

Do Internet Users Have More Social Ties? A Call for Differentiated Analyses of Internet Use

Shanyang Zhao

Department of Sociology
Temple University

Research on the impact of Internet use on social ties has generated conflicting results. Based on data from the 2000 General Social Survey, this study finds that different types of Internet usage are differentially related to social connectivity. While nonsocial users of the Internet do not differ significantly from nonusers in network size, social users of the Internet have more social ties than nonusers do. Among social users, heavy email users have more social ties than do light email users. There is indication that, while email users communicate online with people whom they also contact offline, chat users maintain some of their social ties exclusively online. These findings call for differentiated analyses of Internet uses and their effects on interpersonal connectivity.

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Introduction

The social impact of the Internet has been under close scrutiny for many years (DiMaggio, Hargittai, Neuman, & Robinson, 2001; Katz & Rice, 2002). One issue that has generated a great deal of debate among researchers is the effect of Internet use on interpersonal connectivity (Sproull & Kiesler, 1991; Uslaner, 2000). Three major conflicting findings have been reported: (1) Internet use decreases social ties, (2) Internet use increases social ties, and (3) Internet use neither decreases nor increases social ties (Wellman, Haase, Witte, & Hampton, 2001). Such contradictory results have come not only from studies with different research designs and measurements, but also from studies based on similar designs and measures (Kraut et al., 1998, 2002). A myriad of factors have probably contributed to this puzzling controversy. This article examines the possibility of differential impacts of different types of Internet usage on social connectivity. The idea is that different online activities may be differentially related to the formation and maintenance of social ties: While some activities (e.g., email and chat) are positively correlated with social ties, other activities (e.g., Web surfing) are negatively associated with them. If that is indeed found to

be the case, then differentiated analyses of Internet uses and their impacts on social ties are called for.

Literature Review

The effect of use of electronic means of communication on interpersonal relationships drew the attention of academia long before the advent of the Internet. For example, a number of scholars had predicted that the spread of the telephone would enable people to “develop intimate social networks based on personal attraction and shared interests that transcended the boundaries of residence areas” (Aronson, 1971, p. 162). This prediction, however, turned out to be incorrect, as it was later found that telephone use served mainly to reinforce “existing networks of contacts, rather than creating socialized societies of telephone friends” (Pool, 1977, p. 376).

The current debate over the impact of Internet use on social ties can be traced back to the publication of Rheingold’s (1993) influential book on “virtual community,” where the Internet was described as capable of bringing strangers together to form intimate online networks. Rheingold’s positive assessment of the Internet conflicted with the negative views expressed by other scholars who regarded online social networks as “the illusion of community” (Parks & Floyd, 1996) or “categorical identities” that are inferior to the “dense, multiplex, or systematic web of interpersonal relationships” formed in corporeal copresence (Calhoun, 1998, p. 385).

This debate was later extended to arguments about whether or not the growth of online connections is at the expense of offline relationships. Many quantitatively oriented researchers sought to test the various hypotheses using survey data. Based on a study of 169 people in 73 households over a two-year period, Kraut et al. (1998) found that Internet use was detrimental to offline interpersonal relationships, for “greater use of the Internet was associated with subsequent declines in the size of both the local social circle and, marginally, the size of the distant social circle” (p. 1025). Kraut and his associates dubbed this finding an “Internet paradox” because use of the Internet, a technology for social contact, actually led to the reduction of offline social ties. This paradox argument received further support from Nie, Hillygus, and Erbring’s (2002) time diary study that shows “on average, the more time spent on the Internet, the less time spent [offline] with friends, family, and colleagues” (p. 238).

However, opposite findings have been reported as well. For example, Robinson, Kestnbaum, Neustadtl, and Alvarez (2000) found that when compared to those who did not use the Internet, Internet users were likely to spend more time communicating face-to-face and over the phone with family and friends. More surprisingly, in a follow-up study of their earlier sample, Kraut et al. (2002) discovered the exact opposite of what they had previously reported: “Participants who used the Internet more had larger increases in the size of their local social circle and distant social circle and their face-to-face interaction with friends and family increased” (p. 61). In between these two types of contradictory reports there are research findings showing

that "Internet contact neither increases nor decreases contact with people in person or on the telephone. It adds on to it, so that the more people use the Internet, the more overall contact they have with friends and relatives" (Haythornthwaite & Wellman, 2002, p. 28). In other words, much like the telephone, the Internet is more useful for maintaining existing ties than for creating new ones (Koku, Nazer, & Wellman, 2001).

How did empirical research end up producing such bewildering amounts of contradictory findings? A number of factors can be identified as possible contributors. Differences in research design may have played a role. Many of these studies were based on cross-sectional surveys that could lead to incorrect conclusions regarding causal relationships (Shklovski, Kraut, & Rainie, 2004). Use of differing measurements may also have contributed to the conflicting results. For example, in measuring Internet use, some researchers recorded the amount of time respondents spent online, while others employed a simple "user-nonuser" dichotomy, ignoring differences in extent of usage, whereby "any effects of Internet use are likely to be concealed or diluted" (Nie et al., 2002, p. 218). Another factor, which is the focus of the present investigation, might be the failure to differentiate subtypes of Internet uses that differ in their impacts on social ties. While acknowledging the existence of different online activities, most researchers have treated Internet use as a single category, assuming that different types of Internet uses all have similar effects on interpersonal connectivity. However, this assumption, which is crucial to the validity of aggregate findings about the impact of Internet use, might not be correct.

