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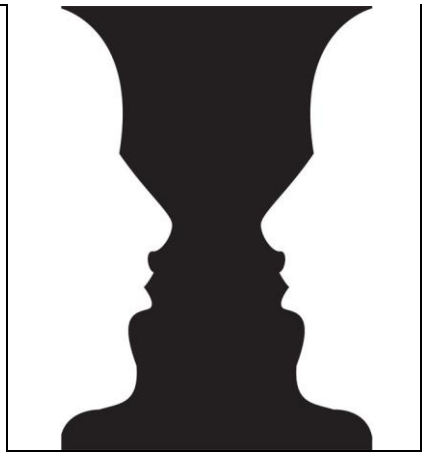

Types of phone usage: Age differences between younger and older persons

Simona-Nicoleta Vulpe[1]
Corina Ilinca[2]

Abstract
Even if more and more people use mobile phones, the gap between younger and older age groups persists and its importance is timely and widened given the present ageing and digital inequality phenomena. How wide is the difference on types of phone usage between different age groups? For answering this research question, we employ binary logistic regressions on several types of phone usage keeping into account age and controlling for region, education, income and whether respondents use a feature phone or a smartphone. The analysed data come from the Spring Change Assessment Survey 2010 provided by the Pew Research Center and it is representative for the United States of America. Our results show that, net of the all the variables included in the model, older persons are less likely than younger persons to use such phone functions, but the strength of association is low. Education and income are relevant for these functions. Using a smartphone in comparison with using a feature phone is important in all the situations included, as well as income. Considering models only for older persons, over 65 years of age, college and income are less relevant. Using a smartphone is more likely than using a feature phone to encourage all types of phone usage, independently of age.

Keywords
Age, phone usage, types of phone usage, digital inequality

[1] Faculty of Sociology and Social Work, University of Bucharest, Bucharest, Romania, mona.vulpe@gmail.com
[2] Faculty of Sociology and Social Work, University of Bucharest, Bucharest, Romania, corina.ilinca@outlook.com

Introduction

Consumer Barometer with Google (2016a), a nationally worldwide representative survey, documented that 39% of the people aged 55 and over, whereas 91% of those under 25 years of age across the globe, in the interviewed countries, used smartphones. The difference between these two age groups is considerable and this gap had been of interest to us for developing the current paper.

With respect to the usage of smartphones according to the economic status of the older persons (Consumer Barometer with Google, 2016b), 22% of those above 55 years of age and in the low income category, whereas 63% of those above 55 years of age and in the high income category used smartphones. The trend was upward in the last 6 years and varied across countries, as Poushter (2017) documented it. The same research revealed a gap between the youngest and the oldest age group of 30% in Spain and 71% in Greece, with at least 8 or 9 of 10 young respondents owning a smartphone.

Another reason for developing our article is given by the scarcity of papers in this area of study as Reinartz (2016) found out from her systematic literature review on digital inequality. Her study revealed a small number of articles focusing on how usage of phones furnishes digital inequality. The simple idea that the older persons get to use mobile phones means that they get to be connected with the others. How wide is the difference on types of phone usage between different age groups?

Digital inequality is pervasive across the world today (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Reinartz, 2016). The extent to which people are connected to the digital world has an influence on how people interact, live and plan their current activities. Taking into account the ageing phenomenon (see Bodogai & Cutler, 2013; Bloom, Canning, & Lubet, 2015; Wong, 2013), digital inequality can be observed when comparing the group of young individuals and the group of elderly. Being born with access to technology, the younger group developed more digital skills than the elderly, who were socialized and educated in a less digitalized world (as statistics over time show, see Poushter, 2017).

Schäffer (2007) concluded that quantitative studies tend to score older people worse on scales of skills in comparison with the younger ones and this might happen due to the items that are used in the design of the study while the older persons are probably not up-to-date with those skills (p. 37). Despite this, older persons are prone to getting involved with technology, especially those who want to be socially active (p. 38). Moreover, Wong (2013) considers how older persons experience digital inequality when they are confronted with usage difficulties, such as changes in user interfaces (from keypad-enabled to touch-screen, p. 231). For example, Swedish older women with low levels of education, over 75 years of age, had a limited access to mobile phones (Bolin, 2008 apud Bolin & Westlund 2009, p. 109) and the older persons in general used texting options on mobile phones less frequently than the younger counterparts (Bolin, 2007 apud Bolin & Westlund, 2009, p. 109).

From an active ageing perspective, the analysis made by Voicu (2008) on the link between social capital and age reveals the importance of being socially active. The higher

the age, the lower the frequency of informal socialization, measured by how frequently the respondents meet their friends and relatives (p. 91). The place of meeting is not explicitly measured, and it may be online through mobile phones.

