



A survey of usage of brain-training apps in an Icelandic convenience sample

Helga Sunna Gunnarsdóttir

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Author: Helga Sunna Gunnarsdóttir
ID number: 180886-3469

Department of Psychology
School of Business

Abstract

The number of older people will increase in the next 25 years and the population pyramid is being inverted. Many things can affect the ageing process and there are many things that affect cognitive health. Some believe that apps that train our brain can help to promote cognitive health and can delay cognitive decline. Interest in health-related apps has increased a lot in recent years but their usage in Iceland is unknown. The market asserts that most of these apps are created to help people to increase and strengthen memory, creativity and attention as well as delaying Alzheimer's disease and other cognitive processes which may develop as people grow older. Given the increase in the downloading of apps related to cognitive function, it would be interesting to know if people think that these apps help them with various cognitive skills and whether they believe that they are useful. Participants were 171 in all, aged from 20 to 65 and of both genders. Online questionnaire was used. The main results showed that women between 50 and 59 years old with graduate degree formed the majority of those downloading apps on their smartphone.

Útdráttur

Fjöldi eldra fólks mun aukast til muna á næstu 25 árum og er fólksfjöldapýramídinn að snúast við. Margt getur haft áhrif á öldrun og vitræna heilsu. Sumir telja að forrit sem eiga að hjálfa heilann geti hjálpað til við að efla andlega heilsu og geti tafið vitræna hnignum. Áhugi á heilsutengdum smáforritum hefur aukist á undanförunum árum en notkun þeirra á Íslandi er nær óþekkt. Markaðurinn úti í heimi fullyrðir að flest af þessum smáforritum séu búin til í þeim tilgangi að hjálpa fólki til að auka og styrkja minni og athygli og seinka Alzheimer og öðrum vitsmunalegum ferlum sem geta átt sér stað þegar fólk eldist. Í ljósi þess að aukning hefur orðið á því að fólk sé að verða sér úti um smáforrit sem tengjast vitrænni starfsemi er áhugavert að vita hvort fólk hafi trú á því að forritin hjálpi þeim og hvort að trú þeirra sé gagnleg. Í rannsókn þessari voru þátttakendur alls 171, á aldrinum 20 – 65 ára, af báðum kynjum. Spurningalisti var settur frammi á veraldarvefnum. Helstu niðurstöður sýndu að konur á aldrinum 50 – 59 ára með frammhaldsmenntun á háskólastigi eru í meirihluta við að nota smáforrit sem tengjast vitrænni heilsu á snjallsíma sínum.

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Cognitive health is important and there are many things that can be done to improve it during retirement, a healthy lifestyle for example. Physical health supports cognitive health along with factors like social relationships and mental health which also have a substantial impact (George & Whitehouse, 2011) as well as diabetes, depression and smoking, for example (Anstey, Sargent-Cox, Garde, Cherbuin, & Butterworth, 2014).

It has been claimed that apps that train our brain can help to promote cognitive health and can be especially helpful to older people with problem-solving and speed of thinking (George & Whitehouse, 2011).

An example of how brain training apps work. Lumosity is a computer program and app that has been designed by experts in neuroscience and is supposed to train cognitive abilities (Hardy & Scanlon, 2009). It has over 70.000 users and is intended to improve attention, flexibility of thinking, memory and problem solving. Participants solve various tasks while the clock is ticking. The point of the exercise is that they can compare themselves with others (Santanachote, 2014) and it is promised that playing Lumosity will improve spatial skills and problem solving (Shute, Ventura, & Ke, 2015).

Interest in such apps has greatly increased in recent years and it has been suggested that training in this manner helps people for up to 5 years after the training undertaken (Willis et al., 2006).

It has also been suggested that people who play video games are less likely to get Alzheimer's disease because they keep their brain active, which is as necessary as physical exercise. It has similarly been suggested that no matter how long people use these apps, their brain will perform better (Santanachote, 2014).

Older people are defined as 60 years and older (“Definition of an older or elderly person,” n.d.) and people on the ages 80 and above are the age group that are most rapidly growing (Butler, 1997).

With this increase there will be a need for low-cost methods to help people delay the deterioration of cognitive functions and attention. These methods should also help people increase their quality of life (Kueider, Parisi, Gross, & Rebok, 2012).

Mild cognitive impairment is a risk factor for developing Alzheimer’s later in life (Gauthier et al., 2006) on average 18% per year (Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012). Mild cognitive impairment refers to the stage between normal cognitive abilities and dementia (Winblad et al., 2004). It follows that interest in mind training and maintenance of brain fitness has escalated. Many believe that doing crossword puzzles, for example, is the solution but it is perhaps not that simple. The solution of successful crossword puzzles is associated with extensive knowledge of both general information and words (Hambrick, Salthouse, & Meinz, 1999).

There are many different components that can affect cognitive ageing. For example, an active lifestyle is correlated to positive affect and life satisfaction, decreased mortality risk, better health and cognition, lower stress and less depression (Paillard-Borg, Wang, Winblad, & Fratiglioni, 2009).

What are apps?

The word “app” is difficult to define. Most app users perceive apps as specialized software they download on their tablet or mobile to aid them in carrying out specific tasks. Technically, any software that runs on a mobile appliance is an app (Street, NW, Washington, & Inquiries, 2011).

