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Internet use and its relation to mental and physical health among older adults

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INTERNET USE AND ITS RELATION TO MENTAL AND PHYSICAL HEALTH AMONG OLDER ADULTS

BY

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DISSERTATION

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ABSTRACT

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University of New Hampshire, May, 2000

This exploratory study examined relations between frequency of Internet use among adults 65 and older and perceptions of social support and personal control. Additionally, standard multiple regression procedures were employed to assess the usefulness of frequency of Internet use, perceived social support, and perceived control as predictors of mental and physical health. Results were that frequency of Internet use was uncorrelated with perceptions of social support and personal control and was not predictive of mental or physical health. Perceived social support and perceived control emerged as predictors of mental and physical health. Recommendations for future research that refines measurement of Internet use and that examines the relation of Internet use to the mental and physical health of older adults are provided.

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CHAPTER I

POTENTIAL BENEFITS OF INTERNET USE

A considerable body of research suggests perceptions of social support and control are important psychosocial predictors of physical and mental health among adults 65 and older. For example, interventions designed to enhance nursing home residents' perceptions of control have been shown to lead to improvements in physical and psychological well-being (e.g., Banziger & Roush, 1983; Langer & Rodin, 1976; Rodin & Langer, 1977; Slivinske & Fitch, 1987). Other research has shown lower levels of perceived control to be associated with reduced activity, lowered life satisfaction, poorer health, and lowered morale (White & Janson, 1986). Perceptions of support availability and actual receipt of support have been shown to be inversely related to psychological distress, physical and functional deterioration, and mortality (Berkman & Syme, 1979; Broadhead et al., 1983; Choi & Wodarski, 1996; Cohen & Wills, 1985; Cutrona & Russell, 1987; Cutrona, Russell, & Rose, 1986; Krause, 1987; Russell & Cutrona, 1991). Given the suggested linkage of perceptions of social support and control with mental and physical health among older adults, effective and efficient means of enhancing perceptions of social support and control need to be researched and identified.

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There is reason to believe that the use of Internet technologies such as e-mail and the World Wide Web may expand opportunities for people to access possible sources of social support. For example, a growing body of empirical research suggests that on-line discussion groups may serve as an important source of social support for people suffering from psychological and physical problems (e.g., Braithwaite, Waldron, & Finn, 1999; Finn & Lavitt, 1994; Salem, Bogar, & Reid, 1997; Sharf, 1997) and can provide a much needed sense of belonging for members of marginalized social groups (McKenna & Bargh, 1998). Czaja, Guierrier, Nair, and Landaur (1993) evaluated the extent to which a computer messaging system (i.e., e-mail) facilitated older adults' (age range 55-95) communications with others. Among other findings, the results showed that the primary reasons participants reported enjoying using the system was that it provided a mental challenge and a means for meeting and interacting with people. Other (anecdotal) evidence suggests that seniors who have Internet access are enthusiastically using e-mail and the World Wide Web to connect with friends, family, and others (Lovato, 1998). While Internet use is certainly not a panacea for all the problems associated with aging, a growing number of investigators are suggesting that seniors' use of the Internet to connect with others and to access information holds great promise for improving their well-being (Furlong, 1989; White et al., 1999).

Czaja et al. (1993) suggest that computer-based communication technologies can enhance personal control by providing older adults with easier access to information and services. Ease of access may help seniors feel and be more independent. E-mail, the World Wide Web, and real-time conferencing (chat) are technologies that may be especially beneficial to older adults who live alone. Such technologies may empower them to expand their opportunities for education, recreation, and communication (Czaja et al., 1993).

Some empirical work and much anecdotal evidence suggest the enormous potential of the Internet to improve seniors' lives. These reports stand in contrast to a recent and highly publicized study that linked Internet use to increased loneliness, depression, and diminished social involvement (Kraut et al., 1998). Specifically, Kraut et al. studied a home-based sample of 169 people in Pittsburgh during their first one to two years on-line. Participants completed measures of social involvement (e.g., participants estimated the number of social contacts they had in the Pittsburgh area during the past month and completed Cohen, Mermelstein, Kamarck, and Hoberman's [1985] social support scale) and psychological well-being (depression was measured using 15 items from the CES-D scale and three items from the Revised UCLA Loneliness Scale were used to measure loneliness) prior to going on-line (T1). They completed the same measures again after 12 months (T2) and one last time after 24 months (T3). The amount (i.e., time spent on-line) and type (e.g., e-mail)

of Internet use during the entire period was automatically recorded. Results were that heavier Internet use at T2 predicted small but statistically significant declines in social network size (the number of people in their local social networks declined) and increases in loneliness and depression at T3. These findings seem to contradict the notion that the Internet is a "social technology" that may boost feelings of connectedness among users.

In subsequent critiques, a number of methodological shortcomings of the Kraut et al. (1998) study were suggested. Among them were that the investigation used a self-selected sample of non-experienced computer users, the sample was limited to one geographical area, an adequate control group was missing, no controls for history or maturation effects existed, and reliabilities for some measures were low (e.g., alpha for the three-item loneliness measure was .54) (Grohol, 1998). The authors themselves pointed to the weak empirical base (e.g. very small effect sizes) for their conclusions and suggested that "The surprise to us [was] that the direction of the effect is opposite to what many in the Internet community, including ourselves, had predicted" (Kraut & Mukhopadhyay, 1998, p. 1). Furthermore, Kraut et al. mentioned that the study lacked generalizability to populations of older adults as they were underrepresented in their sample. They also suggested that isolated elderly persons may actually benefit from using the Internet to expand their social networks. Hence, more empirical research

is needed to discover what the correlates (e.g., social support, mental health) of Internet use may be among older adults.

In light of the potential benefits of Internet use among seniors and the lack of research in this area, this investigation examined associations between Internet use and perceived social support and control. Internet use, perceived social support, and perceived control were also examined as predictors of mental and physical health. Also, perceived social support and perceived control were evaluated as variables that may mediate relations between Internet use and mental and physical health.

Social Support and Health Among Older Adults

Two basic conceptions of social support have guided much of the research on the relation between social support and the mental and physical health of older adults. Some investigators (e.g., Lubben, 1988) define social support in structural terms and have examined the objective features of social networks (e.g., number of local and distant social ties). For example, in a study examining the relation of social support and functional impairment among older adults, Newsom and Schulz (1996) used the Lubben Social Network Scale (Lubben, 1988) to measure amount of actual contact older adults had with friends and relatives (i.e., social support). They found that functional impairment was negatively associated with support. Others (e.g., Cutrona & Russell, 1987) have defined the social support process in functional

terms which concerns the types of support (e.g., emotional, material aid, feelings of belonging, etc.) social relationships might provide. For example, the measure of perceived social support that was employed in the present investigation (the Social Provisions Scale [SPS]) has been used in previous studies with older adults (e.g., Cutrona & Russell, 1987; Cutrona, Russell, & Rose, 1986). The scale was developed on the basis of Weiss's (1974) model of social provisions (others besides Cutrona and Russell have used Weiss's model in research with older adults as the basis for measuring social support [e.g., Felton & Berry, 1992]). The SPS is a measure that taps generalized expectations of six different social functions or "provisions" that may be obtained from relationships with others: guidance (receipt of advice or information), reliable alliance (receipt of assurance that others can be counted on for tangible assistance), reassurance of worth (recognition of one's competence, skills, and value by others), opportunity for nurturance (having the sense that others rely upon one for their well-being), attachment (emotional closeness from which one derives a sense of security), and social integration (a sense of belonging to a group that shares similar interests, concerns, and recreational activities).

Investigations of social networks typically employ measures of structure that, for example, require research subjects to enumerate their contacts with family and friends, and/or the amount and type of support actually provided

(enacted social support). In contrast, the functional approach to measurement taps subjects' private perceptions of their support systems (i.e., respondents assess the availability of, and their satisfaction with, various forms of support). Measures used in research on social support have tended to diverge along these two lines--one "objective" (social network analysis) and the other "subjective" (self-report measures of perceived social support availability and satisfaction with support) (Cohen & Syme, 1985; House & Kahn, 1985; Krause, 1987). Large bodies of literature have grown up around these foci with some investigators suggesting that compared to measures of enacted support, qualitative or subjective perceptions of support (e.g., satisfaction with support) better predict outcomes with respect to older adults' health (Antonucci, 1985).

Another point of divergence in the literature has to do with how social support actually influences health outcomes. Two basic theories have driven research in this area: The direct (or main) effects and the buffering models. The direct effects model maintains that social support enacted in people's daily lives (e.g., perceiving that one has friends or family that can be counted on to provide resources, emotional support, etc.) is linked to health benefits (Cohen & Syme, 1985; Cohen & Wills, 1985). More specifically, people do not necessarily have to be experiencing stress in order to benefit from the belief that they have social support. In contrast, the buffering model predicts that people will

experience the health benefits of receiving social support primarily when they are under stressful conditions (Cobb, 1976; Cohen & Syme, 1985; Cohen & Wills, 1985). Extensive research under both paradigms has provided support for both direct and buffering effects among the general population and among older adults (Cohen & Wills, 1985; Kessler & McLeod, 1985; Mor-Barak, Miller, & Syme, 1991).

The link between the mental and physical health of older adults, social network features, and perceived social support has been studied extensively. The findings are mixed and highlight the complex nature of social support and its relation to well-being (Choi & Woodarski, 1996). Some suggest that the variability of findings may be due, in part, to methodological issues. These issues include difficulties in defining and measuring social support, and problems in assessing the exact nature of its influence on health (e.g., does social support influence health or vice versa?) (Choi & Woodarski, 1996; Hayduk, 1996; House & Kahn, 1985). Also, some research suggests that perceived social support measures that tap generalized expectations of support may actually be measuring a personality trait. Indeed, perceptions of support and the support actually available or provided are often not veridical (Cohen, Mermelstein, Kamarck, & Hoberman, 1985; Lakey, McCabe, Fiscaro, & Brittain-Drew, 1996).

Despite the diversity of findings and the methodological issues, there does appear to be some merit to pursuing research that explores the possible link between health and

social support. According to Cohen and Syme (1985), numerous studies have shown that having social contacts with friends and family, and perceiving oneself to have various types (e.g., emotional, material, etc.) of support available, is associated with positive outcomes with respect to the psychological and physical health of older adults. Additionally, a variety of factors have been shown to mediate the relation. These factors include: individual differences in personality (e.g., social competence) (Cohen & Syme, 1985), whether contacts are perceived as positive or negative (Rook, 1984), whether the type of support provided matches the kind of support a person really needs (Cohen & McKay, 1984), who provides support (Felton & Berry, 1992), the extent to which a person is satisfied with available support (Krause, 1987; Krause, Liang, & Yatomi, 1989), and support recipients' level of vulnerability (Silverstein & Bengtson, 1994; Hayduk, 1996), and sex (Forster & Stoller, 1992).

Some investigators suggest that enhanced perceptions of personal control over desired events mediate observed relations between social support and health. For example, Wills (1985) suggested that knowing support resources will be available when they are needed may boost older adults' feelings of personal control. From this perspective, the supportive function served by social networks concerns perceived network reliability. Additionally, Antonovsky (1979) argued that social support may influence health among

older adults to the extent that it leads to a more generalized sense of control.

Along these lines, both Cicirelli (1980) and Bohm (1983) (as cited in Rodin, Timko, & Harris, 1985) investigated the relationship between control expectancies and variables conceptually related to social support. Cicirelli showed internal control among elderly subjects' to be associated with a greater sense of cohesiveness with siblings and children. Building on Cicirelli's results, Bohm tested the hypothesis that the influence of social support on health might be due to variations in perceived control. Using hierarchical regression analysis with control variables entered first, social support predictors that entered later in the model failed to explain a significant additional proportion of variance in psychological and physical well-being. Thus, the results of her study were interpreted as providing support for her hypothesis that the relation between social support and health is mediated by perceptions of control.

In a more recent investigation (Lyons, 1999) perceived control was examined as a mediator of the relationship between social support and mental (i.e., subjective well-being) and physical health. It was found that control was an important mediating variable among younger and middle-aged adults. However, it was not a plausible mediator of the relationship between social support and mental (i.e.,

subjective well-being) and physical health among older adults.

While the results are somewhat mixed, taken together, the above noted literature points to personal control as a possible mediator of the relation between social support and health. As this is the case, in the next section, a closer look will be taken at control as a construct and at evidence suggesting its direct relation to health in older adults.

Personal Control and Health Among Older Adults

The theoretical underpinnings of personal control as a psychological construct are diverse (Kuhl, 1986). For the purposes of the present discussion, three important conceptual distinctions are necessary in considering the relation between health and personal control. First, research in this area distinguishes between "objective" or actual control and "subjective" or perceived control (Rodin, Timko, & Harris, 1985). Baron and Rodin (1978) conceptualize actual control as "the ability to regulate or influence intended outcomes through selective responding" (p. 5), whereas perceived control concerns both expectations of control in achieving desired consequences as well as the belief in a causal link between one's actions and their consequences. Additionally, control measures often provide an index of "locus" of control which varies along a continuum from "internal" to "external." Such measures indicate the degree to which a person believes his or her outcomes as being contingent upon his or her own efforts (internal) or as being

determined by other factors such as chance, luck, fate, or powerful others (external) (Rodin, Timko, & Harris, 1985; Reid, Haas, & Hawkings, 1977). Finally, a distinction is made between general-global versus domain-specific perceptions of control. Global or general conceptions of the control construct view it as being trait-like--one's locus of control is consistent and generalizes to many situations (e.g., Levenson, 1974; Rotter, 1966). In contrast, domain specific conceptions hold that one's sense of control will vary across different domains or situations (e.g., control over one's health [Wallston, Wallston, Kaplan, & Maides, 1976]). Use of control measures that are domain or situation-specific are actually recommended (e.g., by Lefcourt, 1991; Rodin, Timko, & Harris, 1985) over global measures when conducting research with older adults because they are reportedly better predictors of various outcomes.

A large body of correlational and experimental research suggests that greater internality, with respect to locus of control, is associated with better mental and physical health among older adults (Rodin, Timko, & Harris, 1985). Research examining control-health associations has been conducted with both community-dwelling and institutionalized samples. Early correlational investigations with both populations showed greater internality to be a significant predictor of life satisfaction (Reid & Zeigler, 1980; Wolk & Kurtz, 1975), morale (Brown & Granick, 1983), coping (Kuypers, 1972), and, as discussed earlier, social support. More recent work

supports what has become a well-established link between both global and domain-specific internality and psychological well-being (e.g., Menec & Chipperfield, 1997)

Compared to the rather robust relation between perceived control and psychological well-being, findings concerning the relation between control and physical health are mixed. While there is some support for a positive association between internality and self-reported health status (Ziegler & Reid, 1983), others have found no relation (Hunter, Linn, Harris, & Pratt, 1980). However, in their review of this literature, Rodin, Timko, and Harris (1985) suggest the lack of association may be due, in part, to methodological factors, such as variability in the types of health measures that were used across studies.

