



# Time on the Internet at home, loneliness, and life satisfaction: Evidence from panel time-diary data

Irena Stepanikova<sup>a,\*</sup>, Norman H. Nie<sup>b,1</sup>, Xiaobin He<sup>c,2</sup>

<sup>a</sup> Department of Sociology, Sloan College, University of South Carolina, Columbia, SC 29208, USA

<sup>b</sup> Stanford Institute for the Quantitative Study of Society, Stanford University, 417 Galvez Mall, Encina Hall West, Room 104, Stanford, CA 94305, USA

<sup>c</sup> Department of Sociology, Stanford University, Stanford, CA 94305, USA

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## ABSTRACT

This study uses data collected from adult U.S. residents in 2004 and 2005 to examine whether loneliness and life satisfaction are associated with time spent at home on various Internet activities. Cross-sectional models reveal that time spent browsing the web is positively related to loneliness and negatively related to life satisfaction. Some of the relationships revealed by cross-sectional models persist even when considering the same individuals over time in fixed-effects models that account for time-invariant, individual-level characteristics. Our results vary according to how the time use data were collected, indicating that survey design can have important consequences for research in this area.

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## 1. Introduction

As recently as a decade ago, only a fraction of the American population was using the Internet, but today the Internet is no longer a technological novelty. Americans from all walks of life rely on the Internet to communicate with family and friends, conduct business, find information and entertainment, shop, and manage their finances. Social scientists agree that Internet usage has profound effects on various aspects of the social landscape and individual lives (Betroth & McClure, 1998; Broody et al., 2000; DiMaggio, Agitate, Neumann, & Robinson, 2001; Haythornthwaite & Wellman, 2001; Katz, Rice, & Aspen, 2001). However, because of the recency of the Internet phenomenon, our understanding of the implications of Internet use is still developing (DiMaggio et al., 2001). One area in which theoretical debates abound but empirical evidence is limited concerns the psychological outcomes of Internet use. In this study, we seek to contribute to a better understanding of the psychosocial implications of Internet use by presenting recent evidence from panel data to engage questions about the relationships between loneliness, life satisfaction, and time spent on various Internet activities.

### 1.1. Internet use, sociability and psychological outcomes

A number of studies show that close, supportive social relationships aid in stress reduction, social support, self-verification, and other processes linked to increased well-being and decreased distress (e.g., House, Umberson, & Landis, 1988; Johnson, 1991; Phillips, 1967). The insights from these studies can be extended to argue that Internet use affects psychological well-being inasmuch as it affects the ability of Internet users to obtain such social benefits. Consequently, the direction of the relationship between Internet use and psychological well-being may be either positive or negative, depending on how Internet use influences the social processes that contribute to mental health. If Internet use facilitates these processes, we would expect psychological well-being to increase with Internet use. For instance, if the Internet helps people to be more efficient in coordinating social activities and performing daily tasks, as Robinson, Kestnbaum, Neustadt, and Alvarez (2000) argue, the Internet might free up more time for face-to-face socializing, which reduces stress and provides social support. It may even enable the creation of new supportive social ties that would otherwise not exist, enhancing the social integration and psychosocial health of individuals.

Another argument, labeled the “communitarian hypothesis” by Nie, Hillygus, and Erbring (2002), stresses the unique ability of email and other Internet applications to maintain geographically dispersed networks, as shown by Boase, Horrigan, Wellman, and Rainie (2006). Haythornthwaite and Wellman (2002) argue that Internet use contributes to a broader social movement toward “networked individualism”, a new type of relating in which local networks lose their prominence as communities become more

\* Corresponding author. Tel.: +1 803 777 6866.

E-mail addresses: [irena@sc.edu](mailto:irena@sc.edu) (I. Stepanikova), [nhn@stanford.edu](mailto:nhn@stanford.edu) (N.H. Nie), [binbinhe@stanford.edu](mailto:binbinhe@stanford.edu) (X. He).

<sup>1</sup> Tel.: +1 650 291 9717.

<sup>2</sup> Tel.: +1 650 723 2998.

fragmented, diffuse, and fluid (see also Wellman, 2001). Email and other new technologies enable these more diffuse networks by making it possible to communicate across large geographical distances quickly and easily. Virtual communities could potentially serve as networks of social support and sources of self-verification not limited by physical distance. Such opportunities for social interaction could be especially important for members of socially marginalized groups, individuals with unique interests and needs, or those who have difficulty finding communities of support and validating their identities where they live. In addition, some people seem to find it easier to form relationships on the Internet since the relative anonymity decreases the risks inherent in self-disclosure and increases feelings of closeness to interaction partners in the virtual world. For Bargh and McKenna (2004), Internet communication resembles the “strangers on a train” phenomenon in which people in transient environments feel more comfortable talking to individuals they do not know well than they might feel talking to acquaintances or strangers in other environments, such as on the street. For some individuals, these opportunities may play an important role in stress reduction and other processes that protect mental health.