Apple introduced the application (app) for the first time in 2007 when the iPhone was put on the market. Subsequently apps became very popular (Purcell, 2011).

Games are the most popular apps to download and the apps which people are most willing to pay for. Other popular apps are, for example: music, social networking, maps, navigation, weather and search (Purcell, 2011).

In recent years, the numbers of apps that are supposed to train the brain have multiplied and are estimated to generate an income of about 2 - 8 billion dollars in 2015, as the population gets ages. The market asserts that most of these apps are created to help people to increase and strengthen memory, creativity and attention as well as delaying Alzheimer's disease and other cognitive processes which may occur as people grow older. Few of these apps have, however, been scientifically tried on older people, which would be vital in order to establish that they do, in fact, improve their cognitive functions (Kueider et al., 2012).

About 13.600 health-related apps are available for downloading. About 3000 of them (6%) are related to mental health. The authors of the study: *Smartphones for smart delivery of mental health programs: A systematic review* concluded that apps related to health are motivated by economic incentives and by advertising rather than by science (Donker et al., 2013). New brain training apps are created almost every day. They promise an increased IQ level and better memory. But how many of these brain training apps actually work? (Santanachote, 2014).

This new market of cognitive training is called "brain fitness". The goal is to encourage the growth of new brain synapses and to train the brain in a similar way to any kind of sports activity (George & Whitehouse, 2011). While the pharmaceutical and "smart drugs" market offers drugs to increase brain function, the new increasing "brain fitness" market offers brain training apps and video

games that should do the same as, or more than, the drugs which people take (George & Whitehouse, 2011).

Most of these apps and video games are marketed and sold for individual use and have slogans like "Flex your brain the fun way" (Big Brain Academy) and "give your brain the workout he needs" (Nintendo Brain Age). Slogans like this attract people to buy these kinds of apps. People think that they are buying something that works because they trust the technologies developed for wellbeing, but do not, however, know whether they do, in fact, really work (George & Whitehouse, 2011).

After all the promises about how well brain training affects our cognitive health, it would be interesting to know how many of those who in the future may need memory training via a computer, or some other form of technology, already use something of the sort on their own initiative.

There are no studies that have been done on this topic in Iceland as known.

There was no specific hypothesis, the aim was to find out how common it was among the convenience sample, aged from 20 – 65 years to use various brain training apps and whether people thought that they were of help. Also, whether there were gender differences in usage and whether they were particularly associated with some age groups.

Method

Participants

Participants were 171 in all, aged from 20 to 65 and of both genders. Females accounted for 133 (80.7%) of the respondents and men 33 (19.3%).The sample was defined as Icelandic

people, 20 years and older. A convenience sample was used. Most of participants were on the age 50 to 59 years old (33.3%). Participants that lived in in the Reykjavík Metropolitan area were 83% and the most common educational level was graduate degree (34.5%). For further information, see Table 1.

Table 1.

Background information about participants (age – range, gender, residence and education)

Age range	n	%
20 - 29	28	16.4
30 – 39	33	19.3
40 - 49	33	19.3
50 - 59	57	33.3
60 - 65	20	11.7
Gender		
Women	138	80.7
Men	33	19.3
Residence		
Reykjavík	142	83.5
Outside Reykjavík	28	16.5
Education		
Graduate Degree	59	34.5
Undergraduate degree	46	26.9
College degree	36	21.1
Industrial/occupational degree	23	13.5
Elementary degree	7	4.1

Design

The research was quantitative in the form of a questionnaire which was constructed by the researcher. The questionnaire contained 21 questions and was created on www.surveymonkey.com. The questionnaire was presented in Icelandic and was a net-based survey study using a convenience sample.

Participants were asked to provide the following background information: age, gender, if they lived in Reykjavík metropolitan area or outside Reykjavík metropolitan area and education. Specific questions on the use of brain training apps then followed. The answer options were pre-specified except for the name of particular brain-training apps. Participants were recruited to answer the first four questions which was about background information. If they did not have smartphone then they did not continue the survey and were thanked for the participation.

A five-point Likert scale was used on the last 13 questions with the answer options: “Strongly disagree”, “Disagree”, “Neutral”, “Agree” and “Strongly agree”. For further information see Appendix 1.

The answers from the Likert scale was added together and was named “attitude toward brain training apps”.

The questionnaire was introduced by the following text:

My name is Helga Sunna and I am completing a bachelor's degree in psychology at Reykjavík University. This survey focuses on brain training apps and I would be very grateful if you could take the time to answer this questionnaire. It should not take more than about 7 minutes. With best regards: Helga Sunna.

Descriptive statistics was used (age range and gender) as well as group comparisons (chi square, t-test). Independent variables was gender, age, if they lived in Reykjavík metropolitan area or outside Reykjavík metropolitan area and education. The dependent variable was brain training app usage.

Procedure

After the ethics approval was completed, the researcher submitted information about the study to the Data Protection Authority. The survey was distributed via link on the researcher's Facebook account, where the study was introduced to the participants as well as the purpose of the study. Family members and friends also shared the link. The questionnaire was open and accessible for three weeks.

