

# Graceful, Cheerful and Efficient Ageing: Listen to your Grandmother!

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## Abstract

Many of the problems that we experience as we age are, quite simply, associated with bad habits. There are, of course, neurophysiological factors that decline as we age: our bodies wear down, we have less energy, there is less plasticity in our brain and we are more vulnerable to certain kinds of maladies. However, even considering these inevitable age-related declines, poor habit patterns can markedly exacerbate and accelerate these problematic conditions. Neurotherapists who do not attend to these poor habit patterns are likely to have many clients with less than ideal therapy outcomes. By attending to issues such as diet, sleep hygiene, activity levels, socializing, and engaging in purposeful and meaningful activities clients can markedly enrich the quality of the later the years of their lives.

Five decades ago when I was in graduate school a number of the Ph.D. students would joke about what we called Bubbe (Yiddish for 'grandmother') psychology. If your professor couldn't make sense of something, ask your Bubbe for the real scoop!

I was reminded of this when I was writing about two subjects: The first on factors that adversely affect young children's cognitive functioning (Swingle, in submission) and the second on factors that affect the elderly. It seemed apparent that what my grandmother told me as a child (e.g., "eat your broccoli!") was also very good advice for me in my advanced years of life. Further, just as we are medicating normal children's behavior, an absolute outrage in my opinion, we are doing the same with elders.

What did my Grandmother tell me when I was a young child that is now useful advice in old age? Well, first she said, "Get your duff off the sofa!" Which happens to be very good advice for seniors. In a 2012 article in the journal *Neurobiology of Aging* (Fiocco et al, 2012) it was pointed out that a sure recipe for cognitive decline is salt and inactivity. In a three-year study of more than 1,200 older adults with normal cognitive function at outset, researchers found that a high intake of sodium combined with low levels of physical activity was associated with a decline in global cognitive functioning. The authors go on to say that exercise may help immunize the brain against some of the adverse effects of higher sodium intake. So as Grandma pointed out, lying on the couch eating potato chips is not a good idea for young children; and it is certainly not a good idea for us seniors.

The second part of Grandma's advice with regard to "off the sofa" was "and go outside and play!" The data relevant to this aspect of Grandma's advice is very straightforward. Katzmarzyk & Lee (2012) report that the relative risk for all-cause mortality was about 45% higher for individuals sitting more than six hours per day compared with those who sat less than three hours per day. Further, watching TV for less than two hours per day increases life expectancy by about 1.4 years.

It is important to keep in mind that sitting for six hours per day does not only implicate those who are sitting watching TV. Those of us who continue to work well into our old age should remember that it is unwise to sit behind a desk for long periods of time. The recommendations are quite straightforward - one should get up about every hour and walk around for five minutes.

Walking actually affects subcortical structures in the brain. Colcombe (et al, 2006) took a sample of 120 older adults without dementia who had been sedentary for the previous six months and gave a portion of them a walking regime. Those who were given the walking regimen showed about a 2% increase in hippocampal volume compared with a contrast condition, where there was about a 1.5% decrease.

“Get a move on!” is also a favorite admonition of grandmothers around the world. And it is very good advice indeed. A seven year follow up in a study of 2,340 seniors (mean age 74) found that deaths among slow walkers were almost three times greater than among fast walkers (>150ft./minute) (Odden, Peralta, Haan, & Covinsky, 2012). In another study (Bridenbaugh & Kressiq, 2013), with a group of 1,153 older men (mean age 77), it was found that cognitive impairment progressed as walking gait slowed.

And when you walked Grandma always said “stand up straight!” Again, very good advice. Walking in a slouched position markedly decreases self-reported energy levels; particularly for those in a depressed mood state (Peper & Lin, 2012).

Grandma was also sure to remind me to “eat your broccoli!” Again, useful advice at all of life’s stages. Haverman-Nies & DeGroot (2003) conducted longitudinal research with about 2,200 seniors (70-75 years) exploring the effects of diet and activity on both vital and subjective well-being. Poor diet increased the occurrence of death by 1.2 in males and 1.3 in females. Inactivity increased the odds by 1.4 in males and 1.8 in females. Interestingly, inactive males were far more likely to rate their health as poor (odds ratio 2.8) as contrasted with females (odds ratio .8) even though inactive females had higher odds of death when inactive. These data again point to the major importance of activity for health with elderly clients.

