

## SEVEN FACTORS OF HAPPINESS AND HOLISTIC APPROACH TO HAPPINESS AMONG SENIOR CITIZENS IN BULACAN PROVINCE, PHILIPPINES

**Author Name:** Dr. Victoria Valenzuela, Mr. Joseph H. Batac

**Affiliation:** 1. DPA, FRIPA Bulacan State University  
2. MDM La Consolacion University, Philippines

**E-Mail:** [victoria.valenzuela@bulsu.edu.ph](mailto:victoria.valenzuela@bulsu.edu.ph)

### Abstract

Everyone is searching for ways to be happy. Happiness is the greater desire of all elderly and senior citizens. The word happiness derives from the word for luck, as in “happenstance” with two different meanings: hedonic and eudaemonic. Hedonic happiness refers to maximizing pleasure and minimizing pain that tends to be characterized as momentary or superficial while eudaemonic happiness is more of psychological well-being in line with fulfilling life. The purpose of the study is to measure the relationship of the 7F factors of happiness and happiness of the senior citizens. The study is based on the primary data collected with the help of the standardized questionnaire from Oxford University to measure the happiness of senior citizens and self-developed questionnaire to assess the 7F factors of happiness of senior citizens namely: food, fitness, feelings, family, faculty, friend, and faith. It was found from the study that all factors namely: friend, faculty, food, and family are positively and significantly related to happiness of senior citizens. Study also highlights the fact that the highest contributing factor in happiness among senior citizens is friend followed by faculty, while the least contributing factor in happiness among senior citizens is the family factor.

**Keywords :** Senior citizens, 7F factors of happiness, holistic approach to happiness

### INTRODUCTION:

In the ten-year period from 2000 to 2010, the demographic destiny of Bulacan province indicates a 2.2% per annum population growth rate of those 60 years old and over. In the same time period, the growth rate of those age 14 years old and below is at -1.1% per annum. This trend is validated by the declining population growth rate of the province, from 4.81% per annum in the year 2000 to 2.28% per annum in 2015. Parallel to this trend is the declining share of the population 14 years old and under, from 35.3% in 2000 to 31.4% in 2015, while for those 60 years old and over, there was the increase from 5.5% in 2000 to 6.6% in 2015. The provincial population is living longer while birth rate is going down. If these trends persist, by 2044 or 25 years from now, there will be more Senior Citizens than those 14 years old and below, with those 60 years old and over comprising approximately 21% of the provincial population. Given a 2015 total provincial population of 3,292,071, those ages 60 years old and over, collectively known Senior Citizens are at 385,133 persons, representing 12% of the population. There are 164,849 males and 230,284 females. The higher number of female than male is not surprising since as of 2017, life expectancy of females in the Philippines is 75 years, higher than the male at 67 years. To provide some comparative data, the demographics of Bulacan is compared to the country level data, those in selected South East Asian countries, and from South Korea and Japan:

Geographical Scope	% of Population 60 years old and over, 2015	% of Population 65 years old and over, 2018	Fertility Rate	Male Life Expectancy	Female Life Expectance
Bulacan Province	12%	No data	No data	No data	No data
Philippines	7.3%	5%	2.6	67	75
Thailand	15.8%	12%	1.5	73	80
Vietnam	10.3%	7%	2.0	71	79
Indonesia	8.2%	6%	2.3	69	74
Cambodia	6.8%	5%	2.5	67	71
China	17.3%	11%	1.7	74	79
Japan	33.0%	28%	1.4	81	87
South Korea	18.5%	14%	1.1	80	86
Singapore	17.9%	11%	1.2	81	85

Source of Data: Help Age International, Singapore and South Korea Statistics Office and World Bank Database

The United Nations World Health Organization (WHO) defines an aging society with 7% or more of the population to be elderly– those 65 years old and over. An aged society would be those with 14% or more of the population to be elderly. Those with 20% or more of the population to be elderly are considered as super-aged population. Japan is a super aged society. South Korea, Thailand, China and Singapore are around the aged society. Vietnam is an aging society. Indonesia, Cambodia and the Philippines are not yet an aging society.

