



Full length article

Life satisfaction in the internet age – Changes in the past decade

Sabina Lissitsa^{a,*}, Svetlana Chachashvili-Bolotin^b^a School of Communication, Ariel University, Israel^b The Institute for Immigration & Social Integration, Ruppin Academic Center, Israel

ARTICLE INFO

Article history:

Received 28 November 2014

Received in revised form

30 July 2015

Accepted 1 August 2015

Available online xxx

Keywords:

Life satisfaction

Internet adoption

Digital uses

Senior population

Repeated cross-sectional study

ABSTRACT

Using data from large scale Annual Social Surveys of the CBS in Israel, the current study investigated the impact of internet adoption and internet uses on the life satisfaction of senior citizens (aged 65+), compared to those of working age (ages 20–64) during the decade of 2003–2012. The findings show high-medium levels of life satisfaction – higher in younger age group, compared to the senior citizens. Life satisfaction increased moderately over time among the younger age group, while among the older population it remained stable during the decade under study. Our main conclusion is that internet adoption and digital uses increase life satisfaction, after controlling for socio-demographic variables, sociability and health condition. In addition, internet adoption and digital uses can constitute an important channel for increasing life satisfaction among senior citizens and weaker social groups: people from low economic strata and those suffering from health problems that interfere with day-to-day functioning. Moreover, in contrast to other powerful factors impacting life satisfaction (income, religiosity, sociability and health problems) this factor can be changed with relative ease, if digital literacy becomes one of the important goals in the national agenda.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Extensive empirical literature is emerging on the determinants of life satisfaction as part of mental well-being. Social scientists from various disciplines have tried to understand the factors that impact individual life satisfaction and whether these influential factors, as well as satisfaction with life, have changed over time. Internet connectivity and usage have risen dramatically in the past decade, providing people with greater ease in obtaining information, creating economic and social exchanges, engaging in social activities and online communities and much more. However, the long-term impact of internet adoption and use on individual well-being in general and life satisfaction in particular has received limited attention from scholars. The empirical literature monitoring changes in individuals' well-being in 72 countries from 1972 to 2006 did not include ICT adoption among the influencing factors (Blanchflower & Oswald, 2008). Given the increasingly prominent role of the internet in people's daily lives, an understanding of its influence on individual life satisfaction is crucial.

In addition to its direct and indirect benefits (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Hargittai & Hinnant, 2008; Kim & Kim, 2001; Mossberger, Tolbert, & Stansbury, 2003; Van Dijk, 2005; Zillien & Hargittai, 2009), internet penetration has also had a dramatic side effect: it has created a digital divide between those who have access to information and communication technologies and know how to utilize them, and those who do not (Compaine, 2001). Access to the technology and to its benefits is not equally distributed either between or within nations (Guerrieri & Bentivegna, 2011), including Western countries, and worldwide, older people tend to be on the 'wrong' side of the digital divide (Lissitsa & Chachashvili-Bolotin, 2015; Olphert & Damodaran, 2013). Moreover, senior citizens older than sixty can be identified as the social group having the lowest level of participation in the information society (Fuglsang, 2005). The European Digital Development Index (EDDI) value for the age bracket of 65 and older is constantly below the European average and shows no sign of improvement (Guerrieri & Bentivegna, 2011). Considering that life expectancy has increased substantially (Nimrod, 2013), today a 65-year-old person may expect to live an additional 18.6 years (Greenberg, 2009) and it is important to ensure quality of life for the aging population, which in our time is inextricably linked with internet adoption and use (Shapira, Barak, & Gal, 2007).

* Corresponding author.

E-mail addresses: sabinal@bezeqint.net (S. Lissitsa), svetachb@gmail.com (S. Chachashvili-Bolotin).

In this context it seems important to indicate how the age based digital divide is reflected in life satisfaction during the period of internet adoption in the early years of the 21st century. Thus, the main goal of the current research is to examine the impact of internet adoption and uses on life satisfaction among the senior population (ages 65+) in Israel, compared to those still in the labor market (ages 20–64) during the decade spanning 2003–2012.

We will begin by defining life satisfaction, after which we will discuss the impact of internet adoption and use on life satisfaction in general. Following this we will focus on the impact of internet adoption and use on life satisfaction in the older population.

2. Literature review

2.1. Life satisfaction

Subjective well-being is determined by affective, cognitive and emotional components (Diener, Emmons, Larsen, & Griffin, 1985). The affective component is represented by perceived quality of life, the cognitive component by general satisfaction and the emotional component by level of depression. Shin and Johnson (1978) define life satisfaction as an overall assessment of one's own quality of life based on one's personal judgment and criteria. According to Diener (1984), life satisfaction is best measured by asking individuals to rate their satisfaction with life as a whole, as opposed to totaling up their satisfaction in specifically defined areas. Other researchers in the field concur with this approach (e.g., Kahneman & Krueger, 2006; Bohnke, 2008).

The main predictors of life satisfaction are health, employment status, marital status, social capital, income, education, religiosity and ethnicity. In other words, individuals who are healthier, non-immigrants, married, employed, more religious, and have higher income and extensive social networks are more likely to report higher satisfaction with life (Amit & Litwin, 2010; Bonini, 2008; Blanchflower & Oswald, 2008; Dolan, Peasegood, & White, 2008; Easterlin, 2001; Frijters, Johnson & Shields, 2011; Helliwell, 2006; Helliwell & Putnam, 2004; Tomás, Sancho, Gutiérrez, & Galiana, 2014). However, the findings about the impact of education and age on life satisfaction are ambiguous. Researchers have reported a positive impact of education on life satisfaction (Cheung & Chan, 2009; Davis & Friedrich, 2004), as well as a negative impact (Rao, Tamta, & Kumari, 2014). Studies have revealed different factors that can mediate the negative impact of education on life satisfaction, such as a mismatch between job and education (Artés, Salinas-Jiménez, & Salinas-Jiménez, 2013), as well as educational aspirations that exceed opportunities (Ferrante, 2009).

Some studies found no relationship between age and life satisfaction (e.g., Diener & Suh, 1998), others reported a weak positive linear association (e.g., Hansson, Hillers, & Forsell, 2005) or a weak negative relationship (e.g., Chen, 2001). Helliwell and Putnam (2004) showed that compared to a younger group, people age 65 and above reported more life satisfaction. Perhaps one of the most influential studies in recent year pertaining to these two variables was that conducted by Blanchflower and Oswald (2008) based on cross-sectional data from multiple nations. The study demonstrated that life satisfaction follows a curvilinear pattern that reaches its nadir at middle age but then increases into later adulthood. Likewise, Lockenhoff and Carstensen (2004) found that subjective well-being either increases or remains stable with age, even in the face of decreasing health. One explanation for this paradoxical finding is that several life domains (e.g., social life) improve with age so that increases in those domains offset decreases in others (e.g., health) (McAdams, Lucas & Donnellan, 2012).

As can be seen from the above findings, it is not possible to draw an unequivocal conclusion about correlation patterns between age

and life satisfaction. In our focus on life satisfaction among those aged 65+ in this study, we do not treat age as a sequential variable but rather as a dichotomous variable where the 20–64 age group serves as the control group.

2.2. The impact of internet adoption and use on life satisfaction

The findings in the research literature are ambiguous regarding the impact of internet use on well-being and life satisfaction. The direction of the relationship between these variables may be positive or negative, depending on how internet use influences the social processes that contribute to mental health. If internet use facilitates these processes, we would expect psychological well-being to increase with internet use. For example, internet offers users greater opportunities and resources for promoting their careers, work, education and social status (DiMaggio et al., 2004; Hargittai & Hinnant, 2008; Kim & Kim, 2001; Mossberger et al., 2003; Van Dijk, 2005; Zillien & Hargittai, 2009) and enhancing income and social mobility, which correlate positively with individual well-being. The appropriate use of internet in areas such as online news, online forums, online counseling, etc. can help to promote self-sufficiency, psychological empowerment, lifelong learning, and a higher quality of life (Fowler, Gentry, & Reisenwitz, 2015; Hu & Leung, 2003; Leung, 2010). In the same vein, e-mail and social media facilitate the building and maintaining of social relations or online interactions with people that users have never met physically (Pénard & Poussing, 2010; Shklovski, Kiesler, & Kraut, 2006) by facilitating rapid communications across large geographical distances. Consequently, these online activities can generate greater well-being by improving and expanding social capital which is known to be one of the main factors influencing life satisfaction (Elgar et al., 2011; Oh, Ozkaya, & Larose, 2014).

