports are then coded using the basic activity coding scheme developed for the 1965 Multi-National Time Budget Research Project (as described in Szalai 1972). As shown in outline form in Table 2, the Szalai code first divides activities into non-free time activities (codes 00-55) and free time activities (codes 56-99); non-free activities are further subdivided into paid work, family care and personal care,

TABLE 2: BASIC 2-DIGIT ACTIVITY CODE

00-59 Nonfree Time		
00-09 Paid Work	**40-49 Personal Needs and Care**	**70-79 Entertainment/social**
00 (Not Used)	40 Washing, hygiene, etc.	70 Sports events
01 Main job	41 Medical care	71 Entertainment
02 Unemployment	42 Help and care	72 Movies
03 Work travel	43 Eating	73 Theater
04 (Not used)	44 Personal care	74 Museums
05 Second job	45 Night sleep	75 Visiting
06 (Not used)	46 (Not used)	76 Parties
07 (Not used)	47 Dressing	77 Bars/lounges
08 Breaks	48 NA activities	78 Other social
09 Travel to/from work	49 Travel/personal care	79 Travel/social
10-19 Household Work	**50-59 Educational**	**80-89 Recreation**
10 Food preparation	50 Attend classes	80 Active sports
11 Meal cleanup	51 Other classes	81 Outdoor
12 Cleaning house	52 (Not used)	82 Exercise
13 Outdoor cleaning	53 (Not used)	83 Hobbies
14 Clothes care	54 Homework	84 Domestic crafts
15 Car repair	59 Travel/education	85 Art
16 Other repair		86 Music/drama/dance
17 Plant/garden care		87 Games
18 Pet care		88 Computer use games
19 Other household		89 Travel/recreation
	55-99 Free Time	
20-29 Child Care	**55-58 IT/Library**	**90-99 Communications**
20 Baby care	55 Using library	90 Radio
21 Child care	56 Using the Internet	91 Television
22 Helping/teaching	57 Playing games on a PC	92 Records/tapes
23 Talking/reading	58 Other PC use	93 Read Books
24 Indoor playing		94 Magazines/etc.
25 Outdoor playing		95 Reading newspaper
26 Medical care-child		96 Conversations
27 Other child care		97 Writing
28 Dry clean		98 Think/relax
29 Travel/child care		99 Travel/communication
30-39 Obtaining Goods/Services	**60-69 Organizational**	
30 Everyday shopping	60 Professional/union	
31 Durable/house shop	61 Special interest	
32 Personal services	62 Political/civic	
33 Medical appointments	63 Volunteer helping	
34 Govt./financial services	64 Religious groups	
35 Repair services	65 Religious practice	
36 Other services	66 Fraternal	
37 Other shopping	67 Child/youth/family	
38 Errands	68 Other organizations	
39 Travel/goods, services	69 Travel/organizational	

and free time activities are further subdivided under the five general headings of adult education, organizational activity, social life, recreation and communication.

Activity categories 56 (Internet use), 57 (computer games) and 58 (other computer use) were coded in minutes per day, and then converted into hours per week after ensuring that all days of the week were equally represented. In other words, the sampling units involved are in terms of person-days rather than persons, since the latter were only interviewed about a single day's activities. The data are weighted by demographic variables to match 1998-2000 U.S. Census Bureau characteristics (e.g. gender, age, education, income and employment status).

Multivariate controls for demographic differences were introduced by using Multiple Classification Analysis or MCA (Andrews, Sonquist, and Morgan 1973). In short, MCA provides differences in categorical predictor variables that make the statistical effects of other predictors equal.

Internet use, the major independent measure, was operationalized in two different ways to capture both single-day and longer-term use. The *single-day* measure was developed from the time-diary, defined by whether respondents explicitly mentioned Internet or IT usage as either a primary or secondary activity in the diary. The *longer-term* general Internet use measure was developed from responses to a questionnaire item asking how many hours a week they used the Internet. While 1251 respondents did not report using the Internet in their diary, some 254 reported such usage "yesterday" in the diary and these are the comparison groups in Table 3; in contrast, 889 of these respondents said they had used the Internet in a typical week and 866 said they had not in Table 4.

RESULTS

Comparison of the daily diary activities of Internet users, vs. nonusers on that same day, is shown in Table 3 for the "yesterday" diary users and in Table 4 for general, longer-term Internet users. Data are shown in extrapolated weekly hours that add to 168 hours per week in order to aid in interpretation. Statistically significant bivariate differences ($p < 0.05$) were then subjected to MCA adjustment for the demographic control measures and the results shown in the final columns. For these analyses, initial attention is given to the most socially relevant activities in the diaries—mainly found in the right half of the table dealing with free-time activities.

