Author(s): Kekäläinen, Tiia; Kokko, Katja

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Personality traits and computer use in midlife: leisure activities and work characteristics as mediators

Tiia Kekäläinen and Katja Kokko

Background

Nowadays, computers and the internet are part of everyday life. According to a survey conducted by Eurostat (2015) in 2014, 78% of adults in European Union countries had used the internet during the previous three months. The survey found that the younger the age group, the greater the proportion of internet users. The reasons for using the internet appear similar accros age, and the most common reasons are. information search, e-mail and other communications, and internet banking (Keenan, 2009; Statistics Finlans, 2015). The most common reasons are information search, e-mail and other communications, and internet banking (Keenan, 2009; Statistics Finland, 2015). The most noteworthy difference between age groups is in the use of social networking sites (SNS); in Finland, 87% of people aged 25-34, 51% of people aged 45-54, and 19% of people aged 65-74 used the internet for social networking (Statistics Finland, 2015).

In addition to age, gender has some link to computer and internet use such that although the frequency of internet use is similar between men and women, they use the internet for somewhat different purposes (Keenan, 2009; Statistics Finland, 2015). It is noteworthy that the reasons for computer use in general extend beyond the use of the internet, but then, internet use is no longer linked solely to computers. In this chapter, we present research in both domains: computer use and internet use. In addition, research has increasingly focused on the use of SNS, Facebook in particular, which is the most popular social networking site in the world, with over one billion users in December 2015 (Facebook Company Info, 2016).

Computer, internet and SNS use have been widely studied and many individual factors predict their use; for example, age, life satisfaction and social resources (education, income) are linked to computer use in different age groups (Hills and Argyle, 2003; Kim and Jeong, 2015; Livingstone and

Haddon, 2009; Papacharissi and Rubin, 2000; Wagner, Hassanein and Head, 2010). In addition to age, generation and age cohort contribute to computer and internet use such that younger generations, X (born 1965-1979) and Y (born 1976-1994) use computer and internet much more than older generations, such as baby boomers (born 1946-1964) (Anderson et al., 2010). Generations differ in when they started using modern digital technology: generation Y since they were kids, generation X before entering the working life and baby boomers in their midlife. Hence, according to Shah, Kwak and Holbert (2001), the most important media for generation X is the internet, whereas for baby boomers it is television, which reflect their perceptions.

The biggest difference between generations is in the use of SNS, but studies have mainly been conducted among children, youth and young adults (Amichai-Hamburger and Vinitzky, 2010; Guadagno, Okdie and Eno, 2008; Kuo and Tang, 2014; Özgüven and Mucan, 2013; Tuukkanen et al., 2013; Wilson, Fornasier and White, 2010). Relatively little attention has been paid to middle-aged adults´ use of computers and SNS, particularly from the viewpoint of personality. Therefore, this chapter focuses on middle-aged adults and their individual characteristics as predictors of computer use. The chapter also investigates whether leisure activities or work characteristics, mediate the associations between personality and computer use among middle-agers.

Personality traits

Besides socio-demographic factors, such as age and education, computer use is associated with other characteristics of an individual. In this chapter, we analyse personality, which describes the ways individuals think, feel and behave (McCrae and Costa, 2003), as a potential antecedent of computer use. We conceptualise personality here using the Big Five taxonomy (also known as the five-factor model), where the five personality traits are extraversion, neuroticism, agreeableness, conscientiousness and openness to new experiences (Goldberg, 1993; John and Srivastava, 1999; McCrae and Costa, 2003).

Every personality trait can be seen as a continuum. For example, McCrae and Costa (2003) and John and Srivastava (1999) describe typical characteristics of individuals who are in extremes of a continuum, in other words high or low in the traits. According to them, *extraversion* is a personality trait reflecting activity, optimism and the desire to be with other people while individuals with low extraversion are reserved and quiet. Individuals who score high in *neuroticism* typically have negative feelings, whereas individuals with low scores in neuroticism have high emotional stability and can handle difficult and stressful situations well. Furthermore, McCrae and Costa note that

openness to new experiences is related to desire to seek new experiences and broaden a way of thinking, whereas individuals with low scores are down-to-earth and prefer routine. People with high scores in *conscientiousness* are well-organised, hardworking and dutiful, and with low scores aimless and negligent. *Agreeableness*, on the other hand, is a trait related to good-natured, unselfish and altruistic behavior, whereas individuals with low agreeableness are critical, antagonistic and hardheaded.

An individual´s personality is considered to be quite stable across situations and the life course (Caspi, Roberts and Shiner, 2005; McAdams and Olson, 2010). With respect to the relative stability in the rank-ordering of the Big-Five, the same longitudinal data used in the present study shows a high level of continuity in adulthood (Kokko, Tolvanen and Pulkkinen, 2013). There is also significant continuity from childhood temperamental characteristics to adult personality traits; for example, behavioural activity in childhood contributes to extraversion-related characteristics in adulthood, particularly in males (Pulkkinen, Kokko and Rantanen, 2012). As regards absolute stability, some general changes in the levels of the personality traits take place over time in adulthood, as conscientiousness and agreeableness tend to increase in midlife, whereas neuroticism tends to decrease (Kokko, Tolvanen and Pulkkinen, 2013; Roberts and Mroczek, 2008).

