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UNDERSTANDING THE EFFECTS OF THE INTERNET ON FAMILY LIFE

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"[T]he American family during the past 25 years has entered a new world of rapid change" (p. 415) wrote Ernest Burgess in 1928 as he reflected on the introduction into society of technologies such as the automobile, motion pictures, radios, airplanes, and telephones. A review of any decade of the 20th century would include the introduction of an array of technological developments, including radio, television, videocassette recorders (VCRs), microwave ovens, air conditioners, refrigerators, personal computers, and the Internet.

Less than two decades ago, computers were primarily used in science, engineering, and business, and the Internet was the province of the military. Yet in 2001, 57% of all households had a computer, and 51% had direct access to the Internet (National Telecommunications and Information Administration [NTIA], 2002). Social critics and technologists have been active in discussing the implications of these changes for individuals, families, work, and society. There are those who see computers and the Internet as a positive force that will foster greater communication and better access to education, promote global understanding, and make the world a better place to live (Rheingold, 1993). Some also believe that the Internet will lead to better social relationships because people will be freed from the constraints of time and place (Katz & Aspden, 1997). Other critics suggest that computer technology will impoverish relationships, isolate family members from each other, and distance families from the outside world (Stoll, 1995).

A quick look at the history of technological developments in the past century reveals that at each introduction of a new technological device there have been similar arguments. Fischer (1992), who traced the introduction of the automobile and telephone in the early part of the 20th century, found numerous accounts that parallel the current debates. For example, notes from a 1926 Knights of Columbus committee meeting called to discuss whether modern inventions help

or hurt character and health included the following questions: “Does the telephone make men more active or more lazy?” “Does the telephone break up home life and the old practice of visiting friends?” “How can a man be master of the auto instead of it being his master?” (quoted in Fischer, 1992, p. 1). In contrast, in 1916 AT&T issued a public relations announcement noting that “the telephone is essentially democratic, it carries the voice of the child and the grown-up with equal speed and directness. . . . [I]t is not only the implement of the individual, but it fulfills the needs of all the people” (quoted in Fischer, 1992, p. 2).

Family scientists also have entered into these discussions, sometimes with empirical data, sometimes as polemists. The Lynds, in their studies of Middletown during the 1920s, argued that the automobile liberated young people to attend movies and roadhouses, thus leading to promiscuity and undermining the family (Lynd & Lynd, 1929). Ogburn and Nimkoff (1955) asserted that the machines of the Industrial Revolution determined the character and nature of families at the beginning of the 20th century. In contrast, Burgess (1928) cautioned against the view that families are shaped solely by environmental factors: “Only through research can the necessary basis of fact be found for any practical program to meet the problems of the changing American family” (p. 415).

In keeping with the advice of Burgess (1928), we examine research on the effects of computers and the Internet on families to bring about a better understanding of how this technology influences family life. We begin with an overview of the extent to which computers and the Internet have become part of the landscape of family life. To provide perspective, we also consider information about other communication technologies. Then we look at five questions regarding the effects of computers and the Internet on families: (a) How has the Internet affected romantic relationships? (b) How has the Internet affected family relationships?

(c) How does the Internet affect family ties to social networks? (d) How is the intersection of work and family altered by the Internet? and (e) How can the Internet be used to help families?

The Information Technology Context

Much has been made of the rapid introduction of computers and the Internet into the private realm of family life. However, this is just the latest wave of information technology to become commonplace in households. The older technologies—radios, telephones, and televisions—are in well over 90% of U.S. households, and although the proportion of households with these devices has remained steady over the last three decades, an increasing number have multiple radios and televisions (Newburger, 1999).

The prevalence of personal computers and Internet use in the home has grown rapidly in recent years, but ownership of computers and access to the Internet vary on the basis of income, education, household composition, and ethnicity. Low-income and single-parent households and households headed by individuals with little education are far less likely to have Internet access in their homes than affluent, two-parent households composed of adults with more years of formal education (NTIA, 2002). However, the growth rate in Internet access is much greater among the former, leading to a gradual diminishing of the gap. Ethnic differences follow a similar pattern. Asians (60.4%) and whites (59.9%) are more likely to use the Internet than blacks (24.7%) or Hispanics (20.1%), but between 2000 and 2001 Internet use grew the most rapidly among blacks and Hispanics. Personal computers and the Internet may eventually become commonplace in families across a broader spectrum of socioeconomic and racial strata, but for now, there are large differences in who has in-home computer capabilities and who does not.

