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Predictors of Internet Use among Older Adults in Lithuania

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Abstract. *Introduction.* The internet is essential to daily life by virtue of bridging age gaps and enhancing communication, information access, and social participation. Research has linked it to various positive outcomes, such as better psychological well-being. However, internet use among older adults in Lithuania is still below the European average. Therefore, this research examined various predictors of internet use among older Lithuanian adults. *Methods*. Data from Wave 8 and Wave 9 COVID-19 Survey 2 of the Survey of Health, Ageing and Retirement in Europe (SHARE) were analyzed. By using probability sampling, the study ensured a representative sample of 626 Lithuanian respondents aged 65 and older. Self-reported internet use for any reason was used in the analysis as the outcome variable. Personality traits were measured using the 10-item Big Five Inventory. Several health indicators, chronological and subjective age discrepancy, and sociodemographic characteristics were also assessed. *Results*. Logistic regression analysis revealed that age, place of residence, feeling younger than one's actual age, and agreeableness as a personality trait predicted the likelihood of internet use. The study offers valuable insights into the predictors of internet use among older Lithuanian adults, while emphasizing that not only obvious demographic factors but also individual characteristics may play a crucial role in internet use.

Keywords: internet use; personality traits; older adults; ageing.

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Vyresnio amžiaus Lietuvos gyventojų naudojimąsi internetu prognozuojantys veiksniai

Santrauka. *Įvadas.* Internetas yra labai svarbus kasdieniame gyvenime, nes padeda mažinti atotrūkį tarp skirtingų kartų, palengvina bendravimą, prieigą prie informacijos ir dalyvavimą visuomeniniame gyvenime, o moksliniai tyrimai rodo, kad jis siejamas su įvairiais palankiais padariniais, pavyzdžiui, geresne psichologine savijauta. Tačiau vyresnio amžiaus suaugusiųjų naudojimasis internetu Lietuvoje vis dar nesiekia Europos vidurkio. Todėl šiame tyrime buvo nagrinėjami įvairūs vyresnio amžiaus Lietuvos gyventojų naudojimąsi internetu prognozuojantys veiksniai. *Metodai.* Analizėje buvo naudojami Europos sveikatos, senėjimo ir išėjimo į pensiją (SHARE) tyrimo 8 bangos ir 9 bangos COVID-19 antro tyrimo duomenys. Taikant tikimybinę atranką, tyrime buvo užtikrinta reprezentatyvi 65 metų ir vyresnių 626 Lietuvos respondentų imtis. Tyrimo metu respondentų buvo prašoma nurodyti, ar pastaruoju metu jie naudojo internetą bet kokiam tikslui. Asmenybės bruožai buvo vertinami naudojant 10 teiginių Didžiojo penketo klausimyną. Taip pat buvo matuojami keli sveikatos rodikliai, chronologinio ir subjektyvaus amžiaus skirtumas bei sociodemografinės charakteristikos. *Rezultatai.* Logistinė regresinė analizė atskleidė, kad amžius, gyvenamoji vieta, jausmas, kad esi jaunesnis, nei yra iš tikrųjų, ir sutarumo asmenybės bruožas prognozavo naudojimosi internetu tikimybę. Tyrimas suteikia vertingų įžvalgų apie vyresnio amžiaus Lietuvos suaugusiųjų naudojimosi internetu veiksnius, pabrėžiant, kad ne tik akivaizdūs demografiniai veiksniai, bet ir individualios savybės gali turėti didelę reikšmę naudojimuisi internetu.

Pagrindiniai žodžiai: interneto naudojimas; asmenybės bruožai; vyresnio amžiaus žmonės; senėjimas.

Introduction

The internet is becoming increasingly integral to daily life and a fundamental necessity for modern living, transcending age barriers and continuously expanding its role in digital interaction, information access, and participation in contemporary society. Recent data indicates a significant increase in internet use among older adults (Hunsaker & Hargittai, 2018), although their usage rates remain lower than those of younger generations (Shutsko, 2022). However, this is particularly evident in some countries, where internet use among older people remains relatively low. For example, internet use among older adults in Lithuania is still below the European average (Eurostat, 2024a).