Personality traits and computer use

The links between the Big Five personality traits and computer or internet use have been analysed in several studies. Recently, the role of personality traits in social media use has also been studied, although mostly among younger adults. In majority of previous studies, extraversion has not been linked to internet use in general (Berner et al., 2012; Chen and Persson, 2002; Hills and Argyle, 2003; Kim and Jeong, 2015; Swickert et al., 2002). However, extraversion has specifically been linked with more frequent use of social media (Correa, Hinsley and de Zúñiga, 2010; Ryan and Xenos, 2011; Wilson, Fornasier and White, 2010), especially for communication (Ryan and Xenos, 2011). Moreover, this association was similar among both young (aged 18-29) and older adults (aged 30+) (Correa, Hinsley and de Zúñiga, 2010). The studies also suggest that individuals with high and low scores in extraversion use social media for different purposes (Orchard and Fullwood, 2010); individuals high in extraversion may use social media to communicate with friends and to broaden their social network while individuals low in extraversion may also use social media because they prefer online communication to real-life communication (Orchard and Fullwood, 2010).

Like extraversion, neuroticism has not correlated with computer or internet use in general (Berner et al., 2012; Chen and Persson, 2002; Hills and Argyle, 2003; Landers and Lounsbury, 2006), but it has been linked to social media use. Several studies found that individuals who are high in neuroticism use social media more than individuals low in neuroticism (Correa, Hinsley and de Zúñiga, 2010; Kuo and Tang, 2014; Ryan and Xenos, 2011). However, according to Correa, Hinsley and de Zúñiga (2010), this association has been found only in adults aged 30 and over, and only in men. Individuals who have high or low scores in neuroticism may, like individuals with high or low scores in extraversion, have different motives for using Facebook: individuals high in neuroticism may use it to boost their self-assurance, while individuals low in neuroticism share information for self-actualization (Amichai-Hamburger and Vinitzky, 2010). It has also been reported that individuals high in neuroticism perceive Facebook as a part of their everyday lives and feel lost if they have not used it for a while (Kuo and Tang, 2014). It may be that the resemblance between individuals who have high scores in neuroticism and low scores in extraversion is explained by a preference for both types for online communication to real-life communication.

Openness to new experiences has been positively associated with internet use (Chen and Persson, 2002; Kim and Jeong, 2015) and especially with social media use (Correa, Hinsley and de Zúñiga, 2010; Guadagno, Okdie and Eno, 2008; Kuo and Tang, 2014). Correa, Hinsley and de Zúñiga (2010), observed that high openness predicts social media use in individuals aged 30 and older, but not in younger adults, and only in women. These results may not come as a surprise since it can be assumed that the adoption of new technologies interests individuals with intellectual curiosity and willingness to engage in new activities, but why the association is found only among older adults, remains unclear.

For conscientiousness, again, the results are somewhat inconsistent. Some studies show that individuals with high scores in conscientiousness use computers for academic purposes (Landers and Lounsbury, 2006; Orchard and Fullwood, 2010), but less frequently for leisure purposes (Landers and Lounsbury, 2006), and less for social media (Hughes et al., 2012; Ryan and Xenos, 2011; Wilson, Fornasier and White, 2010). In other studies, no associations were found between conscientiousness and internet use (Berner et al., 2012; Chen and Persson, 2002; Swickert et al., 2002). These results on computer use are reasonable considering individuals who are characterised by high conscientiousness may want to do their jobs well and carefully, and use the computer more for those purposes than for recreation.

Moreover, in previous research, agreeableness has shown no associations with computer or internet use in general (Berner et al., 2012; Kim and Jeong, 2015; Swickert et al., 2002) or with social media use (Guadagno, Okdie and Eno, 2008; Özgüven and Mucan, 2013; Ross et al., 2009; Ryan and Xenos, 2011; Wilson, Fornasier and White, 2010). In studies where some significant associations have been found, high agreeableness has been linked to infrequent use of computers (Landers and Lounsbury, 2006) and Facebook (Kuo and Tang, 2014).

Leisure activities as possible mediators between personality traits and computer use

Although different personality traits seem to have associations with different types of leisure activities, to the best of our knowledge, no previous research has been published on the factors mediating personality traits and computer and internet use. We hypothesise that leisure might be one such mediator since it is linked to both personality and computer use (Figure 13.1). In order to function as mediator, certain criteria need to be met, as suggested by Baron and Kenny (1986). First, the personality traits in question and computer use have to correlate with each other. Second, the personality traits have to correlate with the mediator variables, and finally, the mediators have to correlate with computer use. As described above, personality traits show some significant, though inconsistent, associations with computer, internet and social media use, but they are also associated with other types of leisure activities. Extraversion and openness to new experiences, in particular, are positively associated with different kinds of leisure activities, such as sport activities and outdoor leisure (Jopp and Hertzog, 2010; Kuo and Tang, 2014). Conversely, high neuroticism is associated with less frequent participation in outdoor leisure and fitness (Kuo and Tang, 2014) and in experiential activities (e.g. gardening, reading) (Jopp and Hertzog, 2010). Furthermore, both agreeableness and conscientiousness have been positively associated with religious activities and experiential activities (Jopp and Hertzog, 2010).

