

The Oxford Handbook of Internet Psychology

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CHAPTER 2

Social interaction and the Internet

A comparative analysis of surveys in the US and Britain

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The Internet has been a major social and technical innovation, ranging from household use of the Web for electronic messaging to accessing information and operating one's financial affairs. This worldwide multimedia computer and transmission network of networks is altering access to important intellectual resources and dramatically changing lives and social arrangements in many places around the world. In the decade since the Internet became available to both public and commercial interests and was made much more accessible through the Web and browsers, nearly two-thirds of the adult population in the US and over half the adult population in Britain has used the Internet to seek and receive information and communicate with others both known and unknown (Rice and Katz 2003). This chapter examines a central question raised by this growth in Internet use: is Internet use associated with increased or decreased social interaction?

First, the chapter reviews relevant prior literature and research on the digital divide in general and the relationships of Internet use with social interaction. This overview grounds four research questions, namely what can be learned by: comparing users and non-users; comparing users with more and less offline interpersonal and mediated social interaction; assessing changes in social networks; and comparing US and British Internet users. We then identify possible answers to these questions based on results from national surveys in the US in 1995 and 2000 and Britain in 2003.

The Internet, digital divides and social interaction

Digital divides

The 'digital divide' is a critical social issue because it tends to represent and reinforce socioeconomic divides, including social interaction.

Individuals can participate in, or be excluded from, networks of information and communication by virtue of which side of the digital divide they are on (Katz and Aspden 1997a, b, 1998; Rice *et al.* 2001). In the US, racial and sex differences in access to the Internet have diminished, and most remaining differences can be explained by other basic demographic/socio-economic factors such as income, age, education and, in the case of race, awareness of the Internet (Hoffman 1998; Katz and Aspden 1997b, 1998; Katz and Rice 2002; Net users 2001; NTIA 2002; Walsh *et al.* 2001). Still, as a 2002 NTIA report shows, there is a persistent large and in some cases, increasing, disparity (The Children's Partnership 2002). More complex forms of divide exist, such as those based on conceptualizations of access (Liff and Shepherd 2004), kinds of usage (Net users 2001), differences in use by sex within ethnic groups (Shade 2004) or by race within low-income groups (Mossberger *et al.* 2003), by those with sight, hearing or mobility disabilities (NTIA 2002) and across national boundaries (Anderson and Tracey 2002: 144–146; Chen *et al.* 2002: 84; Rose 2004). Thus any study of Internet use and social interaction must control for socio-demographic influences on usage.

Internet and social interaction

Considerable significance has been accorded to the question of whether Internet use is associated with more, or less, social interaction, in various forms (*American Behavioral Scientist* 2001; DiMaggio *et al.* 2001; Rice 2002; Wellman and Haythornthwaite 2002). Social interaction issues are particularly significant because they are central to notions of how the Internet might reconfigure access to information, people, services and technologies, such as in changing personal relationships with family and friends (Dutton 1999, 2004). This may affect social capital through decreased or increased social interaction with others. Thus there is a need to understand in what ways, within different contexts, the Internet might reduce, maintain or increase current forms of social interaction and expression, or foster new forms. (Hiltz and Turoff 1995; Parks and Floyd 1996; Turkle 1996).

On the one hand, some researchers have argued that information and communication

technologies (ICTs) are inherently impersonal and mediating and enable deception and misinformation, which could undermine their role in enabling the formation of meaningful interpersonal relationships (Stoll 1995; Turkle 1996). From this perspective, the Internet detracts from meaningful real-world communities and reduces social capital (Beniger 1987; Gergen 1991; Kiesler *et al.* 1984; Nie 2001), for example because spending more time on the Internet 'crowds out' more meaningful relationships and higher quality communications and decreases meaningful social interaction and social integration (Kraut *et al.* 1998; Selnow 1994; Putnam 2000). There is some evidence that Internet use is associated with social withdrawal, such as the way it can provide some protection from anxiety by those who are shy. (Birnie and Horvath 2002). Riphagen and Kanfer's (1997) survey showed that email users and non-users had similar numbers of relationships, but users had more distant relationships, suggesting those came at the cost of local interactions.

The Carnegie-Mellon HomeNet study (Kraut *et al.* 1998) provided one of the earliest quantitative field surveys of Internet use which found negative effects of Internet use on social interaction. They recruited 96 volunteer families and provided them with computers and dial-up Internet access and then surveyed these novice users for three years. At the midpoint, those who used the Internet most reported lower levels of family face-to-face communication and interaction in social circles, as well as greater loneliness, depression and stress. The authors concluded that Internet use displaces interactions with close social ties. Nie and Hillygus (2002) also found, through a cross-sectional time diary study, that interactions with family members decrease with more Internet use.

However, others have argued that yet another context for social interaction, creativity and emotional and informational support, is provided by the Internet, including through the use of discussion lists and newsgroups; health and psychological support groups; Internet Relay Chats; Multi-User Dungeons (MUDs) and online dating services (Baym 1995; Katz and Rice 2002; Matei and Ball-Rokeach 2001; Rice 1987a, b; Rice 2001). Partially, this is due to the increased opportunities to interact with both known and

unknown others based on similar interests, networks of relationships and mere chance. For example, looking at 1995 data, Katz and Aspden (1997a), in apparently the first national random study of users and non-users, found that there was no social deficit for users compared to non-users (these data are analysed along with several other series in this chapter). Looking at this subject but with different data several years later, Robinson *et al.* (2000) concluded that Internet users engage in more telephone and face-to-face communication with friends and family than non-users. Also, to the degree that email and Internet communication masks some interpersonal behaviours and cues, it may well foster more honest and insightful online friendships (McKenna and Bargh 2002). The Internet may enable diverse people to share information, interests and support (Kavanaugh and Patterson 2001; Sullivan *et al.* 2002; Wellman *et al.* 2001), but also reconfigure patterns of communication, reshaping not only who people know and communicate with but also how they access services and other technologies (Dutton 1999, 2004; Rheingold 1993). People who move can use the Internet to maintain their prior social relationships and associated social support and consequent psychological well-being, as well as to communicate with others in the new location to reduce uncertainty (Shklovski *et al.* 2005). However, Shklovski *et al.* suggest that using the Internet both to maintain those prior relationships and for entertainment to escape the stress from moving may delay developing new relationships, thereby leading to lower psychological well-being.

