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The Role of Technology in Supporting Social Engagement Among Older Adults

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Introduction

Social connectively and meaningful social engagement have long been heralded as important components of successful aging. For example, Rowe and Kahn's model of successful aging (Rowe & Kahn, 1998) as well as the Proactivity Model of Successful Aging (Kahana & Kahana, 1996, 2001) posit that engaging in social activities and using social resources is important to maintaining a good quality of life in older age. It has also been shown that social goals and maintaining close social relationships are a priority in later life (e.g. Carstensen, Fung, & Charles, 2003). Yet many older adults, due to changes in life circumstances, are socially isolated and lonely. For example, loss of a social network through changes in life roles such as retirement, loss of a partner or friends, and the onset of a chronic illness or disabling condition can also result in lack of social ties and risk for loneliness.

Estimates suggest that 19–30% of older adults suffer from loneliness. For example, data from a recent survey of a population-based sample of older adults indicated that 19% of the respondents suffered from loneliness and an additional 19% feel lonely often or some of the time (Hawkley, Kozloski, & Wong, 2017). Social isolation and loneliness are especially prevalent among older adults who have mobility restrictions, live alone or in rural locations, are of lower socio-economic status, or are in the older cohorts. In 2015, about 28% of all non-institutionalized persons aged 65+ in 2015 lived alone. Living alone is more prevalent with advanced age, especially among women (Administration on Aging, 2016). Generally, social isolation refers to lack of social ties and a social network, while loneliness refers to a perceived lack of meaningful social companionship. Social support, which is related to social connectivity, refers to the provision of emotional, instrumental, or informational support to an individual (Cohen, 2004).

Recently, increased attention is being paid to this issue given the evidence linking both social isolation and loneliness to adverse physical, emotional, and cognitive outcomes (Aylaz, Aktürk, Erci, Öztürk, & Aslan, 2012; Cacioppo & Cacioppo, 2014; Ellis & Hickie, 2001; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000). Recently data from the English Longitudinal Study of Aging has also found that loneliness is an important predictor of dementia (Rafnsson, Orrell, d'Orsi, Hogervorst, & Steptoe, 2017). In this regard, efforts are being directed towards understanding factors that influence social isolation and loneliness and how this varies across populations of older adults, as well as potential strategies to prevent or remediate problems with isolation and loneliness. In this article we explore the potential role that computers and information technologies can play in identifying those at risk for isolation and loneliness, as well as enhancing opportunities for meaningful social connectivity and engagement.

How Can Technology Help?

There are numerous technology applications that have the potential to address problems with isolation and loneliness

among older people. For example, new and continuing developments in sensing and monitoring technologies that can be integrated within an individual's home provide an opportunity to identify not only changes in physical and cognitive functioning but also social activity. These changes might include leaving the home less frequently, fewer social visits, or other changes in social behavior such as decreased frequency of connecting to others via telephone or email, and may signal that the individual is at risk for becoming isolated and lonely. Of course, questions arise regarding the feasibility and acceptability of using these technologies. In this regard, Kaye and colleagues (2011) found that installation of an unobtrusive home-based assessment platform in the homes of elderly persons was feasible and can be used successfully to monitor activities and detect changes in activity patterns. Other studies (e.g., Melenhorst & Bouwhuis, 2004; Wild, Boise, Lundell, & Foucek, 2008) have shown that older adults will be receptive to the use of these types of technology if they perceive the systems foster the ability to live independently. However, there is no large-scale implementation or systematic evaluation of these systems with broad and diverse samples of older adults. There are also issues surrounding scheduling and duration of monitoring; the nature of the data capture; the format of data reporting; cost; maintenance; usability; and privacy. Less sophisticated wearable activity monitors can also provide some limited insight into social behaviors, as they provide at least an estimate of daily activity. Recently, York, Cornwell, and Cagney (2017) explored the potential use of iPhones, which captured Global Positioning Systems (GSP) and Ecological Momentary Assessments (EMAs) as a means of assessing real-time activities and activity space of older adults. They found that use of this methodology allowed examination of the social environments that were visited by the people in their sample and concluded that variation in activity space can provide important insights into the health and well-being of older adults.

The internet and smartphone technologies also provide a vast opportunity for enhancing the social connectivity of older adults through email, social media, Instagram, and other applications. As noted above, smartphones are also being used as vehicles for real-time activity reporting. According to recent data from the Pew Research Center (Anderson and Perrin, 2017), 67% of adults aged 65+ go online and about 51% of those report that they have high-speed internet at home. However, there are significant differences in access and use among subpopulations of older adults. Adults in the older cohorts report using the internet and having broadband access less than those in younger cohorts, as do those who are less educated and have lower household incomes. Also, as pointed out by Cotten (2017), the Pew data is only based on community-dwelling older adults and thus is an overestimate of use as it does not include people in various types of care facilities. The same general use and adoption patterns are true for smartphone ownership. Of those 65+ who do use the internet, about 34% indicate that they have used social networking sites. This is considerably less than the usage of younger adults (Anderson and Perrin, 2017). The use of social media, however, is increasing among older people.