Sleep was a big issue with Grandma. Her advice was on both ends of the sleep cycle; specifically, “go to bed!” and “get your lazy duff out of bed!” About 50% of seniors report sleep problems and those taking prescription sleep medications are at risk of slowing brainwave peak frequency which is associated with cognitive inefficiencies. Adequate sleep architecture is as critical in old age as it is with younger people. Memory is directly related to adequate slow wave sleep in the elderly (Oudiette, Antony, Creery, & Paller, 2013). However, for the present discussion, it is Grandma’s “get out of bed” admonition that is of primary concern. Over sleeping is associated with many health issues (Ohayon et al, 2013). Higher mortality rate (Kim et al, 2013), depression, cognitive inefficiencies, and many adverse health conditions are correlated with excessive sleep in elderly clients.

Several decades ago, when I was at the University of Ottawa, I maintained a small private practice. Being at the seat of the federal government I had many clients who were civil servants. Working for the government is apparently a depressing ordeal in itself (Virtanen, Stansfeld, Fuhrer, Ferrie, & Kivimaki, 2012); those who worked longer hours in government were twice as likely to be depressed compared with those who worked a mere 7-8 hour days!

Many of my clients were dissatisfied, worn-out, or downright unhappy in their present jobs and their retirement was conceptualized as moving out of something rather than into something. I observed a trend indicating that having a sense of purpose and goal direction in daily activities was critical for individuals transitioning into their retirement years. Clients who look forward to retirement as an escape from their present condition did not thrive well. Those who had very definitive plans for purposeful and goal directed retirement activities did very well indeed. I had clients who: started businesses; pursued long desired avocations such as music, writing and art; and those who had detailed plans for adventurous travel.

Those unhappy clients who looked forward to a break from their humdrum unfulfilling day-to-day jobs, but did not have any clear picture of what their retirement would be like, did not fare well at all. In fact, I do not think it is unreasonable to say that the “lights went out” in about 18 months either figuratively or vitally. I recall one such client who responded to my query about what his retirements plans were with the statement that he looked forward to pursuing his hobby. His hobby was wine collection! Now I admit I know virtually nothing about this activity, but all I could visualize was my client sitting in his wine cellar reading a “wine collector” journal and falling asleep after his daily round of tastings!

The data are quite clear about this matter. Boyle, Barns, Buchman, and Bennet (2009) used data from about 1,200 elders with an average age about 78 years. Self-rated purpose of life correlated negatively with self-rated depression ( $-.32, p < .001$ ), as one might expect. However, controlling for self-rated depression and a number of other variables, purpose of life was associated with a substantially reduced risk of death; specifically, the hazard rate of a person with a high purpose of life score was about 57% of the hazard rate for a person with a low (10<sup>th</sup> percentile) purpose of life score.

At upper senior age levels we see some variations in trends. Internet Addiction (IA) is a good example. In general, excessive internet use (addiction) is a severe condition that has many negative consequences including increased risk of suicide, obesity, loss of job, marital break-up, financial problems, depression, expulsion from school, and severe sleep disturbances (Swingle, 2013). Seniors are vulnerable to IA and such activities can lead to reduction in socializing, physically activity and poor sleep habits.

However, for seniors in their mid to late eighties, social isolation is a severe problem. Depression increases steadily from a low for people in their forties to highest levels for seniors in their eighties. Dr. Shelia Cotton, a sociologist at the University of Alabama, studied data from about 8,000 seniors. She reports the findings showed that prevalence of depression increased from a rate of 5% at the age of 70 to approximately 13% at the age of 85. Depression at this age is associated with social isolation,

loneliness and lack of emotional support. Dr. Cotton found that seniors who regularly use the Internet for social networking were nearly one-third less likely to meet the criteria for depression when compared to socially isolated seniors who did not use the Internet.

Several other factors are of great importance on the issue of retirement, dementia, and depression. Alcohol is a depressant and despite all the efforts to promote ethanol as a useful dietary supplement, there is no convincing evidence for benefit at any level of use. Alcohol use leads to depression and depression leads to alcohol use. Alcohol use leading to life dissatisfaction is a stronger relationship than the reverse (Koivumaa-Honkanen et al, 2014).