Findings from intervention studies in which perceptions of control have been manipulated have demonstrated links between control and both psychological and physical health. Unlike investigations that have explored the correlates of control, experimental studies have provided data upon which claims of causality (e.g., an internal locus of control leads to improved well-being) and directionality (e.g., internality leads to health, not vice-versa) may be advanced.

A classic study in this domain was a quasi-experiment with older adults living in a nursing home (Langer & Rodin, 1976). This study--and a later follow-up investigation (Rodin & Langer, 1977)--showed that providing residents with a sense of control over their environment raised mood, increased

participation in a variety of activities, and improved
health. Other research related to the Langer and Rodin
investigation has shown that the positive effects of control-
inducing manipulations may be short-lived (Schulz, 1976;
Schulz & Hanusa, 1980). What this research suggests is that
having some modicum of control and then suddenly losing it
may lead to negative health outcomes. The positive control-
health link demonstrated in these early investigations has
been supported by subsequent studies that have looked at the
effects of control on a variety of illnesses (e.g., cancer
and cardiovascular disease) and immune function (Rodin,
1986).

While there is sufficient evidence to support the claim
that perceptions of, and actual, control are linked to
health, Rodin (1986) indicates that the effects of control-
relevant processes on biological functions that maintain
health are "not totally simple or straightforward" (p. 160).
Moreover, not all studies have provided evidence for a
control-health link and there appear to be cases in which
attempts at control are actually stress-inducing (Rodin,
1986). This latter point can be linked to the notions of
"primary" control (control strategies that involve one's
direct actions upon the environment) and compensatory
"secondary" control strategies which involve modifying one's
self (e.g., altering one's expectations of self) (Heckhausen
& Schulz, 1995). Evidently, among the young-old (65-75)
primary control strategies are associated with health.

However, such strategies may become detrimental to health in later life (Chipperfield, Perry, & Menec, 1999). Chipperfield et al. suggest that among the old-old, employment of compensatory control strategies may actually be more adaptive than continued attempts at primary control.

A number of mechanisms by which control (primary) brings about positive psychological and physical health outcomes have been suggested. With respect to the psychological well-being of older adults, some research suggests that the feeling of responsibility over event occurrence--both desirable and undesirable--that comes with greater internality affords older adults with environments that are more predictable. Thus, having a sense of predictability, which has been shown to have a strong positive effect on psychological well-being (e.g., Seligman, 1968), appears to reduce psychological distress associated with otherwise uncontrollable events. Evidently, persons with an internal locus of control may be more prepared to engage in actions which boost environmental predictability.

With respect to physical health, perceptions of control may influence whether actions are taken to prevent and remedy health problems. These include gathering health-related information, engaging in self-care behaviors, being active in interactions with medical providers, and showing better compliance with medical regimens (Rodin, Timko, & Harris, 1985).

Research on the construct of health locus of control
(Wallston & Wallston, 1982) supports the hypothesis that
individuals with higher levels of perceived (internal)
control take greater responsibility for meeting their health
needs. For example, in a study examining health locus of
control as a predictor of hypertensives' adherence to medical
regimens, Stanton (1987) found that participants' (age range
29-78 years) expectancy for internal control over their
health was a significant determinant of adherence. Another
study of health-related information-seeking found that people
classified as "internals" who highly valued health indicated
a greater willingness to read information on hypertension
than externals who also valued health highly (Wallston,
Maides, & Wallston, 1976). A similar study by Toner and
Manuck (1979) showed that older adults who were internals
were more motivated than those who were "externals" their age
to read information on hypertension.

Health information seeking and its association with
greater internality are particularly relevant to the topic of
the present investigation. Specifically, the World Wide Web
is a technology that may be used to access health-related
information. Both the Web, e-mail, and other Internet
technologies may be used to access such information, to
communicate with people who are health experts, and with
people who may actually may be experiencing a particular
condition. Thus, accessing the Internet may relate both to
perceived control as well as to perceptions of social support

(e.g., informational and/or emotional). As this may be the case, exploring Internet use and the nature of its relations to perceived control, social support, and psychological and physical well-being may be a fruitful new line of investigation.

Internet Use Among Older Adults and Its Correlates

Ogozalek (1991) discusses the emergence of a new interdisciplinary area of study concerning the relationship between aging and technology use. According to Ogozalek, one area of this new field has to do with the potential benefits accompanying the use of computers and computer networks. Among the benefits discussed were the provision of home-based health care and "at-distance" caregiver monitoring. Being able to transmit and receive information using computers reduces the necessity for seniors to make time-consuming trips to medical facilities, allows more flexibility for caregivers, and more independence for older adults (Ogozalek, 1991). Other uses of computer technology that may benefit older adults include having easy access to health care information (Lieberman, 1992) and expanded educational opportunities (e.g., distance learning and peer education delivered via the Web) (Clark, Heller, Rafman, & Walker, 1997; Schneider, Glass, Henke, & Overton, 1997). At present, there are many Internet resources tailored to older adults including Web sites, opportunities for intergenerational communication on various topics, and commercial services (Post, 1996).

While the evidence is largely anecdotal, computers and "Internet appliances" (i.e., devices like WebTV that enable Internet access) have emerged as technologies that may promote social interaction among the elderly. By enabling access to e-mail, bulletin boards, forums, discussion groups, and real-time conferencing, participation in on-line networks may have the effect of minimizing isolation and loneliness (Furlong, 1989; White et al. 1999).

As early as 1986, computer networks were being established with seniors in mind--SeniorNet, based in San Francisco, being the first (Furlong, 1989). Since then, home computer and Internet use by older adults in the United States has burgeoned with a recent AARP survey finding senior citizens to be the fastest-growing segment of Internet users (Alter, 1999; Finn, 1997). So great is older adults' interest in the Internet and computers, that some communities are currently initiating projects to provide older citizens with computer training and access to the Internet (Hadigan, 1995; Noer, 1995)

From all appearances then, the Web, e-mail, discussion groups, and real-time conferencing (chat) all seem to be playing a potentially important role in keeping older adults connected to (and making new) friends, family, and like-minded others (LeClaire, 1997; Furlong, 1989; Ward & Smith, 1997). While various uses of the Internet seem to be providing a growing number of older adults with an information access system, access to shopping and services,

and access to sources of emotional and other types of social support, a very limited number of studies have systematically investigated what the mental and physical health correlates of computer network use among seniors are.

McConatha, McConatha, and Dermigny (1994), for example, conducted a study with 14 long-term care nursing home residents aged 59 to 89. Participants received four one-hour training sessions in how to use the on-line computer service "Prodigy" (an interactive computer network that supports e-mail, and other forms of interaction [e.g., games]). The results were that participants showed improvement on measures of activities of daily living and cognitive functioning, and also showed decreases in depression. Additionally, the investigators claimed that the mental stimulation provided by the training positively impacted participants' feelings of competency and autonomy. However, in terms of making any claims as to the benefits of computer network use, two limitations of this study were its small sample size and that observed effects may have been due to the training and not necessarily to network use.

In another study (McConatha, McConatha, Deaner, & Dermigny, 1995), residents of a nursing home (aged 50 and older) participated in an intergenerational computer education program. As part of the program, for six months, 13 residents aged 50 and above received two half-hour training sessions weekly from gerontology graduate students in how to use Prodigy. Also, 12 middle-school students corresponded

with participants using Prodigy. Although the results were mainly positive (the treatment group showed decreased depression and improved cognitive functioning compared to matched controls who participated in normal nursing home recreational activities [e.g., bingo), the sample size again was very small and the participants, but not the control group subjects, received intensive one-to-one attention throughout the course of the intervention--a potentially serious confound.

More recently, White et al. (1999) conducted a pilot/feasibility study in a retirement community in which the impact of computer, Web, and e-mail use on residents' psychosocial well-being was assessed. Two groups were formed. One group (n = 15) had access to computers and received training and support in their use of e-mail and the Web. The other group, a comparison group (n = 8), did not have computer or Internet access or training. Change scores on four measures of psychosocial well-being at T2 and T3 were computed for the intervention group. The four measures included the Affect Balance Scale, the UCLA Loneliness Scale, the CES Depression Scale, and the Duke Social Support Index. The results were that loneliness scores at T2 (two weeks after intervention) were significantly different from loneliness scores at T1. Similarly, change scores for loneliness (but not the other dependent measures) for comparison and treatment groups at T3 (five months after intervention) were indicative of decreasing loneliness among

those in the treatment group. That no significant changes in affect or social support were obtained was attributed to high baseline scores on these measures (ceiling effects).

Qualitative (anecdotal) evidence from the White et al. (1999) study suggests the potential of computer/Internet access to positively affect the lives of older adults. For example, one treatment group participant said "I am not particularly lonely. I was until I got onto the Internet. Now I have lots of friends all over the country"; another reported that "I find I communicate with my family more by e-mail than I do by phone or letter" (White et al., 1999, p. 370).

While these results suggest potential beneficial effects of Internet use, the reliability and generalizability of the conclusions of this study are questionable. One reason is that treatment group participants may have become less lonely because of the increased socializing they did with other participants and support staff when using the computers. Also, the sample was very small and involved (mainly) residents of an independent living section of a retirement community who had high levels of education. Despite the limitations of this study and the two other studies described above, the findings do suggest that computers and Internet use may be an effective psychosocial intervention especially for lonely, isolated older adults living in congregate housing.

Purpose of the Present Study

To date, it appears that only a very few studies have examined the relation between computer network use and psychosocial variables such as loneliness and social support with older adults as the population of interest. Studies usually have included small samples from the population of non-community dwelling seniors. No study of the correlates of Internet use, with respect to psychological and physical well-being, has been done with a large sample of community-dwelling (i.e., non-institutionalized) older adults.

In light of the potential benefits of Internet use among seniors, and the lack of research in this area, this investigation examined associations between Internet use and perceived social support and control among community dwelling adults who were 65 and older. Internet use, perceived social support, and perceived control were also examined as predictors of mental and physical health. Also, perceived social support and perceived control were evaluated as variables that may mediate relations between Internet use and mental and physical health. It was expected that:

1. Internet use would correlate significantly and positively with perceived social support and perceived control.

2. Internet use, perceived social support, and perceived control would be significant predictors of mental and physical health.

3. Relations between Internet use and mental and physical health were expected to be mediated by social support and perceived control.

4. Internet use was not expected to relate to social network size or to the frequency of attending organized social events.

It is important to state here that the correlational and cross-sectional design of this study made it impossible to make any claims of cause-effect. Also, it was impossible to determine the direction of influence of the independent and dependent variables (does Internet use lead to enhanced social support or vice versa?). These limitations appear to characterize much of the work that has been done in this area. Nonetheless, it was believed that this research would add to existing literature on the relation between domain-specific perceived control and psychological and physical well-being among elderly individuals. It would also add to the literature concerning the relations between perceived social support and well-being. Finally, it would be one of the first of what will probably be a growing number of studies that examine the relation of Internet use to important psychosocial predictors of mental and physical health and to mental and physical health themselves.

CHAPTER II

METHOD

Participants

Twelve-hundred and fourteen community dwelling (i.e., non-institutionalized) adults 65 years of age and older were asked if they would participate in this study. Prospective subjects were all members of the Seacoast chapter of a national organization called "Senior Friends." Using the organization's database, the Senior Friends advisor created a list of all members who were 65 and older. A form letter (see Appendix A) introducing the study and requesting research participants was sent to these members only. Letters were number-coded and a reference list with names, addresses, and their corresponding code numbers was created. Respondents therefore did not need to place their names or addresses on the form letter they returned. To protect respondent anonymity, the reference list was kept in a secure file. Only the researcher had access to this list. The names/addresses and code numbers were kept in separate files and were organized so that only the researcher knew which names/addresses went with which code numbers.

Three-hundred and sixty-five willing persons returned the number-coded form letter (postage-paid) indicating their

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desire to participate. In actuality, 303 adults (104 men [34.3%] and 199 women [65.7%] completed surveys. Response rates of 25%-30% or less are typical in surveys conducted by mail (Smith & Davis, 1997). Thus, the estimated sample size for this study was 365. The 303 participants constituted a response rate of 25%, a sample size that was in line with expectations.

Mean age of participants was 72.7 years (Mdn = 72 SD = 5.98). Ages ranged from 65 to 95. The ethnic background of participants was 97.3% (n = 293) White. The remaining 2.7% were, respectively, African American (n = 3), Hispanic (n = 1), Asian (n = 2), and Native American (n = 2). With regard to education, 2% had completed grade school only, 32.6% had high-school diplomas only, 29.9% had had some college, 16.9% had completed undergraduate college degrees, 7% had had some graduate school, and 11.6% had earned graduate degrees. Participants lived primarily in private residences (93.4%), with 2.7% living in homes/apartments in retirement communities, 3.7% lived in a family member's home, and .3% (one person) lived in an assisted-living facility. Nearly half (41.7%) of participants reported that they lived alone. The remaining participants (58.3%) reported living with at least one other person. Marital status included 51.2% married, 12.6% divorced, 34.2% widowed, 1.3% single/never married. For widowers, the median number of months since their partner's death was 105.5 (8.8 years) (M = 126.54, SD = 102.49). For those who were not currently married, 14.7%

reported currently being involved in a romantic relationship. Median annual income was $35,000 ($\underline{M}$ = $36,391.05, $\underline{SD}$ = $22,974.08). As 198 participants (65.3%) chose not to report income, income was not included as a variable in subsequent analyses. The median length of membership in Senior Friends was 25 months ($\underline{M}$ = 31.87, $\underline{SD}$ = 26.79).

Materials

All participants completed a questionnaire. Part one comprised relevant demographic items (age, annual income, education, etc.) (see Appendix B). Part two included items assessing computer/Internet appliance access, computer experience (past and present), computer anxiety, and present Internet use (a 1-5 scale was used in which 1 = never, 2 = hardly ever [less than monthly], 3 = a little [monthly], 4 = some [weekly], 5 = lot [daily]) (see Appendix C). Part three was developed specifically for this investigation. It included items assessing the type, quantity, frequency, and subjective perceptions of Internet use (see Appendix D). Part four comprised measures of psychological well-being, physical health status, and measures of perceived control, social support, social network size, and frequency of participation in organized social activities. (See Table 1 for scale titles, the abbreviations of their titles used in this study, and their reliabilities.)

