Sociability, Interpersonal Relations, and the Internet

Reconciling Conflicting Findings

NORMAN H. NIE
Stanford University

During the course of the past year, at least four different academic surveys have been conducted, each focusing to some extent on the impact of Internet use on the quantity and quality of interpersonal communication and sociability. Remarkably, these studies arrive at starkly different conclusions regarding the social repercussions of Internet use. At the heart of this debate is whether Internet use can be a potentially isolating activity or one that leads to substantially greater communication among people and thus enhances human connectivity and sociability. Based on an analysis of these studies' key findings and methodological approaches, this article attempts to understand the role of the Internet in shaping our interpersonal relations. The key findings suggest that Internet users do not become more sociable; rather, they already display a higher degree of social connectivity and participation, due to the fact that they are better educated, better off financially, and less likely to be among the elderly. And simply because of the inelasticity of time, Internet use may actually reduce interpersonal interaction and communication.

During the course of the past 9 months, at least four different academic surveys have been conducted, each focusing to some extent on the impact of Internet use on the quantity and quality of interpersonal communication and sociability. With the exception of the area of sociability, the data from all four surveys tell the same basic story. All studies show that the percentage of households connected to the Internet falls in the mid- to high 40s. All demonstrate similar patterns of Internet use. Sending and receiving e-mail is ubiquitous; searches for products, news, weather, stock quotes, and entertainment are frequent. Internet use is not evenly distributed according to product or service, however. Certain types of purchases, such as music and books, are quite common. Larger purchases might be researched on the Internet but are actually purchased in a brick

Author's Note: *I would like to express my appreciation to my colleague and coprincipal investigator, Lutz Erbring, for his substantial contributions to this article. I would also like to thank my outstanding team of graduate assistants who aided me at every stage in the preparation of this article: Sunshine Hillygus, Jennifer Lawless, Katya Seryakova, and Shawn Treier. Few institutions have such a group of able and dedicated graduate researchers.*

AMERICAN BEHAVIORAL SCIENTIST, Vol. 45 No. 3, November 2001 420-435

and mortar setting. A much smaller percentage of Internet users trade stocks, bank, or engage in other financial transactions online. And all studies find the existence of a digital divide with differences in Internet access across levels of education, wealth, and generation.

Remarkably, however, these studies arrive at starkly different conclusions regarding the social repercussions of Internet use. At the heart of this debate is whether Internet use can be a potentially isolating activity or one that leads to substantially greater communication among people and thus enhances human connectivity and sociability. As coauthor of the first of these survey investigations, Stanford's "Internet and Society" (and apparently something of a target for subsequent studies), I shall try to reconcile these different research findings to bring some understanding to the role of the Internet in shaping our interpersonal relations.

Foremost, I would like to suggest that if the data from these four studies are approached with the same questions and analyses, it seems quite likely that all might produce comparable conclusions. Unfortunately, the data from these studies have not yet made it into the public domain, so much of what follows is necessarily hypothesis and conjecture. I cannot emphasize enough the necessity of using parallel measures and replicating systematic multivariate analyses on each of the data sets. Such a data confrontation would move the debate from competing press releases to a scholarly exchange that would actually advance our understanding of the ways in which the Internet affects human interaction. In the meantime, the following analysis must suffice.

In February 2000, the Stanford Institute for the Quantitative Study of Society (SIQSS) released findings from the first comprehensive study examining the social consequences of the Internet on Americans' daily lives (Nie & Erbring, 2000).[1] For the purposes of the study, an Internet user was defined as a respondent with Internet access, either inside the home, at work, at school, or at another location. This nationally representative study revealed that as Internet use grows, Americans report spending more time working for their employers at home (without cutting back on hours in the office) and less time shopping in stores, watching television, and spending time with friends and family. It was this last finding concerning the quantity and quality of interpersonal communications and sociability that has become the focus of further scholarly attention and controversy. PEW, UCLA, and National Public Radio, Kaiser Family Foundation and Kennedy School of Government (NKK) have each conducted analyses of nationally representative data as well and entered the debate about the implications of increased Internet use (see Table 1).

First, it should be emphasized that each of these studies uncovered the extraordinary communication capacity of e-mail. Internet users, defined in each of the studies as those with Internet access at home or elsewhere, clearly view the Internet (generally) and e-mail (in particular) as significant enhancements to their lives. The Internet today has been greeted with much the same enthusiasm

TABLE 1: Academic Surveys of Internet Use

Study Name	*Author*	*Report Date*	*Sample Size (*N*)*
Internet and Society (IAS)	Stanford Institute for the Quantitative Study of Society (SIQSS)	February 2000	4,113
How Computers and the Internet Have Changed Your Life	National Public Radio, Kaiser Family Foundation and Kennedy School of Government (NKK)	February 2000	1,506
The Internet Life Report	The Pew Internet and American Life Project	May 2000	3,533
Surveying the Digital Future (SDF)	UCLA Center for Communication Policy	October 2000	2,096

as telephones, radio, and television were following their introductions into American society.