A few studies investigated the associations between computer use and other leisure activities. One key suggestion is that a high level of internet use is associated, although not linearly, with more active leisure (Näsi, Räsänen and Sarpila, 2011; Zhou, Fong and Tan, 2014). Jankovic et al. (2016) found an association between Facebook use and higher participation in other leisure activities among students, but only to a certain extent; if Facebook takes too much time, then that time is taken from other activities. According to Näsi, Räsänen and Sarpila (2011), having a higher number of other leisure activities predicted more frequent internet use among a sample of elderly persons

(aged 60-79). In general, older adults use computers less than younger people, which may reveal what an active life means at different ages. Associations may also depend on the types of activities engaged in: according to Zhou, Fong and Tan (2014), internet users go to movies and amusement parks more often than others, but are less active in the domain of physical exercise. One reason for the inconsistencies in the results may be the method of measurement. For example, Robinson et al. (2011) compared three national samples and found that according to self-assessment data, internet users were also more active in other leisure activities, whereas diary-based data showed no differences between internet users and non-users in the amount of leisure activities.

We found that with the exception of Kuo and Tang (2014), no studies have investigated personality traits, leisure activities and Facebook simultaneously. In addition, to the best of our knowledge, the same applies to computer and internet use in general. Kuo and Tang (2014) found an association between high extraversion and higher frequency of Facebook use and higher number of friends on Facebook, which in turn was positively associated with participation in team sports. It follows that openness to new experiences, number of Facebook friends and participation in team sports are all positively correlated with each other. On the other hand, neuroticism correlates positively and agreeableness negatively with the frequency of Facebook use, which in turn correlated negatively with fitness activities. Hence, diverse paths may exist between personality, leisure activities and the use of Facebook. However, Kuo and Tang (2014) did not analyse them in the same model, and they recommended the use of structural equation modelling in future studies.

Work characteristics as possible mediators between personality traits and computer use

While computer and social media use are obviously a way of spending leisure time, for middle-aged adults, computer use does not mean leisure entertainment alone, as it is also used for work-related activities. Accomplishing work-related tasks is one of the most common reasons for computer use among middle-agers (Mann et al., 2005) and for this group, with the diffusion of technical devices and the internet, the boundary between work and leisure has become blurred, as personal computers have made it possible to work during leisure time and at home. According to Berkowsky (2013), 86% of adults check work-related e-mails at least sometimes at home. Therefore, we analyse computer use for business matters outside of working hours along with computer use for leisure purposes and social media use.

Studies show that personality contributes to many aspects of the working career, such as occupational status and income (Judge et al., 1999; Viinikainen et al., 2010). Openness to new experiences, extraversion and conscientiousness have been associated with higher occupational status and better job performance (Barrick and Mount, 1991; Judge et al., 1999), and extraversion also associated with higher income (Judge et al., 1999; Viinikainen et al., 2010). Both the studies by Viinikainen et al. 2010, which is based on the same data as the present article, and by Judge et al. (1999) found that even childhood personality correlated with adulthood career success. Thus, because business-related computer use could be hypothesised to depend on work characteristics, we also consider them as possible mediating factors between personality traits and computer and internet use (Figure 13.1).

The purpose of this study

Previous studies have analysed the associations between personality traits, leisure activities, work characteristics, and different types of computer use as single links. Those studies were based mainly on cross-sectional data yet the present study analyses these different variables simultaneously, using longitudinal data. Figure 13.1 shows our study design, where we hypothesise that personality traits, measured at age 42, are linked to computer and social media use, assessed at age 50. We further assume that work characteristics and leisure activities, measured at age 42, mediate this direct link; that is, personality traits are associated with these mediating factors, which on their part, relate to computer and social media use. The moderating role of gender in the associations between personality and computer use has remained unclear, as some studies found no differences between men and women (Kim and Jeong, 2015; Özgüven and Mucan, 2013) while others did (Amichai-Hamburger and Vinitzky, 2010; Correa, Hinsley and de Zúñiga, 2010; Guadagno, Okdie and Eno, 2008). Therefore, we also studied the gender differences in the associations.

Our research questions were as follows:

1. Which personality traits contribute to different kinds of computer use in midlife?
2. Do work characteristics and leisure activities mediate the associations between personality traits and computer use?