To assess psychological well-being, the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), the Revised UCLA Loneliness Scale (Russell, Peplau, &

Cutrona, 1980), and the Zung Self-Rating Depression Scale (Zung, 1965) were used. The Satisfaction with Life Scale is a five-item scale that measures global cognitive judgments of one's life (see Appendix E). Respondents indicated their agreement with items on a 1-7 scale.

Table 1

Instruments Used, Their Abbreviations and Reliabilities

Instrument	Abbreviation	Cronbach's alpha
1. Satisfaction with Life Scale	LifeSat.	.91
2. Revised UCLA Loneliness Scale	Lonely	.90
3. Zung Self-Rating Depression Scale	Depress.	.76
4. Symptom checklist	Health	.79
5. Functional ability	Function	.81
6. Expectancy subscale	PC	.88
7. Social Provisions (global) Scale	PSS	.90
8. Guidance sub-scale	Guide	.80
9. Reliable alliance subscale	Alliance	.69
10. Reassurance of worth subscale	Worth	.68
11. Attachment subscale	Attach	.76
12. Social integration subscale	Integrate	.74
13. Opportunity for nurturance subscale	Nurture	.70

Sample items are "In most ways my life is close to ideal"

and "The conditions of my life are excellent." A high score

on this measure indicates high life satisfaction. This

measure has been shown to have favorable psychometric

properties and is suitable for use with different age groups

(Diener et al.). In the present investigation, Cronbach's

alpha (after deleting item five to improve reliability [as

indicated by reliability analysis]) for the Satisfaction with

Life Scale was .91. Prior to deletion of this item, alpha =

.90.

The 20-item Revised UCLA Loneliness Scale (Russell et

al., 1980) was used to measure loneliness (see Appendix F).

Respondents indicated their agreement with items on a 1-4

scale. Sample items are "I _eel in tune with the people

around me" and "I lack companionship." A high score on this

measure indicates a high level of loneliness. This measure

has been shown to have favorable psychometric properties and

is appropriate for use with adults 65 and older (Cutrona &

Russell, 1987; Russell et al., 1980). In the present

investigation, Cronbach's alpha (after deleting item four to

improve reliability [as indicated by reliability analysis])

from the scale was .90. Prior to deletion of the item, alpha

= .88.

The Zung Self-Rating Depression Scale (Zung, 1965) was

used to measure depression (see Appendix G). This 20-item

scale has been shown to have favorable psychometric

properties and is appropriate for use with older adults (with

one caveat: possibly not the "old-old" because of somatic complaint type items) (Shaver & Brennan, 1991). Respondents indicated on a 1-4 scale (1 = None or a little of the time, 4 = Most or all of the time) how often their experience matched the conditions stated in the items. Sample items are "I feel down hearted, blue and sad" and " Morning is when I feel the best." High scores on this measure indicate high levels of depression. Cronbach's alpha (after deleting item five to improve reliability [as indicated by reliability analysis]) for the Zung Self-Rating Depression Scale was .76. Prior to deletion of the item, alpha = .71.

To assess participants' physical health, a physical health status profile (previously employed in a study of the rel tion between social support and health in older adults by Cutrona and Russell, [1987]) was used. Profile measures included a 24-item symptom checklist in which respondents indicated on a 1-3 scale (1 = None, 3 = A lot) how often their experience matched the conditions stated in the items (see Appendix H). Sample items are "Poor appetite" and "Fainting." High scores on this scale usually indicate poorer health. However, for the purposes of this study, a new variable for symptoms was computed (called "health") in which high scores were indicative of better health. Cronbach's alpha (after deleting item 20 to improve reliability [as indicated by reliability analysis]) for this measure was .79. Prior to deletion of the item, alpha = .78.

Participants also completed a 15-item functional abilities measure (also previously employed in a study of the relation between social support and health in older adults by Cutrona and Russell, 1987) that taps the extent to which one has trouble with activities of daily living (see Appendix I). Respondents indicated on a 1-3 scale (e.g., 1 = None, 3 = A lot) how much trouble they would have doing the activities stated in the items. Sample items are "taking a bath or shower" and "preparing a meal if you had to." High scores on this scale usually indicate poorer functioning. However, for the purposes of this study, a new variable for functioning was computed (called "function") in which high scores were indicative of better health. Cronbach's alpha (after deleting item 10 to improve reliability [as indicated by reliability analysis]) for this measure was .81. Prior to deletion of the item, alpha = .80.

Also included were two single items requesting participants to indicate how many days in the past week that they stayed 1) in bed, and/or 2) at home because of health problems. Because most participants had not been sick at home (92.7%) or in bed (96.9%) in the past week, these items were not used in any subsequent analyses. Other health measures included two subjective self-ratings of health in which respondents used a 1-5 scale (1 = much worse, 3 = same, 5 = much better) to a) compare their health to others their age, and b) evaluate the extent to which their health had changed in the past six months. Another item tapping subjective self-

ratings of participants' general impression of their health was also included. Respondents rated their health using a 1-5 scale (1 = very poor, 3 = average, 5 = very good). In subsequent analyses, scores from the item in which participants compared their health to others their age and scores from the item in which they indicated their general impression of their health were summed to form a variable named "perceived health." This variable was used in subsequent analyses. The item in which participants rated change in their health was not used in any subsequent analyses as most participants (83%) indicated that their health had not changed.

The Expectancy subscale of the Desired Control Scale (Reid & Zeigler, 1980) was used to assess perceived control. The 34-item Expectancy subscale measures the degree to which older persons feel in control of significant or desirable events in their everyday lives (see Appendix J). Respondents indicated on a scale of 1-5 their level of agreement with items like "The situation in which I live prevents me from contacting my family as much as I wish" and "It is not possible for me to involve myself in interesting activities." High scores indicate high levels of perceived control. The entire Desired Control Scale appears to have favorable psychometric properties and the Expectancy subscale has been shown to be reliable (Cronbach's alpha in the .80s) (Lefcourt, 1991; Reid & Zeigler, 1981). The Desired Control Scale was developed specifically for use with older adults

and is most often administered orally. In the present
investigation, Cronbach's alpha for the Expectancy subscale
was .88. Unfortunately, while there is no information
available on effects of alternative forms of administration,
the scale appeared in the present application to be reliable,
even though participants completed it themselves.

Perceived social support was assessed with the Social
Provisions Scale (SPS) (Cutrona & Russell, 1987) (see
Appendix K). The SPS is a 24-item scale that measures six
provisions of social relationships: guidance (advice or
information), reliable alliance (assurance that others can be
counted on in times of stress), reassurance of worth
(recognition of one's competence), attachment (emotional
closeness), social integration (a sense of belonging to a
group of friends), and opportunity for nurturance (providing
assistance to others). Respondents indicated on a scale of 1-
4 their level of agreement with items like "There is no one I
can turn to for guidance in times of stress" and "There are
people who depend on me for help." Scores can be derived for
each of the six provisions as well as for global social
support. High scores on the global scale and subscales
indicate a high level of perceived social support. The six
scales and the global measure have favorable psychometric
properties (i.e., confirmatory factor analyses have provided
evidence of a six-factor structure that corresponds to the
six provisions, reliability for the total support score was
.92 in a previous study of older adults; reliabilities of the

six subscales ranged from .76 to .84, and several studies have provided evidence of the validity [discriminant validity has been demonstrated against relevant mood, personality, and social desirability measures])(Cutrona & Russell, 1987; Cutrona, Russell, & Rose, 1986), and the scale appears to be appropriate for use with older adults (Cutrona & Russell, 1987; Russell & Cutrona, 1991). In the present study, Cronbach's alpha for the global measure was .90. Cronbach's alpha (after deleting item 3 to improve reliability [as indicated by reliability analysis]) for the guidance subscale (items 3, 12, 16, and 19) was .80. Prior to deletion of the item, alpha = .77. Cronbach's alpha for the reliable alliance subscale (items 1, 10, 18, and 23) was .69. Cronbach's alpha for the reassurance of worth subscale (items 6, 9, 13, and 20) was .68. Cronbach's alpha for the attachment (2, 11, 17, and 21) subscale was .76. Cronbach's alpha (after deleting item 22 to improve reliability [as indicated by reliability analysis]) for the social integration subscale (items 5, 8, 14, and 22) was .74. Prior to deletion of the item, alpha = .73. Cronbach's alpha (after deleting item 4 to improve reliability [as indicated by reliability analysis]) for the opportunity for nurturance subscale (items 4, 7, 15, 24) was .70. Prior to deletion of the item, alpha = .68.

Other items included in the questionnaire assessed local social network size (participants were asked to indicate the number of people in their town/city whom they see socially at least monthly [excluding large group social events]), and the

frequency of participation in organized social activities (a 1-5 scale where 1 = never, 3 = monthly, and 5 = daily was used).

Procedure

Persons who returned the number-coded form letter indicating their desire to participate were mailed a questionnaire and consent form along with a self-addressed stamped envelope. A cover letter giving participants instructions and thanking them for their participation was also included (see Appendix L).

Approximately three months after the initial mailing of the letter of solicitation, a follow-up announcement was placed in the quarterly Senior Friends newsletter. The purpose of the announcement was to encourage non-respondents to participate in the study. This method of follow-up was less expensive than sending all 911 non-respondents individual follow-up cards. Moreover, it was the only method acceptable to Senior Friends administration.

To preserve participant anonymity, consent forms and accompanying questionnaires were separated immediately upon their return to the researcher. Respondents were instructed to not place any identifying marks on the questionnaire. Ten cash awards of $50 each were offered as an incentive for participation. Distribution of cash awards took place January 20, 1999. Distribution of awards proceeded on the basis of a random drawing from among participant code numbers taken from returned questionnaires. In order that the cash awards could

be delivered to recipients, the last page of the questionnaire contained each participant's number code. On this last page, participants were asked to indicate whether or not they would like to participate in the drawing. To preserve anonymity, the portion of the last page containing the code number was removed immediately upon receipt of the completed questionnaire. If participants indicated that they wanted to be entered in the drawing, their number was placed in an envelope and the code number appearing on it was subsequently used in the drawing. Code numbers of participants indicating that they did not wish to be included were discarded. For the debriefing, the investigator will present the findings of the study to Senior Friends members in a lecture on May 23, 2000.

CHAPTER III

RESULTS

Computer and Internet Use

With regard to having access to a computer at home, 51.5% of participants reported that they did. Only 7.2% of participants reported having access to an Internet appliance (e.g., WebTV). Most participants had very little past computer experience (Mdn = 2, M = 2.18, SD = 1.06, [1 = none, 4 = a lot]), and engaged in very little present use of computers (Mdn = 1, M = 2.12, SD = 1.27, [1 = none, 4 = a lot]). Overall, participants did not report being intimidated by computers (Mdn = 3, M = 2.68, SD = 1.24, [1 = not at all intimidating, 5 = very intimidating). With regard to their present use of the Internet, 61.4% (n = 186) of participants indicated that they had never used it, 6.9% (n = 21) used it less than once a month, 2.3% (n = 7) used it monthly, 11.9% (n = 36) used it weekly, and 17.5% (n = 53) used it daily. Among those who used the Internet at least once a month, the mean number of months they had been using it was 23 (Mdn = 23, SD = 21.90).

Of the 96 Internet users, most logged-on from their homes (91%) (see Table 2). The majority of participants, 92.1%, accessed the Internet using a computer with 10.1% (some participants used both) using an Internet appliance.

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Table 2

Usual Log-on Location

	Frequency	Percent
Home	(81)	91.0%
Friend's Home	(5)	5.6%
Public Library	(2)	2.2%
Class	(3)	3.4%
School/college	(3)	3.4%
Family Member's Home	(8)	9.0%
Work	(7)	7.9%

Note. Some subjects reported usually logging-on from more than one location.

With regard to the Internet technologies participants useu, 97.8% used e-mail, 88.9% used the World Wide Web, 17.8% used chat, and 3.3% used other technologies (e.g., AOL's instant messenger).

As for types of Internet use (see table 3) participants reported spending the greatest amount of their time on-line using e-mail ($\underline{M}$ = 51.35, $\underline{Mdn}$ = 50, $\underline{SD}$ = 32.19), with less amounts of time spent using other Internet technologies.

The participants reported spending most of their total time on-line engaging in interpersonal communications ($\underline{M}$ = 42.77, $\underline{Mdn}$ = 30, $\underline{SD}$ = 33.29) and accessing information ($\underline{M}$ = 27.25, $\underline{Mdn}$ = 20, $\underline{SD}$ = 26.74). Less time was spent using the Internet for other purposes (see table 4).

Table 3

Percentage of Total Time On-Line Spent Using Different Internet Technologies

Technology	__M__	__Mdn__	__SD__
E-mail	51.35(%)	50.00(%)	32.19
Web	38.76(%)	25.00(%)	32.07
Chat	3.01(%)	0.00(%)	9.17
Other	1.76(%)	0.00(%)	8.20

Note. Participants indicated the percentage of their total

time on-line they spend using each Internet technology.

Descriptive statistics were computed using these percentages.

Table 4

Percentage of Total Time On-Line Engaging in Various Activities

Activities	__M__	__Mdn__	__SD__
Interpersonal communication	42.77(%)	30.00(%)	33.29
Information access	27.25(%)	20.00(%)	26.74
Entertainment	10.00(%)	18.83(%)	21.50
Other	2.62(%)	0.00(%)	11.80

With regard to how satisfied participants were with

their experience of using the Internet, average levels of

satisfaction (1 = very unsatisfied, 3 = moderately satisfied,

5 = very satisfied) indicated participants were more than

moderately satisfied with using the Internet for purposes of

interpersonal communication ($\underline{M}$ = 3.94, $\underline{SD}$ = 1.19),

information access ($\underline{Mdn}$ = 4, $\underline{M}$ = 3.63, $\underline{SD}$ = 1.03), and

entertainment ($\underline{Mdn}$ = 3, $\underline{M}$ = 3.38, $\underline{SD}$ = 1.17).

The most frequent targets of interpersonal communication

were friends and family members (see Table 5) with most

Internet users reporting weekly communications with friends

($\underline{M}$ = 4.02, $\underline{SD}$ = .99) and nearly weekly ($\underline{M}$ = 3.70, $\underline{SD}$ = 1.15)

communication with family members. Average frequency of use

of the Internet for shopping ($\underline{Mdn}$ = 1, $\underline{M}$ = 1.48, $\underline{SD}$ = .738)

and accessing public and/or private services ($\underline{Mdn}$ = 2, $\underline{M}$ =

2.42, $\underline{SD}$ = 1.25) was in both cases, less than monthly (scale

of measurement was: 1 = never, 2 = less than monthly, 3 =

monthly, 4 = weekly, 5 = daily).