Online activities can be grouped into two main types: (1) solitary activities that do not involve direct contact with other people, e.g., web surfing and news reading, and (2) social activities that involve direct contact with other people, e.g., the use of email, listservs, bulletin boards, and chat rooms. While online social activities may be conducive to the development and maintenance of network ties, online solitary activities may detract from time spent with others and, as a result, reduce social connectivity. Therefore, as Wellman et al. (2001) have argued, "there are no single Internet effects," and it is necessary to perform "more differentiated analyses of the Internet."

This study investigates the differential associations of type of Internet use with size of interpersonal networks. It is hypothesized that more involvement in online solitary activities is associated with fewer social ties, and that more involvement in online social activities is associated with more social ties. However, this hypothesis assumes no particular causal direction between Internet use and social ties. It is possible, for example, that heavy involvement in solitary online surfing leads to a decrease in social ties, but it is also possible that lack of social ties makes a person more prone to engage in online solitary activities. Another possibility is that a third factor, such as certain types of personality, is responsible for both engaging in online solitary activities and lacking social connectivity. The present study, which is based on a cross-sectional data set, can not determine causation, but it may produce results that are useful for further investigations of the causal relationship between Internet use and social ties.

For example, if there is evidence that different types of Internet usage are indeed differentially related to social ties, then researchers should no longer treat Internet use as a single category in analyzing its impact on interpersonal connectivity.

Conceptual Clarifications

Before the research hypotheses for this study are formally stated, the following concepts need to be introduced and properly defined: social use and nonsocial use of the Internet; light use and heavy use of the Internet; institutionally based and voluntarily based interpersonal relationships; online and offline interactions; and contact time and number of people contacted.

Social Use versus Nonsocial Use of the Internet

The Internet is used for both social and nonsocial purposes (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1999; Weiser, 2001). Nonsocial use of the Internet involves solitary online activities, such as web surfing, news reading, and person-versus-computer gaming. Such asocial activities can detract from time spent with others. In contrast, social use of the Internet involves direct contact with other people. Depending on the level of acquaintanceship involved in the relationship with others, online social activities may be broken down into two types: (1) interacting with acquaintances, e.g., family, coworkers, and friends, and (2) interacting with strangers, e.g., anonymous others. While online contact with acquaintances, which is commonly maintained through email, may not make new additions to one's existing social ties, online communication with strangers, which often occurs in places like chat rooms and multiuser domains, may increase one's network size. To study the impact of Internet use on social connectivity, it is therefore necessary to divide Internet use into the following three subtypes: (1) nonsocial use of the Internet for solitary activities, e.g., web use, (2) social use of the Internet for contact with the acquainted, e.g., email use, and (3) social use of the Internet for contact with the unacquainted, e.g., chat use.

Light Use versus Heavy Use of the Internet

The extent to which Internet use affects interpersonal relationships depends on, among other things, the extent to which users use the Internet (Copher, Kanfer, & Walker, 2002). There are great variations in the amount of time individuals spend online communicating with others. Some people go online only occasionally to check their email, whereas others spend hours in chat rooms every day, talking to strangers. It is inappropriate to lump together these two kinds of people in the same user category when studying the effects of Internet use, as this will overestimate the effect of Internet use for some and underestimate the effect for others (Kraut et al., 2002).

Institutionally Based versus Voluntarily Based Relationships

The reasons people come to form relationships with others in everyday life are varied. In some cases, it is because they want to; in other cases, it is because they

have to or happen to. Institutionally based relationships are “involuntary” (Goldstein & Warren, 2000) in the sense that the social ties are formed not due to personal choice but because of the given institutional arrangement (e.g., characteristics of one’s family or workplace); as such, the number of social ties a person has may not reflect his or her level of sociability. Voluntarily based relationships, on the other hand, are social ties that are formed on the individuals’ own initiative according to mutual liking and common interests. Such voluntary relationships are analogous to what Giddens (1991) calls “pure relationships” in that “the connection with the other person is valued for its own sake” (p. 90). It seems likely that the Internet has a differential impact on the formation of these two types of social ties.

Online versus Offline Interactions

For most of human history, interactions among people have taken place in the context of corporeal copresence. The invention of writing made it possible for people to communicate with each other without being physically together. The telephone, and more recently the mobile cellular phone, have enabled people to remain in simultaneous contact while located in separate places. Even though writing displaced some face-to-face interaction and the telephone “eliminated much of the time which otherwise would have been spent in writing letters or traveling to meetings” (Aronson, 1971, p. 154), postal mail and phone calls have been largely used to maintain social ties established through in-person contact (Pool, 1977). The Internet is the first major medium of communication that allows people to establish new social contacts outside the face-to-face context as well as to maintain existing ties formed in corporeal copresence.¹ It remains to be seen, however, whether the Internet will displace the traditional media of phone and letter in offline interpersonal communication (Robinson et al., 2002).