Mobile phones are a useful tool for the elderly, as well as for other age categories, offering them an efficient way to connect with their family and friends. Kwok and Tsang (2012), in their study consisting in interviews with 50 participants among whom there were seniors who used phone and email as daily ways of communication (p. 311), reached to the conclusion that communication using phones as to stay in touch with family members and friends is a measure or an indicator of active ageing.

Income, social status and affordance influence mobile phone or purchase of applications (Ajay & Prabhakaran, 2011). The higher the income, the higher the chances to acquire a mobile phone or specific applications, but the correlation gets lower as the market becomes more competitive and the prices get lower (Ajay & Prabhakaran, 2011, pp. 780, 782). The same idea of keeping in touch with others was developed by Martinez-Pecino and Lera (2012). The main results of this study showed that mobile phones helped the older persons to keep in touch with their relatives, so they could receive social support from them. The use of mobile phones also ensured the older persons feelings of security, freedom and independence.

The Technology Acceptance Model (TAM; Legris, Ingham, & Collerette, 2003, pp. 191-192) included the following components: perceived usefulness, perceived ease of use, attitude towards usage, behavioural intention to use, and actual use. Several studies use TAM, in line with other similar theories such as the theory of reasoned action (Venkatesh, Morris, Davis, & Davis, 2003), to explain the acceptance and usage of technology, particularly mobile phones, by the elderly.

TAM was also used by Zhou, Rau, and Salvendy (2014a) who conducted a survey, with participants being younger and older adults from China. The authors found age-related differences between the two groups with regard to mobile phone usage. Seniors paid more attention to visual characteristics of phones compared to younger participants and they were less interested in Internet access and connectivity. Older persons found it difficult to use soft-keys and multi-tap, and considered the keyboard of feature phones to be more adequate for them than the keyboard of smartphones (p. 401). Wong (2013) found similar results in his study on the Malaysian sample, where older persons experienced difficulties in changing their feature phones with touch-screen smartphones. Moreover, Zhou, Rau, and Salvendy (2014b) analysed in detail a subgroup of older people in China to emphasize differences between feature phones and smartphones usage, considering the current phenomenon of population ageing.

The Cognitive Complexity Theory was tested by Ziefle and Bay (2005) using experimental data on older and younger highly educated participants with no or little usage experience of mobile phones in order to investigate the usage of more or less sophisticated mobile phones. Their results showed that, when it comes to usage of less sophisticated mobile phones, the older persons were as good as the younger counterparts. Otherwise, the younger group had more skills in using the more sophisticated mobile phones.

Rosales and Fernández-Ardèvol (2016) answered the following research questions: how older people use smartphones and how their usage differs from the usage of younger groups (p. 493). Among their participants there were seniors who used smartphones beyond basic functions. These participants used smartphones for social interaction, hobbies, entertainment (p. 500). The authors emphasized the fact that smartphone usage tends to change over the years, thus more research is needed to identify the "alternative trends of adoption and use" (p. 500) that reflect the interests of various age groups in smartphone applications.

Methodology

The analysis was conducted on persons who own a phone, either feature phone or smartphone. We ran binary logistic regressions on each of the dependent variables measuring types of phone usage. The analysed dataset came from the Spring Change Assessment (2010) provided by the Pew Research Center and was representative for the United States of America.

Variables included in the analysis

Our dependent variables refer to usage of certain functions of phones. The main question was "Please tell me if you ever use your cell phone to do any of the following things. Do you ever use your cell phone to...?", followed by the specific function: send or receive e-mail, send or receive text messages, take a picture, download a software application or "app", access the internet and record a video. All the functions have a corresponding variable coded in a dummy way: 0 for no and 1 for yes.

Age was considered as a numeric variable. Region was included as dummy variables constructed as 1 for the code corresponding to a specific region and 0 all others. All the regions were: Northeast, Midwest, West and South. The reference category, for which we did not include a specific dummy variable in regressions, was South because it contained the highest number of cases (for details on the strategy, see Grace-Martin, 2016). Education is composed of people without college (code 0) and people with college (code 1). The type of phone was added with code 0 if respondents had a feature phone and 1 if respondents had a smartphone. The family income per year was added using the following coding: 1 for less than $10,000, 2 for $10,000 to under $20,000, 3 for $20,000 to under $30,000, 4 for $30,000 to under $40,000, 5 for $40,000 to under $50,000, 6 for $50,000 to under $75,000, 7 for $75,000 to under $100,000, 8 for $100,000 to under $150,000, and 9 for $150,000 or more. This was the only variable with considerable missing data (19.5% of the sample of adults owning a phone). For dealing with missing data, we replaced the missing values with the median of the sample.

