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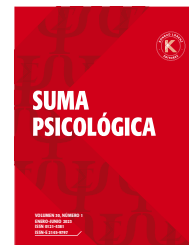
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Minding the gap: The moderating role of education between subjective health and social life perception and Internet use time

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Internet use (IU),
well-being,
subjective general health

Abstract Introduction: Internet addiction results in intense and frequent use. There is a gap in the literature in relation to the unawareness of problematic Internet use (PIU) in predicting Internet use time (IUT). **Objective:** To identify sociodemographic/psychological variables contributing and moderating IUT. **Participants:** 1,270 participants of the European Social Survey (EES), Round 8. **Instruments:** EES variables assessing Internet use (IU), health perception, well-being, social life, and sociodemographic variables, underlying the construct. **Results:** Age, education, sources of household income, social activities compared to others of the same age and subjective general health explain IU per day; and age, years of education, domicile and socially meeting with other people with whom to discuss intimate matters explain IU per week. Education was found to be a significant moderator in the relationship between subjective general health and IU per week; and in the relationship between socially meeting with other people and IU per day. **Discussion:** Maladaptive IU, when the perception of health is worse, and adaptive IU, when the perception of social life is better, are both suggested, depending on education. **Conclusions:** These findings point to the need to study IUT involving educational level, keeping in mind that what may be PIU at one educational level may not be the case at another.

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Lidando com a lacuna: O papel moderador da educação na relação entre a percepção subjetiva da saúde e da vida social e o tempo de utilização da Internet

PALAVRAS CHAVE

Utilização da Internet (IU),
bem-estar,
percepção subjectiva
de saúde

Resumo Introdução: O vício da Internet traduz-se numa utilização intensa e frequente. Existe uma lacuna na literatura sobre o desconhecimento dos preditores do uso problemático da Internet (PIU) do tempo de utilização da Internet (IUT). **Objetivo:** Identificar as variáveis sociodemográficas/psicológicas que contribuem e moderam o IUT. **Participantes:** 1270 participantes da European Social Survey (EES), Round 8. **Instrumentos:** Variáveis ESS que avaliam a utilização da Internet (IU), percepção de saúde, bem-estar, vida social e variáveis sociodemográficas, sub-

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acentes ao construto. **Resultados:** Idade, escolaridade, fontes de renda familiar, atividades sociais em comparação com outras da mesma idade e saúde geral subjetiva explicam IU por dia e idade, anos de escolaridade, domicílio, convívio social com outras pessoas e quem para discutir assuntos íntimos explicam IU por semana. A escolaridade mostrou-se um moderador significativo na relação entre saúde geral subjetiva e IU por semana; e na relação entre encontro social com outras pessoas e IU por dia. **Discussão:** IU desadaptativa, quando a percepção de saúde é pior, e IU adaptativa, quando a percepção de vida social é melhor, dependem da escolaridade. **Conclusões:** Os resultados sugerem o estudo do IUT de acordo com o nível educacional, pois o que pode ser um PIU num nível educacional pode não ser noutro.

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Internet use (IU) has increased over the past few decades. Due to computer use, the percentage of households using the Internet has also increased (Ryan & Lewis, 2017). In 2002, in Portugal, 26.9% of families already had a computer in their homes. By 2017, this value was 71.5%. In 2002 15.1% of families had an Internet connection, which increased to 76.9% in 2017 and to 84.5% in 2020 (Pordata, 2020). Currently, people use the Internet to access a variety of services, including those associated with work, leisure, health, shopping, socialising, among others (Valarezo et al., 2018). Smartphones make Internet access available to almost everyone at any time (Leung et al., 2020).

There are several studies related to predictors of IU, namely, interpersonal utility, pastimes, information seeking, convenience and entertainment (Papacharissi & Rubin, 2000); digital skills, opportunity and extrinsic motivation (Ojo et al., 2019); search for health-related content (Hunsaker et al., 2021; Tyler et al., 2020); and social gratification (Tirado-Morueta et al., 2020). Most studies focus on predictors of problematic Internet use (PIU), such as Internet addiction (IA); namely, the information literacy (Langerizadeh et al., 2018); the breadth of extracurricular activities, the age of first IU, and whether people used Internet for the first time (Wang et al., 2013); lower school bonding, depression, smoking and alcohol use (Chang et al., 2014); and loneliness, self-esteem, and life satisfaction (Bozoglan et al., 2013).

PIU is an inability to control one's use of the Internet which leads to negative consequences in daily life (Aboujaoude, 2010; Spada, 2014). PIU is not a disease, pathology or clinical disturbance, but a distinct pattern of cognitions and behaviours translating into negative results for daily life (Tokunaga, 2015); PIU maybe the first stage of IA that, if left untreated, can evolve into negative life hazards (Fernandes et al., 2019). Gmel et al. (2017) distinguished PIU and IA: PIU is not an independent disorder while IA is. PIU refers to excessive and compulsive IU, whereas IA denotes an addiction and dependence (Zhou et al., 2018). One of the dominant elements of PIU is the time spent using it (Kurniasanti et al., 2019; Shek et al., 2013). People who are addicted to the Internet make intense and frequent use of it both in terms of days per week and in the length of each session (Chak & Leung, 2004). The gap identified in the literature refers to the unawareness of the PIU predictors of IUT. There is a need to fill this gap by studying the determinants of IUT through psychological perceptions of well-being, social life and health, in addition to sociodemographic variables.