How Has the Internet Affected Romantic Relationships?

Dating and Intimacy

Although interactive Internet applications (e.g., electronic mail, newsgroups, chat rooms) were first developed in the early 1970s, the role personal computers played in romantic relations went largely unnoticed until the number of Internet users mushroomed in the mid-1990s. Early on, there was a stigma attached to seeking and finding love online, but the number of people engaging in online dating has grown rapidly. Jupiter Research reported that in 2002, 16.3 million people visited online dating sites; there are now more paying subscribers to online dating services than any other content area on the Internet (cited in O'Connell, 2003).

Models have been hypothesized to explain the lure of online romantic/sexual relationships, such as Cooper's (1998) Triple-A Engine (Access, Affordability, Anonymity) and Young's (1999) ACE Model of Cybersexual Addiction (Anonymity, Convenience, Escape). Although empirical validation of these models is needed, early research has demonstrated that certain types of people prefer Internet-facilitated courtship. For example, those who are socially anxious or lonely are more likely to form intimate relationships via the Internet (McKenna, Green, & Gleason, 2002), and shy individuals are able to overcome many relationship-initiation barriers (Scharlott & Christ, 1995). It is likely that other barriers to relationship formation (e.g., proximity, social class, some physical traits) also become less important at the outset of computer-mediated relationships (Cooper & Sportolari, 1997; McKenna at al., 2002), although participants in a study on attitudes toward online relationships indicated discomfort with meeting potential partners online when their physical appearance is not known (Donn & Sherman, 2002).

There is evidence that online relationship development is different from traditional

courting. Online romantic relationships have much higher levels of self-disclosure and intimacy early in the relationship (Clark, 1998; Gerlander & Takala, 1997). McKenna et al. (2002) found that the stability of online relationships over a 2-year period compared favorably to that of traditional relationships. If an online interaction is going well, the relationship often evolves into a conventional face-to-face relationship (McKenna et al., 2002; Parks & Roberts, 1998), or at least occasional contacts for those who are geographically distant. Concern has been expressed because one can easily deceive another in computer-mediated relationships (Cooper & Sportolari, 1997), a concern that is especially pertinent for relationships that have not resulted in face-to-face meetings. However, due to the relative anonymity and discreetness of e-mail, many lies (e.g., marital status) may still be quite easily maintained even when meetings occur.

Researchers studying courtship behavior vis-à-vis technology should examine how online dating differs from traditional courtship behavior and whether mate selection criteria differ in online relationships versus face-to-face relationships. An interesting line of research would be to monitor how the characteristics of people who use online services and the reasons and meanings they attribute to their use change over time as online dating finds greater acceptance among the general population. The role of cellular phones, instant messaging, and other emerging communication technologies in the development and maintenance of early relationships also should be investigated.

Extramarital Relationships

Infidelity has usually been defined as sexual relationships outside marriage; however, the emergence of computer-mediated relationships and virtual sex has raised new questions about boundaries of intimacy (Merkle & Richardson, 2000). Anecdotal evidence suggests that many people know of a friend, family member, or acquaintance whose face-to-face romantic

relationship was threatened by an online relationship. Thus, intimate online relationships, even if not physical, may become common sources of tension in existing face-to-face romantic relationships (Young, Griffin-Shelley, Cooper, O'Mara, & Buchanan, 2000). Indeed, Schneider (2000) found that among 94 respondents whose marital relationships were seriously and adversely affected by a partner's cybersex activities, more than 60% indicated that the online relationship never progressed beyond computer-mediated interaction. Clearly, research is needed that investigates the changing boundaries of intimacy brought about by computer-mediated interaction.

How Has the Internet Affected Family Relationships?

Most researchers have focused on broad descriptions of trends in the use of the Internet, such as time spent using computers and the Internet (Howard, Raine, & Jones, 2001) and the ways in which children and adults use these technologies (Orleans & Laney, 2000). Few researchers have examined the ways in which the Internet has altered family functioning.