Contact Time versus Number of People Contacted

Most existing research measures the effect of Internet use on social ties in terms of changes in the amount of time people spend with others: The more time spent communicating with others, the more social ties one has.² This approach, although useful, is not always informative, for contact time does not necessarily reflect the number of people with whom one keeps in contact. Some individuals may spend a large amount of time interacting with only a small number of people, whereas others may manage to spend less time communicating with a lot of people. If the theory of “the strength of weak ties” (Granovetter, 1973) is correct, then the size of social network a person maintains matters as well. It is thus important to examine not only the amount of time spent with others but also the number of people contacted.

Research Hypotheses

This study examines the relationship between Internet use and social ties. “Social ties” refers to “connections among individuals — social networks and the norms of

reciprocity and trustworthiness that arise from them” (Putnam, 2000, p. 19). For the purpose of this investigation, social network size is measured in terms of the number of people with whom a person regularly keeps in contact. To exclude the confounding effect of institutional affiliations on personal network size, this study focuses on the social ties that are voluntarily formed on the basis of common interests and mutual liking. Such relationships can emerge both online and offline and can be maintained through face-to-face as well as other modes of interpersonal contact. In contemporary society, noninstitutional social ties are playing an increasingly important role in providing individuals with social and emotional support (Wellman & Potter, 1998).

“Internet users” are divided into three subgroups: web users, email users, and chat users. Web users are those who use the Internet for online solitary activities, such as web browsing and file downloading. Email users and chat users, on the other hand, are those who use the Internet for communicating with other people. The term “chat users” is employed here to refer to people who interact with one another via many-to-many, rather than one-to-one, contact media, such as chat rooms, newsgroups, listservs, and bulletin boards. A main difference between email users and chat users is that while email users mostly communicate with someone they already know in person, chat users often communicate with people they do not know in person. Given the nature of these different types of Internet usage, the three groups of Internet users are expected to differ in the size of their non-institutional social networks.

To take into consideration the variations in extent of Internet use and their impacts on social ties, each of the three groups of Internet users is further dichotomized into light users and heavy users. The relationship between the amount of time spent online and the number of social ties a person maintains is expected to vary according to types of Internet usage.

Do Internet users have more social ties? It is argued here that the answer to this question depends on both what the Internet is used for (type of usage) and how much it is used (extent of use). Three hypotheses are formulated below for testing. The first hypothesis looks at the relationship between type of Internet use and number of social ties; the second hypothesis re-examines this relationship by taking extent of use into account; and the third hypothesis concerns the possibility that different types of Internet use may be associated with different types of social ties. All hypotheses are stated in correlational terms, but the possible justifications for the hypothesized relationships are provided in causal language. It is important to bear in mind that it is the hypotheses, not the justifications for the hypotheses, that are under examination. Although the present study cannot determine causation due to the cross-sectional nature of the data used here, the outcome of this study has implications for causal analysis.

H1: Different groups of Internet users have different sizes of network connections. Compared to nonusers, social users of the Internet have more social ties, and nonsocial users of the

Internet have fewer social ties. Among the social users, chat users have more social ties than email users do.

Possible justifications for this hypothesis include the claim that nonsocial use of the Internet keeps users away from interacting with others both online and offline; as a result, nonsocial users are likely to have fewer social ties than do nonusers (Nie et al., 2002). Among social users, chat users are likely to have more social ties because, being on newsgroups, listservs, and bulletin boards, they tend to communicate with more people, including those they do not know in person (McKenna et al., 2002).

H2: The relationship between types of Internet usage and size of network connections varies with time spent online. For social use of the Internet, heavy users tend to have more social ties than light users do; but for nonsocial use of the Internet, heavy users tend to have fewer social ties than light users do.

Possible justifications for this hypothesis include the notion that as nonsocial use of the Internet detracts from time spent with others, the more time one spends online, the less time one spends socializing with others, and, consequently, the fewer social ties one has. In contrast, as social use of the Internet involves direct contact with others, the more time one spends online, the more time one spends socializing with others, and, consequently, the more social ties one has. Among social users of the Internet, heavy chat users may have more social ties than heavy email users do because many-to-many communications involve more people than one-to-one messaging does.

H3: Social contacts are maintained differently by different user groups. Email users tend to maintain their contacts both online and offline, and chat users tend to maintain some of their social contacts exclusively online.

Email is usually exchanged between acquaintances who also keep in touch with each other offline through traditional modes of contact, i.e., in person, by phone, and by letters (Koku et al., 2001; Neustadt & Robinson, 2002). Many-to-many online communications, on the other hand, often take place among people unknown to one another offline (Parks & Roberts, 1998). Because of this, an increase in online contacts among chat users may not be associated with a corresponding growth in their offline contacts.

Data and Measurement

The data used for this study are drawn from the General Social Survey (GSS), which has been conducted nearly annually since 1972 (biannually after 1994) by the National Opinion Research Center (Davis & Smith, 1992). Each survey is a national sample of approximately 1,500 (increased to 3,000 since 1994) noninstitutionalized Americans 18 years of age or older. The response rate over the years ranges from 73% to 79%.

This study is based on the GSS data collected in the year 2000. The 2000 General Social Survey ($n = 2,817$) contains a special topical module on Internet use, covering

topics like type of online programs used, type of online activities engaged in, amount of time spent online, as well as levels of interpersonal contact through traditional means of communication.

Measures of Internet Users

The 2000 GSS asked respondents whether they ever used (1) the World Wide Web, (2) electronic mail, and (3) many-to-many online communications programs, such as chat rooms, newsgroups, bulletin boards, and discussion forums. For each of these three types of online activities, respondents were asked to estimate the amount of time (minutes and hours) they spent per week in using them. Several categories of "Internet users" are constructed for this study based on such information.