The premiere area of disagreement that separates SIQSS's Internet and Society (IAS) study from those of the PEW study and UCLA's Surveying the Digital Future (SDF) study involves whether Internet use leads to fewer interpersonal interactions. Whereas SIQSS, as well as NKK, uncover an inverse relationship between Internet use and sociability, the PEW and SDF studies challenge these results. I suggest that the findings from all of the studies might be reconciled if we take into account the limitations of PEW's and SDF's data analysis.

IT'S A QUESTION OF TIME

In designing the IAS study, the authors reached back into the literature on television viewing, particularly the classic study by Gary Steiner (1963), who found that television viewers felt that "television replaces other . . . family activities" (p. 230). In other words, television watching occurs, to some extent, at the expense of socializing; the more time spent watching television, the less time spent with family, friends, and neighbors. Later studies extended this finding to the areas of organizational activity and political participation (e.g., Nie & Sackman, 1970). In fact, this relationship is now widely recognized and largely uncontested. The term *couch potato* has become part of our daily vernacular, with the implication that long hours spent viewing television are a tradeoff for other activities, especially interpersonal and social ones (Putnam, 1995; Robinson & Godbey, 1997).

The IAS analysis approached the topic of Internet use in much the same way as Steiner analyzed television watching. Quite simply, there are constraints on an individual's time, and this is key to understanding the impact of Internet usage on interpersonal communications and sociability. The IAS study found

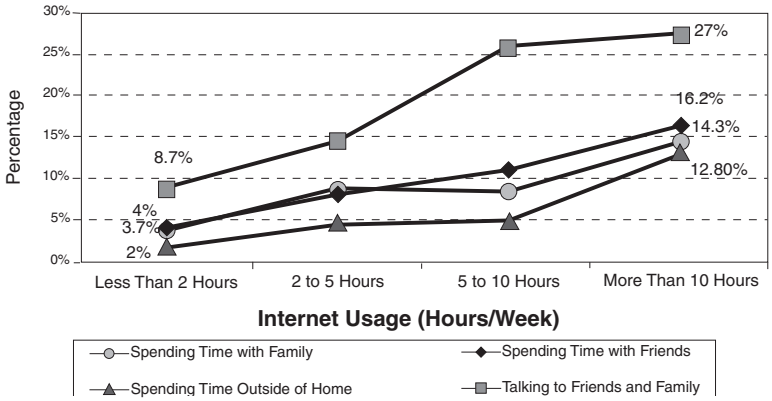

Figure 1: Social Isolation Increases
SOURCE: Nie and Erbring (2000).

strong parallels to what Steiner and others have found about the tradeoff between hours of television viewing and other activities, including time available for family, friends, and social outings. Even the positive role of e-mail for communicating and staying in touch with distant friends and family—admittedly somewhat underinvestigated by the IAS—can in no way diminish the decline noted in other forms of social interaction.

SIQSS was not alone in finding that time spent on the Internet is, in part, replacing time previously spent with family and friends. The NKK (2000) study found "that 58% of all adult Americans reported that computers led people to spend less time with friends and family . . . furthermore the study found that slightly fewer than half of Americans, 46%, say that computers have given people less free time," whereas only 24% believe the contrary.

Figure 1 illustrates the IAS central finding concerning the impact of the hours of Internet use per week on four aspects of sociability. The design of the questionnaire was such that the more than 2,000 respondents with reported Internet access were asked to estimate the amount of time spent on the Internet in an average week. In a separate part of the questionnaire, these respondents were asked a series of questions about whether, since becoming Internet users, they were spending more or less time with family, with friends, socially outside of their home, and talking to friends and family members on the telephone. The IAS study found that for each of these measures of sociability, as the number of hours of Internet use increases, so does the percentage of respondents reporting declining social activities. Among those using the Internet more than 10 hours per week, 27.0% report talking to their friends less on the phone, 16.2% report spending less time with their friends, 14.3% report spending less time with their family, and 12.8% report spending less time at events outside the home.

The amount of Internet use among Americans continues to increase. Just 8 months after the IAS fieldwork, the SDF found that the average hours of

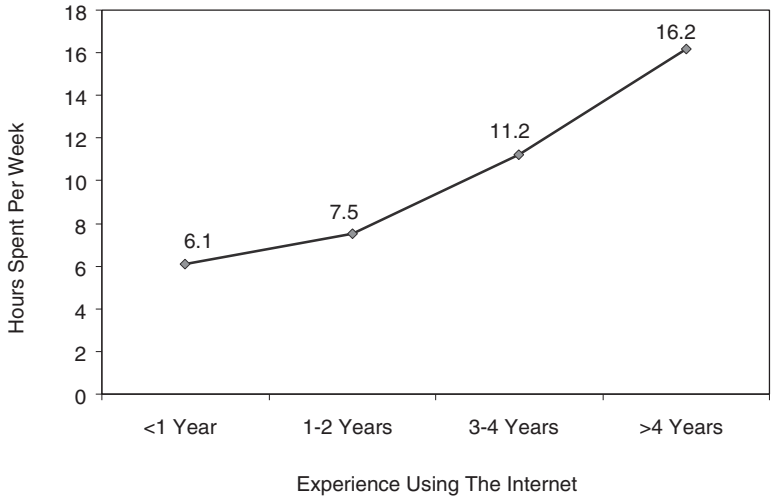

Figure 2: Internet Experience and Use
SOURCE: UCLA Internet Report (2000).