Several studies have examined the impact of access to the internet on the well-being and social outcomes for older adults, and the results are mixed. For example, use of the internet was shown to decrease loneliness and increase social contact among a sample of older adults in assisted and independent living communities (Cotten, Anderson, & McCullough, 2013). Chopik (2016), using data from the Health and Retirement Survey, found that among a sample of older adults ($N = 591$), higher use of social technology was linked to higher subjective health and well-being and lower depressive symptoms. The link between use of social technology and these outcomes was mediated by reductions in loneliness. Furthermore, each of the links between social technology use and physical and psychological health was mediated by reduced loneliness. These findings also support the evidence of an association between loneliness and mental health. Other studies have found no impact of technology access on well-being (e.g., Dickinson & Gregor, 2006; Slegers, van Boxtel, & Jolles, 2008).

We (Czaja, Boot, Charness, Rogers, & Sharit, 2017) recently evaluated the impact of a specially designed computer system, PRISM, on outcomes related to well-being and social engagement among a diverse sample of older adults who lived alone in the community and were at risk for social isolation. PRISM, which contained internet access (with vetted links to sites such as NIHSeniorHealth. Gov), an annotated resource guide, a dynamic classroom feature, a calendar, a photo feature, email access, games, and online help, was compared to a control condition that included a binder containing content that paralleled the PRISM system in a non-electronic form (e.g., paper resource guides, paper calendar). Three hundred seniors were randomly assigned to the PRISM or control condition and completed baseline, 6-, and 12- month follow-up assessments. At 6 months those who received PRISM reported significantly decreased loneliness and increased perceived social support and well-being as compared to those who received the binder. Although the differences in these outcomes between the groups were not maintained at the 12-month assessment, those who received PRISM still maintained improvements from baseline. Importantly, 33% of our sample was 80 and older. Interview data indicated that those who used PRISM found it easier to connect with family and friends, and the majority of PRISM participants indicated that use of PRISM improved their daily life.

A recent study of use of Information and Communication Technologies (ICT) among the "oldest old" (Sims, Reed, & Carr, 2017) found that more common use of ICT was to connect to family and friends as opposed to searching for information, and that overall, using ICT was linked to higher levels of physical and mental well-being. Interestingly, the

investigators also found a meditational effect, such that use of ICT to connect to family and friends was associated with greater life satisfaction, higher goal attainment, and less loneliness, whereas using ICT to support new learning was associated with better subjective health and fewer functional limitations. They point out that for the benefits of ICT to be maximized for older people, it is important to align the purpose of ICT use with the goals of the user.

Conclusions

Overall, while some studies have found no benefit of ICT use among older adults, our findings and those of others are in fact encouraging and suggest that the use of the internet can be beneficial for older people with respect to maintaining and enhancing social engagement and reducing feelings of loneliness. Use of technology can help older adults maintain ties with friends and family, form new relationships, and find information about social activities and community events. Clearly this is an area that needs further exploration. Identification of strategies to prevent and decrease loneliness is a high priority given the adverse effects associated with lack of meaningful social connectivity and engagement.

> **Use of technology can help older adults maintain ties with friends and family, form new relationships and find information about social activities and community events.**

Although research in this area is growing, we need more rigorous studies that examine the impact of ICT use among large, diverse samples of older adults, as well as examples of potential moderators and mediators of the association between ICT use and well-being outcomes. We need to understand what applications are most beneficial, for whom, in what contexts, and the mechanism linking use of applications to outcomes. Additionally, it is important to examine potentially negative outcomes such as decreases in human contact or social activities due to an over-reliance on technology (e.g. gaming). Data is also needed to understand applications, which are most beneficial to older adults and align with their needs, preferences, and goals. However, as cogently pointed out by Kaye (2017), large-scale randomized clinical trials are not the only vehicle for generating this evidence. In some cases, answers to questions can be gleaned by smaller-scale usability trials or by data mining of available large-scale survey data (e.g., Chopik, 2016).

It is also critical to understand barriers to access and meaningful use. The age-related digital divide still exists, especially for older adults of lower socio-economic status, those who have mobility restrictions, and those in rural locations. Unless we alleviate issues with access, the potential benefits of ICT cannot have broad-scale implementation. Of course, access to technology is not sufficient. The technology must be useful to and usable by older people. Designers of these systems must focus on usability issues and consider the characteristics, needs, and preferences of older adults. In the PRISM project, we used a user-centered design approach, which included several rounds of usability/pilot testing across all three of the participating sites with representative samples of users. We were able to train all of our participants on the use of PRISM, and the majority (88%) of the sample found PRISM easy to use (Czaja et al., 2017). The development of useful and usable systems requires partnerships between system designers, gerontologists, researchers, and older adult consumers. Appropriate training and technical support must also be available. For example, the PRISM system included the PRISM software application as well as a training protocol, user guide, and a help system. We also pilot tested our training protocol, which led to important modifications such as more emphasis on use of the computer mouse. Community organizations can play an important role in enhancing access by providing training programs and opportunities for access. Policy makers must also be on board with respect to helping to ensure that all groups of older people have attainable broadband access.

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