Indeed, those who communicate more and have broader social networks are likely to use the Internet for the same purposes: Birnie and Horvath's (2002) survey of undergraduates found that frequency and intimacy of Internet communication were positively associated with frequency and intimacy of face-to-face and telephone communication. A poll conducted by the Pew Research Center for the Pew Internet and American Life Project (2000) reported that Internet users indicated email had improved their social and kinship connections and more so for those who had used the Internet longer and more frequently. Indeed, there were fewer social isolates among users than non-users and

users had a greater number of recent social contacts and greater access to social support. Parks and Floyd (1996) and Parks and Roberts (1998) found evidence of intimate and well-developed online relationships, often leading to real-world interactions.

Boase *et al.* (2006) assessed this fundamental question in a somewhat different way through a Pew nationally representative survey in 2004 about the role of the Internet and social ties. This study distinguished two types of relations: 'core ties' (very close relationships involving frequent contact, important matters, or help) and 'significant ties' (lower levels of these relationships). People who keep in contact with most of their core ties via email also keep in touch with 25 per cent more of their core ties by telephone than non-emailers and people who keep in contact with most of their significant ties via email also keep in touch with 50 per cent more by in-person contact. Controlling for other factors, such as income, education, network size, or more diverse occupational networks, Internet users were also more likely to get help on up to eight issues from their core as well as significant ties (such as in caring for someone with a major illness, finding a new place to live, changing jobs, deciding for whom to vote, etc.) compared to non-users and for more issues. Further, Internet users have more significant ties (though not more core ties) and 31 per cent report that using the Internet increased the number of their significant ties and 28 per cent said core ties increased. They conclude that Internet use supplements and complements in-person and telephone communication; helps maintain social networks including those who do not live nearby; allows users to seek medical, financial, or other support from others in their networks; and shifts major sources of social capital from a physical community to diverse people and resources.

Later evidence from the HomeNet study (Kraut *et al.* 2002) shifted from its initial conclusion that heavy Internet use caused isolation and depression to stating that, after three years, the heaviest Internet users were happier and had more social contacts, including increased social interaction with family members increased. Likewise, Gershuny's (2002) study of parents' and kids' diaries from 1,000 randomly chosen households concluded that Internet users were

involved in as much social activity as non-users and that new users actually increased the time they devoted to social and leisure activities. Howard's (2004) analysis of the Pew Internet and American Life Project surveys found that people who had more experience using the Internet were more likely to have called a friend or relative 'yesterday' just to talk and also turn to more people for help. In addition, controlling for demographic variables, Internet experience was significantly associated with perceived increases in those users' connection with friends and family and their ability to meet new people (Howard 2004: 15–16).

Copher, Kanfer and Walker's (2002) analysis of a week's worth of around-the-clock communication diaries by 45 community leaders in a US found that 'heavy' email users had more communication, a higher percentage of communication and spent more time communicating than 'light' users. There was little difference in proportionate use of each of the other communication media mentioned, with exceptions such as slightly less phone use or, as also found in the World Internet Project, less television watching (Dutton and Shepherd 2003). Boneva *et al.* (2001) looked specifically at gender differences in relationships between Internet use and social interaction (among a small sample from Pittsburgh), which seem to reflect some gender differences in interpersonal communication. For example, women tend to use email to support family relationships (elderly parents, siblings, extended family), keep in touch with distant people and enjoy email more than do men for such purposes. The paradox here is that the authors conclude that email better fits women's 'expressive style,' involving 'emotional intimacy and sharing of personal information' not usually considered as indicators of isolation, depression and depersonalization attributed to Internet use.

A meta-research project reviewed the results of 16 studies involving 35,578 respondents and 48 relationships between Internet use and social involvement (Shklovski *et al.* 2006; *IT & Society* 1(1)). Shklovski *et al.* concluded that Internet use is not associated with social interaction with family members and found contradictory evidence concerning social interaction with friends. Of 74 relationships examined 10 (from 5 studies) were significantly positive (e.g., increased time with

friends, face-to-face communication) and 12 (from 6 studies) were significantly negative (e.g., decreased time with family, social visits). They argue that research design contributes somewhat to different results, with cross-sectional studies sometimes indicating decreased interactions with friends while longitudinal studies sometimes show greater interactions with friends. Additional influences on divergent findings include different measures for Internet use (for instance, system logs of actual use vs. self-report; frequency, breadth, or history of use; activities and information searching vs. communication) and for social interaction (for instance, friends vs. family).

For example, the Nie and the HomeNet studies have been criticized for biased samples, atypical technology and possibly intrusive interventions. When LaRose *et al.* (2001) analysed a survey replication of the HomeNet data with different causal assumptions, they found no direct influence of Internet use on depression. Rather, that relationship was mediated by self-efficacy and expectations of experiencing stressful situations on the Internet and email was used to communicate with close associates to obtain social support which helped to reduce depression. Thus, they argue, increased depression among the novice users in the HomeNet study arose because they did not have enough self-efficacy to handle sufficiently the stresses of using the new technology in their home. Across all 48 relationships (using effect sizes, but removing three outliers all from one six-hour diary study), there was no statistically significant relationship between Internet use and social interaction. Relationships involving social interaction with friends were less positive than with unspecified close relationships but, when using hierarchical linear modelling to control for whether multiple effect sizes come from the same study, there was a slight positive association of Internet use and social interactions with friends. Longitudinal design differed from survey design only by tending to find positive effects with friends and none with others (and no influence on family interactions). The authors interpret all these results as the effect of reducing costs and inconvenience of communicating with friends, or the Internet playing a role as a sort of reminder of friendships outside of home or work; in both cases,

family relationships are more stable, enduring and available).