Table 5

Targets of Interpersonal Internet Communication and Average
Frequency of Contact

Target of Communication	Mdn	$\underline{M}$	$\underline{SD}$
Friends	4.00	4.02	.99
Family Members	4.0	3.70	1.15
Miscell. Groups	2.00	2.39	1.51
Cyberfriends	1.00	1.52	1.08
Chat Groups	1.00	1.44	.97

Note. Scale used: 1 = never, 2 = less than monthly, 3 =

monthly, 4 = weekly, 5 = daily.

Correlational Analyses

Correlational analyses were performed to evaluate expected relations between Internet use and perceived social support and perceived control. They were also performed to describe relations among all other (in addition to perceived social support and perceived control) predictor variables (see Table 6).

Table 6

Correlations Among Predictor Variables

Pred. Vari- ables	Iuse	PSS	PC	Sex	Age	Educ.	Mar. status
Iuse	1.0	.13	.16	-.04	-.25*	.20*	.14
PSS	--	1.0	.62*	.08	-.20*	.10	.17
PC	--	--	1.0	.08	-.25*	.07	-.02
Sex	--	--	--	1.0	-.07	-.18	-.27*
Age	--	--	--	--	1.0	.02	-.23*
Educ.	--	--	--	--	--	1.0	-.07
Mar. status	--	--	--	--	--	--	1.0

Note. Initial values of r were rounded to two decimal places. Sex was dummy coded 1 = male, 2 = female.

* Significant with Bonferroni correction ($p < .002$)

It was expected that more frequent Internet use would be associated with higher levels of perceived social support (PSS) and perceived control (PC). Although obtained results were in the predicted directions, correlations between Internet use and these two variables were non-significant.

Internet use was however, marginally non-significantly positively correlated with perceived control, $r(301) = .1634$, $p = .004$. Internet use did significantly correlate with the demographic variables age, $r(299) = -.2533$, $p < .001$, and education (Educ.), $r(299) = .2027$, $p < .001$, (1 = grade school, 6 = completed graduate degree). These results suggest that the relatively younger and more educated participants were more frequent Internet users.

Perceived social support was significantly and positively associated with perceived control $r(301) = .6226$, $p < .001$. The very strong relation between these two variables indicates that they are, at least to some extent, redundant. While this doesn't present a problem in the present study, Tabachnic and Fidell (1996) advise against using highly correlated (.70 and above) predictors together in regression analyses. Higher levels of perceived social support were also significantly and negatively associated with age, $r(299) = -.2016$, $p < .001$. Although the correlation was relatively weak, this finding suggests that older participants experienced relatively less perceived social support than younger ones. Perceived control was significantly and negatively associated with age $r(299) = -.2464$, $p < .001$, with younger participants reporting higher levels of perceived control than older ones.

Correlations among the criterion variables that were used in subsequent regression analyses are reported in table 7. While no predictions were advanced with respect to the

direction and strength of intercorrelations among mental health (life satisfaction [LifeSat.], loneliness [Lonely] and depression [Depress.]) and physical health variables (health, function, and perceived health [Phealth]), results were that all associations among the variables were significant.

Table 7

Correlations Among Criterion Variables

Criterion Variables	LifeSat.	Lonely	Depress.	Health	Function	Phealth
Life-Sat.	1.0	-.43*	-.42*	.23*	.23*	.28*
Lonely	--	1.0	.59*	-.34*	-.26*	-.22*
Dep-ress.	--	--	1.0	-.54*	-.36*	-.39*
Health	--	--	--	1.0	.53*	.47*
Func-tion	--	--	--	--	1.0	.55*
Phealth	--	--	--	--	--	1.0

Note. Initial values of r were rounded to two decimal places.
* Significant with Bonferroni correction (p < .003).

Correlational analyses were also performed to identify relations between predictor and criterion variables (see table 8) that were used in subsequent regression analyses. Positive correlations were expected between Internet use and life satisfaction, health, function, and perceived health . Negative correlations between Internet use and loneliness and depression were also expected.

Table 8

Correlations Between Predictor and Criterion Variables

Pred- ictors	Criterion Variables					
	LifeSat.	Lonely	Depress.	Health	Function	Phealth
Iuse	.09	-.15	-.17	.17	.18	.09
PSS	.34*	-.65*	-.48*	.30*	.26*	.18
PC	.30*	-.53*	-.48*	.38*	.38*	.23*
Sex	-.13	-.11	.03	.08	-.01	.07
Age	-.04	.07	.08	-.18	-.27*	.00
Educ.	.07	-.05	-.02	-.01	-.00	.02
Mar.status	.18	-.17	-.15	.08	.14	.01

Note. Initial values of r were rounded to two decimal places.

* Significant with Bonferroni correction (p < .001).

Although none of the correlations between Internet use and criterion variables were significant, the direction of associations were consistent with expectations: More frequent Internet use was associated with less loneliness, $r(301)$ = -.1485, p = .01, less depression $r(300)$ = -.1656, p = .004, better health, $r(299)$ = .1687, p = .003, and better functioning, $r(297)$ = .1815, p = .002.

A number of the other expected relations were significant however. Specifically, higher levels of perceived social support were associated with greater life satisfaction, $r(299)$ = .3363, p < .001, less loneliness, $r(301)$ = -.6483, p < .001, less depression $r(300)$ = -.4781, p < .001, better health, $r(297)$ = .3019, p < .001, and better functioning, $r(297)$ = .2563, p < .001.

Additionally, higher levels of perceived control were associated with greater life satisfaction, $r(299) = .2989$, $p < .001$, less loneliness, $r(301) = -.5298$, $p < .001$, less depression $r(300) = -.4813$, $p < .001$, better health, $r(297) = .3781$, $p < .001$, better functioning, $r(297) = .3832$, $p < .001$, and better perceived health $r(297) = .2282$, $p < .001$. The only demographic variable that correlated significantly with any of the criterion variables was age: Being older was associated with poorer functioning $r(295) = -.2712$, $p < .001$.

Finally, social network size and frequency of attending organized social events were also correlated with Internet use. These variables were expected to be unrelated. Results were, in part, consistent with expectations: Internet use was not significantly associated with social network size $r(280) = .1154$, $p = .053$ (although this correlation might also be viewed as being marginally non-significant). However, Internet use was significantly and positively associated with frequency of attending organized social events $r(301) = .1464$, $p = .011$ (after Bonferroni correction with $p < .025$).

Regression Analyses

Four groups of six exploratory standard multiple regression analyses were performed. All analyses were performed using SPSS REGRESSION.

Regressions with Internet use and perceived social support as predictors.

The first six regressions were performed to examine Internet use and perceived social support as predictors of

life satisfaction, loneliness, depression, health, function, and perceived physical health. Internet use and perceived social support were expected to emerge as significant predictors. Additionally, perceived social support was examined as a variable that may mediate relations between Internet use and the criterion variables. Table 9 displays the R^2, sr^2, and the standardized regression coefficients (Beta) for all six analyses.

With life satisfaction as the dependent variable, R for regression was significantly different from zero, $F(2, 298) = 19.44$, $p < .001$. The regression coefficient for perceived social support differed significantly from zero,

Table 9

Standard Multiple Regression of Internet Use and Perceived Social Support on Mental and Physical Health Variables

Dependent Variables	Total R^2	Iuse sr^2	Iuse Beta	Perceived Social Support sr^2	Perceived Social Support Beta
LifeSat.	.115*	.002	.05	.107*	.33
Lonely	.425*	.004	-.07	.402*	-.64
Depress.	.240*	.011	-.11	.212*	-.46
Health	.109*	.018	.13	.080*	.29
Function	.089*	.023*	.15	.056*	.24
Phealth	.035	--	--	--	--

Note. Initial values of R^2, and sr^2, were rounded to three decimal places. Initial Beta coefficients were rounded to two decimal places.

* Significant with Bonferroni correction ($p < .008$).

$t(298) = 6.004$, $p < .001$. Perceived social support ($sr^2 = .1070$) was the only independent variable that contributed significantly to the prediction of life satisfaction. The two independent variables in combination contributed another .0084 in shared variability. Altogether, 11.54% of the variability in life satisfaction was predicted by knowing scores on these two variables.

With loneliness as the dependent variable, R for regression was significantly different from zero, $F(2, 300) = 110.64$, $p < .001$. The regression coefficient for perceived social support differed significantly from zero, $t(300) = -14.484$, $p < .001$. Perceived social support ($sr^2 = .4024$) was the only independent variable that contributed significantly to the prediction of loneliness. The two independent variables in combination contributed another .0221 in shared variability. Altogether, 42.45% of the variability in loneliness was predicted by knowing scores on these two variables.

The next regression was performed with depression as the dependent variable. R for regression was significantly different from zero, $F(2, 299) = 47.11$, $p < .001$. The regression coefficient for perceived social support, $t(299) = -9.134$, $p < .001$, differed significantly from zero. Perceived social support ($sr^2 = .2122$) was the only independent variable that contributed significantly to the prediction of depression. The two independent variables in combination contributed another .0164 in shared variability. Altogether,

23.96% of the variability in depression was predicted by knowing scores on these two variables.

With health as the dependent variable, R for regression was significantly different from zero, $F(2, 296) = 18.04$, $p < .001$. The regression coefficient for perceived social support, $t(296) = 5.161$, $p < .001$, differed significantly from zero. Perceived social support ($sr^2 = .0802$) was the only independent variable that contributed significantly to the prediction of health. The two independent variables in combination contributed another .0110 in shared variability. Altogether, 10.87% of the variability in health was predicted by knowing scores on these two variables.

The next regression was performed with function as the dependent variable. R for regression was significantly different from zero, $F(2, 296) = 14.36$, $p < .001$. The regression coefficients for Internet use, $t(296) = 2.720$, $p = .007$, and perceived social support, $t(296) = 4.246$, $p < .001$, differed significantly from zero. Both Internet use ($sr^2 = .0228$) and perceived social support ($sr^2 = .0555$) contributed significantly to the prediction of function. The two independent variables in combination contributed another .0102 in shared variability. Altogether, 8.85% of the variability in function was predicted by knowing scores on these two variables.

With perceived health as the dependent variable, R for regression was not significantly different from zero, $F(2, 296) = 5.38$, $p < .01$. As this was the case, there is no

reason to present here each predictor's contribution to regression.

Regressions with Internet use and perceived control as predictors.

The next six regressions were performed to examine Internet use and perceived control as predictors of life satisfaction, loneliness, depression, health, function, and perceived physical health. Internet use and perceived control were expected to emerge as a significant predictors. Perceived control was examined as a variable that might mediate relations between Internet use and the criterion variables. Table 10 displays the R^2 , sr^2, and standardized regression coefficients (Beta) for all six analyses.

With life satisfaction as the dependent variable, R for regression was significantly different from zero, $F(2, 298)$ = 14.94, $p < .001$. The regression coefficient for perceived control, $t(298) = 5.210$, $p < .001$, differed significantly from zero. Perceived control ($sr^2 = .0828$) was the only independent variable that contributed significantly to the prediction of life satisfaction. The two independent variables in combination contributed another .0066 in shared variability. Altogether, 9.12% of the variability in life satisfaction was predicted by knowing scores on these two variables.

With loneliness as the dependent variable, R for regression was significantly different from zero, $F(2, 300)$ = 59.69, $p < .001$. The regression coefficient for perceived

control, $\underline{t}(300)$ = -10.494, $\underline{p}$ < .001, differed significantly

from zero. Perceived control ($\underline{sr}^2$ = .2626) was the only

Table 10

Standard Multiple Regression of Internet Use and Perceived
Control on Mental and Physical Health Variables

Dependent Variables	Total $\underline{R}^2$	Iuse $\underline{sr}^2$	Iuse Beta	Perceived Control $\underline{sr}^2$	Perceived Control Beta
LifeSat.	.091*	.002	.04	.083*	.29
Lonely	.285*	.004	-.06	.263*	-.52
Depress.	.240*	.008	-.09	.212*	-.47
Health	.155*	.012	.11	.127*	.36
Function	.162*	.015	.12	.129*	.36
Phealth	.055*	.003	.05	.047*	.22

Note. Initial values of $\underline{R}^2$, and $\underline{sr}^2$, were rounded to three

decimal places. Initial Beta coefficients were rounded to two

decimal places.

* Significant with Bonferroni correction ($\underline{p}$ < .008).

independent variable that contributed significantly to the

prediction of loneliness. The two independent variables in

combination contributed another .0182 in shared variability.

Altogether, 28.47% of the variability in loneliness was

predicted by knowing scores on these two variables.

The next regression was performed with depression as the

dependent variable. $\underline{R}$ for regression was significantly

different from zero, $\underline{F}(2, 299)$ = 47.08, $\underline{p}$ < .001. The

regression coefficient for perceived control, $\underline{t}(299)$ =

-9.132, $\underline{p}$ < .001, differed significantly from zero. Perceived

control (sr^2 = .2121) was the only independent variable that contributed significantly to the prediction of depression. The two independent variables in combination contributed another .0195 in shared variability. Altogether, 23.95% of the variability in depression was predicted by knowing scores on these two variables.

With health as the dependent variable, R for regression was significantly different from zero, $F(2, 296)$ = 27.20, p < .001. The regression coefficient for perceived control, $t(296)$ = 6.666, p < .001, differed significantly from zero. Perceived control (sr^2 = .1268) was the only independent variable that contributed significantly to the prediction of health. The two independent variables in combination contributed another .0162 in shared variability. Altogether, 15.53% of the variability in health was predicted by knowing scores on these two variables.

The next regression was performed with function as the dependent variable. R for regression was significantly different from zero, $F(2, 296)$ = 28.60, p < .001. The regression coefficient for perceived control, $t(296)$ = 6.750, p < .001, differed significantly from zero. Perceived control (sr^2 = .1290) was the only independent variable that contributed significantly to the prediction of function. The two independent variables in combination contributed another .0179 in shared variability. Altogether, 16.20% of the variability in function was predicted by knowing scores on these two variables.

With perceived health as the dependent variable, $\underline{R}$ for regression was significantly different from zero, $\underline{F}(2, 296) = 8.60$, $\underline{p} < .001$. The regression coefficient for perceived control, $\underline{t}(296) = 3.841$, $\underline{p} < .001$, differed significantly from zero. Perceived control ($\underline{sr}^2 = .0471$) was the only independent variable that contributed significantly to the prediction of perceived health. The two independent variables in combination contributed another .0050 in shared variability. Altogether, 5.49% of the variability in perceived health was predicted by knowing scores on these two variables.

Taken together, the results of these first 12 regression analyses were only in part consistent with expectations. Internet use emerged as a predictor of Function but only in the model that included perceived social support. Perceived social support and perceived control, however, were significant predictors of all criterion variables (with the exception of perceived health for the Internet use – perceived social support model which did not form a useful equation). Finally, there was no empirical basis (i.e., there were no significant relations present between Internet use and the dependent measures) for proceeding with an evaluation of expected mediating relations between Internet use, perceived social support, and perceived control, and the dependent measures. Therefore, the issue of mediation is moot.