Results

Descriptive statistics (see Table 1)

Considering usage of certain functions, almost 4 in 10 respondents send or receive e-mail, whereas 7 in 10 respondents send or receive text messages. 76.9% take a picture, 36.7% download a software application or "app", 45.2% access the internet, and 36.9% record a video.

The mean age is 49.5. The largest region is the South (38.1%), followed by Midwest with 22.8%, and West with 22.1%. 66.1% of the sample studied at college. 46.3% have a smartphone. With respect to income, the category with the highest percentage is $40,000 to under $50,000, followed by the category $50,000 to under $75,000 (13.9%).

Table 1. Descriptive statistics

	%	Mean	S.D.	Min	Max
Send or receive e-mail					
0. No	61.1				
1. Yes	38.9				
(N)	1952				
Send or receive text messages					
0. No	28.4				
1. Yes	71.6				
(N)	1949				
Take a picture					
0. No	23.1				
1. Yes	76.9				
(N)	1954				
Download a software application or 'app'					
0. No	63.3				
1. Yes	36.7				
(N)	1943				
Access the internet					
0. No	54.8				
1. Yes	45.2				
(N)	1950				
Record a video					
0. No	63.1				
1. Yes	36.9				
(N)	1949				
Age		49.54	17.79	18	94
(N)	1918				
Region					
Northeast	16.9				
Midwest	22.8				
South	38.1				
West	22.1				
(N)	1954				

Table 1. Descriptive statistics (continued)

	%	Mean	S.D.	Min	Max
Education					
0. Without college	33.9				
1. College	66.1				
(N)	1940				
Type of phone					
0. Feature phone	53.7				
1. Smartphone	46.3				
(N)	1954				
Family income per year					
1. Less than $10,000	5.4				
2. $10,000 to under $20,000	7.5				
3. $20,000 to under $30,000	10.0				
4. $30,000 to under $40,000	8.7				
5. $40,000 to under $50,000	27.0				
6. $50,000 to under $75,000	13.9				
7. $75,000 to under $100,000	11.1				
8. $100,000 to under $150,000	9.4				
9. $150,000 or more	7.1				
(N)	1954				

Multivariate statistics (see Table 2 and Table 3)

Net of all the other variables included in the model with all age groups (see Table 2), age is a significant and negative predictor of any of the analysed phone functions. The higher the age, the lower the chances to use such functions, but the coefficients are similar and low in intensity. Except Northeast in comparison with South for downloading an app where the coefficient is negative and statistically significant, all of the considered region variables were not statistically significant. College matters only for sending and receiving e-mail. Using a smartphone in comparison with using a feature phone is important in all the situations included, as well as income.

Table 2. Binary logistic regressions for each of the dependent variables measuring types of phone usage (regression coefficients, odds ratios and sig. *** p<0.001, ** p<0.01, * p<0.05)

	Send or receive e-mail	Send or receive text messages	Take a picture	Download an app
Age	-.039 (.962) ***	-.083 (.920) ***	-.052 (.950) ***	-.056 (.946) ***
Region (reference category: South)				
Northeast	-.024 (.997)	-.196 (.822)	-.073 (.929)	-.533 (.587) *
Midwest	-.338 (.713)	.223 (1.250)	.097 (1.102)	-.073 (.930)
West	-.135 (.873)	.082 (1.085)	0.005 (1.005)	-.133 (.876)
College	.546 (1.727) **	.112 (1.118)	-.170 (.844)	.072 (1.075)
Smartphone	3.368 (29.017) ***	1.470 (4.351) ***	2.102 (8.182) ***	4.311 (74.523) ***
Income	.202 (1.223) ***	.161 (1.175)	.104 (1.110) **	.169 (1.184) ***
Constant	-1.911 (.148) ***	4.100 (60.338) ***	3.025 (20.590) ***	-1.542 (.214) ***
R^2	.630	.485	.383	.711

Table 2. Binary logistic regressions for each of the dependent variables measuring types of phone usage (regression coefficients, odds ratios and sig. *** p<0.001, ** p<0.01, * p<0.05) (continued)

	Access the internet	Record a video
Age	-.068 (.935) ***	-.055 (.947) ***
Region (reference category: South)		
Northeast	-.141 (.869)	.057 (1.059)
Midwest	-.364 (.695)	-.204 (.816)
West	-.236 (.790)	.113 (1.120)
College	.206 (1.228)	.099 (1.104)
Smartphone	3.802 (44.770) ***	1.992 (7.332) ***
Income	.133 (1.143) **	.084 (1.087) **
Constant	.469 (1.599)	.447 (1.564)
R^2	.721	.485

Considering models only for older persons (see Table 3), over 65 years of age, the people from the Northeast region are more likely than those from the South region to record a video or to download an app using their phone and those from West in comparison with those from South to access the internet, whereas for all other types of usage there are no differences between the regions. College is relevant only for accessing the internet and income only for downloading an app. Using a smartphone is more likely than using a feature phone to encourage all types of phone usage.