Another reason to presume a positive relation between internet use and happiness is that nowadays, access to the internet is perceived as a social norm in developed countries. Non-internet users might feel ostracized or socially excluded even if they do not feel the desire to adopt the internet (Khvorostianov, Elias, & Nimrod, 2012; Stepanikova, Nie, & He, 2010).

However, internet use might also have detrimental effects. Since internet activities are largely performed in solitude and displace potentially more interactive social activities, people who spend large amounts of time on the internet may end up feeling socially isolated, cause a decline in mood (Sagioglou & Greitemeyer, 2014) and low life satisfaction (Kim, LaRose, & Peng, 2009; Stepanikova et al., 2010). Moreover, researchers have reported compulsive internet use (Muusses, Finkenauer, Kerkhof, & Billede, 2014), which reflects an internet addiction (Cheng & Li, 2014), problematic or pathological internet use (e.g., Caplan, 2002; Davis, 2001; Morahan-Martin & Schumacher, 2000), internet dependence (e.g., Wang, 2001) and associated lower psychological wellbeing (Chou, Condon, & Belland, 2005; Widyanto & Griffiths, 2006). The internet might also create addictive behavior (e.g., gambling, online gaming, pornography) and thus be detrimental to mental health (Banjanin, Banjanin, Dimitrijevic, & Pantic, 2015; Li & Chung, 2006).

Although many studies have addressed various implications of internet use on different aspects of well-being, including life satisfaction, as far as we know research examining the impact of internet adoption and use on life satisfaction over time on a large sample of participants has not yet been conducted.

2.3. Internet adoption and its impact on life satisfaction among the older population

Aging is often accompanied by various physical and mental problems including deteriorating health and cognitive functioning.

A central aspect of these phenomena is the feeling of powerlessness, a subjective experience caused by mental and physical stress, the loss of economic security, deterioration in the ability to exert influence and make a difference socially or politically, diminished social ties, a loss of one's regular social network and support group (Butler, Lewis, & Sunderland, 1998; Shapira et al., 2007) and greater dependency on others (Cox, 1988). Given the extent to which digital technologies have penetrated many daily functions (Arnaldi, Boscolo, & Stamm, 2010; Näsi, Räsänen, & Sarpila, 2012) the role of the internet in late adulthood is of increasing concern.

Using the internet for communication may help reduce social isolation, loneliness, and depression among older adults (Blit-Cohen & Litwin, 2004; Cotton, Ford, Ford, & Hale, 2012; Lelkes, 2013; Olphert & Damodaran, 2013; Zhang & Kaufman, 2015). Computer-mediated information technology may help older adults enhance communication with family members and friends, expand opportunities for lifelong learning (Freese, Rivas, & Hargittai, 2006; Sundar, Oeldorf-Hirsch, Nussbaum, & Behr, 2011), extend social support networks (White et al., 2002; Zhang & Kaufman, 2015), enrich personal interests and health-related information and open additional entertainment resources for exploration (McMellon & Schiffman, 2000; O'Hara, 2004). In this way the use of computers and the internet can empower older people (Erickson & Johnson, 2011), contribute to their quality of life, improve their attitudes toward aging (Cody, Dunn, Hoppin, & Wendt, 1999; Dickenson & Hill, 2007), encourage them to look forward and welcome new challenges (Blit-Cohen & Litwin, 2004), preserve cognitive abilities (Haesner, O'Sullivan, Gövercin, & Steinhagen-Thiessen, 2015) and help in coping with this group's typical mental and physical difficulties (Shapira, Barak & Gal, 2007). Using a survey of 7000 retired persons, Ford and Ford (2009) showed that internet use by elderly Americans led to about a 20% reduction in depression; in other words, the internet increased their mental well-being.

Predictors of internet use among senior citizens include higher education and greater income (Charness & Boot, 2009; Silver, 2014; Wright & Hill, 2009); positive attitudes towards computers and the internet (Wagner, Hassanein, & Head, 2010); high computer self-efficacy and low computer-anxiety (Czaja et al., 2006); good physical health (Kaye, 2000); and cognitive functioning (Czaja et al., 2006). The main purposes of internet surfing in older age are: managing health (Wong, Yeung, Ho, Tse, & Lam, 2012), nurturing professional interests, maintaining and extending social networks; appreciating the past and enjoying leisure (Khvorostianov et al., 2012).

The expansion of internet into all areas of our lives, the growth in the elderly population and the contribution of digital uses to the quality of life of the senior population, increase the importance of a comprehensive study of internet adoption and use and their impact on life satisfaction. Most of the surveys exploring the impact of internet use on life satisfaction in late adulthood have applied a macro level approach and referred to internet use as a single activity, without differentiating between various functions and activities (see Nimrod, 2013), or have explored the communicative aspect of internet uses (Blit-Cohen & Litwin, 2004; Nahm & Resnick, 2001; Nimrod, 2014) and leisure activities (Carle, 2007; Cody et al., 1999; Iyer & Eastman, 2006). Comparatively little research effort has been expended in examining how internet use for other purposes, such as information seeking, entertainment activities and online purchasing, may relate to life satisfaction. Those surveys that have sought a deeper understanding of the effect of internet adoption and use on life satisfaction have used relatively small samples without taking the time perspective into account.

Pew Internet and American Life project has followed up internet adoption in the US among population-representative panels

including a sub-analysis of senior use since 2000 (Smith, 2014; Zickuhr & Madden, 2012). In recent years a Health and Retirement panel study of more than 22,000 Americans over the age of 50 has begun to report on internet use. In 2011 the first wave of the National Health and Aging Trends Longitudinal Study (NHATS) which included items pertaining to ICT use was conducted among Medicare beneficiaries aged 65 and older (Elliot, Mooney, Douthit, & Lynch, 2013). However, as far as we know, no research using a large senior population has been conducted that investigates *trends in the impact of internet adoption and use on life satisfaction* over the past decade. This is the purview of the current research.

The current survey will examine the impact of internet adoption and various types of digital uses on life satisfaction during the last decade among a large sample of participants using a comparative perspective: comparing post-retirement-age senior citizens with adults of labor market age.

2.3.1. Research questions

1. What trends were visible in internet access, digital uses and life satisfaction over the decade from 2003 to 2012 among Israeli senior citizens (aged 65+), compared to those aged 20–64?
2. What was the impact of internet access and digital uses on life satisfaction among senior citizens? Do differences in the effect of these variables appear between the two age groups, and if so, what are the differences?
3. Has the impact of internet access and digital uses on life satisfaction changed over time?

3. Methods

3.1. Source of data

The current research is based on a repeated cross-sectional study. Study data were culled from the Annual Social Surveys conducted under the auspices of Israel's Central Bureau of Statistics (CBS) from 2003 to 2012. The CBS conducts a social survey annually using different respondents each year. The surveys provide up-to-date information about living conditions and the welfare of the population in Israel. The social survey questionnaire has two main parts: a core questionnaire containing about 100 items covering the main areas of life such as: socio-demographic characteristics of household members, employment, economic situation, health, skills; studies, languages, courses, use of computers and the internet and so on. Each year a different variable module is devoted to one or two topics, in order to investigate it in greater detail than is possible in the core questionnaire.

CBS interviewers carry out face to face interviews in the field between January and December each year. Each interview, which is conducted in Hebrew, Russian or Arabic, depending on the interviewee, lasts about one hour.