One area of speculation is whether computer technology strengthens or damages relationships among family members. One of the earliest studies on the role of the Internet in family life (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 2000) monitored a group of parents and their teenagers over their first 1 to 2 years of Internet use. Parents and adolescents used the Internet more often to interact (e.g., sending and receiving e-mail) with non–household members than to seek information or entertainment. They also spent less time communicating in the household with family members than they did before gaining Internet access. These results give credibility to the fears that Internet use damages family relationships; however, a follow-up study 2 to 3 years later found that these initial declines in family communication did not persist

(Kraut et al., 1998).

In one of the few observational studies about computers and family relationships, Orleans and Laney (2000) observed 32 children between the ages of 8 and 17 on at least three occasions each for an hour or more while they did computer work on their own or with others at home. Children and their parents seldom talked to each other while the children were using the computer. Generally, children used the computers independently and were more likely to talk with siblings or peers for help regarding computer problems than they were to ask their parents. About 65% of the time that the children were online, they sent and received e-mail, visited chat rooms, and played interactive games. Boys and girls used the computers in different ways:

> The girls were more likely to be serious about using the computer. They were more focused on using the computer for particular purposes, and their demeanor while using [the computer] was more somber than the boys. The boys seemed more likely to view the computer as a multipurpose toy that was itself fun to use and integrated it into their social lives. (Orleans & Laney, 2000, p. 67)

Another area of interest to family scientists has been the ways in which parents manage the use of technology. There is a long history of increasing parental awareness of media content through labeling systems (e.g., parental advisory warning labels) and developing various parental control devices for technologies. Family scientists are in the early stages of understanding parental regulation of children's use of the Internet, in terms of both managing family boundaries and dealing with dangerous situations. There are numerous technological attempts (e.g., filtering software) to address these issues, but there is little understanding about how parents actually regulate the Internet and what types of technological tools, if any, work.

Livingstone (2002) found that only 6% of parents were concerned about their children's use of computers and the Internet. Parents were far more concerned about illegal drugs (51%), crime (39%), and educational standards (38%). These data suggest that when viewed in the context of other hazards children face, parents perceive that there are more serious threats to children's well-being than their children's computer and Internet use. However, 50% of the parents in Livingstone's (2002) study reported having rules about children's use of the Internet. In contrast, children reported about half as many restrictions as their parents. The inconsistency between reports of parents and of their children points to a need for a better understanding of computers and Internet use in family contexts on a day-to-day basis. This may require observational and longitudinal data in addition to self-reports by children and parents.

The contextual nature of parents' Internet concerns compared with their concerns about other aspects of life illustrates the importance of studying the Internet in context to provide a more complete understanding of how the technology fits with other aspects of family life. When the Internet is studied in isolation, it is easy to misunderstand how it fits with other aspects of family life and to distort its significance and influence. These studies provide a glimpse into the variety of ways that computers and the Internet may affect relationships in families. Whether they have a positive or negative impact on family interactions is a complicated question that requires more research and the consideration of how other household technologies, such as cell phones, video games, and television, foster or hinder family communication, conflict, and socialization.

Another important question related to the Internet concerns aggressive behavior. There is much research about the contribution of television and video games to aggressive behavior in children and adults (e.g., Johnson, Cohen, Smailes, Kasen, & Brook, 2002). The Internet not

only provides additional opportunities for family members to be exposed to violent images and activities but makes it possible to be in contact with people who are engaged with violent material and activities. Given the level of violence in the world, understanding how family members are affected by these potentially harmful opportunities is critical.

Another important direction for research is to focus, not on computer technology itself, but rather on computer technology in the context of family issues such as intergenerational relationships, postdivorce relationships, social network processes, and work. For example, the Internet may provide new ways for older family members to communicate with distant family members, and there are many unanswered questions regarding ways this technology may serve as a bridge for homebound elderly. Similarly, using the Internet to maintain relationships with nonresidential children or parents would have quite different effects than participating in online games for recreation. The Internet can become an important way for family members to stay connected after divorce.