From the WHO definition, Bulacan province is within the range of an aging society. Aging is taking place in Bulacan province and the policy implications for the future have multidimensional challenges – from the way the urban and rural areas are designed to consider the productivity and the mobility of the aging population, the types and sources of food during old age to continue productivity and delay if not reverse debilitating conditions, to preventive health initiatives that addresses infirmities of older people, and overall quest for growth considering the quality of life of both the old and the rest of the population. The fiscal resources of the province will increasingly address the unique needs of the growing older population with appropriate interventions at this time. This will compete with the limited fiscal resources of the

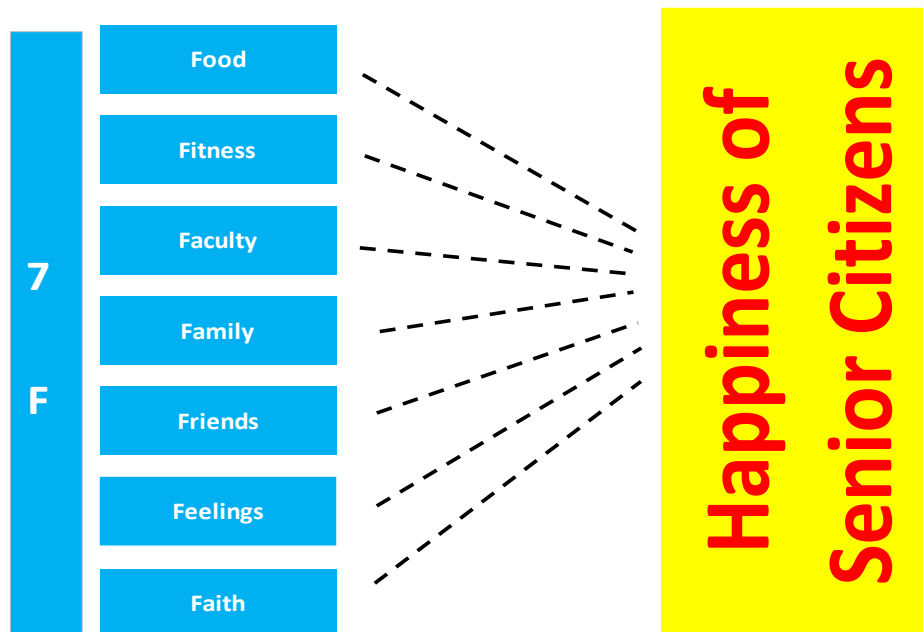
province. Understanding these needs and challenges are essential for public policy to be effective and impactful.

### **FORMULATION OF THE PROGRAM FRAMEWORK**

As in any other provincial local government organization in the Philippines, the social welfare support to the aging population is the mandate of the Provincial Social Welfare Support Office, PSWDO. The Bulacan PSWDO supports two civic organizations who represent the constituency of those 60 years old and over. These are the Office of Senior Citizens Association or OSCA and the Federation of Senior Citizens Association of the Philippines, FSCAP Bulacan Chapter. In both organizations, there are no plan or strategy documents that lay out or provide details on addressing the different dimensions associated with aging.

The Bulacan provincePSWD supports are mostly in health interventions such as medical check-up and assistive device distribution, those that promotes movements such as dancing and local travels, social pension for the indigent – thosenior citizens without family and formal pension supports, and cash incentives for centenarians. Much like the two provincial level organizations of senior citizens, there is no plan or strategy documents to address an aging society. At the country level, a plan of action on aging was published in 2010 and has three focus areas: senior citizens and development, advancing health and wellbeing into old age, and, ensuring supportive and enabling environment. Happiness is not included as a variable of concern, although there are some relations to it such as active aging and well-being. Also, the predominant character of published researches on aging in the Philippines is qualitative. In Singapore, the content of the state interventions is on successful or positive aging, looking at variables on health, community support and even religion. For Japan, since 2007, there is the Japanese Study of Aging and Retirement (JSTAR) which looks at the economic, social and health conditions of the elderly. The survey has more than 35 questions which includes the aspects of religious activities. In South Korea, active aging is the predominant policy that looks at employment, participation in society and independent living. Thus far, there are three main themes that characterizes aging in Asia and Southeast Asia: successful or positive, active and wellbeing. In addition to these themes, at the global level, there are themes on longevity that focuses on three themes: food intake, physical activity and social support with researches on five locations in the world with a large population of old people (Blue Zones). At the global level, the World Health Organization, WHO, has health as the main theme of their aging studies. The United Nations has an annual World Happiness Report but with sampling across the population. With these different themes, the South East Asian themes are more relevant to those in Bulacan province, considering seven independent variables and using happiness as the dependent

variable. The following framework is proposed for Bulacan province:



**Figure 1. Conceptual Model of the Study**

With this proposed framework, two sets of questionnaires were prepared – one for the dependent variable of happiness and the other for the seven independent variables. There is no published literature on happiness and aging in the Philippines. At the global level, there is only one paper on it, a review of the literature on happiness in aging.