3.2. Population

The survey pool population comprises the permanent non-institutional population of Israel aged 20 and older, as well as residents of non-custodial institutions (such as student dormitories, immigrant absorption centers and independent living projects for the elderly). New immigrants are included in the survey population if they have been resident in Israel for at least six months.

3.3. Sampling method

Each year the CBS sample size comprises about 7500 persons aged 20 and older, representing about 4.5 million people in that age bracket. The response rate is around 80%. The sample design involves defining groups based on a combination of three demographic variables: population groups (Israeli-born Jews, immigrants and Arabs), age and gender. The expected size of each design group is to be proportional to its size in the population. Our total sample, combining interviews made over 10 years, included 73,523 respondents, of them 61,455 respondents of working age (20–64) and 12,068 respondents aged 65+.

The formulation of all the questions used in the study was identical for each of the ten years because we used only the core questions.

3.4. Variables

3.4.1. The dependent variable

Overall life satisfaction was measured by the following item: “Overall, how satisfied are you with your life?” The scale was 1–4: 1 – not satisfied at all, 2 – not very satisfied, 3 – satisfied, 4 – very satisfied.

3.4.2. The independent variables

Using the internet in the preceding three months was measured by the following item: “During the last three months, have you made use of the internet, including e-mail?” Internet access was coded as 1 for those who used and 0 for non-users.

Internet uses were measured by the following items: “Did you use a computer during the last three months for: searching for information; e-mail; discussion groups and communications; games; buying products?” For each item, users were coded as 1 and non-users as 0.

3.4.3. The control variables

Wave of data collection was coded on a scale of 0–9, where 2003 = 0, 2012 = 9.

Age group was coded 0 for the 20–64 age group and 1 for the 65+ age group.

Ethnicity was measured by two dichotomous variables: Arabs and immigrants (those who immigrated to Israel after 1989). Veteran Jews (born in Israel or immigrated before 1989) were the comparison group.

Gender was coded 1 for men and 0 for women. *Religiosity* was measured on a scale of 1–4: 1 – not religious, secular; 2 – traditional; 3 religious; 4 – very religious.

Marital status was measured as a dichotomous variable: 1 – married; 0 – other marital status.

Number of children was measured as a continuous variable.

Area of residence was coded 1 for center residents and 0 for periphery residents.

Education was measured by a dichotomous variable: 0 – no academic degree, 1 – academic degree (BA, MA or PhD).

Employment was measured as a dichotomous variable: 1 – works, 0 – doesn't work.

Income level was measured by the item: “Last month, what was the total gross income of all members of the household, from all sources: work, pensions, support payments, rents, etc.?” The scale was: 1. NIS 2500 (New Israeli Shekels) or less; 2. NIS 2501–4000; 3. NIS 4001–5000; 4. NIS 5001–6500; 5. NIS 6501–8000; 6. NIS 8001–10,000; 7. NIS 10,001–13,000; 8. NIS 13,001–17,000; 9. NIS 17,001–24,000. 10. More than NIS 24,000. This variable was transformed into a continuous variable using the midpoint of each group and divided by 1000.

Hebrew language proficiency. The respondents were asked: “What is the level of your knowledge of the Hebrew language, in speech, reading and writing. The scale was: 1–very good, 2–good, 3–moderate, 4–weak, 5–don't know at all. An index that was composed of combined reading, writing and speaking skills in Hebrew was measured on a scale of 1–5 (1–not at all, 5–very well) which was constructed as an average of these three language skills. Cronbach Alpha for Hebrew language proficiency was 0.95.

Overall health condition was measured by the following item: “How is your health, overall?” The scale was: 1 – not good at all, 2 – not so good, 3 – good, 4 – very good.

Physical or health problems interfere with day-to-day functioning was measured as a dichotomous variable, 0 – does not have such a problem, 1 – has such a problem.

Frequency of meeting/talking to friends was measured by the item: “How often do you meet your friends, or talk to them on the phone?” on scale of 1–4: 1 – less than once a month, 2 – once or twice a month, 3 – once or twice a week, 4 – daily or almost daily.

Loneliness was measured by the following item: “Do you ever feel lonely?” on a scale of 1–4: 1 – frequently, 2 – sometimes, 3 – seldom, 4 – never.

4. Results

We first present the findings regarding life satisfaction, internet access and use over time and then apply multivariate analysis in order to predict life satisfaction.

4.1. Descriptive findings

4.1.1. Life satisfaction

Fig. 1 presents overall life satisfaction for the total sample.

Fig. 1 shows that in both groups overall satisfaction with life is close to 3 (=satisfied). During the decade life satisfaction among the younger age group was significantly higher, compared to the older group, in t-test analyses conducted for each year ($p < .00$). In the younger group life satisfaction increased slightly over time, while in the older group life satisfaction remained generally unchanged.

4.1.2. Internet access over time

Fig. 2 shows the percentage of internet access for both age groups.

Fig. 2 shows that internet access among the senior population increased from 8% in 2003 to 34% in 2012 (an increase of 26 percentage points). At the same time, the percentage of internet

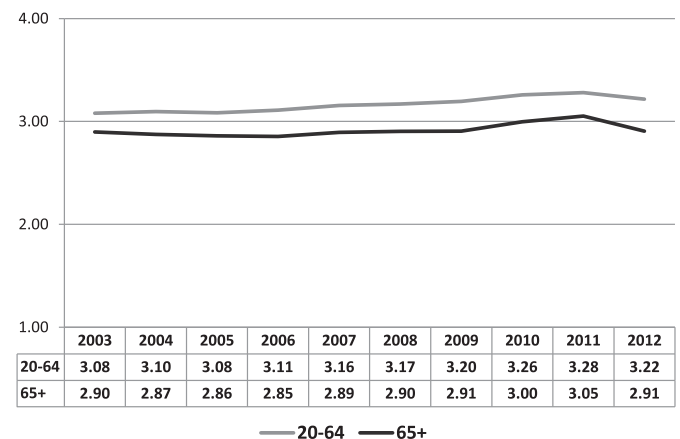


Fig. 1. Overall life satisfaction, 2003–2012.

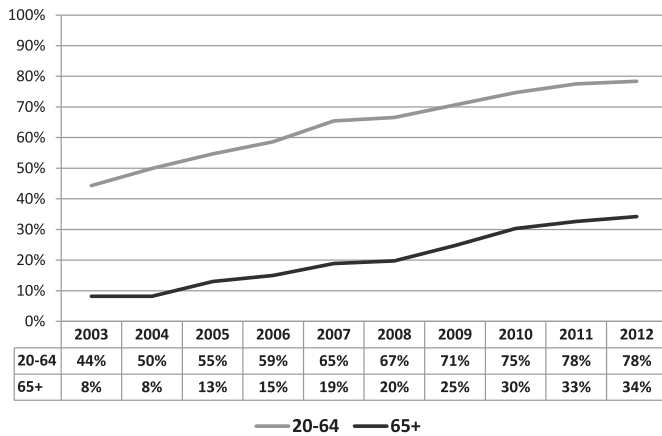


Fig. 2. Using the internet in the preceding three months, 2003–2012.

adopters among the 20–64 age group increased from 44% to 78% (an increase of 34 percentage points). Thus, the absolute gap between senior citizens (65+) and the population aged 20–64 increased during that time.