As communication technologies evolve (e.g., as wireless connections become more commonplace), it will be important to consider the ways that families incorporate these opportunities. Specific uses of computers and the Internet in the home, such as doing office work, maintaining geographically distant relationships, participating in family life education, or engaging in virtual sex, may play an important role in understanding modern family environments and should be studied. Researchers should begin to explore questions such as "With whom are family members communicating?" "What is being communicated?" "What role does computer-mediated conversation play in the overall communication in families?" and "How does computer-mediated communication differ from other forms of communication?"

How Does the Internet Affect Family Ties to Social Networks?

Another early concern regarding the Internet was that people would abandon face-to-face relationships and live their lives online. In an analysis of the decline of involvement in community and other social activities, Putnam (2000) asserted that this decline was due in part to television and that the Internet would contribute to further loss of social ties.

An early study reporting on new Internet users seemed to confirm the idea that the Internet could lead to withdrawal from social involvements (Kraut et al., 1998). New users who spent more time on the Internet reported less social involvement with both geographically close and distant friends. However, over the next 2 to 3 years, social support and interaction with close and distant network members returned to pre-Internet levels. This study took place when Internet technology was newer and people were less familiar with it than they are now. Thus, participants may have withdrawn from social ties because of the novelty of this new technology and the time needed to master it. Few members of their social network would have had access to the Internet, so they would have been less able to use it to maintain existing social ties than current Internet users would be. In a second study with a new sample, Kraut et al. (2002) added more control variables and a wider range of social network measures. In this study, they found that Internet use was related to *increases* in the number of close and distant social contacts and face-to-face communication with family and friends, indicating that the Internet had a positive impact on development and maintenance of social networks.

Other investigators have begun to provide evidence that the Internet may help maintain social ties. Among home Internet users, 96.6% of women and 93.6% of men reported using the Internet to communicate with friends and family (NTIA, 2000). In fact, the primary reason why people send and receive e-mail messages is to maintain interpersonal relationships (Stafford,

Kline, & Dimmick, 1999). Almost twice as many people reported interpersonal reasons for using e-mail (42%) as those who reported using e-mail for business (25%) or information (23%). About 60% of Internet users reported that they communicated more with family and friends now that they had e-mail access (Howard et al., 2001). Franzen (2000) found that, over time, e-mail had a positive effect on the maintenance of social ties. Nearly half of online seniors were persuaded to get Internet access by family members, and a majority reported that the Internet enhanced communication with family members (Fox et al., 2001).

In a unique study of social networks, Hampton and Wellman (2000) surveyed a neighborhood in which all the residents had free access to a high-speed Internet connection. The wired residents recognized almost three times as many neighbors, talked with nearly twice as many, and had been invited or had invited, one and a half times as many neighbors into their homes as had residents of a nearby neighborhood that was not wired. The authors suggested that rather than replacing face-to-face ties, computer-mediated ties supported and strengthened neighborhood social ties by providing new opportunities for social relationships and engagement in community. In a large study of Internet users, Wellman, Haase, Witte, and Hampton (2001) found that online activity supplemented rather than replaced or diminished offline social contacts. Overall, these findings suggest that the Internet has positive effects on family members' ability to maintain real-world social ties outside the immediate family.

How Is the Intersection of Work and Family Altered by the Internet?

For over 100 years, forecasters have predicted that technology will eliminate the constraints of geographical proximity between home and work. In 1893, a writer forecasted that by 1993 work would take place within homes via the telephone (as cited in Fischer, 1992). In 1980, Toffler

introduced the idea of the "electronic cottage" and predicted that downtowns would "stand empty, reduced to use as ghostly warehouses or converted to living space" (p. 221). The decreasing cost of computer technology coupled with the increasing cost of office space has led to additional predictions about the ways in which technology will alter family-work balance (Piskurich, 1996).

A recent review of telework, defined as work performed at an offsite location and most typically within one's home, suggests that many of the forecasts of changing work environments are unlikely to occur (Ellison, 1999). Although there are many optimistic reports about telework, findings from a recent U.S. Bureau of Labor Statistics (2002) report indicated that only about 15% of employees work at home at least 1 day per week. Taken at face value, telecommuting sounds like a solution to work-family strain, child care, and numerous other family dilemmas. However, studies of telecommuting suggest that there may be significant limitations to overcome with regard to working at home.