Further, recent data indicate that even Blood Alcohol Content (BAC) of 0.01 has a significant cognitively impairing effect. Motor vehicle accident data (Phillips et al, 2014) indicate that drivers with a BAC of 0.01 were 46% more likely to be officially and solely blamed by accident investigators than were drivers with 0.0 BAC. So, to repeat the therapist's mantra, all things in moderation; but elderly clients need to know that their cognitive functioning is affected at very low levels of alcohol consumption. Further, clients who retire without proposed purposeful activity are at significant risk of "retiring into the bottle."

## Neurotherapy

As the above data indicate, neurotherapy is not a stand-alone discipline. To be an effective neurotherapist one must have clinical credentials. One-size-fits-all and symptom-dictated treatments are, simply stated, inefficient. Worse are the one-size-fits-all franchises where "certification" requires warm blood and a cheque-book.

The best advice, from Grandma or otherwise, is do not remove your clinical hat when you commence neurotherapy. As the data on the elderly point out there are a great many habit patterns that can have marked detrimental effects on all aspects of life. Attending to these concomitantly with neurotherapy is essential for effective treatment of our elderly clients.

## Case Study: Sally, age 79.

Sally came for treatment at the urging of her daughter. At the initial intake session, Sally indicated that she thought she was having some memory difficulties and her sleep wasn't as good as she thought it could be. The summary data from Sally's ClinicalQ assessment are shown in Figure 1.

The ClinicalQ (Swingle, 2010 a,b) EEG assessment measures brainwave activity at five sites (Cz, O1, F3, F4 & Fz) and requires about 6 ½ minutes of recording time. Remarkable features of the ClinicalQ are identified from a clinical rather than a normative data base. The remarkable features of Sally's ClinicalQ are highlighted in red.

Sally's EEG shows a common pattern that we see with elderly clients who complain of problems with memory and sleep. However there are several other features of Sally's EEG that are important. At location Cz we see there is a mild elevation of the Theta/Beta ratio. Although mild, this may indicate that Sally would admit to some problems with sustaining focus. However, Sally's focus problems are much more likely to be associated with several other remarkable EEG features.

<u>Cz</u>	<u>x <math>\Theta/\beta</math></u>	<u>R <math>\Theta/\beta</math></u>	<u><math>\alpha\uparrow</math></u>	<u>OMNI</u>	<u>TA</u>
	<b>2.43</b>	2.12	42.8%	12.5	47.0
<u>O1</u>	<u><math>\Theta/\beta</math> O</u>	<u><math>\Theta/\beta</math> C</u>	<u><math>\alpha\uparrow</math></u>		
	<b>1.38</b>	<b>1.17</b>	67.1%		
	<u><math>\Theta</math></u>	<u><math>\alpha</math></u>	<u><math>\beta</math></u>	<u><math>\Theta/\beta</math></u>	<u><math>\Theta/\alpha</math></u>
<b>F4</b>	17.5	13.4	<b>16.2</b>	1.08	1.30
<b>F3</b>	18.9	14.4	10.1	1.87	1.31
<b>F4&gt;F3% <math>\Theta = -8.0</math> <math>\alpha = -7.0</math> <math>\beta = 60.0</math></b>					
<b>Fz</b>	<u>Dz</u>	<u>H<math>\beta/\beta</math></u>	<u>L/H</u>		
	<b>14.8</b>	0.52	<b>2.88</b>		

**Figure 1. Sally, female, 79 years old**

Far more important than the mild elevation in the Theta/Beta ratio at Cz is the EEG pattern we see at location O1. Sally’s Eyes Open (EO) Theta/Beta ratio is 1.38 whereas the normative range is between 1.80 and 2.20. The Eyes Closed (EC) Theta/Beta ratio (1.17) is quite a bit below the EO which is a marker for sleep quality problems. Deficient Theta/Beta ratio at O1 is associated with client complaints of poor stress tolerance, anxiety, sleep quality problems, problems with focus, mind chatter, and self-medicating behavior.