Relationship between Internet use and well-being, social life and health perception

Individual well-being is the assessment that people make regarding their lives and their emotional experiences and its structure is described by Ryff (1995) through the multidimensional model of well-being, which includes six distinct aspects of positive psychological functioning: self-acceptance, the environmental domain, positive relationships, purpose in life, personal growth and autonomy. The Internet allows performing certain tasks more efficiently, changing patterns of time use and allowing to have time for other activities to promote well-being. There are four positive impacts of the Internet on well-being (Castellacci & Tveito, 2018): (a) change in IUT, which is related to performing any activity more efficiently, resulting in more free time; (b) new activities, that are carried out at the same time and that were not feasible beforehand; (c) access to information, in a short period, contributing to new knowledge acquisition; (d) and communication tools, visible in the new forms of communication without physical barriers. Individuals characterised by anxious attachment styles may use social media as a means of enhancing psychological well-being (Worsley et al., 2018). In terms of adolescents' psychological well-being, self-esteem is negatively correlated with internet addiction, whereas depression and loneliness are positively correlated with internet addiction (Cheung et al., 2018). Shen et al. (2023) found that PIU has a negative impact on psychological well-being, whereas anhedonia is a mediator for explaining this relationship.

According to Ingold (2016), social life is the intentional presentation of what is represented in culture and there are two fundamental dimensions to social life: structure (patterns in the distribution of relationships and resources in a population) and culture (Gleave et al., 2009). Bargh and McKenna (2004) examined the effects of IU on the formation and maintenance of personal relationships, group memberships and social identity, the workplace, and community involvement, these effects being dependent on particular goals that users bring to the interaction. Internet increases social capital, social support, the sense of community and belonging of many individuals, namely those that are far away from big urban centres and in deprived communities, with less access to knowledge, information and social relations (Kearns & Whitley, 2019). Health is defined by the World Health Organisation as a "state of total physical,

mental and social well-being, and not just as the absence of disease or illness” (Reading, 2009). Perceived health is individual evaluation of one’s own health (Perrig-Chiello & Darbellay, 2004), the subjective component of health being a powerful predictor of mortality (Idler & Benyamini, 1997). Factors related to lifestyle, i.e., alcohol and smoking habits, consumption of fruits and vegetables and physical activity, are important in the perception of health (de-Mateo-Silleras et al., 2019). According to Wangberg et al. (2008), a positive correlation between IU and health has been found. Those using the Internet present better health outcomes and fewer consultations with physicians. Bessière et al. (2010) found that using the Internet to communicate with friends and family was associated with a decrease in symptoms of depression. The Internet can be a platform to come into contact with healthy lifestyles, alternative medicine, and mental health behaviours, helping to monitor health and acquiring healthy lifestyles (Bach & Wenz, 2020).

Derivation of the Hypotheses

The general objective of this study is to identify the sociodemographic and psychological variables that contribute to the IUT in a representative sample of the Portuguese population ($N = 1,270$). It is expected that ($H1$) age, education, perception of well-being, health perception and social life will significantly contribute to the explanation of the IUT. Heo et al. (2015) reported that higher levels of IUT predict higher levels of social support, reduced loneliness, and better life satisfaction and psychological well-being among older adults. Büchi et al. (2018) found that the perception of digital belongingness directly increases social well-being, and Internet skills as digital potential do this indirectly. It is also expected that ($H2$) years of education moderates the relationship in terms of subjective general health and IU, frequency, in times per week. Lam et al. (2020) reported that education had a moderating effect on the relationship between IU and mental health, this relationship being stronger in the highest educational group in both depression and life satisfaction. Finally, it is expected that ($H3$) education moderates the relationship between social life and the time spent per day using the Internet. Schehl et al. (2019) showed that younger participants, with higher education, were more likely to perform all online activities. Men had higher odds than women of performing informational and instrumental but not social online activities.

Method

Participants

The sample consists of 1,270 Portuguese participants, of which 740 (58.3%) are female. The average age of the sample is 50.05 years ($SD = 18.30$; 15-93). The sample presents 10.10 average years of education ($SD = 5.34$), with the majority (675; 53.1%) being active (workers, students and housewives) and the remaining inactive (unemployed, retired, sick, etc.). Most of the participants (759; 59.8%) have no children living at home. The majority (785; 61.8%) live in medium-sized cities and towns; 457 participants (36.0%)

live in and around large cities and only 28 participants (2.2%) live in the countryside. Most of the sample (730; 57.7%) receives wages as the main source of income; the remainder (537; 42.3%) have pensions, other social benefits, investments and others. In relation to income, most participants 647; 51.1%) manage to pay expenses; 257 (20.3%) participants claim to live comfortably with their income; the rest report difficulties in living with their current income, with 139 (11.0%) reporting many difficulties.

Procedure

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. After outlining the topic to be studied, the variables that allowed answering the research question were selected from the European Social Survey European Research Infrastructure (ESS ERIC), Round 8 (European Social Survey, 2016), an academically driven cross-national survey conducted across Europe since 2001. Every two years, face-to-face interviews are carried out with newly selected, cross-sectional samples, concerning attitudes, beliefs and behaviour patterns of diverse populations in more than thirty nations.

Measures

European Social Survey (ESS, European Social Survey, 2016).

Selected items

Items were selected according to the underlying constructs defined by the authors of the ESS.

Variables regarding Internet use time (IUT). The question “Internet use, how often, in times a week” is a scalar variable, whose answer corresponds to “never - 1”, “only occasionally - 2”, “a few times a week - 3”, “most days - 4”, “every day - 5”; and the question “Internet use, how much time on a typical day, in minutes” is a scalar variable to which participants respond, indicating the number of minutes that were used (Table 1). Reliability was assessed by Cronbach’s alpha ($\alpha = 0.74$).

Psychological variables. To assess the perception of well-being, the questions “How satisfied are you with life as a whole” and the question “How happy are you” (answered on a scale ranging from 0 “extremely dissatisfied” to 10 “extremely satisfied”), were used. Reliability was assessed by Cronbach’s alpha ($\alpha = 0.72$).