For the dependent variable, the Oxford Happiness Questionnaire is proposed to be used, translated in the local vernacular. There are 29 questions in the Oxford Happiness Questionnaire with 1 to 6 Licker scale, considered as an interval data. For the independent variables, the bases for the questions are on the recent, relevant literature.

The current or the baseline level of happiness will be determined in order to provide a benchmark conditions before any intervention is undertaken from among the 7F. The Oxford Happiness Questionnaire was chosen since this is designed as an objective assessment whose internal validity and reliability is already established (and therefore the Cronbach Alpha value is already robust). This is Annex B. The translation to the local vernacular was undertaken with technical validation from the BSU.

Currently, there are no survey instruments for the happiness of Senior Citizensthat had been used in Bulacan province and for that matter, for the entire Philippines, that is quantitative in nature. As mentioned earlier, for the Philippines, the predominant studies on aging are qualitative in nature. Thus, this study represents a different and unique approach in designing

the intervention program on aging.

A review of the literature on the seven independent variables was undertaken. The initial results are presented herein, considering over one hundred relevant literature that is provided in the attachment.

### **Food Intake**

Forgetfulness, usually termed as ‘senior moments’ is a common characteristic of a person who are getting old. These lapses in memory are indications that some level of cognitive impairment has set in. Physiological studies showed that one of the main reasons for this is the lack of energy food intake of the brain (Ludwig et al 2018) with fat being more of the preferred source of energy for older people rather than the usual source which is glucose.

Before the advent of agriculture, human beings relied mostly on fats for most of the year rather than sugar or glucose which comes from fruits in the summer season.

However, predominant reliance on fat for brain energy is contradicted by studies on those living in six Blue Zone locations (Sardinia Italy, Lola Linda California, Okinawa Japan, Nicoya Peninsula Costa Rica and Ikaria Greece), or areas where people has 10 times the likelihood of living up to 100 years old. In Okinawa Japan, root crops like sweet potato are high in their diet. In Sardinia Italy and Ikaria Greece, pasta is made from whole grains which is carbohydrate (Buettner and Skemp 2016, Anastaciou et al 2017, Titova et al 2013, Loughrey 2017).

Both Sardinia Italy and Ikaria Greece have the Mediterranean diet with fish as the predominant protein source with good fat – omega 3 fatty acid, combined with vegetables as source of complex carbohydrates. Studies have shown that a fish-based diet, especially those rich in specific nutrients (omega 3 fatty acid) have benefits for old people (Cunane and Crawford 2013, Raji et al 2014, Dennis et al 2015, and Kulzow, et al 2016).

Taken by itself, a diet that is high in good quality fats have shown to counter mild cognitive impairment and other neurodegenerative diseases that is associated with aging, although the findings have been mixed (Croteau et al 2018, Taylor 2018, Lange et al 2017, Nonaka et al 2016, Courchesne-Lauer et al 2016, Cunnane et al 2016, Rebello et al 2014). Studies have also shown some positive and some side effects of the high fat diet on cardiovascular diseases, diabetes and obesity (Kosinski 2017). Also, there are studies indicating adverse and mixed results of the effects on skeletal functions of a diet high in fats (Simm et al 2017, Ding et al 2018, and Rauch et al 2014). This may not be favorable to older people whose skeletal functions may be impaired during old age.

Unlike our human ancestors in a society of hunting and gathering for food from nature, today, access to food has a 24/7 convenience and affordability from those that are available in the local

neighborhood karindaria to exotic, fine dining experience in luxury places. For older people especially those living with unpredictable income, mostly depending on the benevolence of their family, friends or neighbors, the quality and quantity of food are matters of concern. However, studies have shown that reduction in calorie intake or fasting intermittently has favorable effects on brain functions (Vasconsuelos et al 2018) and in heart conditions (Manzareno et al 2014). In human studies, intermittent fasting has shown to improve health and longevity (Ravussin et al 2015, Longo 2018). However, intermittent fasting and calorie restrictions maybe difficult for senior citizens.