They also argue that longitudinal studies have greater validity in asserting causal influences of Internet use on social interaction and that personality factors should be included in more such studies, as baseline controls for, moderators of and direct influences on Internet use and social interaction. Shklovski *et al.* (2004) followed their own advice and analysed year-long panel data (2000 and 2001) from the Pew Internet and American Life Project that included measures of social support and extroversion for 1,501 respondents (42 per cent of the 2000 sample of 3,533). Considering only the 2001 data, family visits, telephone calls and email were all moderately intercorrelated, which could be interpreted as Internet use positively influencing physical and mediated social interaction, but the longitudinal analysis found that Internet use is related to decreases in visiting family the prior day (with greater effects for more extroverted users). Among the 493 relevant respondents, telephone calls increase visits, visits increase email and email does not influence either phone or visits. Overall, then, Internet use led to decreased family visits, but no changes in phoning friends and family, or perceived social support – regardless of the three measures of Internet use – and email is a weaker form of social interaction than face-to-face visits or telephone calls. Methodologically, the meta-analysis and this longitudinal analysis question both causal claims and directional results of cross-sectional studies.

Physical communities and Internet use

In line with this thesis, some studies have analysed how community access to the Internet is associated with social interaction measures such as network density, visits or mediated communication with friends and family (Wellman *et al.* 2001). The Camfield Estates–MIT Creating Community Connections Project applied community technology and community-building concepts to 80 new low to moderate income housing units in the Roxbury area of Boston (Pinkett and O'Bryant 2003). In late 2000, the project provided each family who had at least one member complete an introductory course with a home computer which had high-speed connectivity and the community with a

technology center and community web content. After less than one year, for those 26 families who took the introductory course and participated in both surveys, the following changes in social interaction were found: strengthened and expanded local ties (visiting others' homes, talking to others, recognition of others, emailing other residents, phoning other residents, greater connection to friends and family in the area); being better informed about local activities, including increased communication flow in the development (such as calendars of events and discussion forums); increased motivation to be informed locally, nationally and internationally and increased confidence in themselves and their ability to learn (transition to a sense of competency and activeness and awareness of skills and abilities of the community).

A three-year multimethod study of high-speed access to the Internet in a new wired suburb in Toronto also found that, over time, more neighbours were known and chatted with (although they were more geographically dispersed around the suburb) and an increase in neighbourhood interaction, discussion and mobilization around local issues increased (Hampton and Wellman 2003). Of the 109 housing units, only 64 were connected (due to miscommunication with the developers and insufficient developer resources) and 46 of those homes participated in the study. A natural control group of 21 non-connected households was also studied, enabling the researchers to show that these changes were associated with being among the wired participants. Controlling for gender, age, education and length of residence, being wired still showed increased presence of weak ties, in terms of having being 'recognized' and 'talked with' other community members. This increased social interaction also shaped other social behaviour, such as enabling the community to pressure the developer to fix various problems.

The Internet and social interaction in the US and Britain

The research questions addressed

The kind of social research on the Internet summarized above identifies four general questions

related to the central issue of whether Internet use is associated with increased social isolation or interaction:

1. To what extent are Internet users, compared to non-users, more likely to engage in social interaction?
2. Do people with greater offline interpersonal and mediated social interaction engage in greater online social interaction?
3. Do Internet users reconfigure their social networks in more complex ways? And
4. Do these relationships differ between US and British Internet users?

The study reported below focuses on a small set of social interaction measures (offline interpersonal interaction, offline mediated interaction and online interaction) in considering how Internet use enables people to reconfigure the networks in which they interact, compares results across time (but without using longitudinal, panel data) and compares results across two English-speaking countries with similar Internet adoption rates.

The surveys, sample and analyses

This comparative study analyses two datasets, one from the US and one from Britain. These included many of the same or similar measures, thus allowing for a cross-national comparison of relationships (detailed descriptive and correlation tables are available from the authors). The US data source is the Syntopia project, which has compared Internet users to non-users (and former users, or dropouts) throughout the formative years of the Internet (1995–1997 and 2000) using nationally representative random-digit telephone dialling surveys of US adults (Katz and Rice 2002). The present analyses use data from 1995 and 2000, as those two surveys included measures of social interaction.

The second data source is the 2003 Oxford Internet Survey (OxIS) carried out by the Oxford Internet Institute. This multi-stage random sample of Britons aged 14 and older interviewed participants face to face at their residences, between May 23 and June 28 of 2003 (Rose 2003). First, a random sample of 175 paired Enumeration Districts (EDs) with a combined population of 60

or more, which are stratified and proportional within the main governmental regions, were selected by random start and fixed sampling interval from a list of EDs ordered by income. Within each ED, a random sample of 10 addresses was selected from the British Postal Address File. Of the 3,077 addresses visited 2030 (66 per cent) provided a complete interview, in almost all cases by the available resident with the next birthday. Each potential interview participant was told that 1 British pound would be contributed to the Red Cross for each successful interview.

Internet users were 8.1 per cent of the US sample ($n = 2500$) in 1995 and 59.7 per cent in 2000 ($n = 1305$) and 59.3 per cent of the British 2003 sample ($n = 2025$). Of the US respondents, 7.8 per cent of were dropouts in 1995 and 10.5 per cent in 2000, compared with 6.0 per cent of the British respondents. Anderson and Tracey (2002) reported a similar level of dropouts, as 5.6 per cent of their sample of 1,075 UK respondents had stopped their Internet connection between 1999 and 2000 (see also Katz and Aspden 1998; Katz and Rice 2002).

The analyses are based on the most general and conservative approach to coding, using three main approaches. First, by dichotomizing both continuous and categorical variables in order to enable comparisons both across time and across the US and Britain, as well as with other surveys. Although this was at the cost of loss of variance and an inability to test for curvilinear relationships, appropriate binary logistic regression was used. Secondly, through including relevant socio-demographic and individual control variables. Thirdly, using either chi-square associations for cross-tabulation tables or logistic binary regressions for multivariate analyses.

Internet users are defined here as those who were currently (as of the survey dates) using the Internet; thus dropouts are not included. We also asked users the year they started using the Internet, enabling us to analyse users both as of the year the survey was conducted, as well as how experienced or 'veteran' (as opposed to 'recent') they were. And we asked them to rate their expertise. Thus there are three primary Internet usage measures: non-user/user;

recent/veteran (recent, since 1997, vs. long-term, before 1997); and novice/expert.