Internet use had increased to almost 10 hours per week. Like the IAS study, the SDF study also found that the longer an individual has been an Internet user, the more time he or she spends on the Internet. According to SDF, those respondents who have been Internet users for 3 years spend an average 11 hours per week on the Internet, whereas those connected for 4 or more years average 16 hours of use—an amount equivalent to viewing television 3 hours per night, 5 nights per week (see Figure 2). The sheer growth in hours spent on the Internet justifies careful scrutiny of the changing nature of discretionary time in American society.

Given that the latest of the Internet studies (SDF) reports that the average number of hours of Internet use has increased to almost 10 hours per week, the IAS findings are all that more telling. As much as we might wish it were not so, time may be reallocated or redistributed, but it cannot be expanded. For many of our daily activities—work, child rearing, and the common life chores—time is relatively immutable. The time required for these activities is largely fixed and cannot be expanded, contracted, or easily reshaped. The remainder of daily time, the discretionary time, is more liquid; one activity can be traded for another, and individual choices can—and must—be made in shaping how that time is spent.

As can be seen in Figure 2 (from the SDF study), average use among those who have been connected to the Internet for 3 or more years ranges from 11 to 16 hours per week. Even those who have been connected to the Internet for less than 1 year claim to be on the Web for more than 6 hours per week. Where these hours come from is the critical question for assessing the impact of the Internet on sociability. Several studies, including the IAS study, have found that hours spent working have only increased since the advent of the Internet (George, 1997;

Nie & Erbring, 2000; Schor, 1991). Some of this time comes from television viewing (and sleeping, which, unfortunately, we failed to included in our study); several studies, including ours, have found that respondents report watching less television since beginning Internet use. Yet the overall number of hours of television viewing has not changed in more than a decade, and the 2000 General Social Survey (GSS) shows no change in hours of television viewing since the 1998 GSS, whereas Internet usage during this same period has skyrocketed (National Opinion Research Center, 1996-2000). And some studies conclude that the time comes from time that used to be spent interacting with friends and family and socializing outside the home (Nie & Erbring, 2000; PEW Internet and American Life Project, 2000).

By contrast, the PEW study and SDF study purport opposite findings. According to the authors of the PEW study, "This survey provides clear evidence that e-mail and the Web have enhanced users' relationships with their family and friends—results that challenge the notion that the Internet contributes to isolation" (PEW Internet and American Life Project, 2000, p. 20). Targeting the IAS results quite clearly, the SDF study concluded, "Concerns that the Internet reduces household time together appear nearly groundless." (Nie & Erbring, 2000, pp. 7, 30).

Figure 3 presents the primary evidence from the SDF study that lead to their conclusion that the Internet poses no threat to sociability with family or friends or to engagement in other social activities. Closer scrutiny of the data in the figure, however, indicates that these conclusions should be viewed cautiously at best.

Unfortunately, although SDF respondents were asked how many hours a week they spend on the Internet, participation in the five activities is compared only for the dichotomy of Internet versus nonusers. Recall that the key IAS studies found that more time spent on the Internet meant less time spent socializing. The amount of time spent on the Internet is the key. An individual who spends 1 hour on the Internet simply should not be grouped with someone who spends 15 hours on the Internet. We would clearly expect the effect of the Internet on sociability to be different for these two individuals. Although the SDF study has an excellent measure of weekly time spent on the Internet (see Figure 2), it fails to provide the appropriate analysis that would directly confront the IAS findings. There is no attempt here to replicate the IAS findings, even though the data are clearly capable of such analysis.

Figure 3 indicates an almost 4 hour per week difference between Internet users and nonusers in the amount of time spent socializing with other household members (27 compared to 31 hours per week). We have to wonder: How many fewer hours do those spending 10 or 15 more hours per week on the Internet spend with their families? Given the IAS findings, we would expect that all those spending more than the average of 10 hours a week on the Internet would report substantially fewer hours socializing with family members, friends, and neighbors. It is simply a matter of time.