Research indicates that internet use among older people is related to better psychological well-being (Quintana et al., 2018), higher quality of life (Khalaila & Vitman-Schorr, 2018), fewer depressive symptoms (Cotten et al., 2012), higher cognitive functioning (Kamin & Lang, 2020), and lower sense of loneliness (Cotten et al., 2013). The discrepancy of lower internet adoption among older adults and the benefits associated with using the internet highlights the need to understand the reasons behind both usage and non-usage. This suggests that analysis of factors that may influence internet adoption among older people is not only significant from a scientific standpoint but also has important implications for public policy. Promoting internet use among older people goes beyond just keeping up with technological changes; it could play an important role in enhancing their mental health and social integration.

It is not fully understood why some older adults choose to use the internet while others do not. Although studies have analyzed various factors, such as health-related predictors (e. g. Duplaga, 2021) and personality traits (Landers & Lounsbury, 2006; Roos & Kazemi, 2021), much of the research tends to focus on separate variables. This fragmented approach lacks a comprehensive analysis that combines multiple predictors, such as health, sociodemographics, and personality traits, to provide a more complete understanding of

internet use among older adults. Although there is some research that includes multiple variables (e. g. Macdonald & Hülür, 2021), these studies are conducted in other countries and may not fully capture the situation in Lithuania.

Despite being a country with one of the lowest rates of internet use among older adults in the EU (Rapolienė, Gedvilaitė-Kordušienė, et al., 2024), investigating the determinants of internet use in later life has not attracted significant attention. A pre-pandemic analysis conducted in Lithuania showed that internet use decreased with age, barely reaching one-third among retirees and seldom used for online shopping, banking, or public services among older adults, inferring an association with income and lower rates of internet access in rural areas (Šuminas et al., 2018). Factors associated with internet use were analyzed in qualitative research, revealing that older adults can recognize the benefits of online communication, but remain hesitant and emphasize the dangers it poses to valued face-to-face engagement (Rapolienė, Steponavičiūtė, et al., 2024). Qualitative analysis also showed that psychological reactions, including fear, low confidence, impatience, and age-related learning difficulties, hinder internet use (Rapolienė, Gedvilaitė-Kordušienė, et al., 2024). A study conducted by Lesauskaitė and colleagues (2019) indicated that younger age and positive attitude toward technology increased the odds of internet use, however, this study was conducted in very specific samples (a group of geriatric ward in-patients and a group of Third Age University attendees), thus allowing for very limited generalization of results. Finally, a survey of older internet users, mostly female, showed that English language, technical terms and lack of support were common barriers, but personal qualities were most important in overcoming these obstacles (Gedvilaitė-Kordušienė & Rapolienė, 2023), once again emphasizing the need to investigate personal attributes, such as personality traits, to obtain a more accurate understanding of predictors of internet use among older adults within the Lithuanian population.

Personality traits. The Five-Factor Model, also known as the Big Five, is one of the foremost personality models in research. It identifies five key dimensions, referred to as personality traits, that explain different aspects of human thinking, feelings, and behavior (McCrae, 2005; McCrae & Costa, 2008). These personality traits include neuroticism, extraversion, openness to experience (often shortened to openness), agreeableness, and conscientiousness. However, the role of personality in internet use, particularly among older adults, is not extensively studied, and there is a significant gap in understanding how personality traits correlate with internet use in this age group (Macdonald & Hülür, 2021). Some studies do not include personality traits (e. g. Chang et al., 2015), while others combine data from a broad age range, from young to old, without taking age-specific differences into account (e.g., Correa et al., 2010). Given the importance of personality in shaping behavior and decision-making, it is first essential to explore how each of the five personality traits relates to internet use among older adults to better understand their online engagement.

Neuroticism is characterized by a tendency to experience negative emotions, such as anxiety, self-pity, tension, impulsiveness, and irrational thinking (McCrae, 2005; McCrae & Costa, 2008). Individuals high in neuroticism might exhibit behaviors such as

avoiding the internet due to anxiety, fear of new technologies, or concerns about online risks, such as encountering scams. Conversely, they might use it more to manage stress or distract themselves from negative emotions. However, research results indicate that neuroticism is not related to internet use among older adults (Landers & Lounsbury, 2006; Macdonald & Hülür, 2021; Roos & Kazemi, 2021). Considering that neuroticism is theoretically expected to be linked to internet use among older adults and is already related to it among young adults (Mark & Ganzach, 2014), this may indicate that some factors have not been fully considered in research on older adults, showing the need for further research on this relationship.