Conceptualizations of social interaction

Social interaction is a broad concept, with many different components. These surveys incorporated a small set of variables that represent three main dimensions of social interaction: offline interpersonal; offline mediated; and online interaction. In addition, a few individual traits that might influence general social interaction were included, such as sense of belonging, shyness and innovativeness (see Table 2.1) (Katz and Aspden 1997a; Kraut *et al.* 1998; McKenna and Bargh 2000; Birnie and Horvath 2002).

Socio-demographic aspects of the digital divide in the US and Britain

In 1995, significant unique (from multiple logistic binary regressions) demographic associations with Internet use in the US were: male, younger, higher income and higher education (16 per cent variance explained, 90 per cent of the 1651 cases correctly predicted). In 2000, significant unique explanations of usage were: younger, higher income and higher education (46 per cent variance, 80.4 per cent of 922 cases correctly predicted). In the 2003 British sample, the significant unique predictors of Internet usage were: male, younger, higher socio-economic status and a higher level of education (explaining 37 per cent variance and 75.2 per cent of 2,030 cases correctly predicted). Descriptive analyses of changes in the US data from 1995 to 2000 and in the cohort data from all three surveys show that the digital divide is being narrowed, if not bridged, on sex, age, household income, education and race.

Divides do remain. Many people are not online and both the US and British surveys identify a noticeable percentage of respondents who are Internet dropouts. However, as the digital divide narrows, more of the public in both countries are able to use the Internet, thus highlighting both positive and negative potential consequences for social interaction.

The US case

Offline interpersonal social interaction

The 1995 survey asked interviewees about two kinds of interpersonal social interaction: how many of their 10 closest neighbours they know (dichotomized at six or more) and how many times in the last week did you meet with friends (dichotomized at three or more).

In 1995, long-term and recent Internet users were more likely to know fewer of their 10 closest neighbours. Internet users know fewer of their 10 closest neighbours (44.0 per cent knew 6 or more) than do those who have never used the Internet (52.0 per cent) (chi-square = 4.6, $p < 0.05$). Of non-users who had not heard of the Internet, 37 per cent reported knowing the 10 people living closest to their home and 31 per cent reported knowing 4–9 of the 10 closest people. Similarly, of non-users who had heard of the Internet, 33 per cent reported knowing the 10 closest people and 36 per cent knowing 4–9 of the 10 closest people. Former users reported knowing slightly fewer neighbours (28 per cent reported knowing the 10 closest people and 42 per cent knowing 4–9 of the 10 closest people). They were followed by long-time users (28 per cent reported knowing the 10 closest people and 37 per cent knowing 4–9 of the 10 closest people). Recent users reported knowing the fewest neighbours (21 per cent reported knowing the 10 closest people and 43 per cent knowing 4–9 of the 10 closest people). These results imply that users' social communities are larger and more physically dispersed than non-users'.

However, Internet use and longer-term use are both associated with more, not less, interpersonal social interaction with friends. Internet users meet with friends more (71.0 per cent at least three times per week) than do non-users (58.5 per cent) (chi-square = 11.7, $p < 0.001$). In the week prior to the 1995 survey, 38 per cent of long-time users (having adopted the Internet more than a year before) met 1–3 times with friends and 54 per cent met four or more times. Of recent users, 40 per cent met 1–3 times with friends and 48 per cent met four or more times. Nearly three-quarters (71 per cent) of current users had met with friends at least three times in

Table 2.1 Indicators of social interaction: offline interpersonal interaction, offline mediated interaction, offline mediated interaction, online interaction and controls

Surveys	Offline social interaction		Online social interaction		Controls
	Interpersonal	Mediated	Internet		Sociability, media use and Innovativeness
US 1995	Know how many of 10 closest neighbours No. of times met with friend in past week U+ Internet affect time spent with friends and family	Letters written weekly Phone calls weekly	Contacted family members online V+ Member of online community V+ Made online friend Met person they first knew online		Innovativeness (mean of 'like to do things that are a little dangerous' and 'first among friends to go out and try a new thing'; $\alpha = 0.65$ 1-5) V+
US 2000		Letters written weekly Phone calls weekly	Contacted family members online Member of online community E+		Belonging (mean of 'there are people you feel close to,' and 'you feel part of a group of friends'; $\alpha = 0.56$ 1-5) U+ V+
Britain 2003	Meet friends/family who live 'close but not within walking distance' U- or 'in another country or city' People outside your household you can confide in Time spent meeting with friends	Write to friends/ family who live 'close but not within walking distance' or 'in another country or city' U- Phone friends/family who live 'close but not within walking distance' or 'in another country or city'	Made online friend E+ Met person first knew online V+ E+		Like listening to radio Like watching TV Like reading newspaper (mean for news, for entertainment; $\alpha = 0.56$ 1-5) Shyness (I am a shy person 1-2) U- Innovativeness (when new services are invented it is a good idea to try them 1-5) U+

Note: Summary multivariate internet influences: U = Internet usage; V = Veteran users; E = expert users; + = positive association; - = negative association.

the past week compared to 58.5 per cent for those who had never used the Internet.

In an overall logistic regression predicting Internet usage (Nagelkerke R-sq = 0.11, chi-square = 86.7, $p < 0.001$), knowing 10 closest neighbours became marginally non-significant (beta = -0.31, $p = 0.07$), but the number of times they get together with friends remained significant (beta = 0.46, $p < 0.01$) when the significant influences of education (beta = 0.94, $p < 0.001$), income (0.77, $p < 0.001$) and innovativeness (0.62, $p < 0.001$) were controlled (see left side of Table 2.2, for 1995).

Offline mediated social interaction

In 1995, both users and non-users were asked about their offline mediated social interaction. There was no difference in the number of letters written weekly (54.3 per cent of users and 52.3 per cent of non-users reported writing at least one) but users made significantly more phone calls weekly (82.9 per cent making more than 10, vs. 72.8 per cent for non-users, chi-square = 9.6, $p < 0.01$). In 2000, only users were asked these two questions: 33.2 per cent had written at least one letter and 60.4 per cent had made 10 or more phone calls, in the last week. For letter writing, there were no significant differences between recent Internet users (those who began using in the year prior to the respective survey) vs. long-term users and in novices vs. those with at least average Internet expertise. For telephone calling, long-term users did make more calls (92.0 per cent vs. 79.9 per cent), but there was no difference between novice and expert users.