Nonexclusive web users include those respondents who said they spent one minute or more per week using the World Wide Web. *Nonexclusive email users* include those respondents who said they spent one minute or more per week using electronic mail. And *nonexclusive chat users* include those respondents who said they spent one minute or more per week using many-to-many online communications programs. These three user groups are labeled "nonexclusive" because users in one group might also have engaged in the activities of other groups.

To create mutually exclusive groups of Internet users, a hierarchical rule is adopted. *Web users* are those who used only the World Wide Web; *email users* are those who used email but not many-to-many online communications programs; and *chat users* are those who used many-to-many online communications programs, regardless of whether or not they used the World Wide Web and email. To take into account the amount of time a user spent online, each user group is subdivided into light users and heavy users based on self-reported extent of use.³ *Light users* are those who spent less than three hours per week online, and *heavy users* are those who spent three or more hours per week online. The reason the "three hour" cutoff point is chosen here is that the frequency distributions on time spent online for web, email, and chat uses all exhibited a significant drop at the "three hour" mark, suggesting a bimodal pattern for each type of Internet usage (see Appendix A for the quartiles within which the cutoff points for the three measures fall). Finally, those who have ever used web or email or chat are grouped together under the label of *Internet users*, and those who have never used any of these online programs are named *nonusers*.

Table 1 shows the number and percentage of respondents in different user groups. A total of 2,353 adult respondents, about 84% of the sample ($n = 2,817$), were asked questions regarding Internet use.⁴ 52.9% of the respondents never used the Internet. Among the 47.1% Internet users, 87.18% used the World Wide Web, 89.35% used email, and 20.21% used many-to-many online communications programs. The percentages suggest that the majority of Internet users used both the World Wide Web and email, but only one-fifth of them used online chat. These figures are more or less in line with the findings of another national Internet survey conducted a year later by the Pew Internet and American Life Project (Lenhart, Rainie, & Lewis, 2001). The survey found that 56% of American adults went online

Table 1 Descriptives of Internet user groups

User Classification	N	Percent
Nonusers	1245	52.9
Internet Users	1108	47.1
Nonexclusive Web Users	966	87.18
Nonexclusive Email Users	990	89.35
Nonexclusive Chat Users	224	20.21
Web Users	103	9.30
Email Users	781	70.49
Chat Users	224	20.21
Light Web Users	76	6.86
Heavy Web Users	27	2.44
Light Email Users	467	42.15
Heavy Email Users	314	28.34
Light Chat Users	139	12.54
Heavy Chat Users	85	7.67

in 2001. However, compared with teens ages 12-17, adults were less likely to use many-to-many online communications programs. For example, while teenagers and adults were equally likely to use email (92% of online teens and 93% of online adults), teenagers were considerably more likely than adults to use instant messaging (74% of online teens versus 44% of online adults) and chat room (55% of online teens versus 26% of online adults).

Among the 1,108 Internet users, 9.3% used only the World Wide Web (web users), 70.49% used email but not many-to-many communications programs (email users), and 20.21% used many-to-many communications programs (chat users). Of the Web users, 26.21% were heavy Web users; of the email users, 40.20% were heavy email users; and of the chat users, 37.95% were heavy chat users. The lower percentages of heavy users indicate that the majority of Internet users spent less than three hours per week online in year 2000. In this study, the nonexclusive Internet user groups will not be used, for the large overlap between email users and chat users may dilute the distinctive effect of each user group.

Measures of Social Ties

Number of friends kept in contact measures a person's total number of active social ties established on a voluntary basis. This variable is created from responses to the following question: "Not counting people at work or family at home, about how many other friends or relatives do you keep in contact with at least once a year?" (NUMCNTCT).⁵ Based on replies to a set of follow-up questions, three additional variables are constructed, each measuring the size of a person's offline network connections that were maintained through one of the three traditional modes of interpersonal communication: in person, by phone, and by letters. *Number of friends seen in person* is based on answers to "Of these friends and relatives, about how many

do you stay in contact with by seeing them socially, face-to-face?" (INPERSON); *number of friends talked by phone* is based on answers to "Of these friends and relatives, about how many do you stay in contact with by talking with them on the telephone?" (BYPHONE); and *number of friends contacted by letters* is based on answers to "Of these friends and relatives, about how many do you stay in contact with by exchanging cards or letters through U.S. postal mail?" (LETTERS). (Note: the word "friends" in the above variable labels has been used to refer to both friends and relatives, not counting people at work or family at home.)

Table 2 displays the descriptive statistics for the four measures of social network size. "Number of friends kept in touch" measures the overall size of a person's active friendship network, operationalized as the number of friends and relatives with whom a respondent stayed in contact at least once a year. Obtained responses range from zero ($n = 18$) to 350 ($n = 1$), with a mean of 20.90 and a median of 10. The other three variables measure the number of friends and relatives with whom a respondent stayed in contact at least once a year through each of the three traditional means of interpersonal communication (face-to-face, phone, and letters). The response options are (1) "0 people," (2) "1-2 people," (3) "3-5 people," (4) "6-10 people," (5) "11-15 people," (6) "16-25 people," (7) "26-50 people," and (8) "50 or more people."