The answers from the Likert scale was added together in to one variable and was named "Attitude toward brain training apps". The answer option "strongly disagree" got the value 1, "disagree" got the value 2, "neutral" got the value 3, "agree" got the value 4, "strongly agree" got the value 5, "almost every day" got the value 6, "two to three times per week" got the value 7, "once a week, a few times per month" got the value 8, "once per month" got the value 9 and "rarely or almost never" got the value 10.

Full anonymity was promised and answers were not traceable. The questionnaire did not address any sensitive information. Participants did not write either their name or identity number. SPSS was used in analyzing the results of this research as well as and Excel.

Results

An independent samples *t* – test was conducted to compare gender and their total score for the variable “Attitude towards brain training apps”, education and “Attitude towards brain training apps” as well as place of residence (Reykjavik or outside Reykjavik) and “Attitude towards brain training apps”.

There was a significant difference between the scores for women ($M = 48.55$, $SD = 7.47$) and those for men ($M = 45.23$, $SD = 3.94$); $t(31.2) = 2.35$, $p = .025$. There was not significant difference between the scores for university education ($M = 47.25$, $SD = 7.80$) and other education ($M = 49.29$, $SD = 5.69$); $t(80) = 1.26$, $p = .211$ and not either between those living in Reykjavík ($M=48.06$, $SD = 7.24$) and those living outside Reykjavík ($M = 47.88$, $SD = 6.80$); $t(80) = .093$, $p = .926$.

These results suggests that women have a more positive attitude towards brain training apps than men and that education from university or other education, living in Reykjavík or outside Reykjavík does not have an effect on their attitude towards brain training apps.

Chi square test was performed to compare answers according to gender and whether they had downloaded brain training apps on their smartphone or not, gender and education and gender and age.

The relationship between gender and downloading was not significant, $X^2(2, N = 161) = 1.24$, $p = .265$. The relationship between gender and education was significant, $X^2(4, N = 171) = 11.06$, $p = .026$ as well as the relationship between gender and age, $X^2(4, N = 171) = 10.52$, $p = .032$.

This results indicates that there is not difference between gender and downloading of brain training apps and that there is difference between gender and type of education and also between gender and their age.

Only 3.5% (n = 6) of all participants did not have a smartphone and therefore did not answer further questions. As seen in Table 2, more than half of the respondents 48% (n = 82) had downloaded brain training apps with the purpose of training memory, attention and other cognitive functions and those who had not did not answer further questions (n = 79). Ten skipped that question. When gender difference was compared, more women had downloaded brain training apps than not, in contrast to men. The majority of men had not downloaded brain training apps.

Table 2
Participants that have or have not downloaded brain training apps training apps and gender difference

	Yes	%	No	%	n
Gender:					
Women	69	53.1	61	46.9	130
Men	13	41.9	18	58.1	31
Total	82		79		161
Missing					10
Age range					
20 – 29	13	8.1	14	8.7	27
30- 39	15	9.3	19	11.8	34
40 - 49	13	8.1	15	9.3	28
50 - 59	34	21.1	19	11.8	53
60 - 65	7	4.4	12	7.5	19

Table 3 shows the apps that respondents had acquired. Solitaire was the most popular app to download (69.3%) and after that Sudoku / Crosswords (64.8%). No one had downloaded Cognifit Brain Fitness.

It was possible to label all the answer options which explains why n is higher than the total of the participants.

Table 3
Participants that had used brain training apps on their smartphone

App	n	%
Solitaire	61	69.3
Sudoku / Crosswords Puzzles	57	64.8
Verbal Confusion	27	36.7
Lumosity	18	20.5
Chess	12	13.6
Other	21	25.6

Others refers to n = 2 or fewer

n = 224

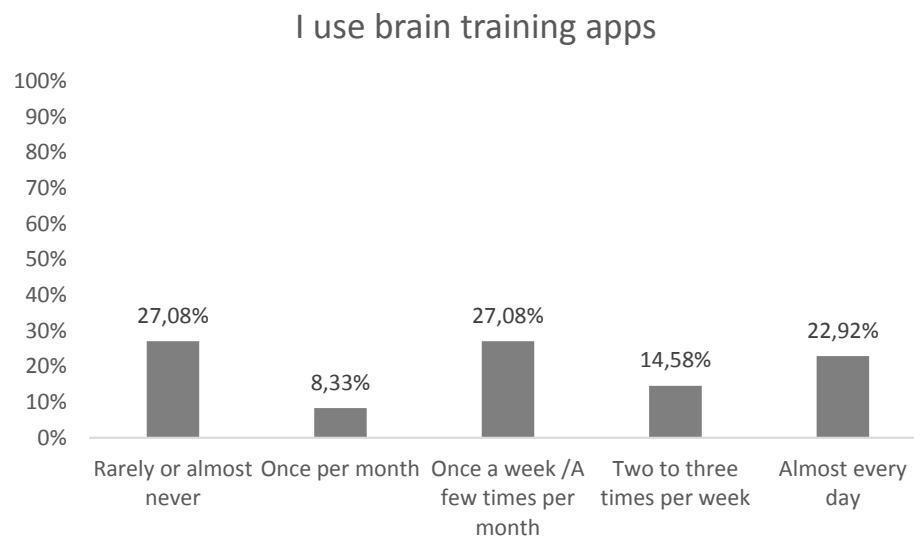


Figure 1: Usage of brain training apps.