<Insert Figure 13.1 about here>

METHODS

Participants

This study is based on the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS). The JYLS was started in 1968 by Professor Lea Pulkkinen and the same participants have thus far been followed from age 8 to 50 (initial N=369) (Pulkkinen, forthcoming; Pulkkinen, 2009). Most participants were born in 1959 and are representative of their respective Finnish age cohort (Pulkkinen and Kokko, 2010), belonging to the tail of babyboomers, also called the younger babyboomers (Reisenwitz and Iyer, 2007). In these analyses for this study, we use information gathered in 2001 when the participants were 42 years old (N=285) and in 2009 when they were 50 (N=271). The number of participants varied as a function of missing information on different variables in a range from 213 to 279. Data was collected using life situation questionnaires (LSQ), semi-structured psychological interviews (in the context of which several self-report inventories were filled in) and a medical examination.

Measures and variables

The main outcome variables in this study are different types of computer use at age 50. First, the participants answered in the LSQ whether they used or had used a computer (1) or not (0). They were also asked how many hours a week they used a computer for business matters outside of working hours and how many hours a week they used a computer for personal matters or enjoyment. Based on the distribution of responses, computer use for business matters was categorised into 0 (1), 1-2 (2) and 3≤ (3) hours per week, and computer use for personal matters into 1≥ (1), 2-4 (2) and 5≤ (3) hours per week. The use of social media (Facebook, chat, blogs) was elicited as a part of more extensive leisure time and activity self-report inventory and utilised a response scale from 1 (not all or very seldom) to 4 (twice a week or more frequently). Response categories were dichotomised into non-users and users. into non-users and users. Non-users represented category 1, who answered not at all or very seldom (0), and users categories 2 to 4 (1).

Antecedents of computer use were measured at age 42 and personality was measured with the NEO-FFI[1] (Costa and McCrae, 1989; Kokko, Tolvanen and Pulkkinen, 2013), a shortened 60-item version of the NEO-PI[2] questionnaire (Costa and McCrae, 1985; Pulver et al., 1995). Each personality trait was measured by 12 statements with a response scale from 1 = strongly disagree to 5 = strongly agree, and mean scores calculated. Cronbach´s alfas for the traits were .87 for neuroticism, .75 for

extraversion, .78 for openness to new experiences, .78 for conscientiousness, and .79 for agreeableness (Kokko, Tolvanen and Pulkkinen, 2013).

Occupational status and weekly working hours were used as work-related characteristics and we used three categories of occupational status: 1 = blue-collar, 2 = lower white-collar and 3 = higher white-collar (Pulkkinen, Ohranen and Tolvanen, 1999). Acquired using the LSQ, weekly working hours ranged from 0 to 100 and leisure activities were elicited as frequency of participation in 22 different activities using a self-report inventory with a response scale from 1 (daily) to 5 (never) and the participants' responses were reverse-scored (Pulkkinen, forthcoming). New mean scores were formed: 'watching TV' (watching informative or topical TV series, entertainment programmes, crime or action programmes, videos), 'reading' (reading books, visiting a library) and 'attending events' (going to see a film, attending cultural events). The variable 'creative activities' includes writing, visual activities, playing a musical instrument and singing, was dichtomised into 0 (never doing any of these) and 1 (doing at least one of them) with the remaining leisure activity variables based on single questions. Based on their distribution, 'religious activity' and 'organizational activities' were dichotomised into 0 (never) and 1 (all other options) and 'socialising', 'handicrafts', 'outdoor activities' and 'exercise' were used with the original categorization. Exercise was measured with a 7-category scale from 0 (never) to 6 (practically every day).

Data analyses

We carried out the analyses using IBM SPSS Statistics 22.0 (IBM Corp., 2013) with the exception of the path analyses, for which we used Mplus 7-software (Muthén and Muthén, 1998-2015). First, for descriptive statistics, differences between men and women were estimated by independent samples t-test and chi-square test. Pearson´s rank-order correlations separately for men and women for all the personality traits, work characteristics, leisure activities, and computer use variables. Furthermore, gender differences were tested using Fisher´s r-to-z transformation (McNemar, 1969).

Based on the previously mentioned mediator criteria (Baron and Kenny, 1986), we chose variables for the path analyses according to their correlations. Here, personality traits that did not correlate with any computer use variable were excluded and only work characteristics and leisure activities that correlated with at least one personality trait and one computer use variable were included. In the path analysis, we used weighted least squares (WLSMV) as the estimator method, which is a robust method when a model includes categorical dependent variables (Muthén and Muthén, 1998-2015). Lastly, the parametrisation used was theta.

RESULTS

Descriptive statistics

The frequency of computer use for different purposes and the number of overall users are reported in Table 13.1. Men and women differed significantly only in computer use for business matters, which men did more. With respect to personality traits, as previously reported by Kokko, Tolvanen and Pulkkinen (2013), women had significantly higher openness to new experiences and agreeableness, but there were also some gender differences in work characteristics and leisure activities.