To assess the perception of social life, three questions were used: “How often do you socially meet with friends, relatives or colleagues” (scalar variable, whose answer 1 corresponds to “never”, 2 to “less than once a month” 3 to “once a month”, 4 to “several times a month”, 5 to “once a week”, 6 to “several times a week” and 7 to “every day”); “How many people are there with whom you can discuss intimate and personal matters” (scalar variable, whose answer 1 corresponds to “none”, 2 to “one” 3 to “two”, 4 to “three”, 5 to “between four and six”, 6 to “between seven to nine” and 7 to “ten or more”); and “Do you take part

Table 1. Frequencies of Internet use, well-being, social life and health perception variables

	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>S_{kw}</i>	<i>K_{rt}</i>
Internet use						
Internet use, how often, in times a week	1	5	3.39	1.803	-0.400	-1.686
Internet use, how much time on a typical day, in minutes	0	1440	138.19	202.62	1.868	3.629
Well-being						
How satisfied are you with life as a whole	0	10	6.26	2.40	-0.688	0.195
How happy are you	0	10	7.30	2.07	-1.064	1.322
Social life						
How often do you socially meet with friends, relatives or colleagues	1	7	5.78	1.47	-1.158	0.574
How many people are there with whom you can discuss intimate and personal matters	0	6	2.69	1.37	0.007	-0.395
Do you take part in social activities compared to others of the same age	1	5	2.56	1.02	0.277	-0.413
Health perception						
Subjective general health	1	5	2.52	0.88	0.295	0.184
Hampered in daily activities by illness/disability/infirmity/mental problem	0	3	1.28	0.54	-1.825	2.388

Note. *Min* = minimum; *Max* = maximum; *M* = mean; *SD* = standard deviation; *S_{kw}* = skewness; *K_{rt}* = kurtosis.

in social activities compared to others of the same age” (ordinal variable whose answer 1 corresponds to “much less than the average”, 2 to “less than the average”, 3 to “the same”, 4 to “more than the average” and 5 to “much more than the average”). Reliability was assessed by Cronbach’s alpha ($\alpha = 0.60$).

In order to assess the perception of health, the questions “Subjective general health” (ordinal variable with five response modalities, those being “very good - 5”, “good - 4”, “normal - 3”, “bad - 2” and “very bad - 1”); and “Hampered in daily activities by illness/disability/infirmity/mental problem” (ordinal variable, whose answer 1 corresponds to “yes, a lot”, 2 to “yes, to a certain extent” and 3 to “no”), were chosen. Reliability was assessed by Cronbach’s alpha ($\alpha = 0.70$) (Table 1).

Data analysis

The data made available in a database of the programme IBM SPSS Statistics version 27 were analysed. Descriptive statistical analyses (mean, standard deviation, minimum and maximum, skewness and kurtosis), analyses of Cronbach’s alpha value, correlation analyses (Pearson’s *r* and Spearman’s rho), regressions (multiple hierarchical regression) and moderation analyses were performed. Considering the sample size ($N = 1,270$), parametric tests were used (Pestana & Gageiro, 2014).

Results

Descriptive statistics

Analysing the values of kurtosis and skewness, most of the variables present normal distribution. The variable “Internet use, how much time on a typical day, in minutes” presents values slightly above those recommended in both kurtosis and skewness indicators. The mean values of the variables are much closer to the maximum values than to the minimum values (Table 1).

Correlations

The variables correlate significantly and negatively (except with professional activity) with all sociodemographic variables, although the highest correlations occur between age and professional activity, on one hand, and “Internet use, how often, in times a week” on the other; and between professional activity and “Internet use, how much time on a typical day, in minutes” (Table 2).

The variable “Internet use, how often, in times a week” correlates positively and significantly with all variables (correlates negatively only with subjective general health), and the highest correlation is with subjective general health. The variable “Internet use, how much time on a typical day, in minutes” correlates significantly with five (three positively and two negatively) of the variables (“how satisfied are you with life as a whole”; “how often do you socially meet with friends, relatives or colleagues”; “how many people are there with whom you can discuss intimate and personal matters”; and “subjective general health”), with the highest correlation, although weak, with “how often do you socially meet with friends, relatives or colleagues” (Table 3).

Regressions

To determine the sociodemographic and psychological variables contributing to explain the analysed variables, two multiple linear hierarchical regression analyses, using the *enter* method, were performed.

Regarding the variable “Internet use, how often, in times a week”, a significant model was found explaining 58% of the variance ($F(5, 1237) = 344.672$; $p < 0.001$; $R^2 = 0.581$). Age, years of education, sources of income, “do you take part in social activities compared to others of same age” and subjective general health contribute to explain this variance (Table 4). Being younger, having less education, having a wage as a source of income, having more social activities than other people of the same age and having a

Table 2. Spearman correlations between Internet use and sociodemographic variables

	1	2	3	4	5	6	7	8	9	10
1 Internet use, how often	1									
2 Internet use, how much time on a typical day, in minutes	0.845**	1								
3 Gender	-0.077**	-0.075**	1							
4 Age	-0.634**	-0.614**	0.016	1						
5 Years of education	-0.164**	-0.117**	-0.05	0.263**	1					
6 Professional activity	0.682**	0.642**	-0.057*	-0.535**	-0.126**	1				
7 Children living with parents	-0.474**	-0.438**	0.101**	0.566**	0.252**	-0.460**	1			
8 Domicile	-0.448**	-0.398**	0.023	0.566**	0.361**	-0.404**	0.648**	1		
9 Sources of income	-0.223**	-0.218**	0.037	0.081**	-0.032	-0.265**	0.101**	0.071*	1	
10 Feelings regarding income	-0.359**	-0.331**	0.140**	0.245**	0.053	-0.457**	0.244**	0.243**	0.153**	1

** The correlation is significant at the 0.01 level.

Table 3. Pearson correlations between Internet use and social life, well-being and subjective general health variables