Among the most commonly available food that is easily accessible is egg. Studies have shown that there is no relationship of egg consumption by older people to cardio vascular disease and diabetes (Miranda et al, and Djousse, et al 2010). Given that egg has both protein and healthy fat, a diet with eggs can be considered as part of the diet in aging population. Eggs have acetylcholine which is needed for neurotransmission to be active in old age (Gutchess 2019).

### **Fitness**

Old age comes with several diseases that are affecting physical and mental health such as diabetes, heart disease, cancer and neurological diseases such as Alzheimer's and Parkinson's. Although the quality and quantity of food intake can be modified to slow down and even reverse or cure diseases of old age, all by itself, food as a medicine takes time and will only bring efficacy if taken with the other aspects of the maintain the good functioning of the whole human physiology in old age. For one, recent researches have shown that having a good amount of sleep, in both quality and quantity, is a major factor that can potentially bring favorable health outcomes to senior citizens (Koyanagi et al 2019, Aker et al 2018,

Navarro-Sanchis 2017, Lee et al 2016, Lopez Virgen et al 2015, and Joo et al 2014). However, too much sleep, especially those taken during day time or afternoon siesta is a character that are inherent in old people indicating the possible on set of dementia.

Physical exercise, in the right quality, quantity and timing, is another important area where recent researches have also shown that this can bring favorable health outcomes to senior citizens. The studies were in aerobics (Kandola 2016), sustained form of aerobics in rat studies (Nokia et al 2016), running (Trincherro 2017 and Farioli-Vecchoili 2014), low (Varma et al 2015), medium (DelleFave et al 2018) and high intensity exercises (So et al 2017). However, in older people, there is always a tendency for the body movement to slow down with a range of reasons – from a psychosomatic mind set to the onset of osteoporosis. Also, in old age, the lower part of the body tends to be the one to become weaker at an earlier stage (sarcopenia) and therefore care should be taken to prevent falls. Uneven gait and/or a slower pace of

walking are signs of the onset of skeletal dysfunction in old age. The appropriate exercise to address these conditions in old age through physical therapy can be undertaken with the supervision of gerontologists.

The aspect of dental health is also important to senior citizens as the loss of tooth/teeth can limit the consumption of nutrition from meat, fruits and vegetables (Raphael 2017, Lunuma 2014). Studies have shown that diseases such as Alzheimer's starts from the lack of dental hygiene (ibid, Fife 2011). However, limiting food intake to liquid to semi solid conditions is difficult to sustain at the same time there is the compromises in the flavors and freshness of the nutrients.

### **Feelings and Family**

Old age comes with feeling of depression, stress and even schizophrenia, all of which are brain related diseases, accompanied by decline in cognitive function and motor movement. To address them, there are psychological and/or physiological interventions but their access to senior citizens are limited, on top of considering the affordability of the cost of diagnosis and thereafter, the treatment that comes with given the limited or absence of predictable earnings due to unemployment during old age. In the absence of formal professional interventions by medical doctors and psychologists, senior citizens can feel some level of happiness when family members, their friends and acquaintances extend sincere physical embraces and hugs, affectionate kisses and other actions showing tenderness, love and care. The quantity and timing of these interactions are not predictable as most of those who accompany or live with senior citizens are busy with being employed to earn income and cover for expenses. There are senior citizens who are left alone up to a point where their mobility is compromised due to infirmities.

Researches and studies have shown that these actions – embraces, hugs and kisses are able to stimulate the production of two hormones: oxytocin (Schwaiger et al 2019, Tully et al 2018, Lin et al 2017, Leuner et al 2016, Tadjibaev 2013 and serotonin (Song et al 2017, Segi-Nishida 2017). These hormones are produced in the brain for resilience (Kang et al 2016, Pfau and Russo 2015, Levone et al 2014). A study shows that senior citizens are more emotional persons and therefore indicate that the parts of the brain that produces these hormones are intact throughout life (Gutchess 2019 and Mather 2016). Such emotional state can be in extremes – one on longing for love and the other the heightened irritability due to impairment in thinking and/or the sensory perceptions - hear, see, smell, touch and taste.