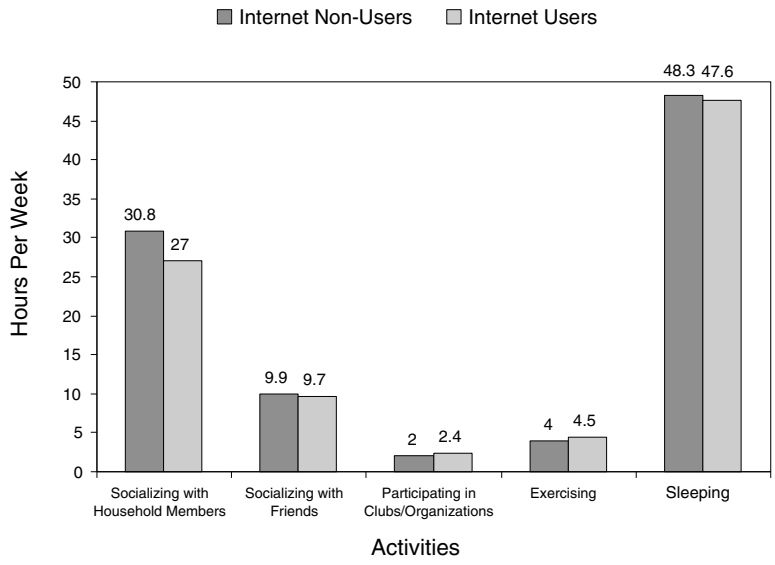

Figure 3: Internet Use and Social Activity
SOURCE: UCLA Internet Report (2000).

We would further expect similar patterns to reveal themselves for the other three social activities in Figure 3. The SDF study (and the others for that matter) finds that hours of use increase with years of use, and this adds further credence to our concern. Finally, as the content, speed, and attractiveness of multimedia presentation improve with bandwidth, both the number of users and the amount of use are expected to increase. Yet the constraints on time remain. Hours on the Web come at the expense of other activities, especially face-to-face interactions with others.

SPURIOUS CORRELATION AND THE DIRECTION OF CAUSATION

Rainie and Kohut, authors of the PEW study, are even more adamant in their opposition to the IAS findings that large amounts of Internet use may lead to fewer interpersonal interactions and more social isolation. They strongly believe the reverse—that Internet use creates a social community—because Internet users report more social resources and connections than nonusers and because of the astounding and unique qualities of e-mail communications in interacting with friends and family. The topic of e-mail will be visited later; first, we concentrate on the greater social connectedness of Internet users versus nonusers. The data from the PEW study are presented in Table 2.

TABLE 2: The Social Connection of Internet Users and Nonusers

	Nonusers	*New Internet Users (less than 6 months)*	*Experienced Users (3 or more years)*
Percentage who have many people to turn to when they need help	38	43	51
Percentage who visited with someone yesterday	61	71	70
Percentage who called someone just to talk	58	61	62

SOURCE: PEW Internet and American Life Project (2000, p. 21).

The PEW authors interpret these data as a direct challenge to the findings of the IAS study. Note, however, that even new Internet users are less socially isolated than nonusers, and those who have been online for 3 years become even more interpersonally engaged and gain even more social supports than new users. The conceptual issues here, and to a parallel degree for Figure 3 from the SDF study, raise serious issues of spurious correlation and misdirected inference due to the spurious attribution, and/or a reversal of the true direction, of causation.

First, the Internet is spreading in adoption from the top of society down according to levels of education, wealth, and other socioeconomic status (SES) characteristics. All four studies show a strong relationship between education, income, and Internet access. Moreover, these relationships are of substantial magnitude. SDF reports that only 31% of those without a high school degree and just a bare majority (53%) of high school graduates use the Internet, whereas 86% of college graduates are Internet users. Family income shows an equally strong relationship, with only 40% Internet users among those earning $15,000 or less, but 88% for those in families earning more than $100,000. In his 2000 State of the Union address, former President Clinton even named this phenomenon the *digital divide*.

These disparities could be expected to be just as great for length of Internet use—the early Internet adopters (those using the Internet for 3 years or more) are surely more elite in terms of education and income. To be sure, as a greater percentage of American adults become connected to the Internet, these education and wealth disparities in Internet use will continue to decline.

The Internet is not only diffusing from top to bottom of the education and wealth hierarchy; it is also spreading, as so many social innovations do, from the young to the old. The SDF study reports that approximately 90% of 16- to 18-year-olds are Internet users, whereas only 25% to 30% of those older than 66 years claim to use the Internet.

These dissemination paths have much to do with the explanation of the patterns found in Table 1. There is a considerable body of literature that has studied the relationship between education/wealth and sociability or social

connectivity. The literature usually uses terms like *social network*, *social relationship*, *social support*, *social ties*, and *social activity* to refer to essentially the same phenomenon—the existence, number, and frequency of social relationships (House, Umberson, & Landis, 1988). Surveys of national and regional populations by Veroff, Douvan, and Kulka (1981) and Fisher (1982) find that respondents with higher levels of education and income generally have larger and denser social networks, more organizational involvements, and more frequent contact with network members. The literature on political participation and engagement is virtually built on disparities in amount of activity based on differences in education and SES (Nie, Junn, & Stehlik-Berry, 1996; Verba & Nie, 1971; Verba, Schlozman, & Brady, 1995). These studies are consistent with others that find lower levels of organizational involvement among individuals of lower SES (Moody & Gray, 1972; Dohrenwend & Dohrenwend, 1970). Limited data also suggest that these individuals may also experience a lower quality, as well as quantity, of social relationships (Belle, 1982; Dohrenwend & Dohrenwend, 1970).