	1	2	3	4	5	6	7	8	9
1 Internet use, how often	1								
2 Internet use, how much time on a typical day, in minutes	0.176**	1							
3 How satisfied are you with life as a whole	0.219**	0.126**	1						
4 How happy are you	0.117**	0.062	0.567**	1					
5 How often do you socially meet with friends, relatives or colleagues	0.088**	0.128**	0.128**	0.137**	1				
6 How many people are there with whom you can discuss intimate and personal matters	0.208**	0.161**	0.215**	0.152**	0.165**	1			
7 Do you take part in social activities compared to others of the same age	0.237**	0.059	0.224**	0.218**	0.260**	0.217**	1		
8 Subjective general health	-0.438**	-0.112**	-0.361**	-0.306**	-0.086**	-0.205**	-0.238**	1	
9 Hampered in daily activities by illness/disability/infirmity/ mental problem	0.259**	0.050	0.228**	0.222**	0.051	0.110**	0.146**	-0.538**	1

** The correlation is significant at the 0.01 level.

Table 4. Multiple Linear Regression: Contribution to explaining the number of times per week of Internet use

					Statistic change				
<i>Model</i>	<i>R</i>	<i>R</i> ²	<i>R</i> ² <i>Adjusted</i>	<i>SE</i>	<i>R</i> ²	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>Sig. F</i>
1	0.757	0.573	0.571	1.170	0.573	494.005	3	1106	0.000
2	0.762	0.581	0.579	1.160	0.009	7.494	3	1103	0.000
					<i>B</i>	<i>Error</i>	β	<i>t</i>	<i>p</i>
1	(Constant)		0.281	0.091				3.079	0.002
	Age		-0.020	0.001	-0.374	-15.936			0.000
	Years of education		0.086	0.004	0.458	21.027			0.000
	Sources of income		-0.037	0.013	-0.063	-2.879			0.004
2	(Constant)		0.276	0.091				3.049	0.002
	Age		-0.019	0.001	-0.356	-14.807			0.000
	Years of education		0.081	0.004	0.429	19.004			0.000
	Sources of income		-0.035	0.013	-0.058	-2.713			0.007
	Take part in social activities compared to others of the same age		0.076	0.019	0.076	3.968			0.000
	Subjective general health		-0.056	0.022	-0.055	-2.564			0.010

R = correlation; *R*² = r-squared; *R*²*Adjusted* = r-squared adjusted; *SE* = standard error; *F* = ANOVA *F*-test; *df* = default freedom; *Sig.* = significance; *B* = shared variance between variables; β = regression coefficient; *t* = Student's *t*-test; *p* = *p*-value.

less favourable subjective general health all together explain 58% of the variance of weekly IU.

Regarding the “Internet use, how much time on a typical day, in minutes”, variable a significant model was found that explains 34% of the variance of this variable ($F(5, 1245) = 131.026$; $p < 0.001$; $R^2 = 0.345$). Sociodemographic and other variables contributing to explain this variance are age, years of education, domicile, “how often do you socially meet with friends, relatives or colleagues” and “how many people are there with whom you can discuss intimate and personal matters” (Table 5). Being younger, having less education, living in larger cities, acting socially with more people and having more people with whom to confide, taken together, account for 34% of the time variance (in minutes) of daily IU.

Moderations

Years of education was a significant moderator in the relationship between subjective general health and times per week of IU ($\beta = 0.012$, $t = 3.063$, $p = 0.002$). The negative relationship between subjective general health and “Internet use, how often, in times a week” was stronger when the years of education was lower ($\beta = -0.236$, $t = -7.645$, $p < 0.001$) (Figure 1). The Johnson-Neyman technique (Johnson

& Fay, 1950) showed that the relationship between subjective general health and “Internet use, how often, in times a week” was significant when years of education was less than 7.03 standard deviations below the mean, but not significant with higher values.

Years of education was also a significant moderator in the relationship between “How often do you socially meet with friends, relatives or colleagues” and “Internet use, how much time on a typical day, in minutes” ($\beta = 0.014$, $t = 3.045$, $p = 0.002$). The positive relationship between “How often do you socially meet with friends, relatives or colleagues” and “Internet use, how much time on a typical day, in minutes” was stronger when the years of education were higher ($\beta = -0.201$, $t = 5.206$, $p < 0.001$) (Figure 2). The Johnson-Neyman technique (Johnson & Fay, 1950) showed that the relationship between “How often do you socially meet with friends, relatives or colleagues” and “Internet use, how much time on a typical day, in minutes” was significant when years of education was more than 6.11 standard deviations above the mean, but not significant with lower values.

Discussion

This study aimed to identify the sociodemographic and the psychological variables contributing to explain the IUT

Table 5. Multiple Linear Regression: Contribution to explaining the number of minutes per day of Internet use

Statistic change									
Model	R	R ²	R ² Adjusted	SE	R ²	F	df1	df2	Sig. F
1	0.578	0.335	0.333	0.817	0.335	209.030	3	1247	0.000
2	0.587	0.345	0.342	0.812	0.010	9.663	2	1245	0.000
		B	Error	β	t	p			
1	(Constant)	0.720	0.136		5.299	0.000			
	Age	-0.019	0.001	-0.347	-12.979	0.000			
	Years of education	0.053	0.005	0.285	10.354	0.000			
	Domicile	-0.099	0.021	-0.112	-4.674	0.000			
2	(Constant)	0.703	0.136		5.183	0.000			
	Age	-0.018	0.001	-0.331	-12.311	0.000			
	Years of education	0.051	0.005	0.274	9.828	0.000			
	Domicile	-0.101	0.021	-0.114	-4.811	0.000			
How often do you socially meet with friends, relatives or colleagues		0.062	0.024	0.062	2.630	0.009			
How many people are there with whom you can discuss intimate and personal matters		0.074	0.024	0.074	3.075	0.002			

R = correlation; R² = r-squared; R²Adjusted = r-squared adjusted; SE = standard error; F = ANOVA F-test; df = default freedom; Sig. = significance; B = shared variance between variables; β = regression coefficient ; t = Student's t-test; p = p-value.