It is most common for respondents to use brain training apps once a week /a few times a month and rarely or almost never. Almost one quarter use them every day (22.9%). Ten participants skipped that question.

All the statements averaged over three except for the statement “Brain training apps help me to get more done”. Overall, the 13 statements had a mean of 3.5. This indicates that participants were generally in agreement with the statements and that they were satisfied with their usage of brain training apps. The mean and standard deviation for each statement can be seen in Table 4.

Table 4
The mean and standard deviation for each statement

Statement	M	SD
I think that brain training apps can improve memory in older people	4	0.73
I think that brain training apps can improve memory in middle-aged people	3.9	0.65
I think it is easy to use brain training apps	3.9	1
I think that brain training apps can improve memory in young people	3.8	0.62
I recommend other people to use brain training apps	3.7	0.68
I am pleased that I started to use brain training apps	3.6	0.63
I think that brain training apps have helped me to strengthen my memory	3.3	0.85
I think that brain training apps have helped me to think faster	3.3	0.74
I am pleased with how brain training apps have helped me with thinking (memory, attention)	3.2	0.73
Brain training apps make it possible for me to solve tasks more quickly	3.2	0.74
I think that brain training apps helped me to maintain concentration	3.2	0.83
Brain training apps facilitate my life (school, work)	3.0	0.83
Brain training apps help me to get more done	2.8	0.74

The result of 13 statements which have all the same answer opinion (“Strongly disagree” to “Strongly agree”) was as follows:

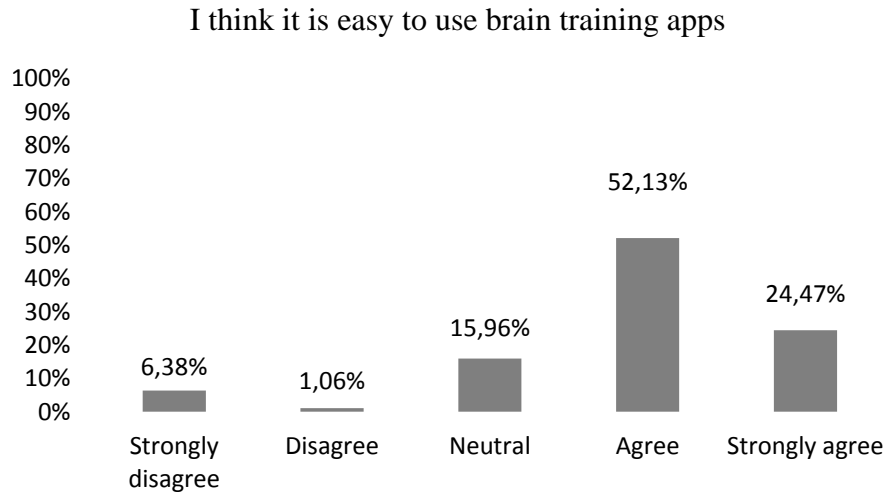


Figure 2. How easy participants think it is to use brain training apps.

More than half think that it is easy to use brain training apps and almost one quarter strongly agree.

The majority of respondents to the statements “I think that brain training apps have helped me to strengthen my memory”, “I think that brain training apps have helped me to think faster” and “Brain training apps facilitate my life (work, school)” answered “neutral” as seen in Figure 3.

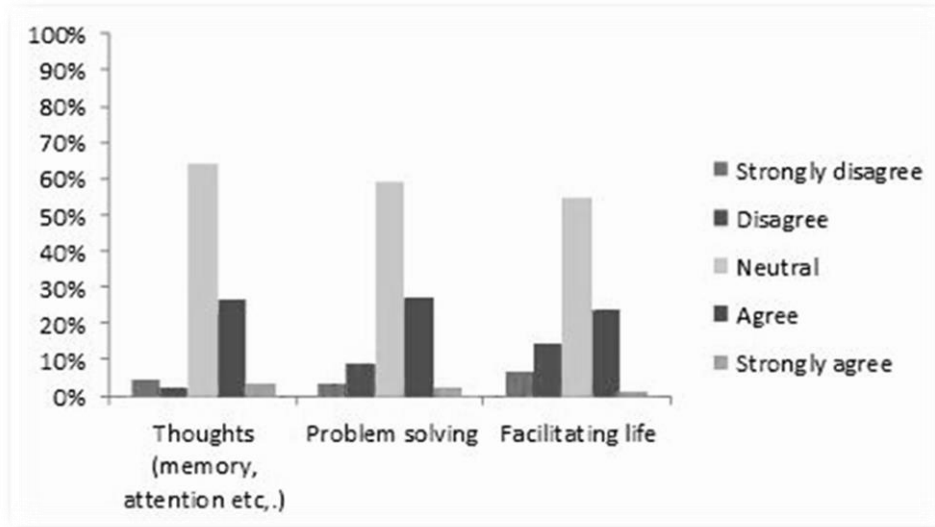


Figure 3. How participants think that brain training apps have helped them with thoughts, faster thinking and facilitating their life.