Extraversion encompasses being social, friendly, self-assured, energetic, and craving stimulation (McCrae, 2005; McCrae & Costa, 2008). Extroverted individuals might use the internet more for social interaction, while introverted individuals, who are less oriented toward social engagement, might use it more for information gathering. Despite these tendencies, both ends of the spectrum are likely to engage with the internet, though research on these patterns remains contradictory. Some research indicates that, among older adults, internet use is positively related to extraversion (Roos & Kazemi, 2021), some studies suggest a negative relationship (Landers & Lounsbury, 2006), and others do not find any relationship at all (Macdonald & Hülür, 2021).

Openness to experience reflects a tendency towards embracing novel ideas, exploring new possibilities, and displaying creative thinking (McCrae, 2005; McCrae & Costa, 2008). Older adults with higher openness to experience may be more inclined to use the internet due to their greater willingness to try new things and adopt new technologies. While certain studies find a positive correlation between internet use and openness to experience among older adults (Macdonald & Hülür, 2021; Roos & Kazemi, 2021), others do not confirm this relationship (Landers & Lounsbury, 2006).

Agreeableness is characterized by a tendency to be forgiving, tender-minded, helpful, and trusting. Individuals high in agreeableness are generally more cooperative and focused on maintaining positive social relationships (McCrae, 2005; McCrae & Costa, 2008). Older adults with high agreeableness might be more likely to use the internet to stay connected with family and friends or engage in social networks. Conversely, they may avoid certain online platforms if they perceive them as sources of conflict or negativity, such as social media sites prone to arguments or negative comments. However, research results on this relationship are still unclear. While some research found negative relationships (Landers & Lounsbury, 2006), others found no relationship (Macdonald & Hülür, 2021; Roos & Kazemi, 2021).

Conscientiousness refers to being organized, reliable, self-disciplined, and goal-oriented (McCrae, 2005; McCrae & Costa, 2008). Older adults with high conscientiousness might use the internet for structured activities like managing finances, organizing schedules, or staying informed through reliable news sources. Conversely, their caution about online scams and misinformation may lead them to be more reserved in their internet use, potentially limiting their online activities. The research on this relationship is inconclusive; some studies have found negative relationships (Landers & Lounsbury, 2006), while

others report no relationship (Macdonald & Hülür, 2021; Roos & Kazemi, 2021) among older adults.

Overall, the relationship between personality traits and internet use among older adults remains unclear, with varying results across different traits and studies. This could be due to limitations in sample representativeness, differences in measurement, and further research is necessary to clarify these inconsistencies.

Health-related predictors. Health challenges may affect various activities of older adults, including their internet use. Research highlights the important connections between internet use and health outcomes in older adults. It shows that older adults with no limitations in activities of daily living (Li et al., 2023) or no limitations in instrumental activities of daily living (Macdonald & Hülür, 2021) are more likely to use the internet. Additionally, studies indicate that among older adults, internet use, as opposed to nonuse, is significantly linked to a lower prevalence of chronic diseases (Duplaga, 2021) or a lower number of physician-diagnosed health conditions (Macdonald & Hülür, 2021). When discussing the relationship between internet use and subjective health, results are contradictory. Some research indicates that internet users are more likely to rate their health as better than nonusers (Kamin & Lang, 2020; König et al., 2018), while other studies have found that internet users are more prone to evaluating their health status as unsatisfactory compared to nonusers (Duplaga, 2021). Although internet use among older adults is linked to better health outcomes in some studies, the relationship between subjective health and internet use remains inconsistent, suggesting a need for more research.