In one survey, although 88% of workers preferred telecommuting, only 11% were doing it (Mokhtarian & Salomon, 1996). The constraints against telecommuting have little to do with technology but rather are related to supervisor unwillingness, concern about lack of visibility to management, household distractions, and a lack of self-discipline to do the work (Mokhtarian, Bagley, & Salomon, 1998). Women with children in particular are more likely to cite household distractions as a constraint when compared to women without children.

Reflecting on studies of the impact of technology on work, Kraut (1987) commented, "Office structure has remained virtually unchanged since the late 19th century, despite . . . major changes in office technology" (p. 130). He suggested that predictors of changes in work as the result of technology have often failed to understand the importance of socializing as a source of

worker satisfaction and the importance of co-workers in conducting many work assignments.

Another hypothesis about the effect of technology on work and family life is that the availability of computers and the Internet at home leads to more people taking work home from the office. Surprisingly, the trend has been in the opposite direction. Between 1991 and 1997, there was a modest decline (from 12.2 million to 11.1 million) in the number of workers taking work home (U.S. Bureau of Labor Statistics, 1998).

Although there may not be dramatic changes in the work-family relationship due to computers and the Internet, there have been subtle shifts. Hill and his colleagues (Hill, Hawkins, Ferris, & Weitzman, 2001; Hill, Hawkins, & Miller, 1996) have chronicled the implementation of flextime and flexplace in the IBM Corporation and reports by employees on work-family balance. In one study, workers assigned to virtual offices reported no better ability to balance work and family (Hill et al., 1996); however, recent findings indicate that workers report being better able to achieve work-life balance when they have more flexibility, either flextime or flexplace (Hill et al., 2001). Additionally, some surveys of family members suggest that the boundary between work and home is blurring: About 10% of Internet users who have access only on the job do something unrelated to work almost daily; about 66% report some use of the Internet for home-related activities while at work (Howard et al., 2001). Likewise, almost 25% of Internet users with access only at home report doing something for work at home. These data indicate that work-related tasks are performed in some homes and that some personal tasks are completed in the workplace but that the effects of technology on work and family life appear to be subtle.

Most of the literature that has explored work-family connections has focused on changes in the ways that families balance work and family as the result of "family-friendly" workplace

policies such as flextime scheduling and telecommuting. This focus may overlook the more subtle ways in which Internet connections both at work and at home may blur the boundaries between work and family. Analysis of these subtle shifts is important for understanding the ways in which technology may be altering families' management of work and family tasks.

How Can the Internet Be Used to Help Families?

The Internet has been used to create new ways of providing peer support, family life education, and family therapy. For example, there are numerous news groups online devoted to family issues such as divorce, death, or children with special needs. Additionally, family life educators and family therapists have begun to create online opportunities to provide help to families. It is important to understand more about the effectiveness of these activities.

Peer Support

Peer support through news groups was one of the first Internet developments. There are groups devoted to a wide range of family issues. Some groups have small readerships, and some have thousands of participants. Participants in these self-help activities find them beneficial (King & Moreggi, 1998). Online groups may be especially important to individuals whose face-to-face social relationships are inadequate or for groups that feel stigmatized, such as parents of special-needs children (King & Moreggi, 1998). Several studies have examined these issues.

Miller and Gergen (1998) concluded, from a content analysis of helping strategies offered on one self-help site, that the help provided differed from change strategies used by trained family therapists. They speculated that although participants may feel like they are getting help through these online groups, the help may not be as effective as that provided by skilled

therapists.