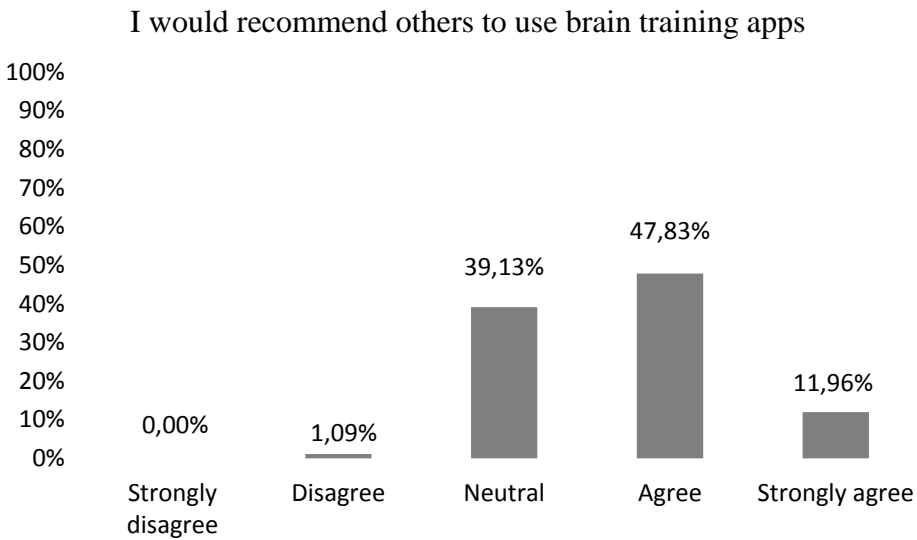


Figure 4. Recommended brain training use.

As seen in Figure 4, almost half of the respondents would recommend others to use brain training apps. Many also answered neutral.

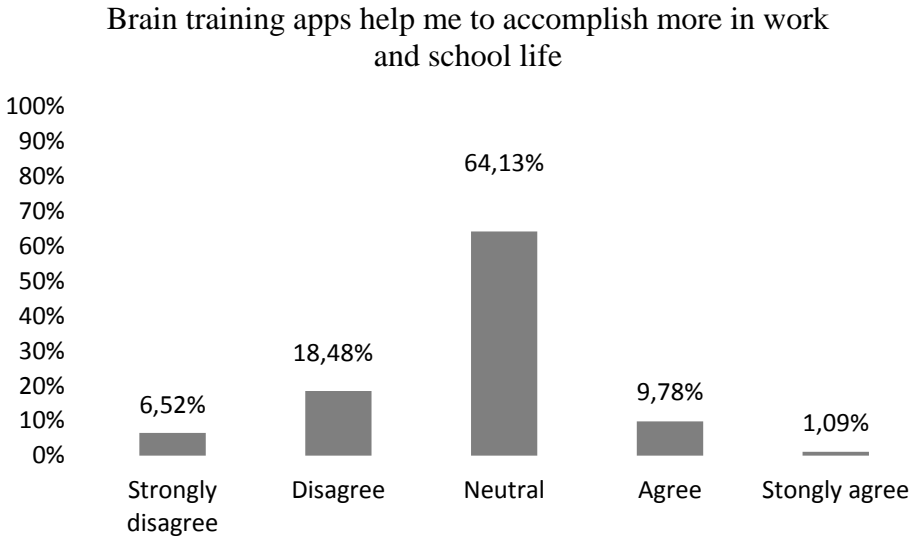


Figure 5. Accomplishment in work and school life.

When looking at Figure 5, most are neutral when answering whether they think that brain training helps them to accomplish more in work and school life.

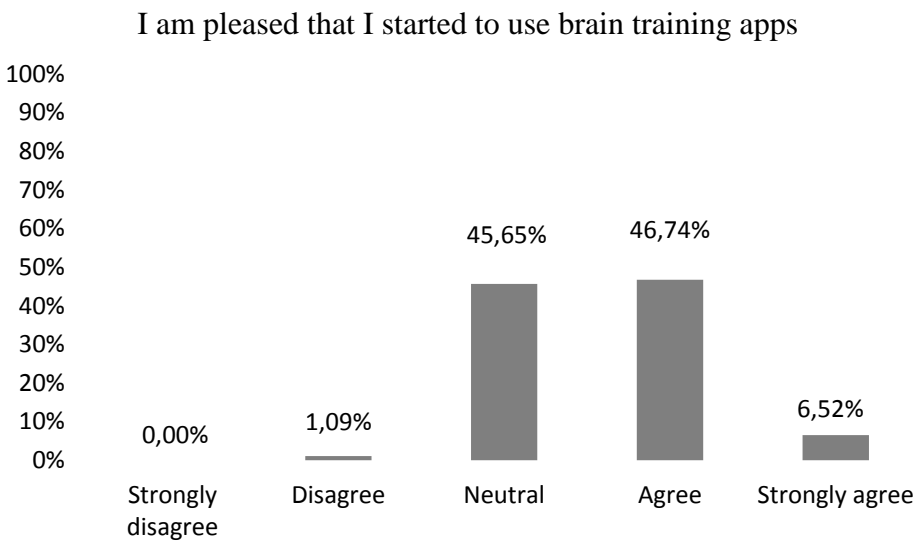


Figure 6. Being pleased or not about brain training apps.