The mean number of friends and relatives seen face-to-face at least once a year was between 6-10 (response value = 4); the mean number of friends and relatives talked with over the phone at least once a year was somewhere between 6-10 and 11-15 (response value = 4.13); and the mean number of friends and relatives contacted through postal mail at least once a year was somewhere between 3-5 and 6-10 (response value = 3.25). These findings show that social ties maintained through phone contact outnumbered face-to-face ties, with relationships maintained through postal letters trailing further behind in prevalence. It must be noted that the above estimates are based on responses from only one-third of the sample, as the rest of the respondents were skipped out of this particular battery of questions due to random item rotations within the survey.

Control Variables

Both Internet use and number of social ties are known to be associated with certain social demographic variables. Eight such variables are controlled for in the multiple

Table 2 Descriptives of social ties

	Median	Mean	SD	N
# of Friends Kept in Touch	10	20.90	28.67	898
# of Friends Seen in Person	4	4.00	1.89	906
# of Friends Talked by Phone	4	4.13	1.69	910
# of Friends Contacted by Letter	3	3.25	2.05	906

Note: Responses to # of friends seen in person, talked with by phone, and contacted by letter are grouped: 3 = "3-5 people", 4 = "6-10 people", 5 = "11-15 people."

Table 3 Regression of social ties on Internet user groups (unstandardized coefficients)

User Groups	(Model 1)		(Model 2)		(Model 3)		(Model 4)	
	# People Kept In Touch		# People Seen In Person		# People Talked By Phone		# People Contacted By Letter	
	b	(s.e)	b	(s.e)	b	(s.e)	b	(s.e)
(Nonuser)								
Light Web Users	5.45	(5.63)	-0.20	(0.39)	-0.02	(0.35)	0.51	(0.40)
Heavy Web Users	-6.65	(10.12)	-0.28	(0.70)	-0.35	(0.63)	-0.84	(0.72)
Light Email Users	2.24	(2.78)	-0.05	(0.19)	0.09	(0.17)	0.44*	(0.19)
Heavy Email Users	10.20**	(3.12)	0.60**	(0.21)	0.40*	(0.19)	0.44*	(0.22)
Light Chat Users	11.91**	(3.95)	0.47	(0.27)	0.54*	(0.24)	0.27	(0.28)
Heavy Chat Users	13.35**	(5.06)	0.06	(0.34)	-0.17	(0.31)	-0.15	(0.35)
Age	0.16	(0.08)	-0.01	(0.01)	0.01	(0.01)	0.02***	(0.01)
Male	-3.02	(1.95)	-0.43	(0.13)	-0.05	(0.12)	-0.67***	(0.14)
Black	-7.30**	(2.70)	-0.54***	(0.18)	-0.42**	(0.16)	-0.72***	(0.19)
Other	-7.28	(4.22)	-0.44	(0.29)	-0.46	(0.26)	-0.65*	(0.30)
Family Income	0.69	(0.47)	0.05	(0.03)	0.07*	(0.03)	0.04	(0.03)
High School	4.33	(2.81)	0.24	(0.19)	0.33	(0.17)	0.34	(0.20)
College	6.88	(4.34)	0.57	(0.30)	0.75**	(0.27)	0.56	(0.31)
Graduate	8.39*	(3.42)	0.68**	(0.24)	0.77***	(0.21)	1.19***	(0.24)
Married	-1.12	(2.60)	0.23	(0.18)	0.2	(0.16)	0.20	(0.18)
Widowed	-5.77	(4.47)	-0.09	(0.31)	-0.20	(0.28)	-0.18	(0.32)
Divorced	-7.27*	(3.21)	-0.11	(0.22)	-0.23	(0.20)	-0.42	(0.23)
Separated	-6.49	(4.88)	-0.32	(0.33)	-0.31	(0.30)	-0.35	(0.34)
Work Full-time	-3.99	(2.78)	-0.22	(0.19)	-0.22	(0.17)	-0.04	(0.19)
Work Part-time	0.53	(3.57)	0.20	(0.24)	0.09	(0.22)	0.17	(0.25)
Student	-9.99	(7.02)	-0.60	(0.49)	-0.36	(0.44)	-0.03	(0.50)
Urbanicity	0.73*	(0.36)	0.06*	(0.03)	0.02	(0.02)	-0.01	(0.03)
R-Square	0.099		0.099		0.107		0.171	
N	(786)		(793)		(793)		(793)	

* $p < .05$, ** $p < .01$, *** $p < .001$.

regression models (Kraut et al., 2002; Nie et al., 2002). These include respondents' age; gender (dummy coded into male and female); race (dummy coded into three categories: white, black, and other); family income; education (dummy coded into less than high school, high school, junior college, and college/graduate); marital status (dummy coded into never married, married, widowed, divorced, and separated); and employment status (dummy coded into not working, work full-time, work part-time, and student); and urbanicity.