<Insert Table 13.1 about here>

In studying whether the small group of computer non-users (n=15) differed from users (n=243) in personality traits (Table 13.2), we found three significant differences: the non-users have higher scores in neuroticism, lower scores in extraversion and openness to new experiences than the computer users. Because the non-user group was so small, further analyses were not considered reasonable.

<Insert Table 13.2 about here>

Note. Statistically significant (p<.05) coefficients are bolded.

Correlations between computer use, personality traits, work characteristics and leisure activities for men and women are presented in Table 13.3. As mentioned, to meet the criteria for mediators (Baron and Kenny, 1986), first, personality has to correlate with computer use, and second, both personality and computer use have to relate to potential mediators, that is, work characteristics and leisure activities. In women, we discovered that the only association between personality traits and computer use was between extraversion and computer use for business matters. In men, however, extraversion and openness correlated positively with computer use for business matters, agreeableness negatively with computer use for personal matters, and openness positively with social media use. Work characteristics and leisure activities had several correlations with personality traits and computer use. However, only work characteristics and leisure activities that met the criteria for mediator according to their correlations were included to the path analysis. Occupational status correlated positively with extraversion, openness to new experiences, computer use for business matters and social media use for men. In addition, weekly working hours correlated positively with extraversion and computer use for business matters. Regarding leisure activities,

organizational activities correlated positively with extraversion and computer use for business matters, and outdoor activities correlated positively with agreeableness and negatively with computer use for personal matters.

<Insert Table 13.3 about here>

In summary, included variables in the path analyses according to their significance, as shown by their correlations; Independent variables included were extraversion, agreeableness and openness to new experiences. As possible mediator variables, we included occupational status, weekly working hours, participating in organisational activities and outdoor activities, and dependent variables incorporated in the analyses were computer use for business matters, computer use for personal matters and social media use.

Path analysis

To see whether the differences in structural paths across gender were statistically significant, we conducted multiple group path analysis[3]. We first estimated a model with no constraints on gender but according to the indices[4], the model fit was not satisfactory. Because of their high modification indices, the variable measuring participation in organizational activities was allowed to correlate with computer use for personal matters and social media, while the measure of occupational status was allowed to correlate with computer use for personal matters only. With these changes, the free baseline model showed a good fit to the observed data[5] so next, we compared the fit of this baseline model with no constraints to a model where all paths were constrained to be equal for men and women, and according to the results[6], the final model was estimated with the whole sample. Given the high modification index, weekly working hours and outdoor activities were also allowed to correlate with each other. The fit of the final model was good[7], and the results of the mediator model are presented in Figure 13.2 with standardised coefficients.

<Insert Figure 13.2 about here>

In the path model, openness to new experiences was directly linked to social media use (p=.041) and agreeableness to computer use for personal matters (p=.033), as already shown by the correlations. Conversely, extraversion showed insignificant associations with business-related computer use (p=.135); It was linked to higher occupational status and weekly working hours which, in turn, were

related to computer use for business matters. Hence, the association between extraversion and computer use for business matters was mediated by work characteristics.

Discussion

The purpose of this study was to investigate which personality traits predict computer use in midlife, and whether work characteristics and leisure activities mediate these associations. The paper also discussed the moderating role of gender. Some significant results are presented here. First, a small group of computer non-users differ from computer users in their personality and the study found that high neuroticism, low extraversion and low openness to new experiences predicted non-use of a computer at age 50. These results indicate that personality relates to whether or not technology is adopted. Second, the hypothesis that gender would moderate the associations is not supported in this study because it is possible that gender differences are more significant among other age groups than middle-agers.

Third, we found that computer use for business matters outside of working hours is predicted by extraversion mediated by work characteristics, thereby supporting our hypothesis. Extraversion appears to contribute to having the kind of job where computer use for business matters is also necessary during leisure time. On the other hand, contrary to our expectations, conscientiousness is not associated with computer use for business matters.

Fourth, computer use for personal matters was predicted by agreeableness: individuals with high scores in agreeableness used computers for personal matters less than individuals with low scores in agreeableness. The results are in line with those of Landers and Lounsbury (2006), who suggest that agreeableness correlates negatively with internet use among students. They assume that students low in agreeableness are less popular and therefore have more time to spend on the internet. Agreeable people are, for example, altruistic and compliant (McCrae and Costa, 2003), hence it is possible that in midlife, agreeable individuals prefer other types of activities, such as those focused on the needs of the others through personal interaction. Therefore, the only possible mediator between agreeableness and computer use is outdoor activities, but it does not mediate the association. It seems that the association between agreeableness and leisurely computer use is either direct or is mediated by other factors that remain unidentified in this study.

Furthermore, our hypotheses that computer use for personal matters would show a negative association with conscientiousness and a positive association with openness to new experiences, did not receive support. In addition, our further, unreported, ANOVA comparison shows that computer use for personal matters was average among individuals with high scores in extraversion, whereas

for low-scoring individuals, it was either on a low or high level. Hence, the association between extraversion and personal computer use may not be linear. This may be one reason why previous studies found hardly any associations between extraversion and computer or internet use (Berner et al., 2012; Chen and Persson, 2002; Swickert et al., 2002), and why in this study, no significant correlation was found between extraversion and personal computer use. Because extraverts are sociable and active persons, they may spend some of their leisure time using a computer, but their interest also extends to other leisure activities.