A roughly equal number indicate that they agree or are neutral that they are pleased that they started to use brain training apps as seen in Figure 6.

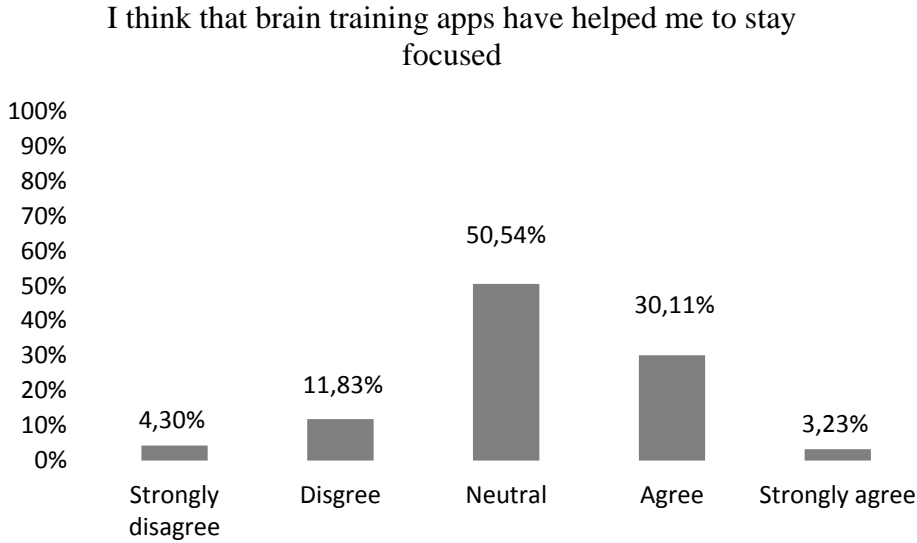


Figure 7. Brain training apps helping to stay focused.

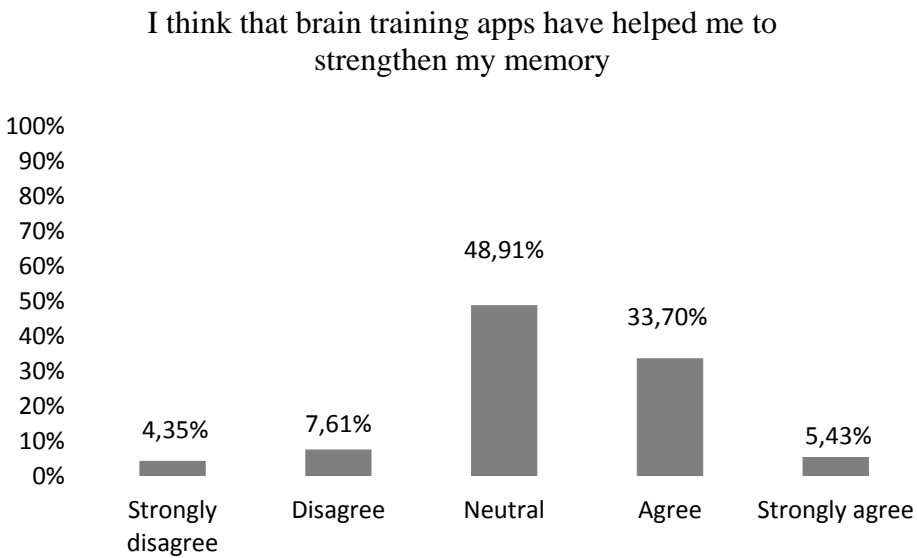


Figure 8. Brain training apps helping to strengthen memory.

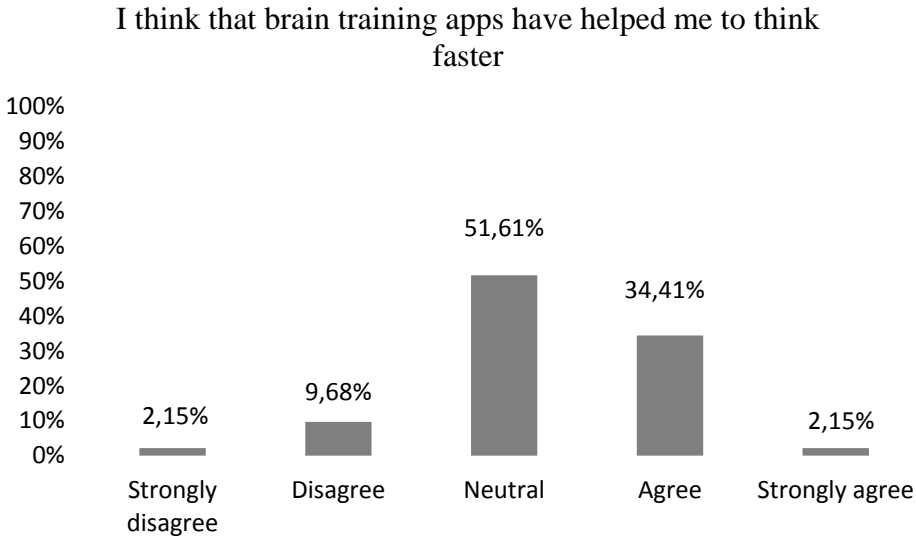


Figure 9. Brain training apps and faster thinking.