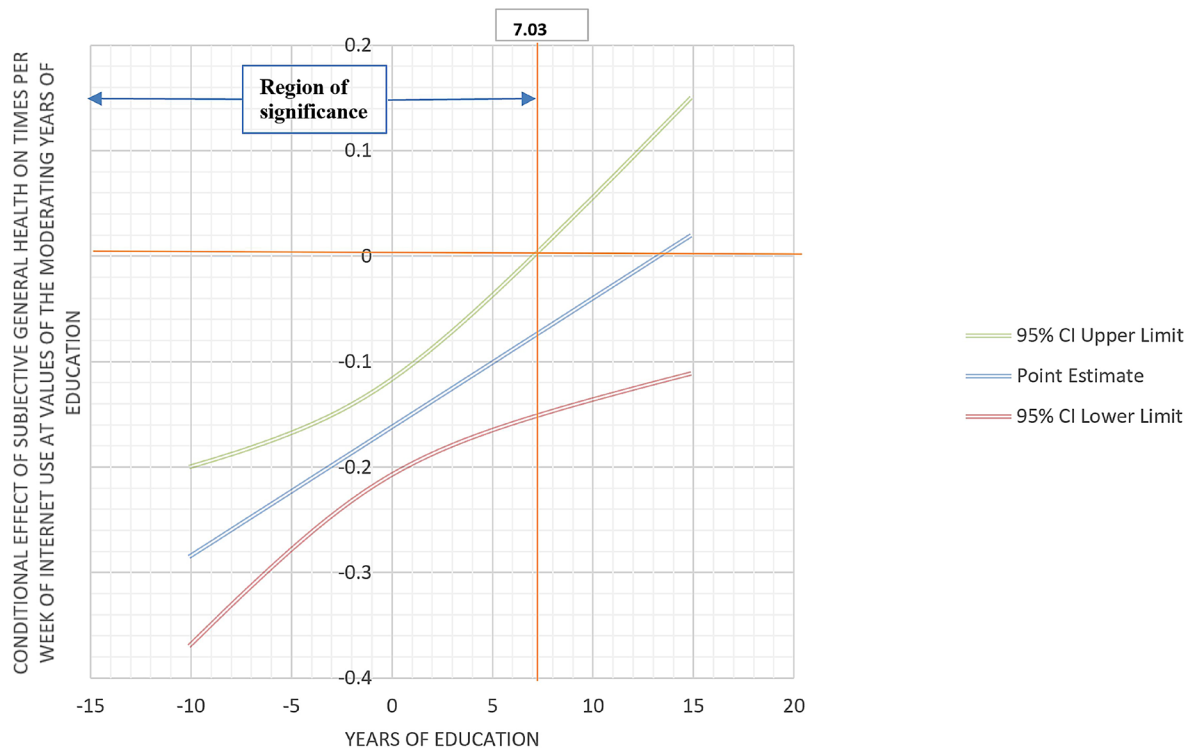


Figure 1. Years of education as a moderator in the relationship between subjective general health and “Internet use, how much time on a typical day, in minutes”

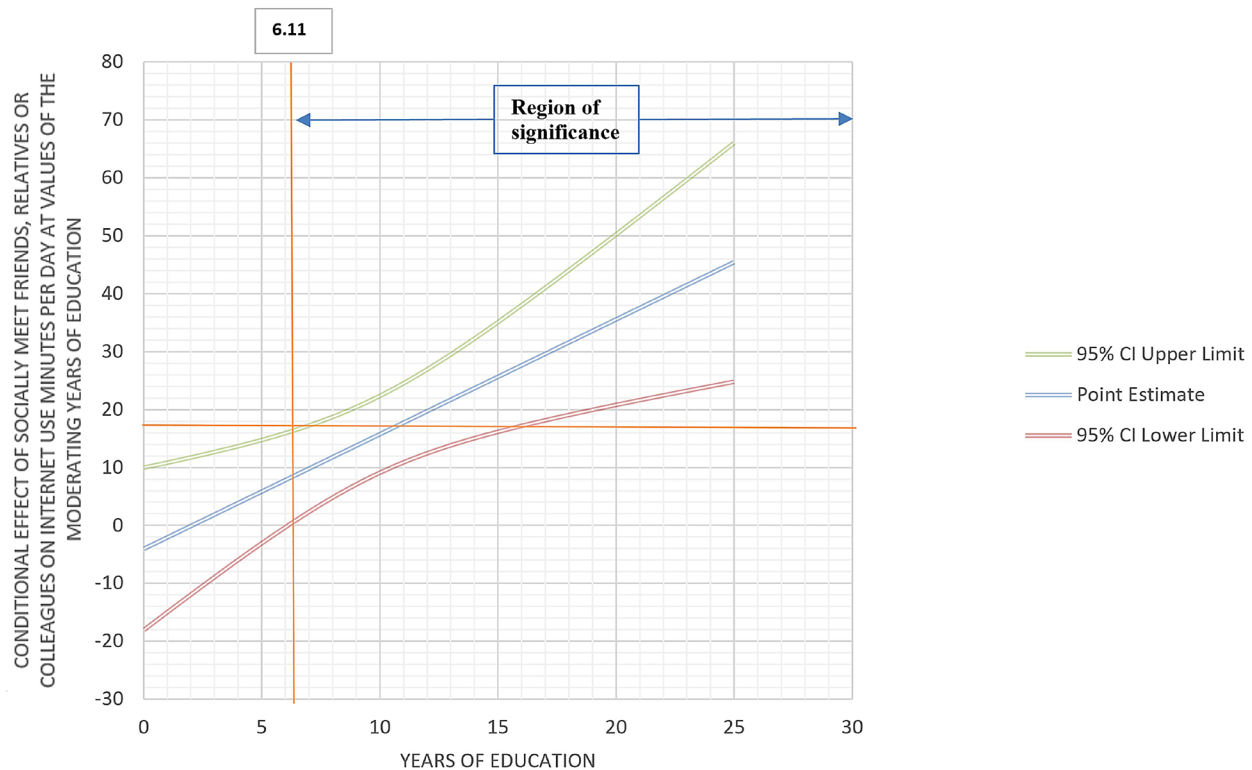


Figure 2. Years of education as a moderator in the relationship between “How often do you socially meet with friends, relatives or colleagues” and “Internet use, how much time on a typical day, in minutes”

