How To Improve Our Cognitive Aging Using Mobile apps

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What is dementia?

Dementia is a chronic deterioration of intellectual function and other cognitive skills severe enough to interface with the ability to perform activities of daily living[1]. It is not a single disease, but a syndrome and more than one type can exist at any one time. It is a known fact that in developed countries, prevalence is 1.5% at age 65 and doubling every 4 years after that age up to 30% at age 80 it is therefor important to search for ways to improve our brain ability to postponed or co-op with these facts.

Main findings in current research

A recently published report[2], funded by the National Institutes of Health, reviews extensive literature on cognitive decline and Alzheimer's disease in search of factors that might delay or prevent these age-related conditions. Of all the factors reviewed, including diet and dietary supplements, physical exercise, social engagement, and other leisure activities, only cognitive training was found to have a high level of evidence for being associated with a decreased risk of cognitive decline. So, if one wants to engage in activities that are known to be associated with a reduced risk of cognitive decline, this report says that cognitive training is the way to do so efficiently. Training with cognitive exercises can improve targeted mental functions, conclude the authors of a review article published recently in the journal Alzheimer's and Dementia. The authors[3] reviewed ten randomized controlled trials involving cognitive training interventions in healthy adults published since 1992. They found that specific abilities

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[1] Merck Manual of Diagnosis & Theraph, 2000

[2] http://www.ahrq.gov/downloads/pub/evidence/pdf/alzheimers/alzcog.pdf

[3] Kathryn Papp and Stephen Walsh from the University of Connecticut and Peter Snyder from Brown University.

such as memory, reasoning, and speed of processing can be improved through targeted training programs. This is an important conclusion, and it is consistent with the growing evidence in support of the effectiveness of cognitive training.

The authors point out that the benefits of cognitive training tends to be specific to the trained domain. If one wants improved memory — train on games designed to improve memory will get results. If one wants an improved attention — train with attention games[4], and so on. It is also clear from this review that there is still a lot that we don't know. Few of the studies have follow-up testing longer than a few months, and many of them lack measures of real-world benefits such as activities of daily living. However, where longer follow-ups and real-world benefits are measured, benefits are seen to be long lasting and quite general. For example, in the active study of cognitive training in normal healthy older adults, benefits to activities of daily living are seen five years after the training intervention ended. While there is still much to learn, the weight of the evidence is showing that cognitive training can be highly effective when properly designed and executed.

There is some new evidence that Alzheimer's disease is *much* more likely for people whose parents both have the neurodegenerative disorder than if only one parent has it[5]. Researchers examined families in which both parents have Alzheimer's, and found that their children ended up with the disease 42% of the time. This finding supports the evidence that genes play an important role in determining whether you end up with Alzheimer's. One of the genetic components responsible for the disease is known as the gene Apolipoprotein E (ApoE).

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[4] http://www.happy-neuron.com/brain-games/attention

[5] http://www.reuters.com/article/2008/03/10/idUSN10448328

Fortunately one's genes do not entirely determine one's fate. One's lifestyle is important too, and although we do not have control on our genetic makeup, we can control how we live. The incidence of Alzheimer's increases with age, and is typically diagnosed after the age of 65. By then, there's not much one can do to slow the disease.

What can one do earlier in life in order to help preserving cognitive function?

I've researched some of the most popular apps stores (Apple[6], Andriod[7] and Palm[8]) and found that there are many types of apps that can help one improve specific skill (e.g. speed of processing, memory, attention etc') but if one wish to start 'training' one's brain on a daily bases in order to prepare for a better future, there are few apps that try to do it more scientifically.

One good example is Lumosity[9]. This company design their game in order to make sure it will cover all the different cognitive functions one want to target. For instance: speed of processing, memory, attention, flexibility, and problem solving. It's giving you a complete solution that seems good both in terms of efficiency (time spent vs improvements in skills) and in a motivation aspects (play against your personal record and/or friends etc').