As seen on Figure 7, 8 and 9, it is indicated that brain training apps had helped most of the respondents to think faster rather than strengthening their memory or helping them to stay focused. The majority of respondents answered these three statements with “neutral”.

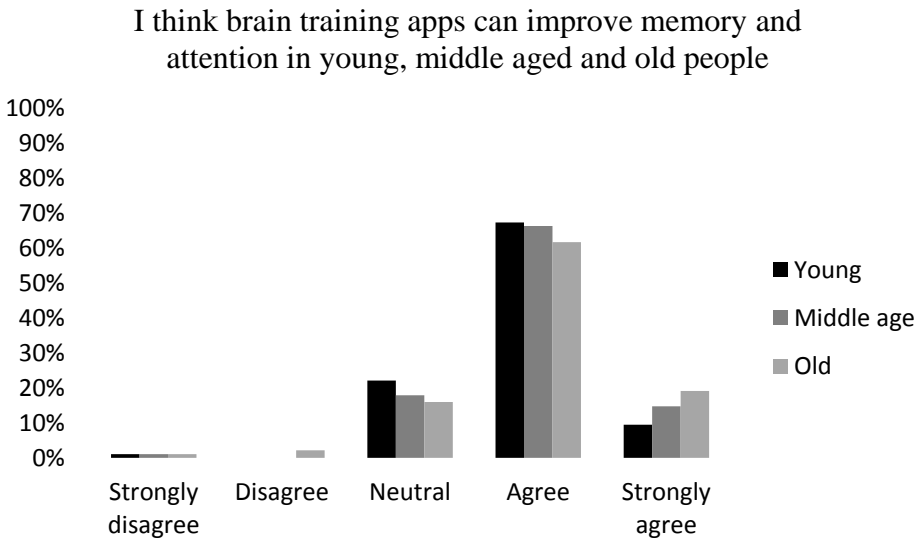


Figure 10. Brain training apps’ usage and improvement of memory and attention in young, middle-aged and old people.

As seen in Figure 10, many think that brain training apps will help to improve memory and attention.

Discussion

The purpose of this research was to find out how many of the convenience sample were trying to train their minds with the help of this new technology (brain training apps), whether participants thought that it helped them, if there was a gender difference/were gender differences and whether this activity was associated with specific age-ranges and educational levels.

The main findings showed that more than half of participants are proficient in some way in using apps that are supposed to help them to strengthen memory, attention and other cognitive skills.

The gender difference was major – 84.2% of women versus 15.8% of men. Women with an average age between 50 - 59 with further education were in the majority of those using brain training apps. Most men had never downloaded brain training apps on their smartphones, but of those who did, the majority were aged between 30 – 39 on average, with a graduate degree or industrial/ occupational education. The smallest percentage groups of respondents were women in the age-range 20 – 29 and men in the age-range 40 – 49. Most participants had downloaded Solitaire on their smartphone and thereafter Sudoku / Crossword Puzzle. It was surprising that so many participants have tried to use brain training apps and that many of them use them quite often.

The most popular answer to most of the questions was „neutral“ which may indicate that people are not aware/sure whether brain training apps have helped them or not or that they do not think about this at all. Many also used the answer option “agree”.

None of the participants answered the statements “I would recommend others to use brain training apps “ and “I am pleased to have started to use brain training apps” with “strongly disagree”, from

which we may presume that they think that the apps may have helped them and that they feel positive about having started to use them. The highest mean was to the statement: “I think that brain training apps could improve memory in older people”, which suggests that they might help this age range more than younger and middle- aged people.

To the author’s best knowledge, this is the first research that has been done on this subject involving the Icelandic population and confirms that brain training apps are widely used among them.

The limitations of this study are few. The questionnaire could have been in more detail - for example, no personal questions were asked about cognitive health or illnesses. As Santanachote reports in his study (2014), people who keep their brain active are in less risk of developing Alzheimer’s disease and mild cognitive impairment and brain training apps are also said to improve cognitive health, according to George and Whitehouse (2011). The questionnaire could also have contained open-ended questions to ascertain, for example, why participants thought that brain training apps helped them.

Most of the participants thought that brain training apps had helped them to think faster rather than strengthening their memory or helping them to stay focused. These findings are not consistent with Kueider (2012) who claims that brain training apps are created to help people to increase and strengthen memory, attention and creativity.

In the future it would be interesting to explore in much more detail how Icelandic people think that brain training apps help them and to work with a bigger sample. It would also be interesting to do similar research on Icelandic people with cognitive impairment, and discover how many of them are using brain training apps and whether they feel that they help them.

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Appendix A

Kæri þátttakandi.

Ég heiti Helga Sunna og ég er að klára BS gráðu í sálfræði við Háskólann í Reykjavík. Ég væri mjögþakklát fyrir ef þú gæfir þér tíma til þess að svara þessum spurningalista sem fjallar um notkun á smáforritum (apps) sem áætlað er að þjálfí minni, athygli og aðra hugræna færni. Það ætti ekki að taka meira en 7 mínútur að svara þessum spurningalista og vek ég athygli á því að öll svör eru órekjanleg.