<u>Regressions with Internet use, perceived social support</u>
<u>and demographic variables as predictors.</u>

The next six regressions were performed to examine
Internet use and perceived social support as predictor
variables, and life satisfaction, lc..eliness, depression,
health, function, and perceived physical health, as criterion
variables. As a means of controlling for their effects, the
relevant demographic variables sex, age, education, and
marital status were also included as predictors. It was
expected that Internet use and perceived social support would
emerge as significant predictors after controlling for sex,
age, education, and marital status (marital status was
included as a potential confounding demographic variable
because it was somewhat correlated with other major predictor
variables (e.g., Internet use and perceived social support).
Table 11 displays the R^2 , sr^2, and standardized regression
coefficients (Beta) for all six analyses.

With life satisfaction as the dependent variable, R for
regression was significantly different from zero, $F(6, 292)$ =
8.65, p < .001. The regression coefficient for perceived
social support, $t(292)$ = 5.914, p < .001, differed
significantly from zero. Perceived social support
(sr^2 = .1017) was the only independent variable that uniquely
contributed to the prediction of life satisfaction. The six
independent variables in combination contributed another
.0225 in shared variability. Altogether, 15.10% of the

Table 11

Standard Multiple Regression of Internet Use, Perceived Social Support, and Demographic Variables on Mental and Physical Health Variables

Dependent Variables	Total R^2	Iuse sr^2	Iuse Beta	Sex sr^2	Sex Beta	Age sr^2	Age Beta	Educ. sr^2	Educ. Beta	Mar. Stat. sr^2	Mar. Stat. Beta	Prcvd. Soc. Supp. sr^2	Prcvd. Soc. Supp. Beta
Life-Sat.	.151*	.001	.04	-.015	-.14	.002	.05	.000	.01	.008	.10	.102*	.33
Lonely	.447*	-.007	-.09	-.007	-.09	-.012	-.12	.000	.02	-.008	-.10	-.373*	-.64
Depress.	.252*	-.013	-.12	.002	.05	-.003	-.06	.003	.06	-.002	-.05	-.207*	-.48
Health	.124*	.013	.12	.002	.05	-.007	-.09	-.003	-.05	.000	.01	.066*	.27
Funct-ion	.133*	.010	.11	-.001	-.04	-.036*	-.20	-.002	-.05	.001	.03	.040*	.21
Phealth	.043	--	--	--	--	--	--	--	--	--	--	--	--

Note. Initial values of R^2, and sr^2, were rounded to three decimal places. Initial Beta coefficients were rounded to two decimal places.

* Significant with Bonferroni correction ($p < .008$).

variability in life satisfaction was predicted by knowing scores on the six variables.

With loneliness as the dependent variable, $\underline{R}$ for regression was significantly different from zero, $\underline{F}(6, 294) = 39.67$, $\underline{p} < .001$. The regression coefficient for perceived social support, $\underline{t}(294) = -14.089$, $\underline{p} < .001$, differed significantly from zero. Perceived social support ($\underline{sr}^2 = .3731$) contributed significantly to the prediction of loneliness. The six independent variables in combination contributed another .0393 in shared variability. Altogether, 44.74% of the variability in loneliness was predicted by knowing scores on the six variables.

The next regression was performed with depression as the dependent variable. $\underline{R}$ for regression was significantly different from zero, $\underline{F}(6, 294) = 16.54$, $\underline{p} < .001$. The regression coefficient for perceived social support, $\underline{t}(294) = -9.027$, $\underline{p} < .001$, differed significantly from zero. Perceived social support ($\underline{sr}^2 = .2072$) was the only independent variable that contributed significantly to the prediction of depression. The six independent variables in combination contributed another .0213 in shared variability. Altogether, 25.24% of the variability in depression was predicted by knowing scores on the six variables.

With health as the dependent variable, $\underline{R}$ for regression was significantly different from zero, $\underline{F}(6, 290) = 6.83$, $\underline{p} < .001$. The regression coefficients for perceived social support, $\underline{t}(290) = 4.686$, $\underline{p} < .001$, differed significantly

from zero. Perceived social support (sr^2 = .0664) was the only independent variable that contributed significantly to the prediction of health. The six independent variables in combination contributed another .0318 in shared variability. Altogether, 12.38% of the variability in health was predicted by knowing scores on the six variables.

The next regression was performed with function as the dependent variable. R for regression was significantly different from zero, $F(6, 290) = 7.40$, $p < .001$. The regression coefficients for age, $t(290) = -3.462$, $p < .001$, and perceived social support, $t(290) = 3.670$, $p < .001$, differed significantly from zero. Both age (sr^2 = .0359) and perceived social support (sr^2 = .0403) contributed significantly to the prediction of function. The six independent variables in combination contributed .0419 in shared variability. Altogether, 13.25% of the variability in function was predicted by knowing scores on the six variables.

With perceived health as the dependent variable, R for regression was not significantly different from zero, $F(6, 290) = 2.20$, $p < .05$.

Taken together, the results of these six regression analyses were only in part consistent with expectations. Internet use did not emerge as a significant predictor of any of the criterion variables. Perceived social support was however, a significant predictor of all criterion variables (with the exception of perceived health).

Regressions with Internet use, perceived control, and demographic variables as predictors.

The final six regressions were performed to examine Internet use and perceived control as predictor variables, and life satisfaction, loneliness, depression, health, function, and perceived physical health, as criterion variables. Again, as a means of controlling for their effects, the relevant demographic variables sex, age, education, and marital status were also included as predictors. It was expected that Internet use and perceived control would emerge as significant predictors after controlling for sex, age, education, and marital status. Table 12 displays the R^2 , sr^2, and the standardized regression coefficients (Beta) for these six analyses.

With life satisfaction as the dependent variable, R for regression was significantly different from zero, $F(6, 292) = 8.20$, $p < .001$. The regression coefficients for marital status, $t(292) = 3.055$, $p = .0025$, and perceived control, $t(292) = 5.695$, $p < .001$, differed significantly from zero. Marital status ($sr^2 = .0274$) and perceived control ($sr^2 = .0951$) were the only independent variables that contributed significantly to the prediction of life satisfaction. The six independent variables in combination contributed another .0058 in shared variability. Altogether, 14.42% of the variability in life satisfaction was predicted by knowing scores on the six variables.

Table 12

Standard Multiple Regression of Internet Use, Perceived Control, and Demographic Variables on Mental and Physical Health Variables

Dependent Variables	Total R^2	Iuse sr^2	Iuse Beta	Sex sr^2	Sex Beta	Age sr^2	Age Beta	Educ. sr^2	Educ. Beta	Mar. Stat. sr^2	Mar. Stat. Beta	Prcvd. Ctrl. sr^2	Prcvd. Ctrl. Beta
Life-Sat.	.144*	.000	.02	-.009	-.10	.005	.08	.001	.03	.027*	.18	.095*	.32
Lonely	.353*	-.004	-.07	-.021*	-.16	-.020*	-.16	.001	-.04	-.054*	-.25	-.279*	-.55
Depress.	.277*	-.008	-.09	.000	.01	-.010	-.11	.001	.02	-.025*	-.17	-.231*	-.50
Health	.173*	.009	.10	.005	.07	-.002	-.05	-.001	-.04	.007	.09	.116*	.35
Funct-ion	.204*	.006	.08	-.001	-.03	-.020*	-.16	-.002	-.04	.008	.10	.112*	.35
Phealth	.069	--	--	--	--	--	--	--	--	--	--	--	--

Note. Initial values of R^2, and sr^2, were rounded to three decimal places. Initial Beta coefficients were rounded to two decimal places.

* Significant with Bonferroni correction ($p < .008$).

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With loneliness as the dependent variable, R for regression was significantly different from zero, $F(6, 294) = 26.73$, $p < .001$. The regression coefficients for sex, $t(294) = -3.100$, $p = .0021$, age, $t(294) = 3.034$, $p = .0026$, marital status, $t(294) = -4.930$, $p < .001$, and perceived control, $t(294) = -11.252$, $p < .001$, differed significantly from zero. Sex ($sr^2 = .0211$), age ($sr^2 = .0203$), marital status ($sr^2 = .0535$), and perceived control ($sr^2 = .2787$) contributed significantly to the prediction of loneliness. It was not possible to determine shared variability as the sum of squared semipartial correlations exceeded R^2. This suggests that one or more of the demographic variables was a suppressor variable. Altogether, 35.30% of the variability in loneliness was predicted by knowing scores on the six independent variables.

The next regression was performed with depression as the dependent variable. R for regression was significantly different from zero, $F(6, 294) = 18.72$, $p < .001$. The regression coefficients for marital status, $t(294) = -3.186$, $p = .0016$, and perceived control, $t(294) = -9.694$, $p < .001$, differed significantly from zero. Marital status ($sr^2 = .0250$), and perceived control ($sr^2 = .2313$) were the only independent variables that contributed significantly to the prediction of depression. The six independent variables in combination contributed another .0016 in shared variability. Altogether, 27.65% of the variability in depression was predicted by knowing scores on the six variables.

With health as the dependent variable, R for regression was significantly different from zero, $F(6, 290) = 10.13$, $p < .001$. The regression coefficient for perceived control, $t(290) = 6.376$, $p < .001$, differed significantly from zero. Perceived control ($sr^2 = .1159$) was the only independent variable that contributed significantly to the prediction of health. The six independent variables in combination contributed another .0342 in shared variability. Altogether, 17.33% of the variability in health was predicted by knowing scores on the six variables.

The next regression was performed with function as the dependent variable. R for regression was significantly different from zero, $F(6, 290) = 12.42$, $p < .001$. The regression coefficients for age, $t(290) = -2.724$, $p = .0068$, and perceived control, $t(290) = 6.398$, $p < .001$, differed significantly from zero. Both age ($sr^2 = .0204$) and perceived control ($sr^2 = .1123$) contributed significantly to the prediction of function. The six independent variables in combination contributed another .0557 in shared variability. Altogether, 20.44% of the variability in function was predicted by knowing scores on the six variables.

With perceived health as the dependent variable, R for regression was not significantly different from zero, $F(6, 290) = 3.55$, $p < .01$.

Taken together, the results of these final six regression analyses were, again, only in part consistent with expectations. Internet use did not emerge as a significant

predictor of any of the criterion variables. Perceived

control was however, a significant predictor of all criterion

variables (with the exception of perceived health which did

not form a useful equation).

CHAPTER IV

DISCUSSION

This exploratory investigation sought, in part, to examine associations between Internet use and perceptions of social support and control. Contrary to expectations, Internet use was not found to be significantly positively associated with perceived social support or perceived control. One possible explanation for these findings is that the measures of perceived support and control used in this study were biased toward "face-to-face" or non-computer meuiated relationships activities, and behaviors. It is possible that if the measures included items tapping sources of perceived social support and personal control that may be delivered/accessed/realized in an on-line environment, stronger relations my have emerged between Internet use and these variables. Perhaps others interested examining the correlates of Internet use could focus their efforts in developing measures grounded in on-line environments and experiences that complement existing psychological measures.

The null results also may have been due to the lack of refinement of the measurement of Internet use. The simple assessment of frequency of use (i.e., weekly, daily, etc.) may not have represented or contained the features of

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Internet use that might indeed correlate with perceived social support and control, such as the type and quality of communications with others using e-mail or real-time conferencing. Additionally, restriction of the range of scores on perceived social support and control (participants had generally high levels of both) may also have influenced the size of the correlation coefficients.

Although perceived social support and perceived control did not vary reliably as a function of Internet use, perhaps it should be noted that in both cases the correlations were in the expected directions: More frequent Internet use was associated with higher levels of perceived social support and control. The directions of relations highlight the need for other research that explores possible associations between Internet use and these two important variables. Such investigations might focus on correlating Internet use and outcome variables using participants from well-defined sub-populations (as Finn and Lavitt [199:] and more recently Davidson, Pennebaker, and Dickerson [2000] have done) of older adults, such as those who are geographically isolated and/or homebound because of a disability. If Internet use can (possibly) provide opportunities for isolated and/or ill or disabled seniors to expand their social networks (as Kraut et al. [1998] have suggested), access needed information (e.g., health), and engage in educational and recreational activities (Czaja et al., 1993; Furlong, 1989; LeClaire, 1997; Ward & Smith, 1997, White et al., 1999), then the

benefits of use may include enhanced perceptions of social support and personal control.

Another focus of this investigation was to examine Internet use, perceived social support, and control as predictors of mental and physical health. It was expected that perceived social support and control would mediate any observed associations between Internet use and mental and physical health.

Regression analyses with Internet use and perceived social support as predictors showed that Internet use was a significant predictor of function: More frequent Internet use was associated with higher levels of functioning. This result was consistent with expectations. Although the zero-order correlation coefficient between Internet use function was small and marginally non-significant (p = .002), this finding suggested that there was an association between Internet use and this important indicator of physical health.

In all subsequent regressions however, Internet use failed to emerge as a significant predictor of function—although the direction of the relations were in the expected directions. Possibly the most straightforward interpretation of the initial finding and of the direction of the relation (i.e., positive) is that people who are in relatively poorer health, and perhaps disabled in some way (i.e., lower physical functioning) may be disinclined to use the Internet. This interpretation makes more intuitive sense than one suggesting that level of functioning varies with frequency of

Internet use. After perceived control and demographic variables were controlled for, however, Internet use failed to predict function. This suggests that the initially observed relation was perhaps a spurious one.

Contrary to initial expectations, Internet use was not a significant predictor of any of the other dependent variables (i.e., life satisfaction, loneliness, depression, health, or perceived health). This was not surprising in light of the fact that Internet use was not significantly correlated with any of these variables.

Inadequate measurement of the dimension or dimensions of Internet use that may be linked to variables like loneliness, depression, and health is one suspected source of the null results (although others such as Kraut et al., [1998] have linked [albeit very weakly] frequency of Internet use to loneliness and depression). A direction for future work in the area of measurement might then be to first obtain data on peoples' experiences of using the Internet employing qualitative methods (e.g., experience sampling), develop scales based on content analysis that tap those experiences, and then attempt to link the varieties of experience to various outcome variables. It might well be that peoples' experience (e.g., mood while "surfing") of using the Internet for various purposes (e.g., entertainment, communications) is what should be assessed and correlated with other variables along with how often they use the Internet and what they use it for.

Additionally, perceived health was generally not a good candidate for correlation as over 80% of participants rated themselves as having above average health, thus restricting the range of scores. It was therefore not surprising that no relation between Internet use and perceived health was observed.