The findings on the elderly are parallel. The literature indicates that people older than 65 years are less likely than those in younger age groups to have rich and dense friendship and family networks or to display high levels of active social participation. In addition, of course, older people in general tend to be more hesitant in adopting or coping with novel technologies. Accordingly, all four Internet studies have found that this age group is massively underrepresented among Internet users.

Thus, because Internet use and social connectivity vary with education, income, and age, the relationship observed by PEW is almost certain to be spurious. In other words, Internet users compared to nonusers report greater sociability and interconnectivity primarily because they are more educated, wealthier, and younger—not because they are Internet users. Indeed, as noted above, Internet users are shown in the PEW study to be more socially connected even when they are new to the Internet. Moreover, Internet users who have been connected 3 or more years are the most likely to have many people to turn to, visited someone yesterday, or called someone just to talk because they became users at a time when Internet connectivity was even more education-, income-, and age-biased.[2] Again, as a greater proportion of the American population becomes connected to the Internet (thus rendering Internet use less biased in terms of education, income, and age), the PEW findings may be expected to disappear.

Another possibility, and one not fleshed out by any of the studies, is that individuals who are more outgoing and more sociable are more likely to become early adopters, because such people may be more open to all kinds of social innovation and change. This implies that the relationship is not spurious but indeed substantive—but that the direction of causation runs opposite to that implied by the PEW and SDF studies, which assume that Internet use either promotes, or at least does not interfere with, everyday social interaction.

In sum, Internet users do not become more sociable because they have used the Internet, but they display a higher degree of social connectivity and participation because they are better educated, better off, and less likely to be among the elderly. Our own data confirm that Internet users are more educated, higher income, and younger (and thus presumably more socially connected). That, however, is beside the point: The point is, rather, that they report a steady decrease in social interaction with family and friends the longer they are using the Internet, in terms of either weekly hours or online years (despite the fact that they also report an increase in e-mail use!).

Finally, and most simply, there is no theoretical or rational reason to believe—nor has one been proposed by the advocates of that view—that Internet use in and of itself creates more people to turn to if you need help or makes one more likely to visit or call someone for purely social reasons or to spend more time with family. On the contrary, although the PEW and SDF studies find average Internet use of almost 10 hours per week, they nowhere address the question of where that time comes from. Yet Internet use is bound to come at the expense of other previous activities: Which activities? These studies currently have some of the best data for answering this question—time estimates of both Internet use and other discretionary activities—they have just not used their data to answer the question.

THE SOCIETAL BACKDROP

The concerns we raised with the IAS study about the potential role of the Internet in reducing the density and heterogeneity of face-to-face social ligatures were not predicated on the Internet as an isolated social invention but rather as part of an ongoing sociological trend. Much of the social history of the 20th century is a story about the progressive individualization of society and the dissolution of community and family connections—the social support that linked individuals to one another and to their communities. Moreover, much of this decline in social connectedness has been the unintended consequence of technological change. The mobility made possible by the railroad and automobile also made possible suburbanization and the anomic bedroom community. Likewise, airplanes, highway systems, and the telephone made it feasible for the modern corporation to exist in many places at once and consequently made it necessary to move its workforce from one city to another. Quite commonly, people may be born and raised in one community but live their adult lives in another (or several others). All of these innovations had unintended negative effects on lifelong family, extended family, and friendship ties. Siblings, parents, children, aunts, cousins, and grade school and high school friends are no longer present daily, and they no longer form the lifelong support and friendship groups they once did.

Newfound affluence following World War II, combined with these and other social changes, contributed to the breakdown of the nuclear family, making loneliness and isolation a major theme of diary and fiction alike. The rise of television then enticed families from their front porches to their living rooms for an average of 3 hours a day of television viewing (GSS). These are among the many reasons social circles have centered on the workplace rather than extended families, neighbors, or fellow churchgoers.

In an era of Internet usage, it is important to explore the manner in which this technological change is also influencing leisure and work time and affecting the dynamics of human interaction.

LEISURE AND WORK IN AN INTERNET SOCIETY

Only 5 years in its making, the Internet is currently utilized, on average, almost 10 hours per week by 50% of the population. Where are these hours coming from? Our survey indicates some decline in television watching, although national-level data show no meaningful reduction in hours of television consumed. Some of these hours may come at the expense of working at the office, but then we must wonder if on-the-job Internet use affects social interaction at the office. Numerous businesspeople have told me that the traffic and conversation in company hallways has thinned out because of Internet and e-mail. E-mail communication leaves fewer opportunities for the exchange of social sidebars than when information exchanges happened by chats on the phone or walking back and forth in and out of each other's offices.