* 1. Hvert er kyn þitt ?

- Karl
- Kona

* 2. Hver er aldur þinn?

- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60 - 65

3. Hvar á landinu býrð þú ?

- Á höfuðborgarsvæðinu ((Reykjavík, Hafnarfjörður, Seltjarnarnes, Kópavogur, Garðabær/Álftanes, Mosfellsbær, Kjalarnes)
- Fyrir utan höfuðborgarsvæðið

4. Hvert er hæsta menntunarstig sem þú hefur lokið?

- Framhaldsmenntun á háskólastigi (t.d. MS/MBA/PhD/MA)
- Grunnmenntun í háskóla (BA/BS)
- Stúdentspróf
- Iðnmenntun/starfsmenntun/framhaldsskóli (ekki stúdentspróf)
- Grunnskólapróf

* 5. Ég á snjallsíma: (Ef svarið er nei þakka ég þér fyrir þátttökuna).

- Já
- Nei

6. Hefur þú hlaðið niður smáforriti (appi) sem á að þjálfá minni, athygli og aðra hugræna færni í símann þinn? (Ef svarið er nei þakka þér ég þér fyrir þátttökuna).

- Já
- Nei

7. Ég hef notað eftirfarandi smáforrit (app) til að þjálfá minni athygli og aðra hugræna færni: Ef þau eru ekki á listanum, bættu því þá við í annað:

- Lumosity
- Elevate
- Fit Brains Trainer

- Cognifit Brain Fitness
- Brain Trainer Special
- Suduko/Krossgátur
- Orðarugl
- Tafl
- Kapall
- Annað

8. Ég nota heilapjálfunaröpp (apps):

- Á hverjum degi/næstum því á hverjum degi
- Tvisvar til þrisvar í viku
- Einu sinni í viku/nokkrum sinnum í mánuði
- Einu sinni á mánuði
- Sjaldnar/næstum aldrei

9. Hversu sammála/ósammála ertu eftirfarandi fullyrðinum um notkun á heilapjálfunaröppum (apps) og

hugrænni net þjálfun sem þjálfar minni, athygli og aðra hugræna færni (e.brain training apps og web based cognitive training).

Mér finnst auðvelt að nota heilaöpp?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

10. Ég er ánægð með hvernig heilapjálfunaröpp (apps) hafa hjálpað mér með hugsun (t.d. minni, athygli o.fl.þessháttar)

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

11. Heilapjálfunaröpp (apps) gera mér kleift að leysa verkefni fljótari?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

12. Heilapjálfunaröpp (apps) auðvelða mér lífið í leik og starfi?

- Mjög ósammála

- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

13. Heilapjálfunaröpp (apps) hjálpa mér við að koma meiru í verk í leik og starfi?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

14. Ég mæli með því að annað fólk notfæri sér heilapjálfunaröpp (apps)?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

15. Ég er ánægð/ur með að hafa byrjað að nota heilapjálfunaröpp (apps)?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

16. Mér finnst heilapjálfunaröpp (apps) hafa hjálpað mér við að halda einbeitingu?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

17. Mér finnst heilapjálfunaröpp (apps) hafa hjálpað mér við að styrkja minnið?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

18. Mér finnst heilapjálfunaröpp (apps) hafa hjálpað mér við að hugsa hraðar?

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

19. Ég held að heilapjálfunaröpp (apps) geti bætt minni og athygli hjá ungu fólki

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

20. Ég held að heilapjálfunaröpp (apps) geti bætt minni og athygli hjá þeim sem eru miðaldra

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

21. Ég held að heilapjálfunaröpp (apps) geti bætt minni og athygli hjá þeim sem eru aldraðir

- Mjög ósammála
- Ósammála
- Hlutlaus
- Sammála
- Mjög sammála

Appendix B

Kæri þátttakandi

Ég vil byrja á því að þakka þér kærlega fyrir þátttöku þína í tengslum við BS

rannsóknarverkefnið mitt sem fjallaði um notkun á heilaþjálfunaröppum (smáforritum).

Niðurstaða rannsóknarinnar er áhugaverð og sýnir meðal annars framm á að um helmingur þeirra

sem tóku þátt eru virkir að einhverju leiti í því að þjálfa hugann með þeim tilgangi að þjálfa

minni, athygli og aðra hugræna færni. Konur voru í miklum meirihluta í svörum á

spurningalistanum og eru það þær sem eru hvað virkastar í notkuninni. Ef einhverjar spurningar

vakna sem vekur áhuga þinn endilega hafðu samband við mig í gegnum netfangið mitt helgasg12

@ru.is.

Dear participant

I want to start by thanking you for your participation in connection with my BS survey which

was about brain training apps usage. The findings are interesting and shows that about half of

those who participated are active in some way in training the mind with the purpose to train

memory, attention and other cognitive skills. Women were in majority of answering the

questionnaire and they are most active in usage. If you have any questions or are interested in

knowing further results please contact me through my email helgasg12 @ ru.is.