Limitations of the Data

The 2000 General Social Survey is a nationally representative sample with a special focus on Internet use. The survey provides data not only on a wide range of online

activities, which include solitary Web surfing, one-to-one emailing, and many-to-many synchronous or asynchronous exchanges, but also on interpersonal contact through the three major traditional media of communication, i.e., face-to-face, phone, and letters. However, this data set has some limitations. First, the 2000 GSS employed a split-ballot design, which rotated a set of selected questions across three random subsamples within the survey. Consequently, not every respondent was asked all the questions needed for the present study. Second, the survey was based on respondents' self report. Recall errors were thus inevitable, and there might have been exaggerations in the estimation of time spent online and number of friends kept in contact with. However, such problems are inherent in nearly all self-reported data, and the 2000 GSS is not unique in this regard. A third limitation of the data, which does not really affect this study, is that the 2000 GSS is a cross-sectional survey that cannot be used to examine the causal relationship between Internet use and social ties. This limitation is not a problem for the analyses conducted here because the focus of the present study is not on causation but on association. To find out whether different types of Internet uses are differentially associated with social ties, cross-sectional data are in fact sufficient.

Results

Do different types of Internet users have different sizes of network connections? Figure 1 displays the average number of active social ties for the four different Internet user groups, showing that Internet use is indeed differentially related to interpersonal connectivity, depending on types of online activities in which users are engaged. The mean total number of friends and relatives kept in contact with at least once

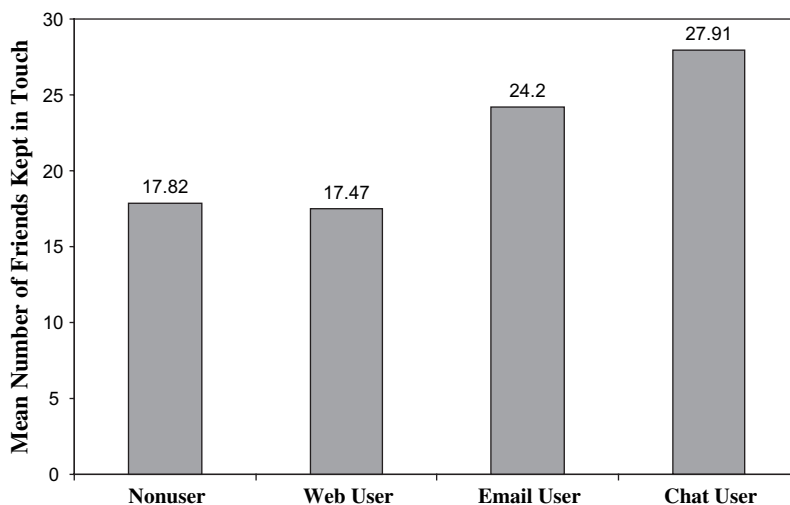


Figure 1 Mean number of social ties by Internet user group.

a year was 17.82 for nonusers, 17.47 for web users, 24.20 for email users, and 27.91 for chat users ($F(3, 894) = 5.268, p < .001$). Post hoc Scheffe tests, however, indicate that the differences between nonusers and Web users and between email users and chat users are not statistically significant. This finding therefore partially confirms H1, suggesting that those who use the Internet for interpersonal contact (email and chat) tend to have more social ties than nonusers and nonsocial users of the Internet.

Does the association between type of Internet use and number of social ties vary with extent of usage? Figure 2 shows that the relationship does differ between light users and heavy users. For Web users, heavy use of the Internet was associated with a reduction in number of social ties: 19.61 for light users and 11.50 for heavy users. For both email users and chat users, on the other hand, heavy use of the Internet was associated with an increase in number of social ties: 20.98 for light email users and 28.53 for heavy email users; likewise, 27.14 for light chat users and 29.29 for heavy chat users. However, the results of t-test reveal that only the difference between light email users and heavy email users reaches statistical significance ($t(282) = -2.423, p = .016$). Thus, this finding partially confirms H2, showing that extent of Internet usage is positively related to network size in the case of email exchange, but is not related to social connectivity in the case of web surfing and chatting online.

Finally, are different groups of Internet users equally likely to maintain their network connections through traditional modes of communication? The preceding two graphs have shown that chat users, especially heavy chat users, appear to have the largest number of active social ties among all the subgroups of Internet users. If these social contacts were maintained both online and offline, then heavy chat users should also have the largest number of social ties kept in touch with through in-person visit, phone, and letter. Figure 3, which focuses only on heavy Internet users (the

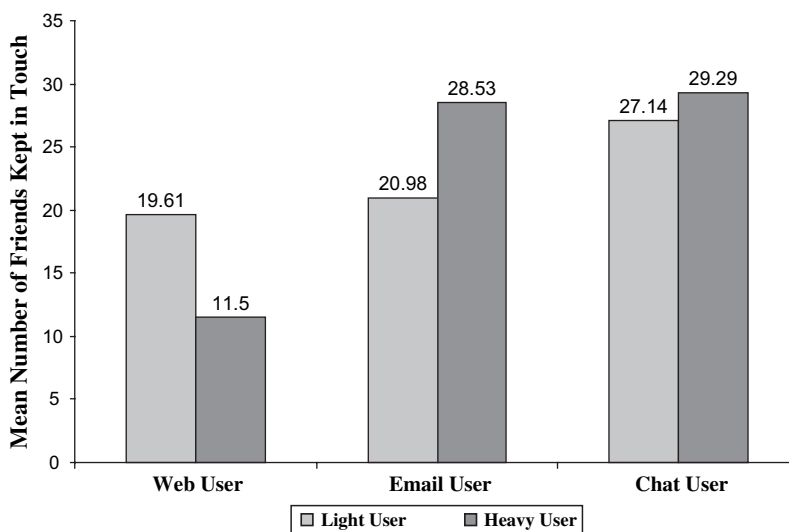


Figure 2 Mean number of social ties by extent of Internet use for each user group.