4.1.3. Digital uses over time

The findings among *internet users* presented in Table 1 show a high percentage of internet users who sought information and used e-mail and a relatively low percentage of users who played games or purchased products and services in the preceding three months. The percentage of users who sought information in the three months preceding the interview was similar in both age groups and did not change over time. The percentage of e-mail usage among senior citizen internet users was higher (83%) at the starting point (2003), compared to the younger age group (78%); however over time e-mail usage increased in the 20–64 age group (from 78% to 87%) and remained stable in the older group, so that in 2012 the user rate was higher in the younger group (87%), compared to seniors (82%). The percentage of social media use increased sharply over time in both groups; in 2012 social media usage was 67% among the 20–64 age group, compared to 52% among senior citizens. The percentage of internet users playing games at the starting point was higher among the younger group, compared to the older group (43% and 37%, respectively). Over time the percentage of game players in the younger group decreased (from 43% to 34%) while the older group showed a slight increase (from 37% to 40%); as a result in 2012 the percentage of game players was higher in the 65+ age group. The percentage of respondents purchasing products online at the starting point was low in both groups (19% and 15% for the younger and older groups, respectively). Over time this percentage increased in both groups and at the end of the decade

was higher among the younger group, compared to the senior citizens (39% and 28%, respectively).

4.2. Multivariate analyses

4.2.1. Predicting life satisfaction with internet adoption and digital uses

For a better understanding of the impact of internet adoption and digital uses on life satisfaction two linear regression models were applied. The first regression model, which was applied to the total sample, was performed in five stages. In the first stage wave of data collection, dichotomous age group variable and dichotomous ethnic variables (for immigrants and Arabs) were entered. In the second stage background and SES variables were added. In the third stage overall health condition, health problems and sociability variables were added. In the fourth stage internet use in the preceding three months was added. In the fifth stage a model was built with the addition of interactional effects. We examined all possible interactions between wave of data collection and control variables, between age group and control variables and between internet use and control variables. Our final regression model included only significant interactions.

The second regression model was applied only to internet users. In the first three stages, the same independent variables were entered as in the first model. In the fourth stage five types of digital uses were entered. In the fifth stage a model was built with the addition of interactional effects. We examined all possible interactions between wave of data collection and control variables, between age group and control variables and between digital uses and control variables. Our final regression model included only significant interactions.

4.2.2. Predicting life satisfaction in the total sample

Table 2 presents the linear regression findings predicting life satisfaction in the total sample (see Table 2).

The findings show that life satisfaction increases over time (see Model 1). Respondents of labor market age (20–64) and veteran Jews reported higher life satisfaction, compared to senior citizens, immigrants and Arabs. These effects diminished slightly after controlling for socio-demographic variables (see Model 2). Respondents who were married, employed, lived in the periphery and had no academic degree reported higher life satisfaction. Life satisfaction increased with higher level of religiosity, higher family income and lower number of children.

Respondents with higher sociability and better health condition were characterized by higher life satisfaction (see Model 3). After controlling for sociability variables and health condition, the effect of age group became insignificant. Moreover, after entering internet use in the preceding three months (see Model 4), senior citizens reported higher levels of life satisfaction, compared to the younger

Table 1
Digital uses among internet users during 2003–2012.

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Seeking information	20–64	92%	95%	95%	95%	92%	94%	95%	95%	95%	95%
	65+	92%	91%	93%	92%	90%	88%	90%	94%	93%	94%
e-mail	20–64	78%	79%	81%	82%	84%	88%	88%	87%	88%	87%
	65+	83%	83%	80%	78%	82%	85%	84%	84%	82%	82%
Social media	20–64	22%	23%	26%	28%	42%	45%	52%	57%	61%	67%
	65+	11%	16%	15%	13%	24%	33%	41%	42%	42%	52%
Games	20–64	43%	42%	41%	40%	37%	35%	40%	34%	38%	34%
	65+	37%	44%	42%	44%	39%	39%	42%	36%	35%	40%
Shopping	20–64	19%	21%	22%	20%	29%	28%	32%	33%	40%	39%
	65+	15%	24%	13%	12%	21%	18%	17%	19%	25%	28%

Table 2
Life satisfaction among total sample – linear regression findings.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta
(Constant)	3.20**		2.75**		2.09**		2.05**		2.04**	
Wave of data collection	0.02**	0.08	0.01**	0.05	0.01**	0.04	0.01**	0.02	0.01**	0.03
Age group (65+ = 1)	−0.19**	−0.09	−0.07**	−0.03	0.00	0.00	0.02*	0.01	0.08**	0.04
Immigrants	−0.35**	−0.19	−0.27*	−0.15	−0.23**	−0.12	−0.22**	−0.12	−0.26**	−0.14
Arabs	−0.18**	−0.09	−0.16**	−0.08	−0.12**	−0.06	−0.10**	−0.05	−0.17**	−0.09
Gender (Male = 1)			0.00	0.00	−0.05**	−0.03	−0.05**	−0.04	−0.05**	−0.04
Marital status (Married = 1)			0.15**	0.10	0.08**	0.05	0.08**	0.05	0.08**	0.05
Locality (Center = 1)			−0.01*	−0.01	−0.02**	−0.01	−0.02**	−0.01	−0.02**	−0.02
Religiosity			0.13**	0.18	0.11**	0.14	0.12**	0.15	0.11**	0.15
Family income			0.02**	0.18	0.01**	0.13	0.01**	0.11	0.01**	0.15
Education (academic degree = 1)			−0.04**	−0.02	−0.01*	−0.01	−0.01*	−0.01	−0.01*	−0.01
Number of children			−0.03**	−0.08	−0.02**	−0.05	−0.01**	−0.04	−0.01**	−0.04
Employment (employed = 1)			0.01**	0.01	−0.04**	−0.03	−0.05**	−0.03	−0.05**	−0.03
Frequency of meeting/talking to friends					0.07**	0.08	0.07**	0.08	0.07**	0.07
Feeling lonely					0.21**	0.29	0.21**	0.29	0.21**	0.29
Overall health condition					0.00**	−0.01	0.00*	−0.01	0.00**	−0.01
Health problems (have a problem = 1)					−0.22**	−0.14	−0.21**	−0.13	−0.25**	−0.16
Internet use							0.09**	0.06	0.12**	0.08
Interaction between wave of data collection and age									−0.01**	−0.03
Interaction between wave of data collection and Arabs									0.01**	0.04
Interaction between wave of data collection and immigrants									0.01**	0.03
Interaction between wave of data collection and internet use									−0.00*	−0.02
Interaction between internet use and income									−0.00**	−0.05
Interaction between internet use and health problems									0.07**	0.03
R ²	0.054		0.107		0.218		0.221		0.223	
R ² Change	0.054**		0.053**		0.111**		0.003**		0.002**	

*p < .05; **p < .01.

group. It should be noted that internet users reported higher levels of life satisfaction, compared to non-users.

The impact of income, religiosity, ethnicity, health problems and sociability corresponds with the research literature (Amit & Litwin, 2010; Bonini, 2008; Blanchflower & Oswald, 2008; Dolan et al.,

2008; Helliwell, 2006; Helliwell & Putnam, 2004; Frey & Stutzer, 2002, 2010; Frijters et al., 2011; Myers & Deiner, 1995). However, the negative impact of employment on life satisfaction contradicts the previous findings (Clark, 2003; Kassenboehmer & Haikens-DeNew, 2009; Winkelmann, 2009). Our data show that the