More markedly, telecommuting will have consequences for the sociability of the workplace (Salaff, Greve, Wellman, & Boase, 1999; Salaff, Wellman, & Dimitrova, 1998; Wellman et al., 1996). With inexpensive DSL connectivity and even greater bandwidth coming, many information workers now have the ability to do their daily jobs equally well from home and the office. With universal connectivity and file sharing, command and control of the quantity and quality of workers' output can be as easily supervised and directed in their home offices as in the office down the hall.[3] Given the ever-mounting costs of office space and escalating commute times in gridlock traffic, many have predicted that an increasing portion of the workforce will work from home in the near future (Nie, 1999). Telecommuting is here and is likely to grow rapidly.[4]

Although telecommuting may actually have some positive consequences for family life—particularly among those with children living at home—the decline of the daily workplace will be the loss of one of the last remaining arenas for daily face-to-face contact outside the home. Because of the decline of the extended and nuclear family, because living in the same location with lifelong friends has become the exception rather than the rule, and because neighborhood and community has often been reduced to sharing a freeway exit, it is the workplace that has become an important source of friendships, daily camaraderie, and even love interests. If millions of office workers stop going to the office,

there will clearly be a reduction in the density and diversity of face-to-face human interaction. If, as predicted, millions of office workers become telecommuters in the next few years, the Internet will in yet another way contribute to social isolation.

Seventeen percent of the American adult population either lives alone or with no other adults in the household; 21% have never been married (*Current Population Survey*, 1988). The prospect of even a small fraction of the American public spending their workdays at home, connected to the office server, and spending their evenings in front of the television or computer, perhaps going for days without face-to-face human interaction seems not only plausible, but also alarming.

TELEVISION AND THE INTERNET: BACKGROUND VERSUS FOREGROUND

Many have documented the deleterious effects of television on sociability both inside and outside the home (Putnam, 1995; Robinson & Godbey, 1997). Yet television is fundamentally different from Internet use in that the television can easily retreat from the foreground of attention to just background noise. Activities, even interpersonal ones, can occur concurrently with television watching. In many homes, the television is always on and may move back and forth from foreground to background while other activities take place.

The Internet, on the other hand, is an interactive device and is therefore a somewhat more demanding activity. Unlike television, the Internet must be user-driven. Although interruptions can certainly still occur, it is much more difficult for the Internet to become background noise. Furthermore, televisions are often in central locations in the home—living rooms or family rooms, for example—whereas computers are more typically in more private spaces where interruptions are less likely to happen. It also seems much less likely that Internet use can be a group activity, whereas television, at the very least, may have several family members watching together. Finally, many of us are familiar with that unique Internet characteristic of surfing that leads Internet junkies to sit down to do a single task and end up, hours later, with a loss of a sense of time, place, and original purpose.

For all of these reasons, the Internet has, I believe, a much more isolating potential than television.

E-MAIL AND PERSONAL CONNECTIVITY: A DUAL-EDGED SWORD

The intent of the IAS study was neither to diminish the importance of the Internet and e-mail nor to provoke or promote an antitechnology liturgy. Rather, the intent was simply to bring awareness to the unintended social consequences of this great technological advance.

There seems little doubt that rapid-delivery e-mail has enhanced some major aspects of human connectivity. The SDF study reports that 76% of e-mail users report checking their e-mail at least once each day. The PEW study finds that 49% of Internet users report exchanging e-mail with family members at least once per week. And this same study found that 49% of e-mail users report that they would "miss it a lot" if they no longer had e-mail.

For some things, business especially, e-mail may be a superior mode to telephone communication. E-mail provides a nonintrusive form of communication, and it leaves a clear written record rather then a memory-dependent telephone conversation or voice message. E-mail is clearly superior when it is necessary to send the same precise message simultaneously to a large number of people. When the famous mid-19th-century German commander and military theorist Klausewitz first saw the telegraph in operation, it is reported that he immediately returned to his headquarters and reorganized the general staff and the entire hierarchy of command and communication. Many contemporary militaries and businesses have likewise followed in General Klausewitz's footsteps, recognizing the enhanced characteristics of e-mail and Internet communications. E-mail may even be somewhat responsible for the recent dramatic increases in American worker productivity.

Interpersonal communications, however, have a purpose far different from that of command, control, and coordination at which e-mail excels. Face-to-face and even telephone communication among colleagues, friends, and family are often about matters of affect. It is not that empathy, tenderness, reassurance, flirtation, sadness, or happiness cannot be written into e-mail. Rather, eye contact, body language, facial expressions, vocalization, hugs, pats on the back, cries, embraces, kisses, and giggles are the fundamentals of our evolutionary socioemotional well-being. Even the most gratifying of personal telephone calls does not replace a personal visit. Nevertheless, the telephone, unlike e-mail, still preserves a number of emotionally verbal cues and intonations. It is not that well-written e-mail is incapable of expressing important emotions; it is simply that written communication is not equivalent to face-to-face interaction.