Sociodemographic and other factors. Identifying the sociodemographic factors associated with internet use among older adults is essential for understanding the digital divide in this population. One such factor is gender, but it's difficult to determine who uses the internet more – women or men – because some research indicates it's men (Kamin & Lang, 2020; König et al., 2018; Reine et al., 2021; Roos & Kazemi, 2021), while other studies suggest it's women (Li et al., 2023). Additionally, some research does not find any gender differences (Macdonald & Hülür, 2021). When discussing age within the older adult age group, research findings are quite clear – younger individuals within this demographic are more likely to be internet users (Kamin & Lang, 2020; König et al., 2018; Li et al., 2023; Macdonald & Hülür, 2021; Roos & Kazemi, 2021). The place of residence is not necessarily always included when analyzing internet use among older adults. However, some research suggests that internet use is more prevalent in urban areas compared to rural ones (Li et al., 2023). Having greater socioeconomic resources is also associated with older adults being internet users (König et al., 2018; Macdonald & Hülür, 2021), although this factor is not always included in analyses. Subjective age describes how young or old individuals feel in comparison to their actual chronological age (Stephan et al., 2015). The discrepancy between chronological and subjective age may shape individuals' perspectives and behaviors, influencing how they approach various aspects of life, including their willingness to engage in certain activities, such as using the internet (Stephan et al., 2015). Research has shown that older adults who feel younger than their chronological age are more likely to be internet users (Seifert & Wahl, 2018).

Overall, while certain sociodemographic factors, such as age, in their relationship to internet use among older adults have been relatively well-explored, many findings remain unclear. Gender, health, and personality traits, for example, show mixed results across studies. It is important to note that different studies do not always account for the interactions between these factors. For instance, the effect of personality traits on internet use might be less significant when controlling for health, yet this aspect has received limited attention. A more comprehensive analysis of internet use predictors in the Lithuanian context could offer a clearer understanding of the low rates of internet use in this population. Therefore, the aim of this research is to examine various predictors of internet use among older Lithuanian adults, with an emphasis on how personality traits predict internet use while controlling for certain factors. The main objectives are stated as follows: 1) to explore the role of sociodemographic characteristics, including subjective age; 2) to explore the role of health-related factors; 3) to explore the role of personality traits in understanding the internet use among older adults residing in Lithuania.

Methods

Data

Data were obtained from the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan, 2013). SHARE is a longitudinal study initiated in 2004, gathering multidisciplinary and cross-national comparative data from 27 European countries and Israel. Participants are selected using probability sampling, ensuring a representative sample (for details on sampling procedures in Lithuania, see Bergman et al., 2019), and data is collected through individual interviews averaging about 80 minutes each. The survey is conducted every two years using the same procedures across all countries. The data are freely accessible to the global scientific community. Currently, SHARE offers nine waves of data focusing on the population aged 50 and above.

For our analysis, we used data collected in Lithuania from Wave 8 (SHARE-ERIC, 2024a), which included information about personality traits and health indicators, and from Wave 9 COVID-19 Survey 2 (SHARE-ERIC, 2024b), which was collected during the COVID-19 pandemic and included information on internet use and subjective age. For methodological details, see Bergmann & Börsch-Supan (2021) and Bergmann et al. (2024). Our sample consists of 626 respondents aged 65 and older living in Lithuania. The mean age of the participants is 75.87 years (age range: 65 – 96; SD = 7.58), with males comprising 35.14 % of the sample. Almost a third of respondents (29.1%) resided in big cities or suburbs of these cities, a similar part 29.6% – were living in large towns, and 41,1% reported living in small towns or rural areas. Median yearly income of all household members was 7800 Eur. Lastly, 37.4% of respondents reported having used the internet since the start of the pandemic.

Measurements

Internet use. Internet use was assessed with the question: "Since the outbreak of Corona, have you used the Internet, for e-mailing, searching for information, making purchases, or for any other purpose at least once?" Respondents could answer with either "Yes" or "No". Data collection took place in the summer of 2021, meaning that this question covers the period of 15 to 18 months since the pandemic outbreak.

Personality traits. Personality traits were measured using the 10-item Big Five Inventory (BFI-10) developed by Rammstedt and John (2007). The BFI-10 evaluates five key factors: *neuroticism*, *extraversion*, *openness to experience*, *agreeableness*, and *conscientiousness*. Participants rated each item on a Likert scale ranging from 1 ("disagree strongly") to 5 ("agree strongly"). The traits were measured by averaging the scores of two items per trait. The resulting scores reflect the extent to which each personality trait is expressed in an individual, with higher scores indicating a greater expression of the trait.

Health indicators. **Subjective health.** Self-reported health was measured using a single item that asked respondents to rate their health on a 5-point scale ranging from "excellent" to "poor". For this analysis, the answers were categorized as very good/excellent (1) or less than very good (0).