Turning first to "yesterday" comparisons for free time activities in Table 3, it can be seen that Internet users do report socializing and visiting with people outside the home for an estimated 1.4 hours less than nonusers on an average week. Their conversation inside the home (with family), however, is almost an hour higher on average, and that difference is statistically significant and can be seen to offset that visiting deficit. After MCA adjustment, neither

TABLE 3: DIFFERENCES BETWEEN IT USERS AND NONUSERS ON A "YESTERDAY" BASIS (YEAR 1998-2001 TIME-DIARY DATA: IN EXTRAPOLATED HOURS PER WEEK)

Non-Free Time Activities	Non-IT (n=1521)	IT (n=254)	IT Difference	Free Time Activities	Non-IT (n=1521)	IT (n=254)	IT Difference
Work/Education	37.3	35.0	-2.3	**Social**: Religion	1.0	1.0	0.0
				Organizations	0.9	.9	0.0
Family Care	21.1	21.6	+0.5	Social Events	1.1	.9	-0.2
				Social/Visit	4.4	3.0	-1.4
Personal Care	75.5	68.7	-6.3	Conversation/Home	1.9	2.7	+0.8*
	----------	---------	------------	Telephone	4.0	4.0	0.0
Total Non-Free Time	133.9	125.3	-8.6				
				Mass Media	16.0	12.1	-3.9
Travel (incl. above)	11.3	10.2	-1.1	Other (fitness/hobby)	4.8	3.8	-1.0
				Computer	0.0	14.3	+14.3*
				Total Free Time	34.1	42.7	+8.6
				Total Time (hrs)	168.0	168.0	0.0

* Difference significant at <.05 level

TABLE 4: ACTIVITY DIFFERENCES BETWEEN INTERNET USERS AND NONUSERS: GENERAL BASIS (YEAR 1998-2001 TIME-DIARY DATA: IN EXTRAPOLATED HOURS PER WEEK)

Non-Free Time Activities	Internet Nonuser (n=866)	Internet User (n=888)	Internet Difference	Free Time Activities	Internet Nonuser (n=866)	Internet User (n=888)	Internet Difference
Work/Education	39.3	35.2	-4.1	**Social**: Religion	1.1	.8	-.3
				Organizations	1.0	.9	-.1
Family Care	19.5	22.5	+3.0	Social Events	.9	1.3	+.4
				Social/Visit	4.1	4.4	+.3
Personal Care	72.5	75.8	+3.3	Conversation/Home	1.7	2.2	+.5
	-----------	---------	------------	Telephone	3.0	3.0	0.0
Total Non-Free Time	131.3	133.5	+2.2				
				Mass Media	17.1	13.9	-2.2
Travel	10.5	11.9	+1.4*	Other (fitness/hobby)	2.1	.9	-1.2
				Computer	0.5	3.2	+2.7*
				Total Free Time	36.7	34.5	-2.2
				Total Time (hrs/wk)	168.0	168.0	0.0

* Difference significant at <.05 level

difference is statistically significant and thus does not support the impoverished social life/functional equivalence argument.

What differences are found? Are there activities to which Internet users

devote less time—given their average 14.3 weekly extrapolated hours they spend on the Internet? Once the 14.3 hours of greater IT use and roughly four less hours of mass media use are taken into account, the social activities engaged in are about the same for Internet users and nonusers. The main differences come from non-free time activities, like personal care and work (activities that will be examined in more detail in the next issue of *IT&Society*). Indeed, there are hardly any differences in specific social activities like religion, organizations, or attending social events—and certainly none that are statistically significant.

There are similar patterns found in the comparison of general Internet users and nonusers in Table 4. Again few of these comparisons are statistically significant. In terms of social life, both in-home and away socializing are slightly *higher* for Internet users, but by less than only an hour a week for the two forms of socializing combined. Differences in religious, organizational and social events are again insignificant—although Internet users did spend more time attending social events. Unlike Table 3, the free time hours of users and nonusers are very similar.

In terms of non-free activities, the work hour differences are again not statistically significant, and Internet users again report slightly more housework/family care, and more rather than less personal care (as in Table 3).

As before, the housework hour differences are not statistically significant after MCA adjustment, nor is the three-hour more personal care statistically significant after MCA control.

In terms of overall mobility, Internet users (long-term) also travel significantly more, but not after MCA adjustment. Moreover, they travel less when examined on a daily basis in Table 3.

SECONDARY ACTIVITIES, SOCIAL COMPANY AND SOCIAL LOCATION

As noted about Figure 2, the diary method also records "secondary" activities that are done to the accompaniment of primary activities, such as watching television or talking while eating a meal. Table 5 shows the two main secondary social activities reported in the diaries (conversation and child care), along with the total minutes of other secondary activity (i.e., mainly mass media like radio and TV).