The left side of Table 2.2 provides logistic regressions predicting offline mediated social interaction (letters, phone calls) for 1995 and 2000, showing any significant influences from demographic factors or the appropriate kinds of Internet usage measures. In the overall logistic regressions for 1995, letter writing was not significantly explained by Internet usage, after controlling for the significant influences of greater education and being male. Making more phone calls was no longer explained by Internet usage, once the significant influences of income and age are taken into account. In the overall logistic regression for 2000, there were no significant influences of veteran usage or Internet expertise

on letter writing, after the significant influences of sex and work status were controlled. And there were no significant influences of veteran usage or expertise on telephone calls after controlling for the significant influence of younger age.

Online social interaction

Internet users were asked about the extent of four kinds of online social interaction: contacting family members online, being a member of at least one online community, making a friend through online interaction, or physically meeting a person (not necessarily a friend) whom they had met first online. All of these, except making an online friend, were lower in 2000. This possibly indicates that later adopters are more likely to be drawn to the Internet for informational than interaction purposes.

Communicating with family members online

In 1995, 42 per cent of users indicated they had contacted family members online, compared to 22.6 per cent in 2000. In 1995, longer-term users were much more likely than recent users to do so (56.0 vs. 26.7 per cent), but level of expertise made no difference. In the overall logistic model, the influence of being a long-term user persisted after controlling for the significant influence of greater income. In the 2000 survey, a smaller proportion of users (20.5 per cent) reported contacting family members online at least several times a year, but there were no differences by recent or long-term status or level of expertise. The overall logistic regression model was not significant.

Member of online communities

Membership in online communities declined as a percentage of users between 1995 and 2000. In the 1995 survey 25.5 per cent of users reported being a member of at least one Internet community. This percentage was significantly higher (48.0 per cent) among long-term users vs. recent users (18.0 per cent) and for those with at least average expertise (33.3 per cent) vs. novices (16.8 per cent). This difference persisted in the overall regression, as shown in the right-hand side of Table 2.2. In 2000, a smaller proportion of users (10.4 per cent) reported being a member of at least one online community. There were significantly more long-term users

Table 2.2 Logistic regressions explaining offline media use and online interactions, US 1995 and 2000

	Users and non-users				Users only					
	Letters weekly		Phone calls weekly		Contact family members online		Member of Internet community		Know internet-only friends	
	B	Exp (B)	B	Exp (B)	B	Exp (B)	B	Exp (B)	B	Exp (B)
1995										
Education	0.43**	1.5								
0 < BA 1 > = BA										
Income 0 < 35K			0.61**	1.8	1.3**	3.6				
1 > 35K										
Sex 0 = M	-0.36***	0.70								
1 = F										
Age 0 < 40			-0.47***	0.62						
1 > 40										
Race 0 = AA									-1.5*	0.22
1 = WnonH										
User 0 = non 1 = user	0.04	1.0	0.32	1.4						
Veteran user 0 = recent user 1 = long-term					1.***	3.6	1.4***	4.2	-0.20	0.82
Expert 0 = novice 1 = more expert										
Chi-sq	30.8***		41.5***		23.9***		16.5***		4.7***	
-2log likelihood	2609		1688		191		210		121	

	Users and non-users		Users only		Know internet-only friends
	Letters Weekly	Phone calls weekly	Contact family members online	Member of Internet community	
Nageikerke R-sq	0.02	0.04	0.19	0.12	0.05
Correctly assigned	56%	75%	71%	75%	89%
N	1908	1539	166	200	179
2000	B	B	B	B	B
Education 0 < BA	Exp (B)	Exp (B)	Exp (B)	Exp (B)	Exp (B)
1 > = BA	1.48	0.29***	1.33		-0.54** 0.59
Sex 0 = M					
1 = F					
Age 0 < 40					
1 > 40		-0.83***	0.44		
Work 1 = full time	0.34*	1.4			
2 = other					
Children					
0 = none 1 = any					
User					
0 = none 1 = user					
Veteran user					
0 = recent user					
1 = long-term					

Continued

Table 2.2 Logistic regressions explaining offline media use and online interactions, US 1995 and 2000 cont.

2000	Users and non-users				Users only					
	Letters Weekly		Phone calls weekly		Contact family members online		Member of Internet community		Know Internet-only friends	
	B	Exp (B)	B	Exp (B)	B	Exp (B)	B	Exp (B)	B	Exp (B)
1 = more expert										
Expert 0 = novice	-	-	-	-			1.2**	3.2	1.3***	3.6
Chi-sq					16.4***		41.8***	ns	17.8***	20.8***
-2log likelihood	1256		1270					547		660
Nagelkerke R-sq	0.02		0.06					0.04		0.04
Correctly assigned	66.7%		61.9%					89.6%		86.2%
N	1000		976				1405	800		850

* p < 0.05; ** p < 0.01; *** p < 0.001.

(11.7 vs. 5.8 per cent for recent users) and those with greater expertise (11.8 vs. 3.9 per cent). In the overall logistic regression, only having greater Internet expertise persisted as an influence on belonging to online communities.

Developing online friendships

In 1995 11.5 per cent and in 2000 13.8 per cent, of users who responded to the question had established friendships via the Internet, presumably people they would not otherwise meet. In 1995, there were no significant differences between recent and long-term users, or between novices and those with more expertise. In the overall regression (right-hand side of Table 2.2), the only significant influence was being African-American. In 2000, however, those with greater Internet expertise were significantly more likely to have developed at least one online friendship (15.7 vs. 5.2 per cent for novices) and this difference persisted in the overall regression after controlling for the significant influence of having less education.