Table 3
Life satisfaction among internet users – linear regression findings.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta
(Constant)	3.25**		2.95**		2.22**		2.19**		2.23**	
Wave of data collection	0.01**	0.06	0.01**	0.03	0.01**	0.02	0.00**	0.02	0.00*	0.02
Age group (65+ = 1)	−0.06**	−0.02	0.01	0.00	0.03*	0.01	0.03*	0.01	0.10**	0.04
Immigrants	−0.30**	−0.17	−0.25**	−0.14	−0.22**	−0.12	−0.22**	−0.12	−0.25**	−0.14
Arabs	−0.12**	−0.05	−0.13**	−0.06	−0.10**	−0.05	−0.09**	−0.04	−0.09**	−0.04
Gender (Male = 1)			−0.01	−0.01	−0.05**	−0.04	−0.06**	−0.04	−0.06**	−0.04
Marital status (Married = 1)			0.11**	0.09	0.06**	0.04	0.06**	0.04	0.06**	0.04
Locality (Center = 1)			−0.04**	−0.03	−0.03**	−0.03	−0.04**	−0.03	−0.04**	−0.03
Religiosity			0.10**	0.13	0.09**	0.11	0.09**	0.11	0.09**	0.11
Family income			0.01**	0.16	0.01**	0.12	0.01**	0.12	0.01**	0.12
Education (academic degree = 1)			−0.03**	−0.02	−0.01*	−0.01	−0.01	−0.01	−0.01	−0.01
Number of children			−0.03**	−0.08	−0.02**	−0.06	−0.02**	−0.05	−0.02**	−0.05
Employment (employed = 1)			−0.02*	−0.01	−0.04**	−0.03	−0.05**	−0.03	−0.05**	−0.03
Frequency of meeting/talking to friends					0.07**	0.08	0.07**	0.08	0.07**	0.08
Feeling lonely					0.21**	0.29	0.21**	0.29	0.21**	0.29
Overall health condition					0.00	−0.01	0.00	−0.01	0.00	−0.01
Health problems					−0.17**	−0.10	−0.17**	−0.10	−0.34**	−0.20
Seeking information							−0.02	−0.01	−0.05**	−0.02
E-mail							0.06**	0.03	0.05**	0.03
Social media							−0.01	0.00	−0.01	0.00
Games							0.00	0.00	0.00	0.00
Online shopping							0.03**	0.02	0.03**	0.02
Interaction between wave of data collection and age group									−0.01**	−0.03
Interaction between wave of data collection and immigrants									0.01*	0.02
Interaction between e-mail use and health problems									0.05*	0.03
Interaction between seeking information and health problems									0.13**	0.08
R ²	0.033		0.071		0.173		0.174		0.175	
R ² Change	0.033**		0.039**		0.102**		0.001**		0.001*	

*p < .05; **p < .01.

positive effect of employment on life satisfaction (see Model 2) changed to negative after controlling for sociability and health problems (see Model 3) and slightly increased after controlling for internet use (see Model 4). Unemployed respondents were more likely to report lower sociability and worse health condition, compared to employed. Sociability and health condition are the main predictors of life satisfaction and controlling for these variables as well as for internet adoption promotes life satisfaction among unemployed respondents.

In addition, the findings showed a significant negative interactional effect (see Model 5) between wave of data collection and age group, i.e., life satisfaction increased over time only among the younger group. The significant positive interaction between internet use and health problems indicates that the effect of internet use on life satisfaction was higher among respondents with health problems. The significant negative interaction between wave of data collection and internet use indicates that the effect of internet use on life satisfaction weakened over time. The significant negative interaction between income and internet use indicates that the impact of internet use on life satisfaction decreased as income rose. The positive interactions between wave of data collection and Arabs and wave of data collection and immigrants indicate that life satisfaction among ethnic minorities increased faster, compared to veteran Jews.

The independent variables included in our regression model explained 22% of variance in life satisfaction.

4.2.3. Predicting life satisfaction among internet users

(Table 3) The findings show that among internet users life satisfaction increases over time (see Model 1). The younger age group (20–64) and veteran Jews reported higher life satisfaction, compared to senior citizens, immigrants and Arabs. The gap between the two age groups became insignificant after controlling for socio-demographic variables (see Model 2). Respondents who were married, unemployed, lived in the periphery and held no academic degree reported higher life satisfaction. Life satisfaction among internet users increased with higher level of religiosity, higher family income and lower number of children. Respondents with higher sociability and without health problems interfering with day-to-day functioning were characterized by higher life satisfaction (see Model 3). After controlling for sociability variables and health condition senior citizens and females reported higher life satisfaction, compared to the younger age group and males. Respondents who used internet for e-mail and online shopping in the preceding three months reported higher life satisfaction, compared to internet users who did not report these uses (see Model 4). The impact of seeking information, social media use and playing games on life satisfaction was insignificant. In addition, the findings show a significant negative interactional effect (see Model 5) between wave of data collection and age group, i.e., life satisfaction increased over time only among the younger group of internet users. The positive interaction between wave of data collection and immigrants indicates that life satisfaction among immigrants who used internet in the preceding three months increased faster, compared to veteran Jews. Significant positive interactions between seeking information and health problems indicate that the effect of seeking information on life satisfaction was higher among respondents with health problems. A similar significant interaction was found between e-mail use and health problems.

The independent variables included in our regression model explained about 18% of variance in life satisfaction for internet users.

5. Discussion

The current study investigated the impact of internet adoption and internet uses on the life satisfaction of senior citizens, compared to respondents of working age during the last decade. As far as we know, ours is the first research to investigate *trends in the impact of internet adoption and use on life satisfaction* over time among a large sample of participants, from a comparative perspective: comparing post-retirement-age senior citizens with adults of labor market age.

Our findings show that internet penetration increased dramatically over time, especially among the younger age group. Internet penetration has not yet reached the saturation point in either group (only one third of the senior population used internet in the preceding three months compared to 80% among the younger age group) and the age based digital divide increased over time.

The respondents reported high-medium levels of life satisfaction – higher in the younger age group, compared to senior citizens. Life satisfaction increased moderately over time among the younger age group, while among the older population it remained stable during the last decade. The main predictors of life satisfaction identified in our study were sociability, income, religiosity, ethnicity and health problems, which corresponds with the research literature (Amit & Litwin, 2010; Bonini, 2008; Blanchflower & Oswald, 2008; Dolan et al., 2008; Helliwell, 2006; Helliwell & Putnam, 2004; Frey & Stutzer, 2002, 2010; Frijters et al., 2011; Myers & Deiner, 1995; Tomás et al., 2014). Those reporting higher levels of life satisfaction were veteran Jews, participants who were more religious, with higher income, low level of loneliness and without health problems interfering with day-to-day functioning. Despite the lower life satisfaction reported by the ethnic minorities – Arabs and immigrants – both groups manifested greater increases in life satisfaction over time, compared to veteran Jews. These findings provide a source for optimism regarding the integration of ethnic minorities in Israeli society.

Our main finding is the positive impact of internet adoption on life satisfaction, although this impact decreases over time. We can speculate that the weakening of the internet effect on life satisfaction may be explained by the relatively high level of internet penetration among those elements of the population that are likely to adopt the technology, and the fact that it is approaching the saturation point. This development makes internet adoption a more difficult variable to employ in order to differentiate levels of life satisfaction than it was when internet use was relatively rare.

Our findings show that the impact of internet adoption on life satisfaction was higher among respondents with health problems interfering with day-to-day functioning and those who reported low income. Moreover, in contrast to our generic findings, the older internet users reported higher life satisfaction, compared to the younger users, after controlling for socio-demographic variables and health problems. In other words, internet adoption promotes life satisfaction in weaker social groups and can serve as a channel for increasing life satisfaction.

In this context it is important to identify the digital uses which impact life satisfaction among internet users. Regarding the findings, e-mail use and online shopping have a positive impact on life satisfaction. E-mail makes it possible to deal with problems and mobilize support without leaving home, to communicate at convenient times without the necessity for correspondents in the discourse to be present in real time, and is therefore less likely to cause addiction (Nahm & Resnick, 2001). Online shopping dramatically expands the possibilities for customers to efficiently compare and evaluate offers by providing analyses and decision tools. It minimizes customer search efforts through enjoyable and

smooth navigation and a logical structuring of information, saving time and money, and meets hedonistic needs while providing shopping enjoyment (Bauer, Falk, & Hammerschmidt, 2006; Pate & Adams, 2013). In these ways both digital uses contribute to quality of life and increase life satisfaction.