In recent informal interviews with U.S. sailors who had served on an e-mail satellite equipped U.S. warship, for example, the benefits and limits of e-mail communication were apparent (for analysis of new communication in military, see Ender & Segal, 1998). Because of the rapidity of interchange, officers and seamen alike report a new ability to maintain contact with and participation in their families even while spending months on shipboard duty. Much of the e-mail communication was used for exchanges about the daily exigencies of family and social life rather than intimate communication, but every one of the sailors appreciated the new technology. When the same officers and sailors were asked whether they would choose telephone or e-mail to communicate with their families, if they could have equal access to both aboard ship, all unhesitatingly chose the telephone.

Hence, there is no doubt that e-mail has produced a substantial and meaningful enhancement in interpersonal connectivity. To snail mail and the telephone we have added a new rapid communication channel. But these forms of communication should not be treated equally.

Finally, the PEW study reported some e-mail related findings that may indicate some cause for concern about the content of e-mail communication. The PEW Internet and American Life Project (2000) findings suggest that e-mail may, at times, be used as a way to avoid conflict, and may also serve as an efficiency substitute for more time-consuming familial face-to-face meetings or phone conversations:

> One of the appealing attributes of e-mail to a surprisingly large cohort of Americans is that they feel they can be more honest online with loved ones and friends than they can be in conversation. Almost a third of family e-mailers (31%) report that it is easier to say frank or unpleasant things in electronic missives than it is in conservation. Asked if they thought this was a good or bad thing for their families, two-thirds of these e-mailers said it was a good thing. (p. 23)

I do not doubt PEW's findings that people believe e-mail represents a new and rich tool for staying in touch with immediate friends and family as well as more distant relatives and acquaintances. However, I am equally concerned that so many e-mailers report that e-mail removes the need for the moral courage required to criticize or castigate a close friend or family member.

In addition, e-mail through communication may not necessarily contain the same depth or emotion a face-to-face or synchronous voice communication includes. After all, forwarding a joke to a friend or family member does not have the same communicative value as engaging in a discussion about the latest news of the day. According to the PEW study, some 62% of those who e-mail relatives say that because of e-mail they can stay in touch with family without having to spend as much time talking to family members. They also find that two thirds (66%) of family e-mailers who log on daily say that with e-mail they do not have to talk as much to relatives. And roughly the same share (67%) of those who logged on yesterday report the same (PEW Internet and American Life Project, 2000, p. 23). In other words, whereas e-mail may promote a sort of contact with friends and family, that contact may be more superficial than that which occurs in more personal venues. Unquestionably, context analysis of e-mail communication is something to consider as we continue to uncover the manner in which Internet use affects sociability.

CONCLUSION: THE UNINTENDED CONSEQUENCES OF TECHNOLOGY

Professor Erbring and I are lifelong technophiles as well as social scientists. In our studies of the Internet, we are as excited by the new technologies as are the researchers who produced the other reports. But as social scientists, we are also

keenly aware that all technological innovations are accompanied by unintended consequences. Some of these consequences are positive; others are negative. Our approach, emanating from the classic media study by Gary Steiner, conducted when television was at the parallel developmental stage as is the current Internet, stresses the inelasticity of time and the Internet's potential role in the continuing decline of arenas for face-to-face relationships. Whatever wonderful things the wired and wireless will bring, a hug is not one of them. At issue is whether there will remain in our society the many places where hugs can be given.

NOTES

1. The data for the study were collected in December 1999 from a national random sample of 4,113 individuals in 2,689 panel households selected using Random Digit Dialing telephone survey methodology. Thus, we obtained a random sample of the full U.S. population, including households with no Internet access or computer. The surveying organization supplied all selected households with dedicated hardware and a WebTV browser. Questionnaires were completed independently by each member of a panel household using their television and their WebTV controls to answer the questions displayed on the screen. All analyses on Internet users were based only on the responses of participants who had Internet access at home or elsewhere prior to and independent of the WebTV access installed by the surveying organization.

2. Generally, the literature indicates that older people experience social decline and social loss in areas considered most salient to the lives of the older people such as relations with relatives, with friends, with spouse; finances; and the world of work (Silverstein & Bengtson, 1991). Another study shows that older persons were less likely to receive social support from their spouses because they are more likely to be widowed (Matt & Dean, 1993). They are also less likely to be employed than younger persons; thus, in addition to the loss of friends due to death, withdrawal from the labor force is also associated with a loss of social support from friends (Wright, 1989).