in a representative sample of the Portuguese population. It was expected that (*H1*) age, education, perception of well-being, health and, social life would significantly contribute to explaining IUT. Results show that being younger, having less education, having a wage as a source of income, having more social activities than other people of the same age and having a less favourable subjective general health explain, together, 58% of the variance of weekly IU. Being younger, having less education, living in larger cities, living socially with more people and having more people to confide with, all together, account for 34% of the variance of daily IUT (in minutes). These results are close to those of Chang et al. (2014) and Demirci et al. (2021) when reporting that age, gender, educational level, place of residence and frequency of IU were found to impact the participants' behaviour on the Internet, related to health information (Hunsaker et al., 2021; Tyler et al., 2020): women, younger, with higher levels of education and living in developed regions use the Internet more. Schehl et al. (2019) suggested that younger participants, with higher education, were more likely to perform all online activities, while men had higher odds than women of performing informational and instrumental (Langarizadeh et al., 2018), but not social online activities. Bozoglan et al. (2013) and Heo et al. (2015) found that higher levels of IUT were significant predictors of higher levels of social support (Tirado-Morueta et al., 2020), reduced loneliness, and better life satisfaction and psychological well-being among older adults. A study by Chopik (2016) with older adults found an association between IUT

and better self-rated health, fewer chronic illnesses, higher subjective well-being, and fewer depressive symptoms.

It was expected that (*H2*) education would moderate the relationship between the perception of health and the “Internet use, how often, in times a week”. *H2* was confirmed since the relationship between subjective general health and “Internet use, how often, in times a week” was significant when years of education was less than 7.03 standard deviations below the mean, but not significant with higher values. These results contradict those of Lam et al. (2020), reporting that education had a moderating effect on the association between frequency of IU and mental health, the associations being stronger in the highest educational group in both depression and life satisfaction.

It was expected that (*H3*) education would moderate the relationship between the perception of social life and the “Internet use, how much time on a typical day, in minutes”. *H3* was confirmed since the relationship between “How often do you socially meet with friends, relatives or colleagues”, and “Internet use, how much time on a typical day, in minutes” was significant when years of education was more than 6.11 standard deviations above the mean, but not significant with lower values. These results concur with those found by Lam et al. (2020), who reported that using the Internet for communication was associated with lower depression and better life satisfaction. Amichai-Hamburger and Hayat (2011) also concluded that IU is a predictor of social life and social interactions, increasing the latter.

The implications of these results indicate the need to limit IUT, not spent in establishing communication with others.

Conclusion

Being younger, having less education, having a wage as a source of income, having more social activities than other people of the same age, and having a less favourable subjective general health, explain 58% of the variance of weekly IU. Being younger, having less education, living in larger cities, living socially with more people and having more people to confide with account for 34% of the variance of daily IU. The relationship between subjective general health and “Internet use, how often, in times a week” was significant when years of education was less than 7.03 standard deviations below the mean, but not significant with higher values. The relationship between “How often do you socially meet with friends, relatives or colleagues”, and “Internet use, how much time on a typical day, in minutes” was significant when years of education was more than 6.11 standard deviations above the mean, but not significant with lower values.

These findings point to the need to study IUT according to educational level, in terms of PIU. Maladaptive IU, when the perception of health is worse, and adaptive IU, when the perception of social life is better, are suggested, depending on education. These results are important for limiting IUT, raising awareness on IU, to which the Portuguese are not so alert, promoting behavioural change in this respect.

Limitations and future research

The main limitation of this study concerns the use of self-report measures whose social desirability and subjectivity are difficult to control. Future studies should seek to include objective measures of time and not just self-report measures. Future studies should also explore the differences in the IUT according to educational level.

Author's Contributions

Conceptualisation, Ângela Leite and João Alves; Data curation, Ângela Leite and João Alves; Formal analysis, Ângela Leite, João Alves and Hélder Fernando Pedrosa e Sousa; Investigation, Ângela Leite and João Alves; Methodology, Ângela Leite, João Alves and Hélder Fernando Pedrosa e Sousa; Project administration, Ângela Leite; Software, Hélder Fernando Pedrosa e Sousa and Maria Alzira Pimenta Dinis; Supervision, Ângela Leite; Validation, Ângela Leite, Hélder Fernando Pedrosa e Sousa and Maria Alzira Pimenta Dinis; Visualisation, Ângela Leite, Hélder Fernando Pedrosa e Sousa and Maria Alzira Pimenta Dinis; Writing - original draft, Ângela Leite and João Alves; Writing - review & editing, Ângela Leite, Hélder Fernando Pedrosa e Sousa and Maria Alzira Pimenta Dinis. All authors have read and agreed to the published version of the manuscript.

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Data availability

The datasets analysed in the current study are available in the European Social Survey repository, <https://www.europeansocialsurvey.org/data/download.html?r=8>

Compliance with Ethical Standards

Conflict of interest. The authors have no conflicting or competing interests to declare.

Ethics Approval. Not applicable (European Social Survey repository data).

Consent to Participate. Not applicable (European Social Survey repository data).