With respect to regressions with Internet use and perceived control as predictors, findings were that Internet use was not a significant predictor of any of the dependent measures. These results were nearly identical to those with Internet use and perceived social support as predictors. Thus the possible reasons (poor measurement of Internet use, restriction of range for perceived health) for the null results mentioned previously can again be applied here.

With regard to the expected mediating roles of perceived social support and perceived control, because there were no observed associations between Internet use and any of the dependent variables (except function in the perceived social support equation and this association disappeared in regressions that included perceived control and social support [along with demographic variables] as predictors), there was really no basis upon which to assess expected mediated relations.

Internet use aside for the moment, as expected, both perceived social support and perceived control were significant predictors of life satisfaction, loneliness, depression, health, and function. Also, perceived social

support, but not perceived control, predicted perceived health. These results were generally consistent with a large body of previous research in which higher levels of perceived social support and control have been linked to better mental and physical health (e.g., Cutrona & Russell, 1987; Menec & Chipperfield, 1997; Reid & Zeigler, 1980; Rodin, Timko, & Harris, 1985; Ziegler & Reid, 1983). It is, however, impossible to determine the direction of effects given the design of the present investigation. Thus, an alternative interpretation is that people in better mental and physical health may perceive that they have more personal control and social support available to them than persons in poorer mental and/or physical health. The significant, negative association between age (which itself was negatively correlated with function) and perceived social support and control provides some support for this alternative interpretation. Findings of previous research also have showed functional impairment among older adults to be associated with fewer friendship contacts, fewer family contacts, and less tangible aid (Newsom & Schulz, 1996).

In additional regression analyses with Internet use, perceived social support and perceived control as predictors, and life satisfaction, loneliness, depression, health, function, and perceived health as dependent variables, the demographic variables sex, age, education, and marital status were also added as predictors. These additional analyses were

conducted in order to control for the possible confounding effects of these important demographics.

In models with perceived social support, Internet use, and the four demographic variables as predictors, Internet use failed to emerge as a significant predictor of any of the dependent variables. Likewise, in models with perceived control, Internet use, and the four demographic variables as predictors, Internet use again was not a significant predictor of any of the dependent measures. Taken together, these findings are quite similar to those produced by the simpler models. Thus, Internet use appears not to be associated with, and is therefore not predictive of, the mental and physical health variables included in this investigation.

The present investigation failed to demonstrate any associations between Internet use and mental and physical health. All that really can be understood from the results of the present study about the relation between Internet use and the mental and physical health of older adults is that scores on the measures of mental and physical health included in this investigation did not vary consistently with the frequency of over-all Internet use in this sample.

Finally, as was expected, even after controlling for relevant demographics, both perceived social support and perceived control were significant predictors of life satisfaction, loneliness, depression, health, and function. Again, these results are consistent with a large body of

previous research in which higher levels of perceived social support and control have been linked to better mental and physical health.

Some previous research that suggests older adults may actually benefit from Internet use, and more generally, from computer network use. Reported benefits include decreased loneliness and depression and improved physical functioning, (Furlong, 1989; LeClaire, 1997; McConatha, Deaner, & Dermigny, 1995; McConatha, McConatha, & Dermigny, 1994; White et al., 1999). Other recent research has shown heavier Internet use to be associated (weakly) with increased depression and loneliness, decreased size of users' local social networks, and increased social isolation (Kraut et al., 1998; Nie & Erbing, 2000). In the present investigation, no relations were found between Internet use and depression or loneliness, and there was a non-significant (p = .053) positive association between Internet use and social network size. The results of the present study may differ, however, from previous investigations (e.g., Kraut et al., 1998) because of its correlational design and because older adults served as participants. The Kraut et al. (1998) investigation was an experiment and had a sample comprised of mainly young adults). Because of these differences, a direct comparison of results is not possible.

It is this researcher's opinion that such differences in results suggest interesting directions for future research. One possible direction for investigations concerning the

correlates of Internet use may be to sample from demographically diverse populations (e.g., older adults versus younger, wealthy versus poor, rural versus urban, new users versus long-time users, etc.). Another possible direction might be to examine how particular psychological and physical attributes (e.g., personality traits, cognitive ability, health, etc.) might relate to, and therefore predict, the use of the Internet technologies. Generally speaking, future researchers may want to consider focusing not only on how Internet use may predict outcomes on variables like depression and loneliness, but also on how various personal attributes and sample characteristics predict who uses the technology and how they use it.

Limitations

Before concluding, there are a number of limitations of this study that must be mentioned. First, distributions for age, loneliness, and depression were somewhat positively skewed. Similarly, distributions for perceived social support, perceived control, life satisfaction, health, function, and perceived health were somewhat negatively skewed. This points to possible self-selection into the study (e.g., only younger, healthier people may have felt like participating), or to the presence of generally high mental and physical health among Senior Friends members.

A check for the presence of outliers yielded one extreme high score for loneliness, one extreme low score for health, two extreme low scores for perceived control, and two extreme

high scores for social network size. In post-hoc analyses, these data points were removed from analyses. Their removal did not substantially alter the results presented here.

Additionally, it unfortunately was necessary to exclude income as a predictor variable in regressions because 198 participants (65.3%) chose not to report their income. However, the extent to which income would have affected the results is questionable. Recent research on a national sample of Internet users suggests that income is not as important a variable in predicting Internet use as was previously believed. Rather, age and education were found to be the most important demographic factors that predict who accesses the Internet (Nie & Erbing, 2000).

As this was a correlational study, it was impossible to determine, and inappropriate to suggest, any cause-effect relations between perceived social support, perceived control and their correlates. And, as mentioned previously, it was not possible to determine the direction of the effects of observed associations.

Conclusion

The findings of this investigation with respect to the correlates of Internet use were, overall, not consistent with expectations. Frequency of Internet use was not found to be associated with perceived social support or perceived control, two major psychosocial predictors of the mental and physical health of older adults. Additionally, Internet use was not a significant predictor of life satisfaction,

loneliness, depression, health, function, or perceived health. As the expected associations between Internet use and the dependent measures were not present, the question of the mediation of any such relations by perceived social support or perceived control became irrelevant. The findings that both perceived social support and perceived control were significant predictors of all mental and physical health variables (except perceived health) were consistent with expectations and with previous research.

The findings of this study, at most, highlight the need for future research concerning the correlates of Internet use among older adults. Some directions for such work have been suggested previously in this chapter. Also, the results support the findings of previous work in which relationships have been found between perceived social support, perceived control, and the mental and physical health of older adults.

Finally, the great quantity of correlations and regressions conducted in this investigation necessitated the employment of the Bonferroni procedure to correct for inflated type-one error rate. Values for alpha were substantially reduced from the conventional p = .05. Thus, in cases where the effects were small it was difficult to obtain significant results.

To avoid this problem, and to possibly better address research questions such as those in this study, future researchers might consider focusing on one or two of the dependent measures--instead of all six--when employing a

correlational design. Also, quasi-experimental designs could be creatively employed (e.g., sample from elders who participate in on-line support groups and from those who do not; one group of older adults living in a retirement community could be given computers and Internet access while an equivalent control group would not receive this treatment) to identify group (e.g., Internet users and non-Internet users) differences on dependent measures such as perceived social support, depression, and loneliness. Lastly, although it would likely be difficult, an experimental longitudinal design (along the lines of that used by Kraut et al. [1998]) could be developed that involves giving computers and Internet access to one or two groups of older adults and establishing an equivalent control group. Measurements of dependent variables such as perceived social support or health could then be taken at various time intervals and change scores computed. This researcher suspects that as more investigators become interested in how Internet use might relate to important indicators of health, a great variety of interesting designs will be developed and employed in order to answer research questions.

LIST OF REFERENCES

Alter, A. E. (1999, March 1). Old timers are taking over the Web. Computerworld, 33(9), 32-33.

Antonovsky, A. (1979). Health, stress, and coping. San Francisco: Jossey-Bass.

Antonucci, T. C. (1985). Social support: Theoretical advances, recent findings and pressing issues. In I. G. Sarason & B. R. Sarason (Eds.), Social support: Theory, research, and applications (pp. 21-38). Dordrecht, The Netherlands: Martinus Nijhoff.

Banziger, G., & Roush, S. (1983). Nursing homes are for the birds: A control-relevant intervention with bird feeders. The Gerontologist, 23, 527-531.

Baron, R., & Rodin, J. (1978). Perceived control and crowding stress. In A. Baum, J. E. Singer, & S. Valins, (Eds.), Advances in environmental psychology (pp. 145-190). Hillsdale, NJ: Erlbaum

Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance, and mortality: A nine year follow-up study of Alameda County residents. American Journal of Epidemiology, 109(2), 186-204.

Braithwaite, D. O., Waldron, V. R., & Finn, J. (1999). Communication of social support in computer-mediated groups for people with disabilities. Health Communication, 11(2), 123-151.

Broadhead, W. E., Kaplan, B. H., James, S. A., Wagner, E. H., Schoenbach, U. J., Grimson, R., Heyden, S., Tibblin, G., & Gehelbach, S. H. (1983). The epidemiologic evidence for a relationship between social support and health. American Journal of Epidemiology, 117, 521-537.

Brown, B. R., & Granick, S. (1983). Cognitive and psychosocial differences between I and E locus of control aged persons. Experimental Aging Research, 9, 107-110.

Chipperfield, J. G., Perry, R. P., & Menec, V. H. (1999). Primary and secondary control-enhancing strategies: Implications for health in later life. Journal of Aging and Health, 11(4), 517-539.

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Choi, N. G., & Wodarski, J. S. (1996). The relationship between social support and health status of elderly people: Does social support slow down physical and functional deterioration? Social Work Research, 20(1), 52-63.

Clark, F., Heller, A. F., Rafman, C., & Walker, J. (1997). Peer learning: A popular model for seniors' education. Educational Gerontology, 23, 751-762.

Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38(5), 300-314.

Cohen, S., & McKay, G. (1984). Social support, stress, and the buffering hypothesis: A theoretical analysis. In A. Baum, J. E. Singer, & S. E. Taylor (Eds.), Handbook of psychology and health (Vol. 4, pp. 253-267). Hillsdale, NJ: Erlbaum.

Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), Social support: Theory, research and applications (pp. 73-94). Dordrecht, The Netherlands: Martinus Nijhoff.

Cohen, S., & Syme, S. L. (Eds.) (1985). Social support and health. New York: Academic Press.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. Psychological Bulletin, 98, 310-357.

Cutrona, C. E., & Russell, D. (1987). The provisions of social relationships and adaptation to stress. In W. H. Jones & D. Perlman (Eds.), Advances in personal relationships (Vol. 1, pp. 37-67). Greenwich, CT: JAI Press.

Cutrona, C. E., Russell, D., & Rose, J. (1986). Social support and adaptation to stress by the elderly. Psychology and Aging, 1, 47-54.

Czaja, S. J., Guierrier, J. H., Nair, S. N., & Landaur, T. (1993). Computer communication as an aid to independence for older adults. Behavior and Information Technology, 12, 197-207.

Davidson, K. P., Pennebaker, J. W., & Dickerson, S. S. (2000). Who talks? The social psychology of illness support groups. American Psychologist, 55(2), 205-217.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. Journal of Personality Assessment 49(1), 71-75.

Felton, B. J., & Berry, C. A. (1992). Do the sources of the urban elderly's social support determine its psychological consequences? Psychology and Aging, 7(1), 89-97.

Finn, J. (1997). Aging and information technology: The promise and the challenge. Generations, 21, 5-6.

Finn, J., & Lavitt, M. (1994). Computer-based self-help groups for sexual abuse survivors. Social Work with Groups, 17(1/2), 21-46.

Forster, L. E., & Stoller, E. P. (1992). The impact of social support on mortality: A seven-year follow-up of older men and women. Journal of Applied Gerontology, 11, 173-186.

Furlong, M. S. (1989). An electronic community for older adults: The SeniorNet network. Journal of Communication, 39(3), 145-153.

Grohol, J. M. (1998). Response to the HomeNet study. Dr. Grohol's Mental Health Page [On-line], 1-3. Available: http://www.grohol.com/homenet.htm.

Hadigan, M. (1995, August 6). Elderly discovering new worlds through PA. Internet program. Durham Herald, G1-G2.

Hayduk, C. A. (1996). The dynamic relationship between social support and health in older adults: Assessment implications. Journal of Gerontological Social Work, 27(12), 149-165.

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. Psychological Review, 102(2) 284-304.

House, J. S., & Kahn, R. L. (1985). Measures and concepts of social support. In S. Cohen, & S. L. Syme, (Eds.) Social support and health (pp. 83-108). New York: Academic Press.

Hunter, K. I, Linn, M. W., Harris, R., & Pratt, T. (1980). Discriminators of internal and external locus of control orientation in the elderly. Research on Aging, 2, 49-60.

Kessler, R. C., & McLeod, J. D. (1985). Social support and mental health in community samples. In S. Cohen, & S. L. Syme, (Eds.) Social support and health (pp. 219-240). New York: Academic Press.

Krause, N. (1987). Satisfaction with social support and self-rated health in older adults. The Gerontologist, 27(3), 301-308.

Krause, N., Liang, J., & Yatomi, N. (1989). Satisfaction with social support and depressive symptoms: A panel analysis. Psychology and Aging, 4(1), 88-97.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). A social technology that reduces social involvement and psychological well-being? American Psychologist, 53(9), 1017-1031.

Kraut, R., & Mukopadhyay, T. (1998). Social impact of the Internet: What does it mean? Communication of the ACM, 41(12), 21-22.

Kuhl, J. (1986). Aging and models of control: The hidden costs of wisdom. In M. M. Baltes & P. B. Baltes (Eds.), The psychology of control and aging (pp. 1-28). Hillsdale, NJ: Erlbaum.

Kuypers, J. A. (1972). Internal-external locus of control, ego functioning, and personality characteristics in old age. The Gerontologist, 12, 168-173.

Lakey, B., McCabe, K. M, Fiscaro, S. A., & Brittain-Drew, J. (1996). Environmental and personal determinant of support perceptions: Three generalizability studies. Journal of Personality and Social Psychology, 70(6), 1270-1280.

Landerman, R., George, L. K., Campbell, R. T., & Blazer, D. G. (1989). Alternative models of the stress buffering hypothesis. American Journal of Community Psychology. 17(5) 625-641.

Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. Journal of Personality and Social Psychology, 34(2), 191-198.

LeClaire, R. B. (1997). How a computer and SeniorNet changed my life. Generations, 21(3), 36-37.

Lefcourt, H. M. (1991). Locus of control. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), Measures of personality and social psychological attitudes (Vol. 1, pp. 413-499). San Diego, CA: Academic Press.

Levenson, H. (1974). Activism and powerful others: Distinctions between the concept of internal-external control. Journal of Personality Assessment, 38, 377-383.