Those in online groups, unlike those in face-to-face groups, can participate in three ways: reading messages, posting messages to the group, or sending private e-mail to selected group members (Mickelson, 1997). Different patterns of social support are evident in these three styles of interacting. Mickelson found that although merely reading newsgroup messages was not related to any of the social support behaviors, posting public messages was related to fears of rejection, and private e-mail requests were related to lack of perceived support from spouses. Thus, the Internet may provide an alternative source of social relationships for those who have difficulty developing social ties face to face. Similarly, Cummings, Sproull, and Kiesler (2002) found that members of an online hearing-loss support group were more likely to participate if they lacked real-world social support. Additionally, these researchers found that in online support groups, unlike face-to-face groups, friends and family members can also participate, and participants whose real-world social network participated reported benefiting the most from online help. Cummings and his colleagues concluded that the paths through which social support may benefit individuals may differ in online support groups as opposed to face-to-face groups. It would be important to examine whether the paths found in a hearing-loss group would be similar to those found in family-issue support groups, such as groups related to divorce, single parenting, new parents, or stepfamilies. This function may be especially important for individuals whose face-to-face social relationships among friends and family are inadequate or for groups that feel stigmatized.

Family Life Education and Family Therapy

Family life educators and family therapists have begun to explore the ways in which the Internet can be used to help individuals and families. It has been suggested that the Internet

provides a valuable medium through which to teach families (Hughes, Ebata, & Dollahite, 1999) and that the Web may be especially suitable for reaching fathers (Grant, Hawkins, & Dollahite, 2001) because Web-based methods are more instrumental, thereby tending to be a better fit for men's learning style. Most of the work in this area has been limited to descriptions of models used for Web site delivery of family life information (Elliott, 1999; Smith, 1999). Hughes (2001) described a preliminary model for collecting process and outcome evaluation data regarding Web site delivery, but there is little information about the overall effectiveness of Web-based family life education. To advance this line of content delivery, family life educators will need to describe their online teaching models and assess the effectiveness of these approaches.

Online family therapy poses many of the challenges of family life education, with added concerns about ethics and hazards of these techniques. More has been written about the promise of online therapeutic approaches (e.g., Jencius & Sager, 2001) than about their effectiveness. For example, Jedlicka and Jennings (2001) described their clinical experiences in treating married couples through e-mail, provided insight into their techniques, and shared their clinical judgments about effectiveness, but they did not make comparisons to other treatment approaches.

The ethics of online family therapy remain an important consideration. Until there is evidence that the exclusive use of e-mail, chat rooms, and virtual therapy is effective, online therapy cannot be considered an ethically viable substitute for empirically validated approaches.

For professionals in family life education and family therapy, both programmatic efforts in refining models of providing education and therapy online and evaluation efforts are needed. Researchers have collected information about the general public's efforts to find health and financial information online, but there has been no similar study regarding information related to family life. This may be one of the first ways to understand how people are seeking family

information online and what types of help they are seeking. Researchers could also examine whether peer support on the Internet is useful. Online news groups that focus on family issues deserve to be studied in more detail, with attention to who participates and what difference it makes.

Directions for Theory and Research

It is easy when looking at technology to find historical predictions that were mistaken, but these mistaken predictions about the use and impact of technology should serve as a caution. They suggest that we are unlikely in the short run to understand the implications of new technologies and that these technological changes deserve study. We were surprised by the lack of study of personal computers in relation to family life. Little has been published since a 1985 issue of *Marriage and Family Review* devoted to personal computers and the family. The advent of the Internet has sparked new interest in the role of computers and the Internet in family life, but how should family scientists address issues of technology in family life

Theoretical Issues

In general, family scientists have little to say about the ways in which the physical environment affects families. Family theories are silent about the ways in which technologies for food preparation (e.g., microwave ovens, dishwashers), communication (e.g., telephone, faxes, the Internet), and recreation (e.g., VCRs, televisions, gaming devices) affect family life. Even ecological theories (e.g., Bronfenbrenner, 1986) offer little guidance about families' technological context and focus primarily on their social ecology. The lack of discussion of these issues makes it difficult to distinguish between important and trivial questions.

The sociology of technology provides some overarching perspective on how to consider the effects of computers on social life. Fischer (1992) described two general approaches to considering the effects of technology on social life. One is a deterministic approach that treats technology as an external force. The other assumes that technology embodies cultural values that shape history. Fischer argued that both of these approaches are problematic because they fail to take into account the ways in which people actively shape the use and influence of technology. For example, it was not inevitable that telephones would be used primarily as private two-way communication devices; early in their development, they were used as a broadcast medium, much as televisions are now used. Thus, the telephone did not determine how people used it; rather, people's use of the telephone shaped how it influenced them. Fischer suggests a social constructivist approach to studying the impact of technology on social life. Research guided by this perspective would examine the ways in which computers get used and the meanings attached to those uses. Researchers should focus their attention on the ways in which the Internet is used in the context of family life. For example, family scientists will obtain a better understanding of the role of the Internet in courtship by studying both online and offline romantic behaviors rather than focusing only on the online behaviors in the absence of broader social interactions.