Fifth, the only personality trait that predicted social media use was openness to new experiences. This is consistent with previous results, where openness was associated with Facebook and other social media use (Kuo and Tang, 2014; Özgüven and Mucan, 2013). Contrary to our expectations, extraversion and neuroticism showed no associations with social media use. One explanation for this may be that at the time of data collection (2009) social media was a recent phenomenon, especially for middle-agers and older adults. This would also explain the finding that only one-fifth of our sample reported using social media at least sometimes. Therefore, openness to new experiences, in particular, may have been a significant predictor of adoption of this phenomenon, new in 2009. The only possible mediator between openness and social media use in this study was occupational status, and it did not mediate the association. Hence our hypothesis that leisure activities would mediate personality and leisure computer or social media use was not supported.

When interpreting the results of this study, it is important to bear in mind that the data were collected in 2009, hence the results are not directly applicable to the 50-year-olds of today. The development of technology is so rapid that its use will have characteristics specific to every age cohort. For example, in the recent past, using the internet was clearly connected to the use of a stationary computer; this is no longer the case. Nevertheless, this study offers interesting information on the seldom studied longitudinal associations between personality and computer use, using representative data, and deepens our knowledge on the individual characteristics underlying adoption and use of technology.

In addition, even though these results may not be completely applicable to the 50-year-olds of today, they may be interpreted within the present generation. The present participants represent their respective Finnish age-cohort group born in 1959. Those born in 1959 belong to young babyboomers, and most of them used internet for the first time at their thirties (Reisenwitz and Iyer, 2007). As the results showed, personality clearly has some effect on how that generation responds to new technology and how they use it. In future research, it would be important to analyse whether

similar individual charcteristics link to the adoption of other types of recent technology (e.g. intelligent domestic appliances) than computer and internet use, and whether the currently middle-aged adults use computers for similar reasons as the present participants. Furthermore, it would be important to replicate the results with different age cohorts and a larger sample size.

In light of these findings, personality should be seen as a meaningful topic of research in connection with the adoption of new technologies and/or the motives driving their uses. It would also be interesting to investigate personality profiles instead of single personality traits. Combinations of personality traits may reveal even more about the associations between personality and behaviour than personality traits separately. Kinnunen et al. (2012) found five longitudinally stable personality profiles in the same sample that was used in this study: for example, resilient individuals low in neuroticism and high in all the other traits and under-controlled individuals high in extraversion and openness and low in conscientiousness. It is noteworthy that even though personality is quite stable over life course (Caspi, Roberts and Shiner, 2005; McAdams and Olson, 2010), there are some general changes in personality traits during adulthood. Agreeableness, which was, in this study, linked to lower personal computer use, tends to increase during adulthood, and openness, which was linked to higher social media use, tends to decrease (Kokko, Tolvanen and Pulkkinen, 2013; Roberts and Mroczek, 2008). These personality differences between age groups may play a role also in computer use differences between age groups. Moreover, in future research, it should be born in mind that personality traits may also have non-linear associations with the use of technologies, as individuals with different personalities may have different reasons for using the same technology. It will also be interesting to see, how personality directs technology use among baby boomers and generations X and Y, as they age and technology changes.

Acknowledgments

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[1] Neuroticism-Extraversion-Openness Five-Factor Inventory

[2] Neuroticism-Extraversion-Openness Personality Inventory

[3] Model fit was evaluated by the chi-square test of model fit and other indices: RMSEA (Root mean square error of approximation), CFI (Comparative Fit Index), TLI (Tucker and Lewis Index), and WRMR (Weighted root mean square residual). The values indicating good fit are $\geq.95$ for the CFI and TLI , $\leq.06$ for the RMSEA (Hu and Bentler, 1999), and ≤1 for the WRMR (Yu, 2002).

[4] x^2 (50)=95.816, p<.001, RMSEA=.08, CFI=.78; TLI=0.61, WRMR=1.20.

[5] x^2 (44)=43.67, p=.486, RMSEA=.00, CFI=1.00; TLI=1.00, WRMR=.76.

[6] According to the difference test, the constrained model did not differ from the unconstrained model: x^2(30)=38.43, p=.144, suggesting that there were no significant gender differences in the paths.

[7] x^2(21)=21.38, p=.436, RMSEA=.01, CFI=1.00, TLI=1.00, WRMR=.53.

Table 1. Frequencies and means with gender differences. Computer use was measured at age 50, and personality traits, work characteristics and leisure activities at age 42.