differences in network size among light Internet users were not as large), reveals that it is in fact heavy email users, not heavy chat users, who reported the largest number of contacts maintained via in-person visits ($F(2, 167) = 3.221, p = .042$), phone ($F(2, 168) = 2.602, p = .077$), and letters ($F(2, 165) = 2.920, p = .057$). This discrepancy suggests that heavy chat users must have maintained some of their social ties exclusively online. In the case of heavy email users, the overall size of their reported social connections is proportional to the number of social ties they maintained through the three traditional modes of contact (6–10 to 11–15 for in-person, 6–10 to 11–15 for by phone, and 3–5 to 6–10 for by letters), indicating that heavy email users tend to communicate online with people they also contact offline. This differential pattern of contact maintenance among subgroups of Internet users confirms H3.

It has been known that certain Internet user groups are associated with certain demographic characteristics, which are related to personal network size. For example, younger, white, better educated, and richer people are more likely to use the Internet as well as to maintain a higher level of social contact (Nie et al., 2002). It is therefore necessary to go beyond bivariate analysis in examining the relationship between Internet use and social ties. Table 3 presents four multiple regression models, predicting number of social ties based on types of Internet usage while controlling for age, gender, race, family income, education, marital status, employment status, and urbanicity.

Model 1 regresses the overall number of social ties on types of Internet usage, showing that email users and chat users are likely to have more social ties than

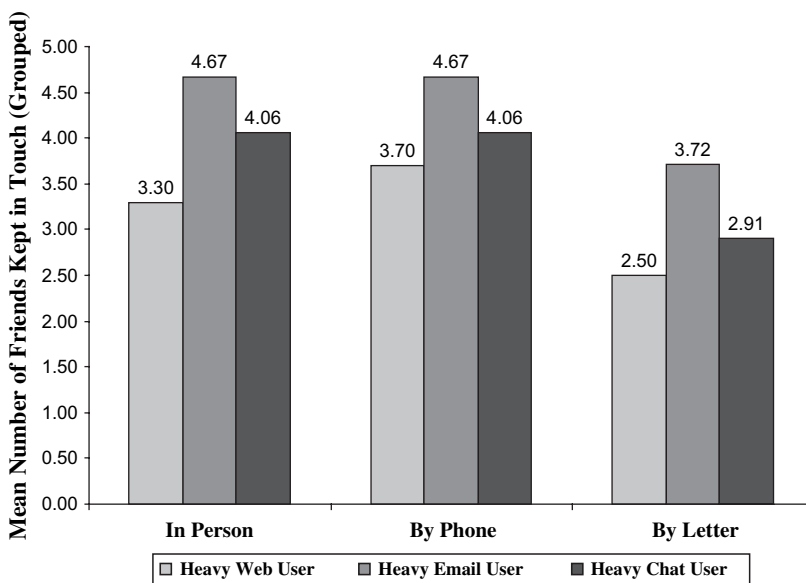


Figure 3 Mean (grouped) number of social ties maintained by each user group via different contact modes.

nonusers do, with chat users having more social ties than email users do. As was found in the earlier bivariate analyses, Web users are not significantly different from nonusers in total number of social ties. Model 1 also shows that heavy email users are likely to maintain more social ties than light email users do ($b = 10.20$ versus $b = 2.24$), and heavy chat users are likely to have more social ties than light chat users do ($b = 13.35$ versus $b = 11.91$). Although not statistically significant, heavy Web users tend to maintain fewer social ties than light Web users ($b = -6.65$ versus $b = 5.45$).

Regression models 2-4 show that heavy email users are likely to stay in contact with more friends and relatives through the three traditional modes of communication than do nonusers ($b = 0.60$ for in-person, $b = 0.40$ for by phone, and $b = 0.44$ for by letters). There is some indication that heavy Web users and heavy chat users are likely to maintain fewer offline social ties than nonusers do, although none of those negative coefficients reached statistical significance. All in all, the results of these multiple regression analyses are consistent with the findings of the preceding analyses.

Discussion

Do Internet users have more social ties? The answer depends on the type of online activities in which users engage and the amount of time they spend on these activities. Those using the Internet for interpersonal contact (e.g., email and chat) are likely to have more social connections than those who use it for solitary activities (e.g., Web surfing), and there is indication, albeit not statistically significant, that solitary web users are likely to have fewer social ties than nonusers. It has also been found that the relationship between time spent online and interpersonal connectivity differs by type of Internet usage. In the case of solitary Web surfing, heavy users of the Internet tend to have fewer social ties than light users do — the regression coefficients in Table 3 drop from 5.45 for light Web users to -6.65 for heavy web users regarding total social contacts; from -0.20 to -0.28 regarding in-person contacts; from -0.02 to -0.35 regarding by-phone contacts; and from 0.51 to -0.84 regarding by-letter contacts. However, these coefficients are not statistically significant, probably due to an insufficient number of cases, as there are only 27 heavy Web users in the sample. With regard to social use of the Internet, particularly email exchange, heavy users are associated with more social ties than light users. The third finding of this study is that Internet user groups also differ in the number of social ties maintained offline. Although chat users have at least as many social ties as email users do, the number of friends and relatives with whom they regularly keep in touch through traditional media of communication is much smaller than that of email users. This suggests that chat users tend to maintain some of their social ties exclusively via the Internet.