Meeting online friends or acquaintances

In 1995 17 per cent of users who responded to the question reported that they had met face-to-face at least one of the friends they had first met online, with no significant differences by level of usage or experience. In 2000 10.1 per cent of users met an Internet acquaintance (in 2000, the question was not about online friends, but simply anyone they had met first online); they were more likely to do so if they were a long-term (11.4 vs. 5.8 per cent) or more expert user (11.6 vs. 3.2 per cent). Of the 67 people responding to the question asking about whether the most recent meeting with someone they had first met online was a positive experience, 47.8 per cent strongly agreed, 35.8 per cent agreed 10.4 per cent were neutral, 4.5 per cent disagreed and 1.5 per cent strongly disagreed. While the relevant subsample size is too small to assess overall influences on meeting Internet acquaintances, nearly 85 per cent felt it was a positive experience.

Offline interaction associations with online social interaction in 1995

We examined whether those who are more sociable offline are also more sociable online.

With the 1995 survey, we were able to test for associations between two indicators of offline interpersonal social interaction (the number of their 10 closest neighbours the respondent knew and the number of times the respondent got together with friends in the prior week) and three measures of online interaction (contacting family members online; membership in online communities; and developing friendships with people met only on the Internet). In overall logistic regressions, neither of the two forms of offline social interaction was significantly associated with any of the three forms of online social interaction, after controlling for significant demographic influences and after including the two usage measures (recent vs. long-term user and novice vs. more expert user). Additionally, in 1995, 88 per cent of both long-time and recent users felt that use of the Internet did not affect the time they spent with friends and family face-to-face or by phone. The same proportion of users (6 per cent) reported they spent more time with friends and family face-to-face or by phone as the percentage reporting that they spent less time. This reveals that the 1995 US data indicates that engaging in more online social interaction is not related to engaging in more offline social interaction in general.

Offline interaction associations with online social interaction in 2000

The 2000 survey contained some items not on the 1995 survey, enabling us to control for some individual factors related to social interaction and media use. One set of items represented 'belonging' (the mean of 'There are people you feel close to' and 'You feel part of a group of friends'). A related sociability variable (introversion/extroversion), was also measured, but played no significant bivariate or multivariate role, so is not reported here. The second set of items represented media use (the extent to which respondents liked listening to the radio, or liked watching TV) and two items about liking to read the newspaper ('to find out what is going on' and for 'entertainment') that were combined into a mean scale. Cross-tabulations indicated that Internet users were more likely to have a greater sense of 'belonging', especially for long-term users but not for expert users; to be less interested in watching TV; and to like listening to

the radio more. When controlling for the significant socio-demographic influences of age (younger – standardized $\beta = -1.3$, $p < 0.001$), education (1.1, $p < 0.001$) and income (1.2, $p < 0.001$), the greater sense of belonging persisted as being associated with Internet use (0.46, $p < 0.05$), while the two media variables did not (overall chi-square = 150, Nagelkerke R-square = 0.27, $n = 720$).

The British case

Associations were tested between Internet usage/non-usage and four offline interpersonal mediated and mediated social interaction activities (meeting, telephoning, emailing, writing letters to friends/family) at two levels of physical proximity (either with those who are close but not within walking distance, or with those who live in another country or city). Internet users (17.9 per cent) are significantly less likely than non-users (29.9 per cent) to write letters to friends and family who live far away (chi-square = 29.7, $p < 0.001$), but are significantly (though only slightly) more likely (72.0 per cent) to actually meet with those far-away friends and family than are non-users (67.3 per cent) (chi-square = 3.7, $p < 0.05$). None of the other six measures differed by Internet usage.

Table 2.3 provides the results from the eight regressions, explaining the four interpersonal and mediated offline social interactions, nearby and far away. The significant socio-demographic influences were: sex (females were more likely to meet, phone and write nearby and phone and write far away); age (younger users were more likely to meet and phone nearby but older users more likely to write nearby and telephone far away); socio-economic status (higher status users were more likely to meet people far away); education (those with more schooling were more likely to email people far away); and employment (those not employed full-time were more likely to write to those nearby and far away). The veteran users (using the Internet more than one year) and experts (who rated their ability to use the Internet as excellent or good) were more likely to email friends and family who live close and those who live far away. There were no significant influences of veteran usage and Internet expertise in using the

telephone, meeting face-to-face, or writing letters. Generally, Internet users are less likely to meet friends or family members nearby, or write to friends or family far away. Shyness, at least in this study, is not associated with use of the Internet, but shy people are less likely to phone nearby friends or family or email those who live far away.

Internet users in Britain were more likely to have more than one person outside their household whom they can confide in (69.8 vs. 57.2 per cent for non-users, chi-square = 30.0, $p < 0.001$), spend eight hours or more meeting with friends (55.9 vs. 47.2 per cent, chi-square = 13.3, $p < 0.001$) and be more innovative (79.0 per cent agree or strongly agree vs. 47.1 per cent, chi-square = 204.0, $p < 0.001$). The two interpersonal interaction measures were found to be no longer significantly associated with Internet use in a logistic regression (chi-square = 613.5, $p < 0.001$, Nagelkerke R-square = 0.38) controlling for the significant influences of higher education, higher working class, lower age, full-time employment and innovativeness.

Summary and discussion

The evidence presented here, in particular from the specific US and British studies highlighted, suggest that, after controlling for primary socio-demographic differences relating to Internet use and some indicators of sociability and innovativeness, Internet use is associated with some increased offline interpersonal interaction (meeting friends) but not with traditional offline mediated interaction (letters, telephone calls), as well as with online social interaction (contacting or emailing friends or family) including some new forms (being a member of online communities, making friends online).