It can be seen that by far the most common reported secondary activity is conversation—more than five hours per day on average. Importantly in the right side of Table 5, Internet users on a general basis reported significantly more diary conversation than nonusers, a difference that was larger after MCA adjustment. On the other hand, IT users on a daily basis reported slightly less conversation in their diaries—as shown in the left-hand side of Table 5. Nor was there any significant difference for secondary activity childcare, another aspect of sociability.

TABLE 5: IT USER VS. NONUSER DIFFERENCES IN SECONDARY ACTIVITIES, SOCIAL COMPANY AND SOCIAL LOCATION

	Yesterday Use			General Internet Use		
	Non-IT Users (n=1521)	IT Users (n=254)	Difference	Non-IT Users (n=866)	IT Users (n=888)	Difference
I. Secondary Activities						
Conversation	35.5	34.9	+0.4	34.0	37.8	+3.8
Child Care	2.2	2.7	+0.5	2.5	2.1	-0.4
Other	23.5	24.5	+1.0	22.0	25.8	+3.8
II. Social Company						
Time alone (awake)	36.3	43.9	+7.6*	39.8	34.3	-5.5*
Spouse	11.3	10.5	-0.8	11.1	11.5	+0.4
Children	9.6	9.9	+0.3	9.7	9.2	-0.6
Spouse and Children	5.7	5.7	0.0	5.2	6.2	+1.0
Coworkers	23.9	19.8	-4.1*	22.4	25.0	+2.6
Friends	9.4	8.7	-0.7	7.7	11.2	+3.5*
Relatives	8.0	9.0	+1.0	9.4	6.8	-2.6
Others	3.6	9.0	+0.4	2.8	4.5	+1.7*
III. Social Location						
At Home	110.8	106.3	-4.5*	109.4	104.1	-5.3*
Others' Home	5.2	5.9	+0.7	5.6	6.3	+0.7
Outdoors	1.5	4.1	+2.6	9.7	3.1	-1.6
Office/Factory	17.2	17.7	+0.5	15.9	19.8	+3.9
Grocery Store	1.8	1.0	-0.8	1.1	1.2	+0.1
Mall/Store	4.3	3.6	-0.7	3.5	4.4	+1.0
School	3.6	3.2	-0.4	2.7	3.7	+1.0
Restaurant/Bar Other	0.9	0.8	-0.1	9.4	8.9	-0.5
Car	11.5	11.4	-0.1	10.7	12.0	+1.3
Other vehicle	0.9	0.9	0.0	0.9	1.2	+0.3
*Significant at the p<.05 level						

Social Company: The next set of entries in Table 5 shows time spent with different social partners. The first entry is for time spent alone *while awake* (and thus excludes time spent sleeping). Internet users spend seventy minutes per day (7.6 hours per week) more time alone than nonusers on average based on the *diary day* usage data (which is statistically significant before and after MCA adjustment). However, they spent less than five hours *less* time alone on the long-term basis reflected on the right side of Table 5.

Time spent with immediate family members (like the respondent's spouse and children) is not significantly different before or after MCA controls for such factors as marital status and presence of children. Time spent with co-

workers and with friends tends to be higher for Internet users in general, but not significantly so after MCA adjustment. The same is true for time spent with others. In contrast, time with relatives is lower on a *long-term* usage basis, but it is higher in the single diary-day analysis.

In general, then, despite their 7.6 more extrapolated hours alone in the diaries, Internet users spend significantly fewer hours alone when the comparison is made among long-term general nonusers. Moreover, there are no statistically significant "social contact" differences between Internet users and nonusers after MCA adjustment. It does not appear, then, that Internet users have impoverished social contacts relative to people who do not use the Internet on days that they report using the Internet—and they report less time alone in the long run analysis.

The last rows in Table 5 describe the average total time that the respondents spent at home, in others' homes and in other social locations. Surprisingly given that the Internet use they report is predominately at home, Internet users spend less time at their own home and more time in others' homes—both on the diary day and in general. Only the own home differences are significant after MCA adjustment. Moreover, none of the other social location differences in Table 5 is consistent nor significant.

SUMMARY AND CONCLUSIONS

In this analysis of recent differences between the daily diary activities of IT users and nonusers, little clear evidence of a pattern consistent with declining social life to parallel the 1965 comparisons between television owners and non-owners. The more active lifestyles of IT users are further suggested by their higher reporting of all secondary activities, and by their higher reports of social contacts with friends and co-workers. At the same time they reported somewhat—but not significantly more—time alone, and less time with their children.

In terms of the historical and theoretical issues raised at the outset of this article, then, IT in its initial stages seems to depart from the massive displacement effects found with television and perhaps earlier media. Internet use seems more a "time enhancer," one in which people do not seem forced to give up other activities to accommodate it. Indeed, it may function like home appliances and the telephone allowing one to be more productive in use of time – such as enriching old social networks with new or newly resurrected social contacts. Such differences, of course, could easily change as people accommodate to these new technologies.

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