## Faculty

'You cannot teach old dog new tricks' is an English idiom associated with old persons whose ability to learn new things are not to be taken as the norm. However, recent studies have shown that older people are working more than ever after a mandatory retirement age without much decline and even better than in cognitive and intellectual capacities (Staff et al 2018, Hertel et al 2013, Grossman et al 2010, Schaie and Willis 2010, Schmiedek et al 2010, Taylor 2009). The pre frontal part of the brain of older people are more active than those who are not (Gutchess 2019). Older people who have accumulated a greater number of years of education, together with wealth of experience that comes with the maturity and rich perspective to the work they have undertaken. Together, this knowledge and expertise form part of the higher level of crystallized intelligence. As to their fluid intelligence, the norm that this declines with age is now contradicted by the above cited researches and studies.

The more intellectually challenging the tasks for older people, the more that they are engaged given a higher level of cognitive reserve that they bring to the tasks since they have longer years of experience, both successes and failures. Even with the entry of more old people in the workforce, studies have shown that this did not contribute to lower opportunity for employment by non-older people, especially the young in developed countries (Gruber and Wise 2010). Retirement pension is not a burden that the senior citizens in developed countries place to the younger population so long as productivity is maintained for those who are of old age. Such policies on productivity in old age is possible in developing countries like the Philippines.

## FRIENDS AND FAMILIES

'Man is, by nature, a social animal' is a quote from Aristotle around 2,500 years ago. However, there is no quote that older persons are social animals since senior citizens tends to withdraw from society as they grow older primarily due to ageism (WHO 2018, Ayalon and Clemens 2017) where the advertisement in the media incessantly portrays old people are hard at hearing, are difficult to speak to since their comprehension is not normal – they tend to repeat statements, memories and thoughts, indicating that recall has been compromised, and are simply too frail to catch up with the fast pace of life in the 21<sup>st</sup> century. This ageism or discrimination due to old age does not contribute to the need for social interaction of senior citizens (Hikichi et al 2017, Kelly et al 2017, Kim 2016, Mohammad et al 2016). The need for both social interaction or leisurely activities (Wang et al 2011) are essential in old age.

Studies have shown that older persons have a much higher level of competency on the aspect of dealing with social conflicts (Grossman et al 2010). This indicates the better use of abstractions



given the wisdom of age. In movies of the present time, e.g. Lord of the Rings, Harry Potter and Games of Thrones, there are old persons who are considered sages and are the source of advice, crystallized intelligence for those who seek them, especially in times of battle. However, since the Philippines had been not been at war in nearly seventy years, the wisdom of old persons are not needed that badly. Rather, old persons are set aside to make way for the next generation, with much loss in terms of the wisdom that comes with the age. Crystallized intelligence of older people is wasted. This should not be the case.

### **FAITH**

Given the long Spanish colonial history of the country, the cultural practices and traditions on the Catholic faith are still alive, especially with senior citizens. In terms of relationship between longevity and religion, the global average life expectancy is 72 years old for female and 68 years old for male (WHO data). For the Philippines, the life expectancy of 75 years old is for female and 67 years old for male. In terms of the contribution to happiness, especially well being at old age, most of the findings in the literature are positive (Lifshitz et al 2018, Mackinlay and Richards 2017, Zimmer et al 2016). However, the latest, 2018 World Happiness Report has the top countries the least religious, indicating that there is more to religion than happiness, especially in old age.

This study aims to achieve the following:

1. To determine the profile of the senior citizens.
2. To measure the relationship of the 7F happiness of the senior citizens.
3. To measure the significant effects of the profile and 7F happiness in the happiness of senior citizens

### **RESEARCH METHODOLOGY**

The study is based on the primary data collected with the help of the standardized questionnaire from Oxford University to measure the happiness of senior citizens and self-developed questionnaire to assess the 7F factors of happiness of senior citizens namely: food, fitness, feelings, family, faculty, friend, and faith. The self-developed questionnaire was validated by experts and translated into Pilipino version in order to have better understanding of the statement. Researchers have also used interview and focus group discussion for the gathering of data. Data was analyzed using SPSS software. Researchers have employed the correlation analysis to determine the relationship between the 7F factors and happiness of senior citizens.