In contrast, among internet users life satisfaction was found not to be connected to social media use and playing games. These findings did not correspond to the research literature, which found communication and entertainment activities to be important sources of life satisfaction (Blit-Cohen & Litwin, 2004; Carle, 2007; Iyer & Eastman, 2006; Kiger, 2006; Nimrod, 2014; Wright, 2000). We can speculate that life satisfaction is more connected to the scope and types of such activities (Nimrod, 2014), than to the actual existence of these activities in the preceding three months. Moderate consumption of communication and entertainment activities can increase life satisfaction (Elgar et al., 2011; Oh et al., 2014), whereas if a person abuses these uses, the resulting addiction to or dependence on social media or game playing may be associated with lower life satisfaction (Cheng & Li, 2014; Chou et al., 2005; Muusses et al., 2014; Widyanto & Griffiths, 2006). Another explanation for the lack of connection between social media use and life satisfaction is Israeli culture, which still emphasizes the importance of physical contact in people relationships (Peres & Ben-Rafael, 2006; Peres & Katz, 1981), which has not yet been replaced by virtual contact. We recommend future examination of the impact of social media on life satisfaction after this digital use has penetrated the different strata of the Israeli population more completely. The scope and types of social media uses should also be examined.

Our findings also show that seeking information has an insignificant impact on life satisfaction in the total sample of internet users. However, this digital use was found to have a positive impact on respondents with health problems that interfere with day-to-day functioning. Seeking information expands opportunities for lifelong learning (Freese et al., 2006), enriches personal interests and supplies useful information. In addition, e-mail use has a stronger impact on life satisfaction among respondents with health problems, compared to other internet users. E-mail use can enhance communication options with family members and friends among people suffering from health problems.

5.1. Study limitations

Study limitations derive from the limitations of the CBS social survey database. In our study life satisfaction was measured only by one item. Future research should measure multiple items of life satisfaction (see Glaesmer, Grande, Braehler, & Roth, 2011; Oishi, 2006) and satisfaction with domains of life (see Test, Greenberg, Long, Brekke, & Burke, 2014). Such research may distinguish which domains of life satisfaction are affected more by internet adoption and use. In addition, we investigated the relation between internet adoption and uses and life satisfaction without measuring the intensity of internet use and detailed information about the types and purposes of digital uses. For example, our data do not enable more specific implications about which contents or which types of social media uses are more or less effective for increasing life satisfaction.

The next limitation is the repeated cross-sectional survey design. Further analyses have to be developed using more appropriate longitudinal data to obtain more robust measures of the short- and long-term effects of internet adoption and digital uses on life satisfaction. With longitudinal data, it is possible to monitor changes in life satisfaction after internet adoption.

6. Conclusions

Our main conclusion is that internet adoption and digital uses increase life satisfaction, after controlling for socio-demographic variables, sociability and health condition. When controlling for socio-demographic variables and internet use, seniors become more satisfied with life than the younger group, even though the generic findings indicate the opposite. The increase in life satisfaction over time only among the younger age group as well as their more rapid internet adoption makes it reasonable to predict that the gap in life satisfaction between people of working age and senior citizens will continue to grow in the future.

In addition, internet adoption and digital uses can constitute an important channel for increasing life satisfaction among senior citizens and weaker social groups: people from low economic strata and those suffering from health problems that interfere with day-to-day functioning. Moreover, in contrast to other powerful factors impacting life satisfaction (income, religiosity, sociability and health problems) this factor can be changed with relative ease, if digital literacy becomes one of the important goals in the national agenda.

6.1. Practical implications

Taking these findings into consideration, the practical implications become clear. Policy that promotes digital literacy in low income populations and among senior citizens should be encouraged. Such policy may also maximize well-being in society as a whole. It is likely that the cost of owning a computer or purchasing internet access involves economic constraints for the weaker elements of the population. One way to alleviate this problem may be to provide a publicly accessible infrastructure for information technologies; for example, in community clubs, clubs for seniors, independent living projects for the elderly and help in teaching digital skills offered by community volunteers. Community volunteers also can be useful in developing digital skills as a part of domestic help for people with health problems. This teaching should begin with operational and formal skills that evolve into the ability to find, select, process and evaluate information (information skills) and to cooperate online with other users (communication skills) (Van Deursen, Courtois, & Van Dijk, 2014). In addition, we recommend focusing on adapting technology to the needs of these people. For example, Skype and programs enabling the conversion of voice to text and vice versa can be an effective tool for senior citizens and people with physical limitations.

Our findings indicate that Israeli senior citizens do not realize the potential of online shopping, which was found to correlate positively with life satisfaction. The inability to examine products physically during online shopping increases the perception of risks associated with online shopping as consumers cannot touch, feel, or try on products before purchase. The additional barriers to online shopping among the elderly may be doubts concerning the trustworthiness of websites (Caine, Fisk, & Rogers, 2006), fear of identity theft and risk to personal information (Gatto & Tak, 2008). Previous surveys showed that older adults are less likely to use different strategies in order to be less visible online, compared to the younger age groups (Hoofnagle, King, Li, & Turow, 2010; Rainie, Kiesler, Kang, & Madden, 2013), possibly as a result of their lower digital skills. In order to overcome these barriers the main internet providers in Israel should consider increasing the awareness of digital dangers and explore ways of filtering internet content for safety.

If senior citizens, people with low income and those suffering from health problems are able to effectively use the many options

offered by the internet, they may experience greater life satisfaction in the long run and move forward in a more prosperous society.