Some nationally representative studies have offered support for these two arguments. Howard, Rainie, and Jones (2001), for instance, reported that social support and likelihood of calling friends or relatives were higher among Americans who had used the Internet as compared to those who had not, and Shklovski, Kraut, and Rainie (2004) found a positive relationship between visiting family members and emailing. Similarly, Katz and Rice (2002) observed that Internet users were more likely to know their closest neighbors and reported meeting with friends more frequently. In a study by Kraut et al. (2002), people spending more time online reported having larger social networks, spending more time interacting face-to-face with friends and family, and better mental health.

A competing argument posits that, although the Internet is used mostly for communication, Internet interaction is fundamentally different from face-to-face socializing and may ultimately lead to decreases, not increases, in psychological well-being. The Internet lacks nonverbal cues important for normal social interaction, and such impoverished interaction may not provide the same benefits as more traditional social activities. In fact, it may foster uncomfortable emotions, such as feelings of anonymity (Sproull & Kiesler, 1986). According to the displacement argument, Internet use may also detract from time available for more traditional social activities such as face-to-face socializing, as time is a limited resource that must be budgeted among competing activities (Heirich, 1964). Since Internet activities are largely performed in solitude and displace time from potentially more socially interactive activities, people who spend large amounts of time on the Internet may end up feeling socially isolated and experience lower levels of psychological well-being.

Several studies have found a negative relationship between Internet use and various aspects of psychological well-being, but most of these used small, non-representative samples. In studies with college undergraduates, loneliness increased with overall time spent using the Internet (Matsuba, 2006) and with time spent using the Internet for entertainment and obtaining information (Whitty & McLaughlin, 2007). Time spent online shopping, doing research, and playing games was associated with increased depression, and Internet surfing was associated with increased sleep disturbances (Morgan & Cotten, 2003; Thomée, Eklöf, Gustafsson, Nilsson, & Hagberg, 2007). Stronger support for the displacement argument comes from nationally representative time-diary studies that found that time online at home displayed a negative relationship with time spent with friends, family, and others, especially on weekends (Nie & Erbring, 2002; Nie & Hillygus, 2002; Nie, Hillygus, & Erbring, 2002). Users’ perceptions of the effects of their Internet

use, according to a 2000 NPR/Kaiser/Kennedy School poll (NPR/Kaiser/Kennedy, 2000), also indicate potential social effects. Fifty-eight percent of respondents felt that computers have caused them to spend less time with family and friends. A more recent study found that about 6% of Internet users felt like their social relationships were suffering due to excessive Internet use (Aboujaoude, Koran, Gamel, Large, & Serpe, 2006).

Other studies have yielded mixed results or no significant differences between Internet users and non-users on a variety of mental health and sociability measures. Thomée et al. (2007) found that depression increased with emailing, while Morgan and Cotten (2003) reported that depression decreased with email use. Findings regarding online chatting have been similarly contradictory; some researchers reported negative effects, such as increased depression and loneliness (Carden & Rettew, 2006; Thomée et al., 2007) for time spent in chat rooms, but others found that chat room use was related to positive effects like decreased loneliness and depression and increased self-esteem (Morgan & Cotten, 2003; Shaw & Gant, 2002). Some research on sociability was similarly mixed. Franzen (2000, 2003) observed that Internet adoption among the Swiss was associated with no changes in size of social networks or time spent socializing, even though email use had a positive effect on social networks. Several studies representing American (Howard, Rainie, & Jones, 2001; Katz & Rice, 2002; Shklovski et al., 2004), Canadian (Pronovost, 2002), and British samples (Anderson & Tracey, 2001; Gershuny, 2003) also reached the conclusion that Internet users do not differ from non-users in the overall amount of time spent on social activities or in the frequency and time spent on phone calls and visits to relatives and friends.

## 1.2. Limitations of previous research and contributions of this study

The aforementioned studies took important steps toward a better understanding of the relationships between various aspects of the Internet use, sociability, and psychological well-being. Still, some unanswered questions persist. Since previous studies using representative samples paid little attention to outcomes beyond sociability, the understanding of how Internet use relates to psychological outcomes is much more limited than the understanding of the relationship between Internet use and sociability. In addition, few attempts have been made to use longitudinal data in studies of the psychological outcomes of the Internet use. In this study, we seek to overcome this limitation by focusing specifically on loneliness and life satisfaction as potential psychological outcomes of time spent on different online activities using longitudinal data. Life satisfaction is often used to indicate psychological well-being (see, for instance, White & Edwards, 1990). Loneliness is a particularly relevant psychological outcome in modern societies such as the United States, in which social isolation has been on the rise (McPherson, Smith-Lovin, & Brashears, 2006). Social isolation, a correlate of subjectively experienced loneliness, is a stressor and risk factor for mental health problems (Klemmack, Carlson, & Edwards, 1974; Prince, Harwood, Blizard, Thomas, & Mann, 1997).

The theoretical arguments outlined earlier stand in sharp contrast with regard to their implications as to how time spent online may relate to loneliness and life satisfaction. If increased Internet use allows individuals to manage their time more effectively and/or create networks and virtual communities that enhance perceived social support, help to reduce stress and aid in obtaining self-verification, as suggested by Robinson et al. (2000) and Haythornthwaite and Wellman (2002), then we can expect that *increased time online should be associated with increased life satisfaction and decreased loneliness*. In contrast, if, as suggested by Nie and Hillygus (2002) and Sproull and Kiesler (1986),

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