Instrumental activities of daily living (IA DL). The IADL index measures the number of limitations in instrumental activities of daily living (Lawton & Brody, 1969). A modified version used in SHARE encompasses nine activities, e.g., shopping for groceries, managing finances. Participants were asked to indicate whether they had difficulty with any said activities lasting at least three months. Their responses were recoded into a dichotomous variable: a score of 0 indicates no IADL limitations, while a score of 1 indicates one or more IADL limitations, such as preparing a hot meal, shopping for groceries, or making telephone calls.

Activities of daily living (ADL). The ADL index measures the number of limitations in basic activities of daily living (Katz et al., 1963). The modified version used in SHARE includes six activities, e.g., bathing, dressing (Steel et al., 2003), and participants are asked to indicate if they had difficulty with these activities that lasted for three months or longer. For this analysis provided answers were categorized into two groups: 0 for "no ADL limitations" and 1 for "one or more ADL limitations".

Chronic diseases. Participants were provided with a list of common chronic conditions (e.g., cataracts, high blood cholesterol, diabetes) and were asked to indicate whether they were diagnosed with any of these conditions. They were also encouraged to tell the interviewer of any chronic conditions that were not on the list. The number of chronic diseases for each respondent was later coded into a dichotomous variable: 0 for one or none and 1 for two or more conditions.

Sociodemographic characteristics. Participants were asked to indicate their gender and age. The financial situation was measured using household income, which was transformed using a logarithm due to significant skewness. Participants were also asked about their place of residence, where they could choose from big city, suburb, large city, small

town, and rural area. This was coded as 1 for big city or suburb, and 0 for the rest (large town, small town, and rural area).

Discrepancy between chronological and subjective age. To measure subjective age, participants were asked the question: "Many people feel older or younger than they actually are, what age do you feel?". Then, subjective age was subtracted from chronological age to determine whether a person feels younger, older, or the same as their actual age.

Data analyses

Statistical analyses were performed using R version 4.4.1 (GLM function). A logistic regression analysis predicting the likelihood of internet use was performed, including age, gender, place of residence, financial situation, subjective health, chronic diseases, discrepancy between chronological and subjective age, and personality traits as predictors.

Results

The analysis revealed several significant predictors of the likelihood of internet use: age, place of residence, feeling younger than one's actual age, and agreeableness. The results are presented in Table 1.

Table 1. **Logistic regression analysis predicting the likelihood of internet use**

Variable	B	SE B	OR (95% CI)
Age	-.14**	.02	0.87 [0.84, 0.89]
Gender (0 - male, 1 - female)	.02	.21	1.02 [0.68, 1.53]
Place of residence (0 - other, 1 - big city/suburb)	1.00**	.22	2.72 [1.79, 4.18]
Financial situation	.27	.14	1.32 [1.00, 1.74]
Subjective health (0 - less than very good, 1 - very good/excellent)	-.15	.49	0.86 [0.32, 2.30]
Chronic diseases (0 - none, 1 - one or more)	.06	.21	1.06 [0.70, 1.62]
IADL (0 - no limitations, 1 - one or more)	-.22	.32	0.80 [0.42, 1.49]
ADL (0 - no limitations, 1 - one or more)	-.19	.38	0.83 [0.39, 1.73]
Discrepancy between chronological and subjective age			
Neutral (0) vs. feels older (1)	-.21	.47	0.81 [0.31, 1.97]
Neutral (0) vs. feels younger (1)	.50*	.22	1.65 [1.07, 2.57]
Personality traits			
Neuroticism	-.02	.10	0.98 [0.80, 1.20]
Extraversion	.11	.14	1.12 [0.84, 1.48]
Openness to experience	.17	.10	1.19 [0.98, 1.43]
Agreeableness	.27*	.13	1.31 [1.02, 1.68]
Conscientiousness	.002	.11	1.00 [0.81, 1.24]

Note. * $p < .05$; ** $p < .001$. $\chi^2(8, N = 626) = 12.06$, $p = .15$, Nagelkerke's $R^2 = .34$.