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References

- Aboujaoude, E. (2010). Problematic Internet use: An overview. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, 9(2), 85-90. <https://doi.org/10.1002/j.2051-5545.2010.tb00278.x>
- Amichai-Hamburger, Y., & Hayat, Z. (2011). The impact of the Internet on the social lives of users: A representative sample from 13 countries. *Computers in Human Behavior*, 27(1), 585-589. <https://doi.org/10.1016/j.chb.2010.10.009>
- Bach, R. L., & Wenz, A. (2020). Studying health-related Internet and mobile device use using web logs and smartphone records. *PLOS ONE*, 15(6), e0234663-e0234663. <https://doi.org/10.1371/journal.pone.0234663>
- Bargh, J. A., & McKenna, K. Y. A. (2004). The Internet and social life. *Annual Review of Psychology*, 55(1), 573-590. <https://doi.org/10.1146/annurev.psych.55.090902.141922>
- Bessière, K., Pressman, S., Kiesler, S., & Kraut, R. (2010). Effects of Internet use on health and depression: A longitudinal study. *Journal of Medical Internet Research*, 12(1), e6. <https://doi.org/10.2196/jmir.1149>
- Bozoglan, B., Demirel, V., & Sahin, I. (2013). Loneliness, self-esteem, and life satisfaction as predictors of Internet addiction: A cross-sectional study among Turkish university students. *Scandinavian Journal of Psychology*, 54(4), 313-319. <https://doi.org/10.1111/sjop.12049>
- Büchi, M., Festic, N., & Latzer, M. (2018). How social well-being is affected by digital inequalities. *International Journal of Communication*, 12, 3686-3706. <https://ijoc.org/index.php/ijoc/article/view/8780/2450>
- Castellacci, F., & Tveito, V. (2018). Internet use and well-being: A survey and a theoretical framework. *Research Policy*, 47(1), 308-325. <https://doi.org/10.1016/j.respol.2017.11.007>
- Chak, K., & Leung, L. (2004). Shyness and locus of control as predictors of Internet addiction and Internet use. *Cyberpsychology & Behavior*, 7(5), 559-570. <https://doi.org/10.1089/cpb.2004.7.559>
- Chang, F.-C., Chiu, C.-H., Lee, C.-M., Chen, P.-H., & Miao, N.-F. (2014). Predictors of the initiation and persistence of In-

- ternet addiction among adolescents in Taiwan. *Addictive Behaviors*, 39(10), 1434-1440. <https://doi.org/10.1016/j.addbeh.2014.05.010>
- Cheung, J. C.-S., Chan, K. H.-W., Lui, Y.-W., Tsui, M.-S., & Chan, C. (2018). Psychological Well-Being and Adolescents' Internet Addiction: A School-Based Cross-Sectional Study in Hong Kong. *Child and Adolescent Social Work Journal*, 35(5), 477-487. <https://doi.org/10.1007/s10560-018-0543-7>
- Chopik, W. J. (2016). The benefits of social technology use among older adults are mediated by reduced loneliness. *Cyberpsychology, Behavior and Social Networking*, 19(9), 551-556. <https://doi.org/10.1089/cyber.2016.0151>
- de-Mateo-Silleras, B., Camina-Martín, M. A., Cartujo-Redondo, A., Carreño-Enciso, L., de-la-Cruz-Marcos, S., & Redondo-del-Río, P. (2019). Health perception according to the lifestyle of university students. *Journal of Community Health*, 44(1), 74-80. <https://doi.org/10.1007/s10900-018-0555-4>
- Demirci, Ş., Uğurluoğlu, Ö., Konca, M., & Çakmak, C. (2021). Socio-demographic characteristics affect health information seeking on the Internet in Turkey. *Health Information & Libraries Journal*, 38(4), 304-312. <https://doi.org/10.1111/hir.12358>
- European Social Survey. (2016). *ESS Round 8 Source Questionnaire*. <https://www.europeansocialsurvey.org/data/download.html?r=8>
- Fernandes, B., Maia, B. R., & Pontes, H. M. (2019). Internet addiction or problematic Internet use? Which term should be used? *Psicologia USP*, 30, 1-8. <https://doi.org/10.1590/0103-6564E190020>
- Gleave, E., Welser, H. T., Lento, T. M., & Smith, M. A. (2009). A conceptual and operational definition of 'social role' in online community. 2009 42nd Hawaii International Conference on System Sciences, 1-11. <https://doi.org/10.1109/HICSS.2009.6>
- Gmel, G., Notari, L., & Schneider, E. (2017). *Is there an Internet addiction and what distinguishes it from problematic Internet use - An attempt to provide working definitions*. Addiction Switzerland. <https://bit.ly/413HydL>
- Heo, J., Chun, S., Lee, S., Lee, K. H., & Kim, J. (2015). Internet use and well-being in older adults. *Cyberpsychology, Behavior, and Social Networking*, 18(5), 268-272. <https://doi.org/10.1089/cyber.2014.0549>
- Hunsaker, A., Hargittai, E., & Micheli, M. (2021). Relationship between Internet use and change in health status: Panel study of young adults. *Journal of Medical Internet Research*, 23(1), e22051. <https://doi.org/10.2196/22051>
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38(1), 21-37.
- Ingold, T. (2016). *Evolution and social life* (1 ed.). Routledge.
- Johnson, P. O., & Fay, L. C. (1950). The Johnson-Neyman technique, its theory and application. *Psychometrika*, 15(4), 349-367. <https://doi.org/10.1007/BF02288864>
- Kearns, A., & Whitley, E. (2019). Associations of Internet access with social integration, wellbeing and physical activity among adults in deprived communities: Evidence from a household survey. *BMC Public Health*, 19(1), 860-860. <https://doi.org/10.1186/s12889-019-7199-x>
- Kurniasanti, K. S., Assandi, P., Ismail, R. I., Nasrun, M. W. S., & Wiguna, T. (2019). Internet addiction: A new addiction? *Medical Journal of Indonesia*, 28(1), 82-91. <https://doi.org/10.13181/mji.v28i1.2752>
- Lam, S. S. M., Jivraj, S., & Scholes, S. (2020). Exploring the relationship between Internet use and mental health among older adults in England: Longitudinal observational study. *Journal of Medical Internet Research*, 22(7), e15683. <https://doi.org/10.2196/15683>
- Langarizadeh, M., Naghipour, M., Tabatabaei, S. M., Mirzaei, A., & Vaghar, M. E. (2018). Prediction of Internet addiction based on information literacy among students of Iran University of Medical Sciences. *Electronic Physician*, 10(2), 6333-6340. <https://doi.org/10.19082/6333>
- Leung, H., Pakpour, A. H., Strong, C., Lin, Y.-C., Tsai, M.-C., Griffiths, M. D., Lin, C.-Y., & Chen, I. H. (2020). Measurement invariance across young adults from Hong Kong and Taiwan among three Internet-related addiction scales: Bergen Social Media Addiction Scale (BSMAS), Smartphone Application-Based Addiction Scale (SABAS), and Internet Gaming Disorder Scale-Short Form (IGDS-SF9) (Study Part A). *Addictive Behaviors*, 101, 105969. <https://doi.org/10.1016/j.addbeh.2019.04.027>
- Ojo, A. O., Arasanmi, C. N., Raman, M., & Tan, C. N.-L. (2019). Ability, motivation, opportunity and sociodemographic determinants of Internet usage in Malaysia. *Information Development*, 35(5), 819-830. <https://doi.org/10.1177/0266666918804859>
- Papacharissi, Z., & Rubin, A. M. (2000). Predictors of internet use. *Journal of Broadcasting & Electronic Media*, 44(2), 175-196. https://doi.org/10.1207/s15506878jobem4402_2
- Perrig-Chiello, P., & Darbellay, F. (2004). La santé et le bien-être: Aspects différentiels et développementaux. In P. Perrig-Chiello & H. B. Stähelin (Eds.), *Réalités Sociales* (pp. 1-15).
- Pestana, M. H., & Gageiro, J. N. (2014). *Análise de dados para ciências sociais - A complementaridade do SPSS* [Data Analysis for Social Sciences - The Complementarity of SPSS]. Edições Sílabo.
- Pordata (2020). *Private households with a computer, with Internet access and with broadband Internet access (%)*. <https://bit.ly/3Z1iuSL>
- Reading, R. (2009). Closing the gap in a generation: Health equity through action on the social determinants of health. *Child: Care, Health and Development*, 35(2), 285-286. https://doi.org/10.1111/j.1365-2214.2008.00935_10.x
- Ryan, C., & Lewis, J. M. (2017). *Computer and Internet use in the United States: 2015*. American Community Survey Reports, ACS-37, U.S. Census Bureau. <https://www.census.gov/content/dam/Census/library/publications/2017/acs/acs-37.pdf>
- Ryff, C. D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, 4(4), 99-104. <https://doi.org/10.1111/1467-8721.ep10772395>
- Schehl, B., Leukel, J., & Sugumaran, V. (2019). Understanding differentiated Internet use in older adults: A study of informational, social, and instrumental online activities. *Computers in Human Behavior*, 97, 222-230. <https://doi.org/10.1016/j.chb.2019.03.031>
- Shek, D. T. L., Sun, R. C. F., & Yu, L. (2013). Internet addiction. In D. W. Pfaff (Ed.), *Neuroscience in the 21st Century*. (pp. 2775-2811). Springer, New York, NY. https://doi.org/10.1007/978-1-4614-1997-6_108
- Shen, W., Hua, M., Wang, M., Yuan, Y., Shao, M., & Zhao, Y. (2023). Anhedonia mediates the link between problematic Internet use and psychological well-being. *Current Psychology*. <https://doi.org/10.1007/s12144-021-01575-0>
- Spada, M. M. (2014). An overview of problematic Internet use. *Addictive Behaviors*, 39(1), 3-6. <https://doi.org/10.1016/j.addbeh.2013.09.007>
- Tirado-Morueta, R., Aguaded-Gómez, J. I., Ortiz-Sobrino, M. Á., Rodríguez-Martín, A., & Álvarez-Arregui, E. (2020). Determinants of social gratifications obtained by older adults moderated by public supports for Internet access in Spain. *Telematics and Informatics*, 49, 101363-101363. <https://doi.org/10.1016/j.tele.2020.101363>
- Tokunaga, R. S. (2015). Perspectives on Internet addiction, problematic Internet use, and deficient self-regulation: Contributions of communication research. *Annals of the International Communication Association*, 39(1), 131-161. <https://doi.org/10.1080/23808985.2015.11679174>