Sally also shows a substantial marker for predisposition to depression. F4 Beta is 60% greater in amplitude as compared with F3. In the frontal regions we want to see all brainwave amplitudes balanced between F4 and F3 (less than about 15% difference).

There are two other remarkable features in Sally’s ClinicalQ. In the frontal region we see an elevation in the amplitude of Delta and a slowing of Alpha. The ratio of slow Alpha (8-9 Hz) to fast Alpha (11-12 Hz) amplitudes is 2.88. Ratios above about 1.50 are generally associated with client complaints of cognitive inefficiencies.

Based on the ClinicalQ, Sally was asked about her sleep, depressed mood states, level of anxiety, and cognitive efficiency, including memory. Sally admitted to having sleep problems, and felt that she was more anxious than “I used to be.”

She then asked her daughter to leave the room at which time she admitted to being very depressed and sleeping during the day although her night sleep was very disturbed. She said she required a “long-time” to fall asleep. Sally also denied that she was taking any prescription medications. Given Sally’s low Theta/Beta at location Cz, the elevated Delta at Fz, and her high Alpha density ratio I asked her about self-medicating behavior. Many clients with EEG profiles similar to Sally’s will deny any prescription medication use although upon probing it is revealed that they are using over-the-counter pain medications and, in particular, alcohol. Sally became tearful and acknowledged that she was very lonely

and depressed and had started taking a little brandy to calm her nerves and help her sleep. She then found that her “night-time nip” had increased to a “worrisome” level.

Sally lived by herself. She valued her independence and felt that, in general, she was making out quite well. She repeated several times that she did not want to become a burden for her daughter. However, Sally was very lonely and her activity level had decreased quite markedly. I believe it was this factor that led her daughter to bring Sally in to the clinic.

There are many aspects to successful treatment for Sally’s condition. Neurotherapy, although important, was only one of many factors that had to be addressed. As I often say, “the neurology is the simple part.” I asked Sally’s permission to bring her daughter into the conversation. Sally agreed and we had a nice long chat about what Grandma’s advice would be to improve Sally’s quality-of-life. As the reader may surmise this included issues such as increasing daytime social activities, exercise, proper diet, routine check-in’s with her daughter, and proper sleep hygiene.

Now if we had followed a symptom-based neurotherapeutic protocol we would likely have simply increased Alpha peak frequency (Angelakis et al, 2007) to address the issue of cognitive inefficiency. Sally’s neurotherapeutic treatment at the clinic did include improving the slow to fast Alpha ratio. However, although this simple protocol would certainly have given rise to improvement in Sally’s condition the other factors contributing to Sally’s deteriorating quality of life would not have been addressed.

After Sally received a course of treatment addressing the remarkable features shown above, we provided her with a sleep monitor to measure sleep activity over a four night period. By the time of the assessment, Sally had diligently attended to proper sleep hygiene; going to bed at 11 PM and getting up at 7 AM. Her sleep was mildly deficient in deep wave duration but adequate for REM duration. Sally admitted to continuing difficulty with alcohol, which was a likely cause of the deep sleep deficiency. We discussed the possibility of a short stay in a local rehabilitation center that has a good record for helping elderly clients. At the time of this writing Sally is considering this possibility.

Finally, I summarized a few things for Sally. Findings from the Mayo Clinic study on aging (participants between 70 and 89 Years of age) show that activity such as reading books, playing games and participating in crafts was linked to a 30 to 50% decreased risk of developing Cognitive Impairment (CI). Elderly people who watch television less than four hours a day were 50% less likely to develop CI. And those elderly who were socially active and read magazines during middle-age were 42% less likely to develop CI (Geda, 2009).

Finally, as reported in the British Medical Journal in 2012, lifestyle improvements improve longevity even into old age (>75 years of age). Physical activities such as swimming, walking or gymnastics were strongly related to longevity. Elderly who regularly engaged in these activities had a median age of death two years older than nonparticipants. Elderly who participated in one or more leisure activities and had a good social network had a median survival of 5.4 years greater than those with no leisure activities and poor social network (Rizzuto, Orsini, Qiu, Wang, & Fratiglioni, 2012).

So, certainly treat the neurological conditions, identified by the ClinicalQ, aggressively with neurotherapy. But, heed Bubbe’s advice!

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