Methodological Issues

The ways in which the Internet in family life has been studied are limited and problematic. In general, most reports about the use of computers are based on large-scale studies using self-report, cross-sectional data from one household member. The range of methods used to study the Internet and families needs to be broader. For example, qualitative studies are needed to provide a richer description of the families, processes, and context surrounding Internet use. Innovative approaches to collecting quantitative data are also necessary.

Although self-report methods are good ways to document the existence of a computer in the household and connections to the Internet, it is not clear that one member of a family can give an accurate picture of the family's computer use. There is ample evidence that people are unable to provide accurate reports about how much time they spend doing various activities unless that information is collected through time-diary methods. For example, Kraut et al. (2002) compared self-reports of Internet time use to actual Internet logs and obtained correlation coefficients in the range of .42 to .55, well below a level usually acceptable for reliability. This discrepancy may be a fruitful area of inquiry in itself but also suggests that researchers will need to incorporate a variety of data collection methods (e.g., observations, time diaries, automated computer logs) to fully understand Internet use in the family.

Most studies are simple social address comparisons that compare groups based on family type, social class, or educational background. To understand the outcomes of family processes, it is necessary to go beyond social address comparisons to consider models that include personal characteristics (e.g., net-savvy parents), various family processes (e.g., parents who report spending time involved in children's activities), and specific social contexts (e.g., home, child care) (Bronfenbrenner, 1986). Process-context models or person-process-context models will provide a richer understanding of how individuals and families are affected by the Internet and through what processes and in what settings this occurs. However, it is likely that the Internet affects families in complex ways because it is a psychological, social, play, and consumer space open to a wide range of positive and negative activities. Kraut et al. (2002) provided a good example of this: They reported that introverts became lonelier and extroverts became less lonely the more they used the Internet. The wide variation in family interaction styles and circumstances suggests that the effects of the Internet may vary greatly depending on family

communication styles and other behaviors. Studies of television use in families may provide some initial hypotheses about family interaction and Internet use. For example, children in high-conflict households are more likely to watch television than children in low-conflict households (Morgan, Alexander, Shanahan, & Harris, 1990). A similar pattern of Internet use also may occur. Thus, it seems unlikely that this medium will be understood without looking more closely at the specifics of what people are doing.

Additionally, researchers need to consider longitudinal designs that take into consideration ways in which families change and adapt to technological changes. It is likely that patterns of interaction with home computers and the Internet change over time on the basis of a number of factors, such as age of children and computer proficiency.

The Internet presents researchers with new methods of data collection that may be appealing to those who study computer technology (e.g., savvy computer and Internet users). Online data collection via e-mail or the Internet can save time and reduce error through automated data entry. Dynamic generation of response options and skip patterns invisible to respondents can allow for complex and personalized survey designs, and printing and postage costs can be avoided. An important disadvantage is that variations in computer hardware and software may result in respondents' experiencing the same survey in different ways (e.g., based on software used, monitor size and resolution), although a skilled programmer and careful planning can minimize (but not eliminate) this problem. Another concern is that representative samples of the general population cannot yet be achieved online due to the socioeconomic bias in Internet users, but samples of specific populations, such as those that are likely to be sought when studying computers and the Internet, can be obtained. Finally, some initial guidelines for online survey design have been outlined (see Dillman, 2000), but reliability, validity, and ethical

issues of online data collection need further investigation.

Conclusion

The major conclusion from this review is that for the most part family scientists are not engaged in exploring the role of computer technology in family life. Much of the debate about the effects of computers on families has been left to social commentators who often have limited access to empirical data or to technologists who predict use on the basis of the capacity of computers. Past approaches to studying technology and families that have assumed that people are passively affected by technology are problematic. It is essential that we develop conceptual models about families in context and study the ways in which families adapt to technological developments.

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