References

- Amit, K., & Litwin, H. (2010). The subjective well-being of immigrants aged 50 and older in Israel. *Social Indicators Research*, 98(1), 89–104.
- Arnaldi, S., Boscolo, F., & Stamm, J. (2010). Living the digital revolution – exploration into the futures of the European society. *European Review*, 18, 399–416.
- Artés, J., del Mar Salinas-Jiménez, M., & Salinas-Jiménez, J. (2013). Small fish in a big pond or big fish in a small pond? the effects of educational mismatch on subjective wellbeing. *Social Indicators Research*, 19(2), 771–789.
- Banjanin, N., Banjanin, N., Dimitrijevic, I., & Pantic, I. (2015). Relationship between internet use and depression: focus on physiological mood oscillations, social networking and online addictive behavior. *Computers in Human Behavior*, 43, 308–312.
- Bauer, H. H., Falk, T., & Hammerschmidt, M. (2006). eTransQual: a transaction process-based approach for capturing service quality in online shopping. *Journal of Business Research*, 59(7), 866–875.
- Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science & Medicine*, 66(8), 1733–1749.
- Blit-Cohen, E., & Litwin, H. (2004). Elder participation in cyberspace: a qualitative analysis of Israeli retirees. *Journal of Aging Studies*, 18(4), 385–398.
- Bohnke, P. (2008). Does society matter? Life satisfaction in enlarged Europe. *Social Indicators Research*, 87, 189–210.
- Bonini, A. N. (2008). Cross-national variation in individual life satisfaction: effects of national wealth, human development, and environment conditions. *Social Indicators Research*, 87, 223–236.
- Butler, R. N., Lewis, M. I., & Sunderland, T. (1998). *Aging and mental health: Positive psychological and biomedical approaches*. Boston, MA: Allyn & Bacon.
- Caine, E., Fisk, D., & Rogers, A. (2006). Benefits and privacy concerns of a home equipped with a visual sensing system: a perspective from older adults. In *Proceedings of the 50th annual meeting of human factors and ergonomics society* (pp. 180–184).
- Caplan, S. E. (2002). Problematic internet use and psychosocial well-being: development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior*, 18, 553–575.
- Carle, A. (2007). More than a game: brain training against dementia. *Nursing Homes Long Term Care Management*, 56(8), 22–24.
- Charness, N., & Boot, W. R. (2009). Aging and information technology use: potentials and barriers. *Current Directions in Psychological Science*, 18, 253–258.
- Chen, C. (2001). Aging and life satisfaction. *Social Indicators Research*, 54, 57–79.
- Cheng, C., & Li, A. Y. L. (2014). Internet addiction prevalence and quality of (real) life: a meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking*, 17(12), 755–760.
- Cheung, H. Y., & Chan, A. W. H. (2009). The effect of education on life satisfaction across countries. *Alberta Journal of Educational Research*, 55(1), 124–136.
- Chou, C., Condrón, L., & Belland, J. C. (2005). A review of the research on internet addiction. *Educational Psychology Review*, 17, 363–388.
- Clark, A. (2003). Unemployment as a social norm: psychological evidence from panel data. *Journal of Labor Economics*, 21, 323–350.
- Cody, M. J., Dunn, D., Hoppin, S., & Wendt, P. (1999). Silver surfers: training and evaluating internet use among older adult learners. *Communication Education*, 48, 269–286.
- Compaine, B. (2001). *The digital divide: Facing a crisis or creating a myth?* Cambridge, MA: MIT Press.
- Cotton, S. R., Ford, G., Ford, S., & Hale, T. M. (2012). Internet use and depression among older adults. *Computers in Human Behavior*, 28, 496–499.
- Cox, E. O. (1988). Empowerment of low-income elderly through group work. *Social Work with Groups*, 11, 111–125.
- Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., et al. (2006). Factors predicting the use of technology: findings from the center for research and education on aging and technology enhancement (CREATE). *Psychology and Aging*, 21(2), 333–352.
- Davis, R. A. (2001). A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior*, 17, 187–195.
- Davis, N. C., & Friedrich, D. (2004). Knowledge of aging and life satisfaction among older adults. *International Journal of Aging and Human Development*, 59(1), 43–61.
- Dickenson, A., & Hill, R. L. (2007). Keeping in touch: talking to older people about computers and communication. *Educational Gerontology*, 33(8), 613–630.
- Diener, E. R. (1984). Subjective well-being. *Psychological Bulletin*, 95, 542–575.
- Diener, E. R., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75.
- Diener, E., & Suh, E. M. (1998). Subjective well-being and age: an international analysis. *Annual Review of Gerontology and Geriatrics*, 17, 304–324.
- DiMaggio, P., Hargittai, E., Celeste, C., & Shafer, S. (2004). Digital inequality: from unequal access to differentiated use. In K. M. Neckerman (Ed.), *Social inequality* (pp. 355–400). New York: Russell Sage Foundation.
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29, 94–122.
- Easterlin, R. A. (2001). Income and happiness: towards a unified theory. *The Economic Journal*, 111, 465–484.
- Elgar, F. J., Davis, C. G., Wohl, M. J., Trites, S. J., Zelenski, J. M., & Martin, M. S. (2011). Social capital, health and life satisfaction in 50 countries. *Health & Place*, 17(5), 1044–1053.
- Elliot, A. J., Mooney, C. J., Douthit, K. Z., & Lynch, M. F. (2013). Predictors of older adults' technology use and its relationship to depressive symptoms and well-being. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 69(5), 667–677.
- Erickson, J., & Johnson, G. M. (2011). Internet use and psychological wellness during late adulthood. *Canadian Journal on Aging*, 30(02), 197–209.
- Ferrante, F. (2009). Education, aspirations and life satisfaction. *Kyklos*, 62(4), 542–562.
- Ford, G., & Ford, S. G. (2009). *Internet use and depression among the elderly*. Phoenix Center Policy Paper Number 38.
- Fowler, J. G., Gentry, J. W., & Reisenwitz, T. H. (2015). Analyzing Chinese older people's quality of life through their use of the internet. *International Journal of Consumer Studies*, 39, 324–334.
- Freese, J., Rivas, S., & Hargittai, E. (2006). Cognitive ability and internet use among older adults. *Poetics*, 34(4), 236–249.
- Frey, B., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, 40, 402–435.
- Frey, B., & Stutzer, A. (2010). "Happiness and Public Choice". *Public Choice*, 144, 557–573.
- Frijters, P., Johnston, D. W., & Shields, M. A. (2011). Life satisfaction dynamics with quarterly life event data. *The Scandinavian Journal of Economics*, 113, 190–211.
- Fuglsang, L. (2005). IT and senior citizens: using the internet for empowering active citizenship. *Science, Technology, & Human Values*, 30(4), 468–495.
- Gatto, S., & Tak, S. H. (2008). Computer, internet, and e-mail use among older adults: benefits and barriers. *Educational Gerontology*, 34, 800–811.
- Glaesmer, H., Grande, G., Braehler, E., & Roth, M. (2011). The German version of the satisfaction with life scale (SWLS). *European Journal of Psychological Assessment*, 27(2), 127–132.
- Greenberg, S. (2009). *A profile of older Americans. Administration on aging*. Washington, DC: US Department of Health Human Services.
- Guerrieri, P., & Bentivegna, S. (2011). *The economic impact of digital technologies. Measuring inclusion and diffusion in Europe*. Cheltenham, UK: Edward Elgar Publishing.
- Haesner, M., O'Sullivan, J. L., Gövercin, M., & Steinhagen-Thiessen, E. (2015). Requirements of older adults for a daily use of an internet-based cognitive training platform. *Informatics for Health and Social Care*, 40(2), 139–153.
- Hansson, A., Hillers, P., & Forsell, Y. (2005). Well-being in an adult Swedish population. *Social Indicators Research*, 74, 313–325.
- Hargittai, E., & Hinnant, A. (2008). Digital inequality: differences in young adults' use of the internet. *Communication Research*, 35, 602–621.
- Helliwell, J. F. (2006). Well-being, social capital and public policy: what's new? *The Economic Journal*, 116, 34–45.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 1435–1446.
- Hoofnagle, C., King, J., Li, S., & Turow, J. (2010). *How different are young adults from older adults when it comes to information privacy attitudes and policies?* Available at: SSRN: <http://ssrn.com/abstract=1589864> <http://dx.doi.org/10.2139/ssrn.1589864>
- Hu, S., & Leung, L. (2003). Effects of expectancy-value, attitudes, and use of the internet on psychological empowerment experienced by Chinese women at the workplace. *Telematics and Informatics*, 20(4), 365–382.
- Iyer, R., & Eastman, J. K. (2006). The elderly and their attitude toward the internet: the impact on internet use, purchase, and comparison shopping. *The Journal of Marketing Theory and Practice*, 14(1), 57–67.
- Kahneman, D., & Krueger, A. B. (2006). Developments in the measurement of subjective well-being. *The Journal of Economic Perspectives*, 20(1), 3–24.
- Kassenboehmer, S. C., & Haisken-DeNew, J. P. (2009). You're fired! the causal negative effect of unemployment on life satisfaction. *Economic Journal*, 119, 448–462.
- Kaye, H. S. (2000). *Computer and internet use among people with disabilities*. Disability Statistics Report (13). Washington, DC: U.S. Department of Education, National Institute on Disability and Rehabilitation Research.
- Khvorostianov, N., Elias, N., & Nimrod, G. (2012). 'Without it I am nothing': the internet in the lives of older immigrants. *New Media & Society*, 14(4), 583–599.
- Kiger, P. J. (2006). Generation xboxers. *AARP Bulletin*, 47(2), 3–4.
- Kim, M., & Kim, J. (2001). Digital divide: conceptual discussions and prospects. In W. Kim, T. W. Ling, Y. J. Lee, et al. (Eds.), *The human society and the internet* (pp. 136–146). Berlin: New York: Springer.
- Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic internet use: the relationship between internet use and psychological well-being. *CyberPsychology & Behavior*, 12, 451–455.
- Lelkes, O. (2013). Happier and less isolated: internet use in old age. *Journal of Poverty and Social Justice*, 21(1), 33–46.
- Leung, L. (2010). Effects of internet connectedness and information literacy on quality of life. *Social Indicators Research*, 98(2), 273–290.
- Li, S. M., & Chung, T. M. (2006). Internet function and internet addictive behavior. *Computers in Human Behavior*, 22(6), 1067–1071.
- Lissitsa, S., & Chachashvili-Bolotin, S. (2015). Does the wind of change blow in late adulthood? – Adoption of ICT by senior citizens during the past decade. *Poetics*, 52, 44–63.