Of course, there are other factors that could and should be examined to fully understand patterns of social interaction. This is empirically suggested in that few of the analyses explained much variance. It is also theoretically likely, in that research can identify many additional factors, such as personality attributes, cultural preferences and use contexts (both social and technological) which influence social interaction. Moreover, it is important to note that as the US and British datasets in the current study were

Table 2.3 Logistic regressions explaining interpersonal, mediated and online social interactions, Britain 2003

Variables	Offline interpersonal		Offline mediated				Online	
	B	Exp (B)	Telephone friends/family who live close but not within walking distance	Write to friends/family who live close but not within walking distance	B	Exp (B)	B	Exp (B)
Education 0 < BA 1 > = BA								
Working class A, B, C1 = 0, C2, D, E = 1								
Sex 0 = M 1 = F	0.24*	1.27	0.39***	1.47	0.55***	1.74		
Age 0 = 40 1 = > 40	-0.41***	0.66	-0.37**	0.69	0.63***	1.87		
Full-time employment 0 = n 1 = y								
'I am a shy person' 0 = not shy 1 = shy								
User 0 = n 1 = y	-0.29*	0.75	-0.21	0.81	0.17	1.19		

Continued

Table 2.3 Logistic regressions explaining interpersonal, mediated and online social interactions, Britain 2003 cont.

	Offline mediated			Online	
	Offline interpersonal	Telephone friends/family who live close but not within walking distance	Write to friends/family who live close but not within walking distance	Email friends/family who live close but not within walking distance (users only)	
Veteran user	-	-	-	0.35*	1.43
0 = n 1 = y					
Expert user	-	-	-	1.24***	3.47
0 = n 1 = y					
Chi-sq	24.0***	28.8***	45.9***	42.1***	
-2log likelihood	1885	1782	1300	1100	
Nagelkerke R-sq	0.02	0.03	0.05	0.07	
Correctly assigned	60.8%	67.3%	81.3%	64.3%	
N	1415	1424	1397	855	

Variables	Offline interpersonal		Offline mediated		Online	
	B	Exp (B)	B	Exp (B)	B	Exp (B)
Meet friends/family who live in another country or city			Telephone friends/family who live in another country or city		Write friends/family who live in another city or country	Email friends/family who live in another country or city (users only)
Education 0 < BA 1 > = BA		0.72				0.66***
Working class A, B, C 1 = 0, C2, D, E = 1	0.33**					
Sex 0 = M 1 = F			0.49***	1.63	0.49***	1.63
Age 0 = 40 1 = > 40			0.37**	1.45	0.60***	1.82
Full-time employment 0 = n 1 = y					-0.44**	0.64
'I am a shy person' 0 = not shy 1 = shy						-0.35*
User 0 = n 1 = y	-0.02	0.99	-0.08	0.93	-0.38**	0.68
Veteran user 0 = n 1 = y						0.43*
						1.54

Continued

Table 2.3 Logistic regressions explaining interpersonal, mediated and online social interactions, Britain 2003 cont.

	Offline interpersonal		Offline mediated		Online
	Meet friends/family who live in another country or city	Telephone friends/family who live in another country or city	Write friends/family who live in another city or country	Write friends/family who live in another city or country	Email friends/family who live in another country or city (users only)
Expert user	-	-	-	-	1.05***
0 = n 1 = y					2.85
Chi-sq	18.0*	27.2***	80.2***		51.2***
-2log likelihood	1870	1340	1515		1211
Nagelkerke R-sq	0.02	0.03	0.08		0.07
Correctly assigned	68.6%	83.5%	78.0%		60.9%
N	1518	1424	1514		914

Note: The same analyses as above for meeting, telephone calling and writing letters were run for Internet users only. In none of those analyses were the Veteran user or Expert user variables significant.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

cross-sectional, no tests of causality can plausibly be performed on them. Nonetheless, this study has tested for typical biases and major competing explanations. It has done so through the use of nationally representative samples in the two countries, comparison of non-users to users, trends across time and statistical controls for socio-demographic and individual factors.

In the US, considering only unique influences that persist in multivariate regressions, Internet users tend to meet more with their friends than do non-users. Among those on the Internet, somewhat more than one in ten users have become friends with others online, have met a notable percentage of them and belong to online communities. Earlier Internet adopters in 1995 tended to engage in more online social interactions, while in 2000 those with greater Internet expertise did so. Internet users in 2000 were more likely to have a greater sense of belonging. The fundamental indicators of the digital divide (age, education and income) tended to persist and even dominate nearly all of the analyses.

The 2003 British data show that Internet users are slightly less likely to meet friends or family who live close by than are non-users, in addition to being less likely to write to friends or family who live in another city or country. This suggests that Internet users do socialize less via other media than do non-users, but only relative to these two contexts (meeting close by and writing far away). In other contexts, both veteran and expert users employ email to interact with friends and family more, both close and far away. Expert and experienced users do not use media other than the Internet less to socialize than do new users, but they do use email more to socialize. This suggests that they socialize overall more than new users, indicating that experience tends to foster more use of the Internet for social relations.

Conclusion

Key findings different from previous studies

The research reported in this chapter does not purport to be a consistent over-time or cross-cultural replication. But the significant multivariate influences summarized in Table 2.1 do provide some possible explanations in four

main areas as to the diverging results compared to prior studies.

First, there are some clear positive associations between Internet use and sociability. However, after controlling for major socio-demographic variables, most analyses show that Internet use is not associated (either positively or negatively) with offline interpersonal or mediated social interaction, which is better accounted for by the socioeconomic and demographic characteristics of users.

Secondly, there seems to be some shift over the time span covered in the US sample. In the earlier stages (1995) of Internet diffusion, earlier adopters (who had been using the Internet for at least one year at the time of the survey) were more likely to engage in more and new social interactions, such as with members of their family or through online communities. In the later stages of Internet diffusion (2000), expertise rather than experience in Internet use was the primary influence.

Thirdly, as the percentage of Internet adopters in the US in 2000 was almost exactly the same (59.7 per cent) as in the 2003 British samples (59.3 per cent), we might expect quite similar relationships. This was confirmed by the finding in both samples of a positive association between both veteran and expert usage levels with online social interaction.

Fourth, it seems that meeting with friends or family is associated in opposite directions with Internet use in certain contexts. For instance, there is a positive association in the 1995 US data but a negative connection in the 2003 British sample, indicating either adoption stage differences or national/cultural differences. However, a more consistent interpretation can be provided by integrating the related measures: of knowing one's 10 closest neighbours; meeting friends in the past week; meeting friends/family who are close; and meeting friends/family who are distant. Internet use seems to be employed to maintain or enhance more diverse and dispersed social interaction, while possibly reducing very proximate social interaction (as Mesch and Talmud 2004 found in their Israeli study). Local social capital might be reduced, while more general, kin-related, or varied social capital might be increased (Birnie and Horvath 2002; Katz and Rice 2002; Robinson, *et al.* 2000; Wellman *et al.* 2001).