3. Obviously, this is only true where the worker does not need to have physical contact with material such as in construction, manufacturing, transportation, and so forth.

4. More than 16.5 million people in the United States, or about 12% of the workforce, now work at home 1 or more days a month, according to the International Telework Association and Council, an industry group in Washington (Hafner, 2000).

REFERENCES

Belle, D. (1982). The stress of caring: Women as providers of social support. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 496-505). New York: Free Press.

Current population survey. (1988, March). Washington, DC: United States Department of Commerce, Bureau of the Census.

Dohrenwend, B. S., & Dohrenwend, B. P. (1970). Class and race as status-related sources of stress. In S. Levine & Scotch (Eds.), *Social stress* (pp. 111-140). Chicago: Aldine.

Ender, M. G., & Segal, D. R. (1998). Cyber-soldiering: Race, class, gender, and new media use in the U.S. army. In B. Ebo (Ed.), *Cyberghetto or cybertopia? Race, class, and gender on the Internet* (pp. 65-82). Westport, CT: Praeger.

Fisher, C. (1982). *To dwell among friends: Personal networks in town and city*. Chicago: University of Chicago Press.

George, D. (1997). Working longer hours: Pressure from the boss or pressure from the marketers? *Review of Social Economy*, *55*(1), 33-65.

Hafner, K. (2000, November 2). Working at home today? *The New York Times*.

House, Umberson, & Landis. (1988). Structures and processes of social support. *Annual Review of Sociology*, *14*, 293-318.

Matt, G. E., & Dean, A. (1993). Social support from friends and psychological distress among elderly persons: Moderator effects of age. *Journal of Health of Social Behavior*, *34*, 187-200.

Moody, P. M., & Gray, R. M. (1972). Social class, social integration, and the use of preventive health services. In E. G. Jaco (Ed.), *Patients, physicians, and illness* (pp. 250-261). New York: Free Press.

National Opinion Research Center. (1996-2000). *General social survey*. Chicago: University of Chicago Press.

National Public Radio, Kaiser Family Foundation and Kennedy School of Government. (2000). Survey shows widespread enthusiasm for high technology. *NPR Online Report*, *3*.

Nie, N. (1999). Tracking our techno future. *American Demographics*.

Nie, N. H., & Erbring, L. (2000). *Internet and society: A preliminary report*. Stanford, CA: Stanford Institute for the Quantitative Study of Society.

Nie, N. H., Junn, J., & Stehlik-Berry, K. (1996). *Education and democratic citizenship in America*. Chicago: University of Chicago Press.

Nie, N. H., & Sackman, H. (1970). *The information utility and social choice*. Montvale, NJ: AFIPS.

PEW Internet and American Life Project. (2000, May 10). Tracking online life: How women use the Internet to cultivate relationships with family and friends. *Online Internet Life Report*.

Putnam, R. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, *6*, 65-78.

Robinson, J., & Godbey, G. (1997). *Time for life: The surprising ways Americans use their time* (2nd ed.). University Park: Pennsylvania State University Press.

Salaff, J., Greve, A., Wellman, B., & Boase, J. (1999). Providing the service that sells: Remote sales workers' human and social capital. In *Proceedings: The fourth international telework workshop: Telework strategies for the new workforce* (pp. 185-195). Tokyo, Japan.

Salaff, J., Wellman, B., & Dimitrova, D. (1998). There is a time and place for teleworking. In R. Suomi, P. Jackson, L. Hollmn, & M. Aspns (Eds.), *Teleworking environments: Proceedings of the third international workshop on telework* (General Publication No. 8) (pp. 11-31). Turku, Finland: Turku Center for Computer Science.

Schor, J. B. (1991). *The overworked American: The unexpected decline of leisure*. New York: Basic Books.

Silverstein, M., & Bengtson, L. V. (1991). Do close parent-child relationships reduce the mortality risk of older parents? *Journal of Health and Social Behaviors*, *32*(4), 382-395.

Steiner, G. A. (1963). *The people look at television: A study of audience attitudes*. New York: Knopf.

UCLA Internet Report. (2000, October). *Surveying the digital future (SDF)*. Los Angeles: Author.

Verba, S., & Nie, N. H. (1971). *The modes of democratic participation: A cross-national comparison*. Beverly Hills, CA: Sage.

Verba, S., Schlozman, K. L., & Brady, H. E. (1995) *Voice and equality: Civic voluntarism in American politics*. Cambridge, MA: Harvard University Press.

Veroff, J. (1981). *The inner American: A self-portrait from 1957 to 1976*. New York: Basic Books.

Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., & Haythornthwaite, C. (1996). Computer networks as social networks: Collaborative work, telework, and virtual community. *Annual Review of Sociology*, *22*, 213-238.

Wright, P. (1989). Gender differences in adults' same and cross-gender friendship. In R. G. Adams & R. Blieszner (Eds.), *Old adult friendship* (pp. 197-221). Newbury Park, CA: Sage.