Lieberman, D. (1992). The computer's potential role in health education. Health Communication, 4(3), 211-225.

Lovato, K. (1998). Technology helps seniors feel connected. Palo Alto Weekly [On-line]. Available:http://server4.service.com/PAW/morgue/monthly/1998_Jan_14.LYTTON.html.

Lubben, J. E. (1988). Assessing social networks among elderly populations. Family and Community Health, 11, 42-52.

Lyons, H. W. (1999). Social exchanges, control beliefs, and health in adulthood: A test of factorial invariance and an examination of a mediational model. Dissertation Abstracts International: Section B: The Sciences and Engineering, 60(2-B), 856.

McConatha, J. T., McConatha, D., Deaner, S. L., & Dermigny, R. (1995). A computer-based intervention for the education and therapy of institutionalized older adults. Educational Gerontology, 21(2), 129-138.

McConatha, D., McConatha, J. T., & Dermigny, R. (1995). The use of interactive computer services to enhance the quality of life for long-term care residents. The Gerontologist, 34(4), 553-556.

McKenna, K. Y. A., & Bargh, J. A. (1998). Coming out in the age of the Internet: Identity "demarginalization" through virtual group participation. Journal of Personality and Social Psychology, 75(3), 681-694.

Menec, V. H., & Chipperfield, J. G. (1997). Remaining active in later life: The role of locus of control in senior's leisure activity participation, health, and life satisfaction. Journal of Aging and Health, 9(1), 105-125.

Mor-Barak, M. E., Miller, L. S., & Syme, L. S. (1991). Social networks, life events, and health of the poor, frail elderly: A longitudinal study of the buffering versus the direct effect. Family and Community Health, 14(2), 1-13.

Newsom, J. T., & Schulz, R. (1996). Social support as a mediator in the relation between functional status and quality of life in older adults. Psychology and Aging, 11(1), 34-44.

Nie, N., & Erbing, L. (2000). Internet and society. [On-line].Available:http://www.stanford.edu/group/siqss/Press_Release/Preliminary_Report.pdf.

Noer, M. (1995, September 25). Senior cybernauts: Hints to retirees isolated by physical disabilities or suffering from depression: Get wired. Forbes Magazine, 240-241.

Ogozalek, V. Z. (1991). The social impacts of computing: Computer technology and the graying of America. Social Science Computer Review, 9(4), 655-666.

Post, J. A. (1996). Internet resources on aging: Seniors on the net. The Gerontologist, 36(5), 565-569.

Reid, D. W., Hass, G., & Hawkings, D. (1977). Locus of desired control and positive self-concept of the elderly. Journal of Gerontology, 32(4), 441-450.

Reid, D. W., & Ziegler, M. A. (1977). Survey of the reinforcements and activities elderly citizens feel are important for their general happiness. Essence, 2, 5-24.

Reid, D. W., & Ziegler, M. (1980). Validity and stability of a new desired control measure pertaining to psychological adjustment of the elderly. Journal of Gerontology, 35, 395-402.

Reid, D. W., & Ziegler, M. (1981). The Desired Control Measure and adjustment among the elderly. In H. M. Lefcourt (Ed.), Research with the locus of Control construct (Vol. 1, pp. 127-157). New York: Academic Press.

Rodin, J. (1986). Health, control, and aging. In M. M. Baltes & P. B. Baltes (Eds.), The psychology of control and aging (pp. 139-165). Hillsdale, NJ: Erlbaum.

Rodin, J., & Langer, E. J. (1977). Long-term effects of a control-relevant intervention with the institutionalized aged. Journal of Personality and Social Psychology, 35, 897-902.

Rodin, J., Timko, C., & Harris, S. (1985). The construct of control: Biological and psychological correlates. In C. Eisdorfer, M. P. Lawton, & G. L. Maddox (Vol. Eds.), Annual review of gerontology and geriatrics (Vol. 5, pp. 3-55). New York: Springer.

Rook, K. S. (1984). The negative side of social interaction: Impact on psychological well-being. Journal of Personality and Social Psychology, 46(5), 1097-1108.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, 1-27.

Russell, D., & Cutrona, C. E. (1991). Social support, stress, and depressive symptoms among the elderly: Test of a process model. Psychology and Aging, 6, 190-210.

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. Journal of Personality and Social Psychology, 39, 472-480.

Salem, D. A., Bogar, G. A., & Reid, C. (1997). Mutual help goes on-line. Journal of Community Psychology, 25(2), 189-207.

Sarason, I. G., Levine, H. M., Basham, R. B., & Sarason, B. R. (1983). Assessing social support: The Social Support Questionnaire. Journal of Personality and Social Psychology, 44, 127-139.

Schneider, E. L., Glass, S., Henke, M., & Overton, J. (1997). Distance learning in gerontology: The future is here. Generations, 21, 46-49.

Schulz, R. (1976) Effects of control and predictability on the physical and psychological well-being of the Institutionalized aged. Journal of Personality and Social Psychology, 33, 563-573.

Schulz, R., & Hanusa, B. H. (1980). Experimental social gerontology: A social psychological perspective. Journal of Social Issues, 36, 30-46.

Seligman, M. E. P. (1968). Chronic fear produced by unpredictable electric shock. Journal of Comparative and Physiological Psychology, 66, 402-411.

Sharf, B. F. (1997). Communicating breast cancer on-line: Support and empowerment on the Internet. Women and Health, 26(1), 65-84.

Shaver, P. R., & Brennan, K. A. (1991). Measures of depression and loneliness. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), Measures of personality and social psychological attitudes (Vol. 1, pp. 204-207). San Diego, CA: Academic Press.

Silverstein, M., & Bengtson, V. L. (1994). Does intergenerational social support influence the psychological well-being of older parents? The contingencies of declining health and widowhood. Social Science and Medicine, 38(7), 943-957.

Slivinske, L. R., & Fitch, V. L. (1987). The effect of control-enhancing interventions on the well-being of elderly individuals living in retirement communities. The Gerontologist, 27(2), 176-181.

Smith , R. A., & Davis, S. F. (1997). The psychologist as detective. Upper Saddle River, NJ: Prentice Hall.

Tabachnic, B. G., & Fidell, L. S. (1996). Using multivariate statistics(3rd ed.). New York: HarperCollins.

Toner, J. B., & Manuck, S. B. (1979). Health locus of control and health-related information seeking at a hypertension screening. Social Science and Medicine, 13A, 823.

Wallston, K. A., Maides, S., & Wallston, B. S. (1976). Health-related information seeking as a function of health-related locus of control and health value. Journal of Research in Personality, 10, 215-222.

Wallston, K. A., & Wallston, B. S. (1982). Who is responsible for your health? The construct of health locus of control. In G. S. Sanders & J. Suls (Eds.), Social psychology of health and illness (pp. 65-95). Hillsdale, NJ: Erlbaum.

Wallston, B. S., Wallston, K. A., Kaplan, G. D., & Maides, S. A. (1976). Development and validation of the health locus of control (HLC) scale. Journal of Consulting and Clinical Psychology, 44, 580-585.

Ward, C. R., & Smith, T. (1997). Forging intergenerational communities through information technology. Generations, 21, 38-41.

Weiss, R. S. (1974). The provisions of social relationships. In Z. Rubin (Ed.), Doing unto others (pp. 17-26). Englewood Cliffs, NJ: Prentice-Hall.

White, C. B., & Janson, P. (1986). Helplessness in institutional settings: Adaptation or iatrogenic disease? In M. M. Baltes & P. B. Baltes (Eds.), The psychology of control and aging (pp. 1-28). Hillsdale, NJ: Erlbaum.

White, H., McConnell, E., Clipp, E., Bynum, L., Teague, C., Navas, L., Craven, S., & Halbrecht, H. (1999). Surfing the Net in later life: A review of the literature and pilot study of computer use and quality of life. Journal of Applied Gerontology, 18(3), 358-378.

Wills, T. A. (1985). Supportive functions of interpersonal relationships. In S. Cohen, & S. L. Syme, (Eds.) Social support and health (pp. 61-82). New York: Academic Press.

Wolk, S., & Kurtz, J. (1975). Positive adjustment and involvement during aging and expectancy for internal control. Journal of Consulting and Clinical Psychology, 43, 173-178.

Ziegler, M., & Reid, D. W. (1983). Correlates of changes in desired control scores and in life satisfaction scores among elderly persons. International Journal of Aging and Human Development, 16, 135-146.

Zung, W. W. K. (1965). A self-rating depression scale. Archives of General Psychiatry, 12, 6370.

APPENDICES

APPENDIX A: FORM LETTER

Dear Senior Friends member:

Your help in an important University of New Hampshire study is needed. In cooperation with the Seacoast chapter of Senior Friends, we are conducting a survey to learn more about health and well-being among older adults. We are also interested in finding out to what extent, and how, older adults are using the Internet. You do not need to be an Internet user to participate--we are interested in both users and non-users alike.

We will use the findings from this study to better our understanding of what contributes to health and well-being among older adults. This study will also provide important information about seniors' use--or non-use--of the Internet. Finally, this study will provide the Seacoast chapter of Senior Friends with valuable information about the health of its members and their Internet use. To these ends, your participation is *very important*.

We request your participation only if you are aged 65 or older and are a member of Senior Friends.

The survey takes about 30-40 minutes to complete. If you choose to participate, just mark "I am a Senior Friends member and am 65 or older. Please send me the survey" below and return this postage-paid form to us at your earliest convenience.

For taking the time to participate in this research, a random drawing from among those who have returned completed surveys by December 15, 1999 will be conducted. Ten cash awards of $50 each will be distributed. As we anticipate around 500 respondents, your odds of winning may be 2 in 100.

We assure you that your answers will be held in the *strictest confidence*. Your answers will only be identified by code number; your name will not be connected to your answers. All reports will only provide aggregated data. There are no anticipated risks associated with participating in this study.

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APPENDIX A (cont.)

We are very grateful for your participation in this UNH-Senior Friends study. Should you have any questions about the survey, your participation, or our findings, please do not hesitate to contact us at (603) 868-5943 or at mamangan@christa.unh.edu. Furthermore, if you have any questions you would like to ask of Seacoast Senior Friends, contact Senior Friends Advisor Cindi Shanley at 1-800-811-2513.

_____ I am a Senior Friends member and am 65 or older. Please send me the survey.

With thanks,

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APPENDIX B: DEMOGRAPHIC ITEMS

Instructions: Please provide the following information. Circle the appropriate response or fill in the information requested.

1. Sex: Male   Female

2. Age:_____

3. Ethnicity: White   African American   Hispanic
             Asian   Other (please specify)_____

4. Current marital/relationship status: Married
Divorced   Separated   Widowed   Single (never married)
Other (please specify)_____

5. If you are presently widowed, please indicate how long (to the nearest month) since the death of your spouse or partner:_____

6. If you are **not presently married**, are you currently involved in a romantic relationship?   Yes   No

7. Education: Grade schcol   High school   Some college   Completed college   Some graduate school
Completed graduate degree Other (please specify)_____

8. Circle the letter preceding one of the following that best describes your current living situation:
A) Private house/apartment/condo   C) Nursing home
B) Family member's home   D) Home/apartment in a
                                  retirement community
                              E) Assisted living

9. How many other persons live with you?_____

10. What is your total annual personal income (the amount you reported last year for income tax purposes)? (Leave this item blank if you do not feel comfortable disclosing this information.)_____

11. Please describe (briefly) your past occupation (include "homemaker").

12. If you are presently employed please describe (briefly) your present occupation.

13. If you are presently employed, how many hours a week do you work?_____

14. Do you do any **regular** (at least once a month) volunteer work?   Yes   No

APPENDIX B (cont.)

15. If you answered yes to the previous question, how many hours a month do you volunteer?_____

16. How long have you been a member of Senior Friends (to the nearest month)?_____

APPENDIX C: COMPUTER AND INTERNET ACCESS ITEMS

The following section includes questions about the use of computers. **Please complete this section even if you have never used a computer**.

1. Do you currently have a computer in your place of residence that is available for your use?   Yes   No

2. Which of the following best describes the amount of **past experience** you have had using computers?
        none   very little   some   a lot

3. Which of the following best describes your **present use** of a computer?
none   very little   some   a lot
    (once a month or so)(once a week or so)(once a day/more)

4. Some people find computers intimidating; others do not. Use the following scale to rate your impression of computers. (If you have no impression, leave this question blank.)

1	2	3	4	5
not at all intimidating		somewhat intimidating		very intimidating

5. Do you currently have an Internet appliance (such as WebTV, which allows you to access the Internet without using a computer) in your place of residence that is available for your use? Yes   No

6. Which of the following best describes **your present use** of the Internet (e.g., e-mail, World Wide Web)?

never used it   hardly ever   a little   some   a lot
       (less than monthly)   (monthly) (weekly) (daily)

7. If you have **never** used the Internet, please briefly explain why in the space provided below.

APPENDIX D: TYPE OF INTERNET USE

<u>Instructions</u>: Please complete the following questions only if you currently use the Internet once a month or more. <u>If you are new to the Internet (within the past month or so) you may not be able to answer some of the questions. Please leave the questions you cannot answer blank</u>.

1. How long have you been using the Internet (to the nearest month)?_____

2. Where do you usually use or "log-on" to the Internet? (Circle all that apply.)
A) Home   C) Public library   E) A school/college
B) A friend's home   D) In a class   F) A family member's home
G) Other (please specify):

3. Please describe (briefly) how you learned to use the Internet (e.g., did someone teach you?).

4. Check which of the following technologies you use to access the Internet:

___ Computer ___ Internet appliance (e.g., WebTV)
Other (please specify):_____

5. Of the following Internet technologies, check the ones that you use:
_____ e-mail (involves using an e-mail account
            send/receive messages)
_____ World Wide Web (involves using a "browser" such as
       Netscape to, for example, search for information)
_____ Chat (involves "real-time" communication with
            others)
_____ Other (please describe):_____

6. Consider the amount of time you spend using the Internet. Below, indicate the percentage of your total time on-line that you spend using each of the following Internet technologies (e.g., 80% e-mail, 20% Web; individual amounts should sum to 100%).
_____% e-mail (include sending and/or reading messages)
_____% World Wide Web
_____% Chat
_____% Other (please describe):_____

7. Consider the amount of time you spend using the Internet. Below, indicate the percentage of your total time on-line that you spend engaged in the following types of activities:

_____% Entertainment (Web browsing to pursue hobbies,
        special interests)

APPENDIX D (cont.)

_____% Information access (seek health information, follow investments)

_____% Interpersonal communication (e-mail to/from friends, family, etc.)

_____% Other (please describe)_____

8. How satisfied are you with the various ways you use the Internet? Below, circle the number to the right of each type of use (according to the 1-5 scale below) that corresponds with your level of satisfaction.