The above findings have important implications for research on the impact of Internet use on social connectivity. First, it is essential to differentiate between social use and nonsocial use of the Internet. While nonsocial use may be negatively related to number of social ties, social use of the Internet is positively related to interpersonal

connectivity. Because of this differential association, time spent online is also related to social ties differently: The relationship is positive if online time is spent on interpersonal contact, but it may be negative if spent on solitary activities. To avoid making contradictory and inaccurate estimates, researchers, when investigating the impact of Internet use on network size, must therefore take into consideration both the types of online activity in which users engage and the amount of time they spend on those activities. As the prevalence of email usage continues to increase in the general population, the number of “Web only” users will further decline, but the impact of nonsocial use of the Internet on social connectivity may remain unchanged. This means that researchers still must be careful not to make overall statements about Internet use and its impacts on social ties based on the study of only a particular type of Internet usage.

Second, it is also essential to differentiate between email users and chat users when looking at social use of the Internet. The present study has found that while email users tend to communicate online with people whom they also contact offline, chat users tend to communicate with some of their social contacts exclusively online. Other researchers have estimated that somewhere between 14% to 26% of Internet users have online friends they have never contacted in person (Katz & Rice, 2002; UCLA CCP, 2000). While it is probably true that online communication is mostly nested within offline social networks in the case of email exchange, it may not be true in the case of online chat, which largely involves contact with strangers. Without such differentiated analyses, researchers may get bogged down in endless debates that are in fact entirely avoidable.

Third, it is important also to differentiate between institutionally-based social ties and voluntarily-based social ties. Unlike the size of one’s institutional social network (e.g., number of family members and coworkers), which is determined by the characteristics of the institutions one belongs to, the size of one’s voluntary social network (i.e., number of friends) is mainly a function of one’s socializing efforts. It is possible that Internet use may affect users’ voluntary social ties more than their institutional social ties. For example, solitary Web surfing may detract from time spent with others and thus reduce the number of friends with whom users keep in contact, but it may not change the size of users’ institutional social network, e.g., the number of family members and officemates the users have. To better study the impact of Internet use on social ties, researchers should therefore specify the type of social ties they intend to investigate.

Finally, it should be stressed again that, although the findings reported here are useful for the study of the impact of Internet usage on social ties, the present study in itself does not address the issue of causation. The research question this study has attempted to answer is, “Do Internet users have more social ties?” which is different from the question “Does Internet use increase social ties?” Showing that social users of the Internet have more social ties than nonusers do, for example, does not prove that Internet use increases social ties. It may be other factors, such as social personality traits (like extraversion or agreeableness), which are correlated

with both Internet users and Internet use, that account for the increase in social connectivity. Longitudinal data are needed to answer the second question. However, longitudinal data alone are insufficient for the study of causation. Combining subtypes of Internet use that have differential effects on social ties, for example, will produce incorrect estimates regardless of whether the data are longitudinal or not. At the initial and exploratory stage, cross-sectional data can be fruitfully employed to examine correlational relationships, which in turn serves as a useful prelude to causation analysis.

Acknowledgments

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Notes

- 1 A notable exception was networked communication via CB radio, which allowed many-to-many contact and provided anonymity through the use of “handles” or, in today’s terminology, “screen names” (Cowlan, 1979). The many-to-many contact capability in combination with the provision of anonymity gave rise to an online social domain that permitted complete strangers to interact with one another.
- 2 Other similar measures include “number of email messages sent or received,” “number of phone calls made,” and “number of personal visits paid.” All these measures examine the amount of contact a person made rather than the number of people with whom a person kept in contact.
- 3 It is difficult to obtain accurate measurement of the amount of time a person spent on different types of Internet usage, particularly based on self-reported estimates. Part of the problem stems from the fact that individuals might not actively differentiate between Internet activities in estimating time online, e.g., between time spent reading news headlines and time spent reading email. As a result, the “extent of use” measures for web, email, and chat may not have been as accurate as they should be.
- 4 Ten respondents provided no answer to the question of whether they ever used a computer (COMPUSE) and were therefore excluded from subsequent analyses.
- 5 This study focuses on personal relationships that are formed on a voluntary basis. However, as the GSS question requires a minimum of only once-a-year contact and excludes personal ties that come from the workplace, the measure used here does not exactly match the conceptual definition of the intended concept.

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Appendix

Table A Five number summary of hours per week spent on Web, email, and chat

	Web Use	Email Use	Chat Use
Minimum	0.02	0.02	0.02
First Quartile	0.50	1.00	1.00
Second Quartile	1.00	2.00	2.00
Third Quartile	3.00	5.00	5.00
Maximum	46.00	60.00	75.00
Number of Cases	103	781	224

About the Author

Shanyang Zhao is Associate Professor of Sociology at Temple University. He received his Ph.D. in sociology from the University of Maryland at College Park. Prior to joining the Temple faculty in 1997, he worked as a senior research associate at the Institute for Social Research in the University of Michigan. His research interests include Internet and human interaction, mental health, and metatheory.

Address: Department of Sociology, Temple University, Philadelphia, PA 19122 USA