Digital divides and choices reconfiguring access

Both the US and the British data show that the most important effect of the Internet is not to increase or decrease the overall level of contact in any one direction in all, or most, circumstances, but to reconfigure access. That is, it helps to change who users interact with and what medium they use to conduct that interaction, for example in relation to friends living further away or with new online friends. This is not a wholesale change in one's social relations, but a change at the margins that can significantly affect who one has access to and who one gets to know. Anecdotal and more systematic research on activities such as online dating provide vivid examples of the significance of reconfiguring access (Dutton 2004, 2005).

With respect to digital divides in the US and Britain, a simple formulation of divides, such as based on gender or race, no longer seems to hold as much explanatory power. However, there are still significant, albeit more nuanced, divides. In Britain, for example, there is some evidence of differential usage patterns and intensity when one looks beyond mere adoption of the Internet (Liff and Shepherd 2004). In the US, except for elderly women, there are few statistically significant differences by gender in Internet adoption and very few related to usage profiles (Pew Internet and American Life Project 2005). While there are divergent usage profiles by gender, similar to those in the UK, such divergences may be smaller for Internet users than they are for users of other communication technologies about which there is much less discussion concerning digital divides. These include, for instance, television content choices and viewing practices, letter writing, book reading and telephone call initiation, answering and duration (Katz 1999).

In terms of race and ethnicity, differential patterns of adoption remain. Yet such differences are not a simple matter of a so-called privileged group enjoying more access. The argument that there is a race component different from an income component in the digital divide is problematical. At least insofar as the US is concerned, there is markedly higher Internet use among those of Asian-American ethnicity (Pew Internet and American Life Project 2001), who also have

the highest income of any US ethnic group as measured by the US Census Bureau (US Census Bureau 2005). Neither is it clear that all of those who are not online are being held back against their preference or are otherwise impeded. For instance, a 2005 study of 1,000 Americans who were not online shows very little interest among them in going online and thereby ending their status on the deprived side of the digital divide (Parks Associates 2006). Moreover, even the subsample of those without Internet access but who already had a PC in their household (about 1 out of 5) said they would not subscribe to the Internet regardless of the cost.

The contrast to the mobile phone is instructive (for a comparison of Internet and mobile phone adoption, see Rice and Katz [2003]). In contrast to the Internet, the poorest and least educated people in the US, Britain and the rest of the world are among the most enthusiastic adopters of the cell phone. The monthly costs of the two technologies are not much different (and may be higher for the cell phone), but the cell phone seems to better suit the needs of users with less education and lower income. In sum, those looking for data that would justify 'doing something' about reducing Internet digital divides among various social groupings will find little unalloyed support in recent data, save among the elderly. Policy might therefore better focus on shaping what Dutton and others (forthcoming) have called the 'digital choice' – generating opportunities to experience the Internet among those predisposed against, or uninterested in, the Internet (see also Compaine 2001).

Future research directions

An important aspect that should be considered regarding our research findings is that the Internet is neither a stable nor a unitary technology. Hence, the clarity of claims that can be made about the Internet's uses and consequences depart importantly from those that have historically come from studies of earlier mass and personal mediated communication systems. These earlier systems were relatively contained and uniform, such as the cinema and TV broadcasting (until the video recorder) in mass communication or the telephone (until the answering machine) and postcard in personal

mediated communication. Hence, it was easier to make claims about the consequences of such reasonably consistent technologies in different places, subcultures and times. The Internet is very different in this regard: its rapid changes in functionality, integration of digital modes, accessibility and ease of user customization make it hard to generalize about its purported monadic qualities and social consequences. For example, the uses and usability profiles in the 1995 US dataset reported here are quite different from those of nearly a decade later in the UK, even though both activities may be called 'being online.' The introduction of mobile access, instant-messaging, multi-player gaming, location services, social networking, mobile digital music (iPods most typically) and multi-media sharing further blur the notion of online versus offline. In addition, the spread of modes of Internet accessibility, which now range from mobile phones to Internet cafes and schools and libraries, exacerbate the challenge of speaking about social consequences.

The ability to track one pre-selected group over time, as some researchers have done, certainly adds a new and valuable dimension to understanding in the areas examined in this chapter. However, without prior random assignment of a representative sample to conditions of being online or offline, or of heavy or light usage (and a proliferating host of other possible controls), it is not always clear that the subsequent claims of longitudinal studies are really stronger than those based on surveys that rely on comparative cross-sectional sampling over time with post hoc statistical controls. Both are needed, but what is clear from our research and that of many others is that those who are online typically do not suffer significant social interaction deficits. There are important exceptions, such as instances of heavy Internet use by social isolates, Internet addiction (Griffiths 2000) and use the Internet for deceptive and harmful purposes. Similar phenomena arise in people's use of letter-writing, telephone conversations and television programming (Katz 1999). This strongly indicates that research might usefully move away from a focus on any deterministic effect of the Internet in reducing or increasing social interaction. Instead, it might be of more value to see the Internet as a medium that can complement, and in some cases extend, social

interaction (e.g. Anderson and Tracey 2002; Copher *et al.* 2002; Katz and Rice 2002). That is, people seem to use the Internet for many of the same purposes they participate in other forms of interaction – a syntopian perspective rather than either a dystopian or a utopian perspective (Katz and Rice 2002). Most generally, the Internet could tend to reconfigure social interaction, for better or worse (Dutton 2004, 2005). In turn, this could contribute to the transformation of who we know, who we maintain relationships with, who we meet online and offline and many other aspects central to the lives of people around the world.

Humans are social and communicative beings and are generally able to use a (still) primarily text-based computer-based communication medium like the Internet to exercise and expand that need and ability. Thus, persisting digital divides and their socio-demographic influences, also represent decreased opportunities for online as well as offline social interaction (both interpersonal and mediated), especially outside one's local network.

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