	All (n=213-279)	Women (n=109-132)	Men (n=104-147)	x^2-test/t-test p
Have used a computer %				.581
No	5.8	5.0	6.6	
Yes	94.2	95.0	93.4	
Social media %				.294
No	80.8	78.0	83.7	
Yes	19.2	22.0	16.3	
Computer use for business matters %				.011
0 h/w	58.0	57.1	58.8	
1-2 h/w	24.2	31.4	17.6	
3≤ h/w	17.9	11.4	23.5	
Computer use for personal matters %				.281
1≥ h/w	29.1	33.0	25.8	
2-4 h/w	34.5	35.9	33.3	
5≤ h/w	36.3	31.1	40.8	
Neuroticism	2.37	2.40	2.33	.475
Extraversion	3.30	3.33	3.24	.469
Openness	3.32	3.45	3.17	<.001
Conscientiousness	3.69	3.75	3.60	.063
Agreeableness	3.63	3.72	3.48	.005
Occupational status %				.001
blue-collar	34.6	12.8	54.0	
lower white-collar	38.9	62.4	24.5	
higher white collar	26.5	24.8	28.0	
Weekly working hours	38.80	36.46	40.90	.032
Watching TV	4.08	3.93	4.22	.001
Reading	2.69	2.95	2.46	.001
Attending events	1.91	1.99	1.84	.009
Socializing	3.55	3.45	3.64	.041
Handicrafts	2.94	2.80	3.07	.026
Outdoor activities	3.27	3.44	3.12	.007
Exercise	3.07	3.18	2.97	.332
Creative activities %				.057
No	68.5	62.9	73.5	
Yes	37.1	26.5	31.5	
Religious activity %				.014
No	68.9	62.6	76.2	
Yes	30.2	37.4	23.8	
Organizational activity %				
No	65.1	67.2	63.3	.495
Yes	34.9	32.8	36.7	

Table 2. Differences in personality traits between computer users and non-users, independent samples t-test.

	Have used a computer		
	No (n=15)	Yes (n=243)	p
Neuroticism	2.95	2.34	.004
Extraversion	2.80	3.31	.006
Openness to new experiences	2.87	3.36	.010
Agreeableness	3.42	3.64	.200
Conscientiousness	3.52	3.69	.320

Table 3. Correlations between personality, computer use, work characteristics and leisure activities for women/men.

	N	E	O	A	C	CB	CP	SM
CB	-.12/-18	.24*/.37*	.15/.27*	-.16/.01	-.03/.15	-	-	-
CP	.08/-.07	-.05/-.03	.06/.10	-.12/-.17*	.00/.00	-.02/.24*a	-	-
SM	-.02/.06	-.04/-.03	.16/.32*	-.03/-.04	-.01/-.18	.16/.98	-.34*/.33*	-
W1	-.42*/-.32*	.28*/.26*	.31*/.24*	.04/.11	.03/.21	.24*/.31*	.08/.23*a	.02/.15*a
W2	-.08/-.04	.18/.27*	-.04/.08	-.04/-.13	.06/.03	.36*/.29*	-.09/-.01	.18/.07
A1	.01/-.06	.16/.06	.17/.17	.11/-.04	.11/.01	.08/.06	-.08/-.20*	-.08/-.02
A2	-.03/-.18	.15/.24*	-.09/.18	-.03/.17a	-.07/-.05	.20*/.14	.26*/.09	.32*/.23*
A3	-.08/-.15	.05/.09	.05/.12	.01/-.02	-.17/.18a	-.05/.07	-.00/.05	.15/.02
A4	-.07/-.01	.08/.21*	.05/.16	.25*/.20*	.01/-.22*a	-.04/.01	-.17/-.04	-.04/.03
A5	-.08/-.01	.08/-.10	.09/-.06	.21*/.20*	.14/.09	.04/-.08	-.20*/-.01	-.03/-.05
A6	-.08/-.02	.10/.07	-.12/-.05	.00/.11	-.00/-.13	-.10/.04	.01/.06	-.04/-.07
A7	.17/.13	.04/-.06	.00/.13	-.21*/.00a	-.07/-.10	-.01/.13	-.10/.00	-.17/.20*a
A8	.03/.11	-.04/-.07	-.25*/-.14	-.00/-.08	-.03/-.06	-.10/-.18	.14/-.03	.06/.08
A9	.09/-.07	.10/.17	.35*/.25*	-.07/.18a	-.09/.02	.21*/.19	.04/.22*	.16/-.07a
A10	.00/-.06	-.12/.06	.38*/.25*	-.04/.23*a	-.13/.01	.01/-.05	-.02/.01	-.07/.00