- Löckenhoff, C. E., & Carstensen, L. L. (2004). Socioemotional selectivity theory, aging, and health: the increasingly delicate balance between regulating emotions and making tough choices. *Journal of Personality*, 72, 1395–1424.
- McAdams, K. K., Lucas, R. E., & Donnellan, M. B. (2012). The role of domain satisfaction in explaining the paradoxical association between life satisfaction and age. *Social indicators research*, 109(2), 295–303.
- McMellon, C. A., & Schiffman, L. G. (2000). Cybersenior mobility: why some older consumers may be adopting the internet. *Advances in Consumer Research*, 27, 139–144.
- Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological internet use among college students. *Computers in Human Behavior*, 16, 13–29.
- Mossberger, K., Tolbert, C. J., & Stansbury, M. (2003). *Virtual inequality: beyond the digital divide*. Washington, DC: Georgetown University Press.
- Muusses, L. D., Finkenauer, C., Kerkhof, P., & Billede, C. J. (2014). A longitudinal study of the association between compulsive internet use and wellbeing. *Computers in Human Behavior*, 36, 21–28.
- Myers, D. G., & Deiner, E. (1995). Who is happy? *Psychological Science*, 6, 10–19.
- Nahm, E., & Resnick, B. (2001). Homebound older adults' experiences with the internet and e-mail. *Computers in Nursing*, 19(6), 257–263.
- Näsi, M., Räsänen, P., & Sarpila, O. (2012). ICT activity in later life: internet use and leisure activities amongst senior citizens in Finland. *European Journal of Ageing*, 9(2), 169–176.
- Nimrod, G. (2013). Applying Gerontographics in the study of older Internet users. *Participations: Journal of Audience & Reception Studies*, 10(2), 46–64.
- Nimrod, G. (2014). The benefits of and constraints to participation in seniors' online communities. *Leisure Studies*, 33(3), 247–266.
- Oh, H., Ozkaya, E., & Larose, R. (2014). How does online social networking enhance life satisfaction? the relationships among online supportive interaction, affect, perceived social support, sense of community and life satisfaction. *Computers in Human Behavior*, 30, 69–78.
- O'Hara, K. (2004). "Curb cuts" on the information highway: older adults and the internet. *Technical Communication Quarterly*, 13(4), 426–445.
- Oishi, S. (2006). The concept of life satisfaction across cultures: an IRT analysis. *Journal of Research in Personality*, 40, 411–423.
- Olphert, C. W., & Damodaran, L. (2013). Older people and digital disengagement: a fourth digital divide. *Gerontology*, 59(6), 564–570.
- Pate, S. S., & Adams, M. (2013). The influence of social networking sites on buying behaviors of Millennials. *Atlantic Marketing Journal*, 2(1), 92–103.
- Pénard, T., & Poussing, N. (2010). Internet use and social capital: the strength of virtual ties. *Journal of Economic Issues*, 44(3), 569–595.
- Peres, Y., & Ben-Rafael, E. (2006). *Cleavages in Israeli society*. Hebrew: Tel-Aviv: Am Oved.
- Peres, Y., & Katz, R. (1981). Stability and centrality: the nuclear family in modern Israel. *Social Forces*, 687–704.
- Rainie, L., Kiesler, S., Kang, R., & Madden, M. (2013). *Anonymity, privacy, and security online*. Pew Research Center. Available at: <http://pewinternet.org/Reports/2013/Anonymity-online.aspx>.
- Rao, M. K., Tamta, P., & Kumari, P. (2014). The impact of age, education and residential setting (community) on health status and life satisfaction. *Indian Journal of Health and Wellbeing*, 5(4), 485–488.
- Sagioglou, C., & Greitemeyer, T. (2014). Facebook's emotional consequences: why facebook causes a decrease in mood and why people still use it. *Computers in Human Behavior*, 35, 359–363.
- Shapira, N., Barak, G., & Gal, I. (2007). Promoting older adults' well-being through internet training and use. *Ageing & Mental Health*, 11(5), 477–484.
- Shin, D., & Johnson, D. (1978). Avowed happiness as an overall assessment of the quality of life. *Social Indicators Research*, 5, 474–492.
- Shklovski, I., Kiesler, S., & Kraut, R. (2006). The internet and social interaction: a meta-analysis and critique of studies, 1995–2003. In R. Kraut, M. Brynin, & S. Kiesler (Eds.), *Computers, phones, and the internet: the social impact of information technology*. Oxford University Press.
- Silver, M. P. (2014). Socio-economic status over the lifecourse and internet use in older adulthood. *Ageing and Society*, 34(6), 1019–1034.
- Smith, A. (2014). *Older adults and technology use*. Pew Research Center. Available at: http://www.pewinternet.org/files/2014/04/PIP_Seniors-and-Tech-Use_040314.pdf.
- Stepanikova, I., Nie, N. H., & He, X. (2010). Time on the internet at home, loneliness, and life satisfaction: evidence from panel time-diary data. *Computers in Human Behavior*, 26(3), 329–338.
- Sundar, S. S., Oeldorf-Hirsch, A., Nussbaum, J., & Behr, R. (2011, May). Retirees on Facebook: can online social networking enhance their health and wellness?. In *CHI'11 extended abstracts on human factors in computing systems* (pp. 2287–2292). ACM.
- Test, M. A., Greenberg, J. S., Long, J. D., Brekke, J. S., & Burke, S. S. (2014). Construct validity of a measure of subjective satisfaction with life of adults with serious mental illness. *Psychiatric Services*, 56(3), 292–300.
- Tomás, J. M., Sancho, P., Gutiérrez, M., & Galiana, L. (2014). Predicting life satisfaction in the oldest-old: a moderator effects study. *Social Indicators Research*, 117(2), 601–613.
- Van Deursen, A. J. A. M., Courtois, C., & Van Dijk, J. A. G. M. (2014). Internet skills, sources of support, and benefiting from internet use. *International Journal of Human-Computer Interaction*, 30(4), 278–290.
- Van Dijk, J. (2005). *The deepening divide*. London: Sage Publications.
- Wagner, N., Hassanein, K., & Head, M. (2010). Computer-use by older adults: a multidisciplinary review. *Computers in Human Behavior*, 26, 870–882.
- Wang, W. (2001). Internet dependency and psychosocial maturity among college students. *International Journal of Human-Computer Studies*, 55, 919–938.
- White, H., McConnell, E., Clipp, E., Branch, L. G., Sloane, R., Pieper, C., et al. (2002). A randomized controlled trial of the psychosocial impact of providing internet training and access to older adults. *Ageing & Mental Health*, 6(3), 213–221.
- Widyanto, L., & Griffiths, M. (2006). "Internet addiction": a critical review. *International Journal of Mental Health and Addiction*, 4, 31–51.
- Winkelmann, R. (2009). Unemployment, social capital, and subjective well-being. *Journal of Happiness Studies*, 10(4), 421–430.
- Wong, C. K., Yeung, D. Y., Ho, H. C., Tse, K. P., & Lam, C. Y. (2012). Chinese older adults' Internet use for health information. *Journal of Applied Gerontology*, 33(3), 316–335.
- Wright, K. (2000). Computer-mediated social support, older adults, and coping. *Journal of Communication*, 100–118.
- Wright, D. W., & Hill, T. J. (2009). Prescription for trouble: Medicare part D and patterns of computer and internet access among the elderly. *Journal of Aging and Social Policy*, 21, 172–186.
- Zhang, F., & Kaufman, D. (2015). Social and emotional impacts of internet use on older adults. *European Scientific Journal*, 11(17).
- Zickuhr, K., & Madden, M. (2012). *Older adults and internet use*. Available at: <http://www.pewinternet.org/Reports/2012/Olderadults-and-internet-use/Summary-of-findings.aspx>.
- Zillien, D., & Hargittai, E. (2009). Digital distinction: status-specific types of internet usage. *Social Science Quarterly*, 90(2), 274–291.