- Tyler, M., De George-Walker, L., & Simic, V. (2020). Motivation matters: Older adults and information communication technologies. *Studies in the Education of Adults*, 52(2), 175-194. <https://doi.org/10.1080/02660830.2020.1731058>
- Valarezo, Á., Pérez-Amaral, T., Garín-Muñoz, T., Herguera García, I., & López, R. (2018). Drivers and barriers to cross-border e-commerce: Evidence from Spanish individual behavior. *Telecommunications Policy*, 42(6), 464-473. <https://doi.org/10.1016/j.telpol.2018.03.006>
- Wang, L., Luo, J., Bai, Y., Kong, J., Luo, J., Gao, W., & Sun, X. (2013). Internet addiction of adolescents in China: Prevalence, predictors, and association with well-being. *Addiction Research & Theory*, 21(1), 62-69. <https://doi.org/10.3109/16066359.2012.690053>
- Wangberg, S. C., Andreassen, H. K., Prokosch, H.-U., Santana, S. M. V., Sørensen, T., & Chronaki, C. E. (2008). Relations between Internet use, socio-economic status (SES), social support and subjective health. *Health Promotion International*, 23(1), 70-77. <https://doi.org/10.1093/heapro/dam039>
- Worsley, J. D., Mansfield, R., & Corcoran, R. (2018). Attachment anxiety and problematic social media use: The mediating role of well-being. *Cyberpsychology, Behavior, and Social Networking*, 21(9), 563-568. <https://doi.org/10.1089/cyber.2017.0555>
- Zhou, N., Cao, H., Li, X., Zhang, J., Yao, Y., Geng, X., Lin, X., Hou, S., Liu, F., Chen, X., & Fang, X. (2018). Internet addiction, problematic Internet use, nonproblematic Internet use among Chinese adolescents: Individual, parental, peer, and sociodemographic correlates. *Psychology of Addictive Behaviors*, 32(3), 365-372. <https://doi.org/10.1037/adb0000358>