N= neuroticism, E=extraversion, O=openness, A=agreeableness, C=conscientiousness, CB= computer use for business matters, CP=computer use for personal matters, SM=social media, W1=occupational status, W2=weekly working hours, A1=religious activity, A2=organizational activity, A3=handicrafts, A4=socializing, A5=outdoor activities, A6=going out, A7=exercise, A8=watching TV, A9=creative activities, A10=reading. *p<.05, asignificant difference between men and women (Fisher´s z-test)
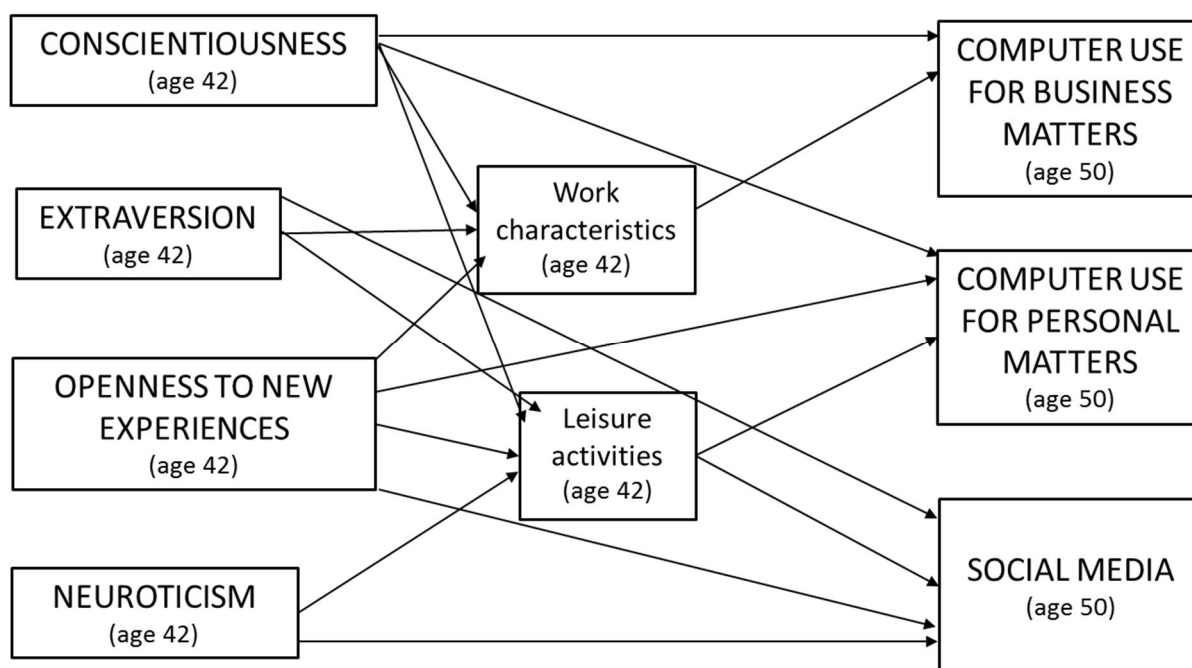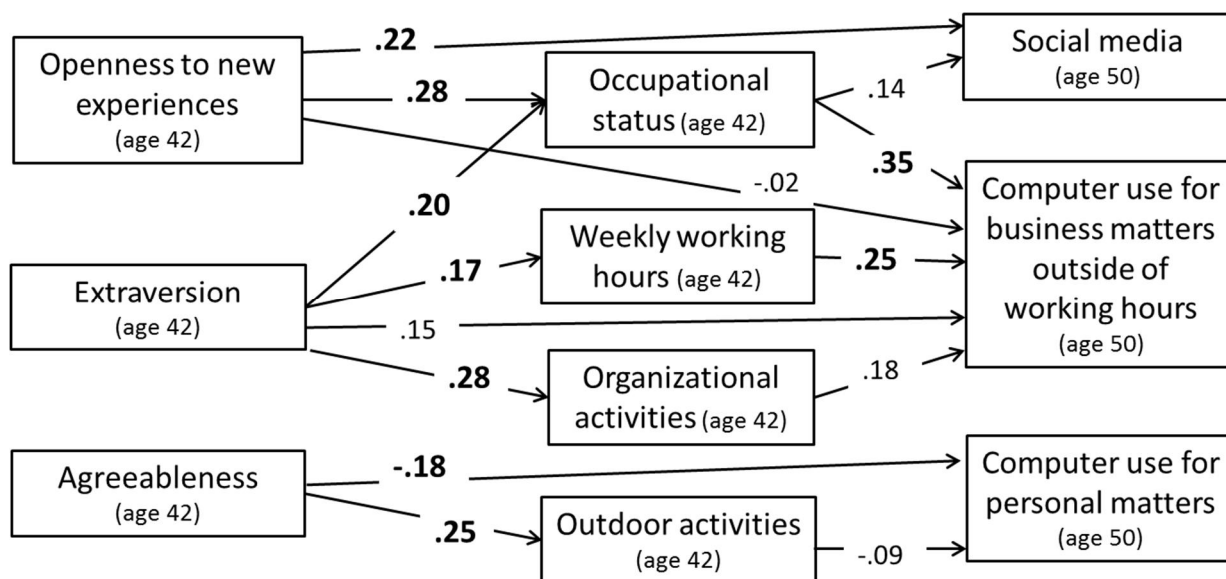
Figure 1. Hypothesized path model.

Figure 2. The mediator path model between personality traits and computer use. Standardized regression coefficients are shown. Statistically significant (p<.05) coefficients are bolded.