1	2	3	4	5
very unsatisfied		moderately satisfied		very satisfied

Entertainment	1	2	3	4	5
Information access	1	2	3	4	5
Interpersonal communication	1	2	3	4	5
Other (from #7 above)	1	2	3	4	5

9. How often do you post and read or just read messages from/on, on-line groups? (Examples of on-line groups would be Bulletin Boards, Newsgroups, Forums, or mailing lists (listservs), established around various topics like occupation, religion, age, profession, investments, politics, etc.)

     never   less than monthly   monthly   weekly   daily

10. How often do you chat with groups on-line?

     never   less than monthly   monthly   weekly   daily

11. How often do you communicate (e.g., exchange e-mail messages, chat) with friends (not ones you've met on-line) using the Internet?

     never   less than monthly   monthly   weekly   daily

12. How often do you communicate (e.g., exchange e-mail messages, chat) on a one-on-one basis with friends whom you've met on-line (e.g., pen-pals)?

     never   less than monthly   monthly   weekly   daily

13. How often do you communicate (e.g., exchange e-mail messages, chat) with family members using the Internet?

     never   less than monthly   monthly   weekly   daily

APPENDIX D (cont.)

14. How often do you use the Internet to shop for products that you want or need (e.g., gifts, food, tickets, etc.)?

never   less than monthly   monthly   weekly   daily

15. How often do you use the Internet to access public or private services (or organizations) (e.g., financial, medical, social, legal, occupational, educational, etc.) ?

never   less than monthly   monthly   weekly   daily

16. Are there any other <u>persons who are important to you</u> that you connect with over the Internet that you feel haven't been included in the previous questions? Please list them below. <u>Please do not list any person's name--use their title(s) or some other meaningful descriptor.</u>

APPENDIX E: SATISFACTION WITH LIFE SCALE (Diener, Emmons, Larsen, & Griffin, 1985)

Instructions: Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by circling the appropriate number next to each item. Please be open and honest in your responding.

1= Strongly disagree   4= Neither agree or disagree
2= Disagree   5= Slightly agree
3= Slightly disagree   6= Agree
    7= Strongly agree

1. In most ways my life is close to ideal. 1 2 3 4 5 6 7

2. The conditions of my life are excellent. 1 2 3 4 5 6 7

3. I am satisfied with my life.   1 2 3 4 5 6 7

4. So far, I have gotten the important
things I want in life.   1 2 3 4 5 6 7

5. If I could live my life over, I would
change almost nothing.   1 2 3 4 5 6 7

APPENDIX F: REVISED UCLA LONELINESS SCALE (Russell et al., 1980)

Instructions: Using the 1-4 scale below, indicate how often you feel the way described in each of the following statements.

	Never	Rarely	Sometimes	Often
1.I feel in tune with the people around me.	1	2	3	4
2.I lack companionship.	1	2	3	4
3.There is no one I can turn to.	1	2	3	4
4.I do not feel alone.	1	2	3	4
5.I feel part of a group of friends.	1	2	3	4
6.I have a lot in common with the people around me.	1	2	3	4
7.I am no longer close to anyone.	1	2	3	4
8.My interests and ideas are not shared by those around me.	1	2	3	4
9.I am an outgoing person.	1	2	3	4
10.There are people I feel close to.	1	2	3	4
11.I feel left out.	1	2	3	4
12. My social relationships are superficial.	1	2	3	4
13.No one really knows me well.	1	2	3	4
14.I feel isolated from others.	1	2	3	4
15.I can find companionship when I want to.	1	2	3	4
16.There are people who really understand me.	1	2	3	4

APPENDIX F (cont.)

17.I am unhappy being
so withdrawn.   1   2   3   4

18.People are around me but
not with me.   1   ?   3   4

19.There are people I can
talk to.   1   2   3   4

20.There are people I can
turn to.   1   2   3   4

APPENDIX G: ZUNG SELF-RATING DEPRESSION SCALE (Zung, 1965)

Instructions: For each statement, circle the number that corresponds to how often you have felt that way during the past two weeks. For statements 5 and 7, if you are on a diet, answer as if you were not.

1= None or a little of the time 3= A good part of the time
2= Some of the time   4= Most or all of the time

1.I feel down hearted, blue, and sad.   1 2 3 4

2.Morning is when I feel the best.   1 2 3 4

3.I have crying spells or feel like it.   1 2 3 4

4.I have trouble sleeping through the night.   1 2 3 4

5.I eat as much as I used to.   1 2 3 4

6.I enjoy looking, talking to and being
with attractive women/men.   1 2 3 4

7.I notice that I am losing weight.   1 2 3 4

8.I have trouble with constipation.   1 2 3 4

9.My heart beats faster than usual.   1 2 3 4

10.I get tired for no reason.   1 2 3 4

11.My mind is as clear as it used to be.   1 2 3 4

12.I find it easy to do the things I used to do. 1 2 3 4

13.I am restless and can't keep still.   1 2 3 4

14.I feel hopeful about the future.   1 2 3 4

15.I am more irritable than usual.   1 2 3 4

16.I find it easy to make decisions.   1 2 3 4

17.I feel that I am useful and needed.   1 2 3 4

18.My life is pretty full.   1 2 3 4

19.I feel that others would be better
off if I were dead.   1 2 3 4

20.I still enjoy the things I used to do.   1 2 3 4

APPENDIX H: SYMPTOM CHECKLIST

Instructions: Below is a list of symptoms that people commonly experience. Using the 1-3 scale below, please indicate how much trouble you have had with each symptom during the past week.

	None	Some	A lot
1. Problems with eyesight	1	2	3
2. Trouble hearing	1	2	3
3. Problems talking	1	2	3
4. Inability to taste food	1	2	3
5. Poor appetite	1	2	3
6. Trouble chewing	1	2	3
7. Trouble swallowing	1	2	3
8. Problems moving your bowels	1	2	3
9. Shortness of breath	1	2	3
10. Headache	1	2	3
11. Trouble sleeping	1	2	3
12. Itching in any part of your body	1	2	3
13. Indigestion	1	2	3
14. Fever	1	2	3
15. Getting tired easily	1	2	3
16. Fainting	1	2	3
17. Poor memory	1	2	3
18. Nervousness	1	2	3
19. Weight loss	1	2	3
20. Weight gain	1	2	3
21. Unusual bleeding	1	2	3
22. Trouble urinating/ passing water	1	2	3
23. Hurting or aching in any part of your body	1	2	3
24. Weakness in any part of your body	1	2	2

APPENDIX I: FUNCTIONAL ABILITY

<u>Instructions:</u> Using the 1-3 scale below, please indicate how much trouble you would presently have doing each of the activities listed below.

	None	Some	A lot
1.Running the length of a football field (100 yards)	1	2	3
2.Getting to places within walking distance	1	2	3
3.Shopping for groceries or clothes if you had to	1	2	3
4.Taking a bath or shower	1	2	3
5.Walking one mile	1	2	3
6.Doing housework	1	2	3
7.Walking up a flight of stairs	1	2	3
8.Running a mile	1	2	3
9.Handling your money	1	2	3
10.Walking to the bathroom	1	2	3
11.Eating	1	2	3
12.Getting in and out of bed	1	2	3
13.Combing your hair	1	2	3
14.Using the telephone	1	2	3
15.Preparing a meal if you had to	1	2	3

APPENDIX J: EXPECTANCY SUBSCALE OF THE DESIRED CONTROL SCALE
(Reid & Zeigler, 1980)

Instructions: The following are statements that may describe
either yourself or the beliefs you have. Using the 1-5 scale
below, please indicate your agreement with each item by
placing the appropriate number on the line preceding that
item. We are interested in your own opinion, not your
judgment of what others think. From time to time you may find
some items seem to be repeated. Don't worry about this, for
each item is purposefully different in terms of its specific
wording. If applicable, consider your on-line (Internet)
activities / relationships too.

1= Strongly disagree   3= Undecided   5= Strongly agree
2= Disagree   4= Agree

1.I find that I am able to arrange for friends to come and
visit me regularly.   1   2   3   4   5

2.People tend to ignore my advice
and suggestions.   1   2   3   4   5

3.Maintaining my level of health
strongly depends on my own efforts. 1   2   3   4   5

4.The circumstances in which I live make it
very difficult (if not impossible) for me to
be involved in numerous activities. 1   2   3   4   5

5.It is difficult for me to get to know people.
                                      1   2   3   4   5

6.I can usually arrange to go on outings
that I'm interested in.   1   2   3   4   5

7.I spend my time usually doing what
I want to do.   1   2   3   4   5

8.The situation in which I live prevents me
from contacting my family as much as
I wish.   1   2   3   4   5

9.Although it is sometimes strenuous,
I try to do the chores by myself.   1   2   3   4   5

10.It is not possible for me to involve myself
in interesting activities.   1   2   3   4   5

11.The future state of my health depends
on fate.   1   2   3   4   5

APPENDIX J (cont.)

1= Strongly disagree   3= Undecided   5= Strongly agree
2= Disagree   4= Agree

12.I find that if I ask my family (or friends)
to visit me, they come.   1   2   3   4   5

13.It depends more on others and less on
myself whether I get to go out for a
good time (e.g., visiting,
shopping)   1   2   3   4   5

14.I would be very upset if I didn't have
much say about where I was to live. 1   2   3   4   5

15.Making people happy is something that
I don't get much opportunity to do. 1   2   3   4   5

16.It is not possible for me to go to religious
services.   1   2   3   4   5

17.Going and visiting with friends is easy
for me to do.   1   2   3   4   5

18.I often cannot get a hold of (e.g., by phone
or other means) members of my family
when I want.   1   2   3   4   5

19.People don't give me a chance to take
on a position of responsibility.   1   2   3   4   5

20.I have quite a bit of influence on the
degree to which I can be involved in
activities.   1   2   3   4   5

21.I can rarely find people who will listen
closely to me.   1   2   3   4   5

22.Despite my circumstances, I can see
my family when I want.   1   2   3   4   5

23.My getting away from the house (or other
place of residence) generally depends on
someone else making the decisions. 1   2   3   4   5

24.Visits from my family (or friends) seem to
be due to their own decisions and not to
my influence.   1   2   3   4   5

25.I find that I am able to return
favors.   1   2   3   4   5

APPENDIX J (cont.)

1= Strongly disagree	3= Undecided 5= Strongly agree
2= Disagree	4= Agree

26.People generally do not allow me to
help them.   1   2   3   4   5

27.Circumstances prevent me from being
more productive.   1   2   3   4   5

28.I can entertain friends when
I want.   1   2   3   4   5

29.Despite my efforts, my children (or other
members of my family) will not
(or cannot) come and visit me as often as
I would like.   1   2   3   4   5

30.Keeping in contact with interesting ideas
is easy for me to do.   1   2   3   4   5

31.My living conditions prevent me from
taking part in the activities that
I enjoy.   1   2   3   4   5

32.It is exceedingly difficult for me to get my
family to either write or phone me
(or contact me using the Internet,
if applicable).   1   2   3   4   5

33.I am able to find privacy when
I want it.   1   2   3   4   5

34.People keep me from watching the TV
programs I want to see.   1   2   3   4   5

APPENDIX K: SOCIAL PROVISIONS SCALE (Cutrona & Russell, 1987)

Instructions: In answering the following questions, think about your current relationships with friends, family members, co-workers, community members, and so on. Please indicate to what extent each statement describes your current relationships with other people. If applicable, consider your on-line (Internet) relationships too. Use the scale below to indicate your opinion. For example, if you feel a statement is very true of your current relationships, you would respond with a 4 (strongly agree). If you feel a statement clearly does not describe your relationships, you would respond with a 1 (strongly disagree).

1= Strongly disagree   3= Agree
2= Disagree   4= Strongly agree

1.There are people I can depend on to
help me if I really need it.   1   2   3   4

2.I feel that I do not have close personal
relationships with other people.   1   2   3   4

3.There is no one I can turn to for guidance
in times of stress.   1   2   3   4

4.There are people who depend on me
for help.   1   2   3   4

5.There are people who enjoy the same
social activities I do.   1   2   3   4

6.Other people do not view me
as competent.   1   2   3   4

7.I feel personally responsible for the
well-being of another person.   1   2   3   4

8.I feel part of a group of people who
share my attitudes and beliefs.   1   2   3   4

9.I do not think other people respect
my skills and abilities.   1   2   3   4

10.If something went wrong, no one
would come to my assistance.   1   2   3   4

11.I have close relationships that provide me
with a sense of emotional security
and well-being.   1   2   3   4

12.There is someone I could talk to about
important decisions in my life.   1   2   3   4

APPENDIX K (cont.)

13. I have relationships where my competence
and skill are recognized.   1   2   3   4

14. There is no one who shares my interests
and concerns.   1   2   3   4

15. There is no one who really relies on me
for their well-being.   1   2   3   4

16. There is a trustworthy person I could turn
to for advice if I were having problems. 1   2   3   4

17. I feel a strong emotional bond with at least
one other person.   1   2   3   4

18. There is no one I can depend on for aid
if I really need it.   1   2   3   4

19. There is no one I feel comfortable talking
about problems with.   1   2   3   4

20. There are people who admire my talents
and abilities.   1   2   3   4

21. I lack a feeling of intimacy with
another person.   1   2   3   4

22. There is no one who likes to do the
things I do.   1   2   3   4

23. There are people I can count on in
an emergency.   1   2   3   4

24. No one needs me to care for them.   1   2   3   4

APPENDIX L: SURVEY COVER LETTER

Dear Senior Friends member:

Your help in this important University of New Hampshire study is greatly appreciated!

By completing and returning the enclosed survey you will be helping us learn more about health and well-being among older adults. You will also be providing needed information about how older adults are (or are not) using the Internet.

Remember: <u>You do not need to be an Internet user to participate--we are interested in both users and non-users alike.</u>

When completing the survey, remember that we are interested in <u>your</u>, not someone else's, perspectives.

For taking the time to participate in this research, a random drawing from among those who have returned completed surveys by **December 15, 1999** will be conducted. Ten cash awards of $50 each will be distributed. **If you want to be included in the drawing, you must indicate this on the last pac**ᵊ **of the questionnaire.** Your answers will be identified by a code number which appears on the last page of the questionnaire. Please *do not alter or remove this number.*

We are very grateful for your participation in this UNH-Seacoast Senior Friends study. Should you have any questions about the survey, your participation, or our findings, please do not hesitate to contact us at (603) 868-5943 or at mamangan@christa.unh.edu. Furthermore, if you have any questions you would like to ask of Seacoast Senior Friends, contact Senior Friends Advisor Cindi Shanley at 1-800-811-2513.

With thanks,

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