The results showed that older age was related to a lower likelihood of internet use (OR = 0.87, 95% CI = 0.84 – 0.89, $p < .01$). Being one year older decreases the likelihood of internet use by 13%. Living in a big city or suburb (OR = 2.72, 95% CI = 1.79 – 4.18, $p < .01$) significantly increased the likelihood of internet use, with residents of big cities or suburbs being 2.27 times more likely to use the internet compared to those in large cities, small towns, or rural areas. Feeling younger than one's chronological age increased the likelihood of internet use 1.65 times compared to feeling one's actual age (OR = 1.65, 95% CI = 1.07 – 2.57, $p < .05$). Higher agreeableness was related to a greater likelihood of internet use (OR = 1.31, 95% CI = 1.02 – 1.68, $p < .05$), with each additional point in agreeableness raising the odds of internet use by 1.31 times.

No significant links were found between internet use and factors such as gender (OR = 1.02, 95% CI = 0.68 – 1.53, $p > .05$), financial situation (OR = 1.32, 95% CI = 1.00 – 1.74, $p > .05$), subjective health (OR = 0.86, 95% CI = 0.32 – 2.30, $p > .05$), chronic diseases (OR = 1.06, 95% CI = 0.70 – 1.62, $p > .05$), limitations in instrumental activities of daily living (IADL) (OR = 0.80, 95% CI = 0.42 – 1.49, $p > .05$) or basic daily activities (ADL) (OR = 0.83, 95% CI = 0.39 – 1.73, $p > .05$), or personality traits like neuroticism (OR = 0.98, 95% CI = 0.80 – 1.20, $p > .05$), extraversion (OR = 1.12, 95% CI = 0.84 – 1.48, $p > .05$), openness to experience (OR = 1.19, 95% CI = 0.98 – 1.43, $p > .05$), and conscientiousness (OR = 1.00, 95% CI = 0.81 – 1.24, $p > .05$) among older people.

The Hosmer-Lemeshow test indicated a good model fit ($\chi^2(8) = 12.06$, $p = .15$). The logistic regression model correctly classified 72% of the cases in this study. The model correctly identified 55% of the cases where study participants engaged in internet use (sensitivity). Also, the model correctly identified 82% of the cases where study participants reported not using the internet (specificity). Thus, the independent variables used in this model are more accurate at predicting non-engagement in internet use rather than engagement in internet use among older adults.

Discussion

The purpose of this research was to examine various predictors of internet use among older Lithuanian adults, and our results provide meaningful perspectives on the possible barriers and facilitators of their internet use.

To gain a comprehensive understanding of which sociodemographic variables predict internet use among older adults, we focused on various sociodemographic characteristics. Like Macdonald and Hülür (2021), we found that gender did not predict internet use, meaning that being female or male does not increase the likelihood of internet use among older adults. This may be because older adults, regardless of gender, share similar motivations for internet use, such as staying connected with family or accessing health information, which results in similar levels of internet use across genders. The analysis revealed that age was a significant predictor of internet use among older adults, which is similar to the findings in neighboring countries (Reine et al., 2021). Specifically, as age increased, the likelihood of internet use decreased. This finding suggest that older individuals may encounter barriers

to adopting internet use and aligns with previous research consistently demonstrating that age is a key factor in internet use among older adults, with older individuals within this demographic generally using the internet less (Kamin & Lang, 2020; König et al., 2018; Li et al., 2023; Macdonald & Hülür, 2021; Roos & Kazemi, 2021). Many older adults may have had limited exposure to the internet earlier in life, they are not "digital natives" (Dingli & Seychell, 2015), making digital platforms feel less familiar and less appealing to use, which could explain such results. The analysis also revealed that place of residence was a significant predictor of internet use among older adults; specifically, those living in a big city or suburb were significantly more likely to use the internet compared to those residing in other areas, such as large cities, small towns, or rural areas. It is difficult to compare our results with other research because the living area is not always included when analyzing internet use among older adults, and existing studies, such as Li et al. (2023), focus on a broader urban-rural comparison. Despite this, it is clear that the place of residence may be an important factor in internet use among older adults. In Lithuania, the share of households with internet access is higher in cities than in rural areas. Towns and suburban areas also have a higher share of connected households compared to rural areas, although the difference is not as large (Eurostat, 2024b). This proximity to reliable internet access and resources might contribute to higher internet use among older adults living in big cities and suburban areas. Some research concludes that greater socioeconomic resources are associated with internet use among older adults (König et al., 2018; Macdonald & Hülür, 2021). However, the financial situation is often not included in the analyses, making overall tendencies unclear. In our research, no significant links were found between internet use and financial situation among older people, suggesting that factors other than financial resources may play a more important role in determining internet use in this population.