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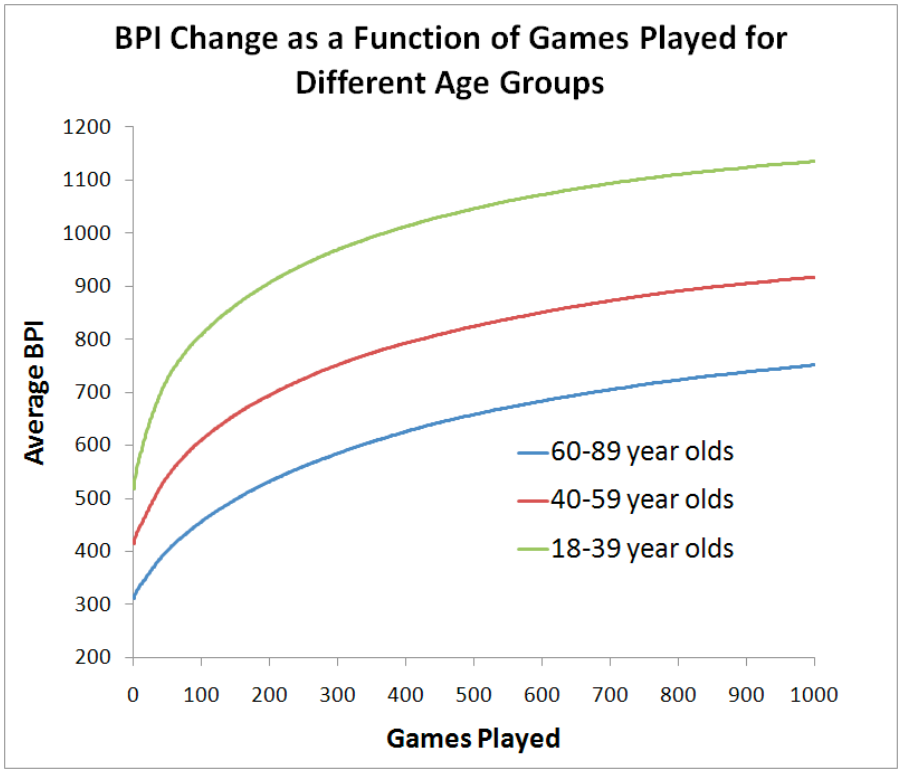
[6] Apple app store - http://www.apple.com/iphone/apps-for-iphone/

[7] Andriod app store - https://market.android.com/

[8] Palm/Hp app store - http://www.palm.com/us/products/software/mobile-applications.html

[9] http://www.lumosity.com



In the graph above you can see that older users started off at lower BPI[10] levels than younger users, but all age groups improved a lot over 1000 games. While initial performance was strongest (on average) in the 18-39 year old cohort, the other groups easily surpass this group's initial performance after substantial training. After 1000 training games, the average 60-89 year old was performing 44% better than the average 18-39 year old was before training.

In my humble opinion, it is clear from the current research that we still don't know much. and there is much more to explore. However, it shows that with the proper cognitive training[11],

[10] BPI - Brain Performance Index is a measure of your performance in a given cognitive function.

[11] Educating the Brain to Avoid Dementia: Can Mental Exercise Prevent Alzheimer Disease? (Margaret Gatz - http://www.ncbi.nlm.nih.gov/pmc/articles/PMC545200/

physical exercise[12], and positive attitude toward life, one can better buffer their brain from later years of cognitive decline and delay the risk of dementia. It seems that we should engage in mentally stimulating activity, on a routine basis, as a way of reducing the risk of dementia. Today, with the growing power of mobile devices that harness us with options to transform 'dead time' (e.g. Standing in the line in the post office) to an useful one. We should recommend people to play less Angry birds[13] and do more 'brain training'.

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[12] WILL A HEALTHY LIFESTYLE HELP PREVENT ALZHEIMER'S DISEASE?
Annual Review of Public Health. Sandra K. Pope, Valorie M. Shue, and Cornelia Beck
http://www.annualreviews.org/doi/abs/10.1146/annurev.publhealth.24.100901.141015

[13] There are 200 million minutes played a day on a global scale - http://www.niemanlab.org/2010/12/i-have-found-the-cognitive-surplus-and-it-hates-pigs/