Table 3. Binary logistic regressions for each of the dependent variables measuring types of phone usage by the respondents over 65 years of age (regression coefficients, odds ratios and sig. *** p<0.001, ** p<0.01, * p<0.05)

	Send or receive e-mail	Send or receive text messages	Take a picture	Download an app
Region (reference category: South)				
Northeast	-.495 (.609)	-.296 (.744)	-.150 (.860)	-1.438 (.237) *
Midwest	-1.070 (.343)	.120 (1.128)	.056 (1.058)	-.172 (.842)
West	-.943 (.390)	-.187 (.829)	.238 (1.268)	-.858 (.424)
College	.503 (1.653)	.266 (1.305)	-.041 (.960)	1.936 (6.929)
Smartphone	3.112 (22.468) ***	1.495 (4.457) ***	1.881 (6.561) ***	4.486 (88.766) ***
Income	.209 (1.232)	.086 (1.089)	.056 (1.058)	-.111 (.895) ***
Constant	-4.294 (.014) ***	-1.727 (.178)	-.692 (.500) *	-5.433 (.004) ***
R^2	.430	.137	.153	.512
N	429	427	429	422

Table 3. Binary logistic regressions for each of the dependent variables measuring types of phone usage by the respondents over 65 years of age (regression coefficients, odds ratios and sig. *** p<0.001, ** p<0.01, * p<0.05) (continued)

	Access the internet	Record a video
Region (reference category: South)		
Northeast	-.379 (.684)	1.102 (3.009) *
Midwest	-.512 (.599)	-.007 (.993)
West	-1.232 (.292) *	.381 (1.463)
College	1.678 (5.354) **	.655 (1.925)
Smartphone	4.419 (82.999) ***	1.403 (4.069) ***
Income	.085 (1.089)	-.013 (.987)
Constant	-5.600 (.004)	-3.460 (.031) ***
R^2	.594	.138
N	429	429

R^2 for each of the models shows moderate to high levels of explained variance in each dependent variable by the independent variables included in the model. For the models ran on all age groups, the lowest value is of 38.3% and the highest value is 72.1%. For the model on older persons, the lowest value is of 13.7% and the highest of 59.4%.

Discussion

The research revealed, in line with the existing literature, age - related differences between younger and older mobile phone users. A possible explanation for these differences was the exposure level to technology during one's formative years (e.g. Keating et al., 2007). The exposure level was higher for younger people in comparison with the older counterparts, which could possibly lead to digital inequality. Mobile phone usage differences between younger and older groups were the frequency use of texting options, sending e-mails, internet access, downloading an app, take a picture or record a video, with lower chances for older persons to be using them than younger people. The strength of the relationship is not high though. Using a smartphone is more likely to facilitate the usage of phone functions, same education at college level than lower levels of education and higher levels of income are more likely to help phone usage of functions. All these patterns apply for the models which keep under control age. When analysing the subgroup of individuals over 65 years of age, education and income are less relevant. Only smartphone usage keeps its relevance.

Digital inequality through phone usage seems to remain pervasive in our results, in line with the literature (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Reinartz, 2016). Keeping into contact with other people via phones, making use of phones through interaction functions and considering phones for keeping memories are important for people's lives. In the current ageing society (see Bodogai & Cutler, 2013; Bloom, Canning, & Lubet, 2015; Wong, 2013), older people can use in a fruitful way the functions of phones.

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Vulpe Simona-Nicoleta, MA Student in Sociology, at the University of Bucharest, Department of Sociology and Social Work. She holds a BA in Sociology (2017). Her research interests are aging, gender studies, technology and digital skills, intersectionality, and public opinion research.

Ilinca Corina, PhD Student in Sociology, at the University of Bucharest, Department of Sociology and Social Work. She holds a BA in engineering (2012), a BA in political science (2013), and an MA in sociology (2014). Her research interests focus on the occupational structure, technology and digital skills, aging, intersectionality, quantitative methodology, and cross-national research.