Similarly to the findings of Seifert and Wahl (2018), our research revealed that feeling younger than one's actual age predicted a greater likelihood of internet use. Older adults who feel younger may exhibit behaviors and attitudes more similar to those of younger individuals, thus bridging the gap in technology adoption that is often seen with advancing age. This suggests that feeling younger than one's chronological age might mitigate some of the barriers typically associated with aging, such as unfamiliarity with digital platforms or reduced confidence in using technology.

Although some research suggests that internet use among older people is related to various health-related indicators (e.g. Duplaga, 2021; Li et al., 2023; Macdonald & Hülür, 2021), in our research, internet use wasn't predicted by any of these (subjective health, instrumental activities of daily living (IADL), activities of daily living (ADL), or chronic diseases). Older adults with health issues may face barriers to internet use due to physical limitations, such as reduced mobility or fine motor skills, or cognitive challenges that make navigating technology difficult. Conversely, those without health issues may not feel a strong need to use the internet, as they can easily handle daily tasks, access information, and connect with others without digital tools. As a result, internet use may be relatively low across both groups, explaining why health indicators don't predict internet use in

our research. Keeping in mind that internet use data was collected during the COVID-19 pandemic, it is also possible that older adults with health issues were compelled to use the internet out of necessity (e.g., for ordering groceries online). Meanwhile, even those in good health may have increased their internet use due to pandemic-related restrictions (e.g., for socializing or entertainment), reducing the usual variation in internet engagement based on health status. As a result, the temporary increase in internet use across different health groups may have masked any potential associations between health indicators and internet use.

Since personality traits can explain various aspects of human life (McCrae, 2005; McCrae & Costa, 2008), they may play a significant role in shaping how individuals interact with technology, including internet use, making them an important area of investigation in understanding digital engagement among older adults. To address gaps in understanding how personality predicts internet use among older people, we explored the links between personality traits and internet use. Our research indicates that, personality-wise, only one trait – agreeableness – might play a significant role in internet use among older adults. Contrary to other research that found no relationship (Macdonald & Hülür, 2021; Roos & Kazemi, 2021) or a negative relationship (Landers & Lounsbury, 2006), we found that higher agreeableness predicted a greater likelihood of internet use among older people. Given that internet use data was gathered during the COVID-19 pandemic, when lockdowns and social distancing measures restricted in-person interactions, agreeable individuals, who are characterized by their strong emphasis on maintaining social harmony, close relationships, and cooperation (McCrae, 2005; McCrae & Costa, 2008), may have been particularly inclined to adopt and engage with digital communication tools. Their tendency to prioritize social bonds and emotional connections likely made them more willing to use video calls, social media, or messaging apps to stay in touch with family and friends. Moreover, agreeable individuals are typically more receptive to guidance and external support (McCrae, 2005; McCrae & Costa, 2008), meaning they may have been more open to learning and adopting new digital tools when encouraged.

Consistent with other studies (Landers & Lounsbury, 2006; Macdonald & Hülür, 2021; Roos & Kazemi, 2021), our research found that internet use was not predicted by neuroticism among older adults. Individuals high in neuroticism might avoid the internet due to anxiety, fear of new technologies, or concerns about online risks, yet they might also use it to manage stress or seek distraction. These opposing tendencies may balance out, resulting in no consistent effect of neuroticism on internet use among older adults. Although the COVID-19 pandemic may have altered the context by increasing stress, uncertainty, and social isolation, which could have intensified both avoidance and engagement behaviors among individuals high in neuroticism, it did not change the overall tendency for these opposing effects to likely balance out.

Our research results align with those of Macdonald and Hülür (2021), who also found no relationship between internet use and extraversion among older adults. This lack of relationship may be due to differing motivations; for example, an extroverted older adult might use the internet to connect with friends and family, while an introverted one might

go online to gather information or read news. These different purposes could result in similar overall internet use, regardless of their level of extraversion. As a result, the overall internet use of both groups might end up being similar, which would cancel out any specific effect of extraversion on internet use.

Just like Landers and Lounsbury (2006), we found no relationship between internet use and openness to experience among older adults. While openness to experience is associated with curiosity, creativity, and a willingness to try new things (McCrae, 2005; McCrae & Costa, 2008), older adults high in this trait may satisfy these needs through offline activities, which may account for the lack of association with internet use in our research.

Our research results are similar to those that didn't find links between conscientiousness and internet use among older adults (Macdonald & Hülür, 2021; Roos & Kazemi, 2021). This lack of association may be because highly conscientious individuals often prefer structured, routine activities and may view the internet as a potential distraction, making them less inclined to engage with it regularly.

The present research provides valuable insights into the predictors of internet use among older Lithuanian adults, contributing to a better understanding of the barriers and facilitators of internet use in this demographic and highlighting important implications for policy and practice. There are clear demographic factors, such as age and place of residence, that play an important role in shaping internet use and may act as barriers to access. As internet use decreases with age among older people, policymakers should prioritize programs that empower them to use the internet. Policymakers should also prioritize improving internet infrastructure in rural areas and small towns to address the lower rates of internet use compared to big cities and suburbs. Expanding community resources, such as public libraries equipped with internet access, and offering digital literacy programs tailored to older adults can further promote internet use. However, beyond these more obvious demographic factors, individual characteristics also play a crucial role, offering new insights into internet use among older adults. The link between feeling younger than one's chronological age and internet use suggests that initiatives promoting active aging and fostering a sense of vitality among older adults may encourage greater internet use. Since agreeableness appears to play a significant role in internet use among older adults, policies and initiatives could focus on promoting digital engagement among individuals with lower levels of this trait. Lower agreeableness is often associated with less emphasis on social connections and collaboration, which might reduce motivation to engage with the internet for interpersonal purposes. To address this, programs could emphasize the practical and personal benefits of internet use beyond social interaction, such as accessing information, managing finances, or pursuing individual hobbies and interests, appealing to the preferences of less agreeable individuals. Overall, our results highlight an important challenge – not only must infrastructure be improved in rural areas, which might be the most direct approach, but policymakers should also recognize that some individuals, particularly those who are older, feel older, or have lower agreeableness, may still be reluctant to use the internet despite increased accessibility. Therefore, different approaches must be taken.

Limitations and future research

Despite the valuable insights provided by this research, several limitations should be acknowledged. One limitation of this research is the use of cross-sectional data, which prevents us from drawing causal conclusions about the relationships between internet use and its possible factors. Additionally, the variables were self-reported, potentially impacting the accuracy of the data. Furthermore, the broad measure of internet use – any internet activity within the period over a year – does not capture specific types of online activities, such as social interaction or information seeking, that may differ in their links with personality traits, demographics, and other variables. Moreover, the data on internet use was collected during the COVID-19 pandemic, a period when internet use was likely influenced by external factors such as lockdowns and social distancing measures. This may have temporarily increased internet engagement among older adults (especially among certain groups, such as those with health issues), potentially affecting the generalizability of the findings to non-pandemic periods. Finally, the was no data on the partner's role is in internet use: for one, a partner not living in the same household may have increased the communication needs; on the other hand, a helpful partner could assist in finding information, doing online shopping or appointments, thus reducing the need for internet use. For future research, including additional variables such as availability of help, digital literacy or attitudes toward technology, could provide a more comprehensive view of the possible factors of internet use among older adults.

Conclusions

Based on the analysis of data from Wave 8 and Wave 9 COVID-19 Survey 2 of the Survey of Health, Ageing and Retirement in Europe (SHARE), representing the Lithuanian population aged 65 and older, the following conclusions can be made:

1. The analysis showed that certain sociodemographic characteristics predicted internet use. Living in a big city or its suburbs, being younger, and feeling younger than one's actual age increased the likelihood of internet use among older adults in Lithuania. Gender and financial situation, however, were not significantly related to internet use.
2. Health-related variables—such as subjective health, chronic diseases, and limitations in instrumental or basic activities of daily living—did not emerge as significant barriers to internet use.
3. Finally, when controlling for sociodemographic and health-related factors, only higher agreeableness among the Big Five personality traits significantly increased the odds of internet use. Other traits—neuroticism, extraversion, conscientiousness, and openness to experience—were not significant predictors.

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