Multiple regression analysis has been used to measure the effects of various factors of happiness in the happiness of senior citizens.

Following hypotheses have been formulated and tested:

- 1) There is no significant relationship between 7F factors and happiness of senior citizens;
- 2) There are no significant differences in the happiness of senior citizens towards the 7F factors namely: food, fitness, feelings, family, faculty, friend, and faith and;
- 3) There are significant effects of profile and 7F factors on the happiness of senior citizens.

## RESULTS AND DISCUSSION

Data from the demographic part of the questionnaire yielded information about respondents' demographic variables. There were 210 senior citizens included in the study. The majority of respondents (150) were female (71.4%) and 107 (51.0%) were married. Fifty-one (24.3%) of respondents were between 60-65 years of age, one thirty-one (62.4%) were between 66-79 years of age and twenty-eight (13.3%) of respondents were 80-91 years of age. Most of the senior-respondents 137 (65.2%) have denture, with companion at least four members of the family at home. In terms of pension and family support, 104 (49.5%) of respondents have pension and 123 (58.6) out of 210 have family support.

To determine the level of happiness of senior citizens based on the twenty-nine items of standardized questionnaire from Oxford University, descriptive statistics for senior citizens' responses were analyzed using descriptive statistics. Sa tingin ko, ang mundo aymabuting lugar (*In my view, the world is a good place.*) had the highest mean of 5.13 which implies that the respondents were happy when.... Second in the level of happiness with a mean of 5.07 was Maganda ang buhay (*Life is good*). On the other hand, the two lowest means 4.48 and 4.50 were obtained for Ako ay may mainit na damdamin sa lahat halos ng aking mga Gawain (*I have very warm feelings towards almost everything that I do.*) and Pakiramdam ko na kaya kong gawin ang anuman (*I feel able to take anything on.*), respectively. This signified that the respondents were happy with the world as a good place and life is good. Respondents are happy and moderately happy when they feel that they can able to take anything on and *have very warm feelings towards almost everything that they do.*

Results from the Pearson product moment correlation coefficient analysis on the happiness of senior citizens indicated the sample for this study reported highly correlated with seven F namely: Food ( $r=.397$ ,  $p<.001$ ), Fitness (.312,  $p<.001$ ), Feelings (.352,  $p<.001$ ), Family (.450,  $p<.001$ ), Faculty (.481,  $p<.001$ ), Friend (.521,  $p<.001$ ), and Faith (.453,  $p<.001$ ). From the stepwise regression model, four significant models have emerged which show the relationship

between dependent and independent variable in the current study. First, regression model indicates the relationship between friend and happiness of senior citizens. The value of R and R-square is .517 and .268, respectively. The value of R-square increases with the addition of some more independent variables in the regression model. Second regression model includes the independent variables namely: friend and faculty. The value of R-square changes from .268 to .367 after adding the faculty factor, which means that the relationship of friend with happiness of senior citizens get more stronger if we add the faculty factor in the regression model. Similarly, in regression model 3 and 4 the value of R-square increases by adding the independent variables. Thus, the last model seems to be the most significant model for measuring the relationship between factors of happiness and happiness of senior citizens because the value of R-square was found to be .407. Hence, it can be concluded that the value of R-square that 40.7 percent of the total variation in the value of dependent variable is due to the independent variables and rest 59.3 percent is due to chance/unknown other factors. Therefore, the four independent variables which are found to be significant in the regression model are friend, faculty, food, and family. In the entire four regression models the value of F is found to be significant at 1 percent (.01) level of significance. Thus, the null hypothesis which states that there is no significant relationship between happiness of senior citizens and 7 F factors tends to be rejected. It can be said therefore, that happiness among senior citizens get affected by friend, faculty, food, and family. The results of regression coefficients along with the t-value for all the four regression models. It was found from the study that all factors namely: friend, faculty, food, and family are positively and significantly related to happiness of senior citizens. Study also highlights the fact that the highest contributing factor in happiness among senior citizens is friend followed by faculty, while the least contributing factor in happiness among senior citizens is the family factor.

#### **Adoption of the Program Framework by the Provincial Government of Bulacan, PGB**

A new set of elected officials begun their 2019 to 2022, a three-year term from noon of 30 June 2019. In Bulacan province, the newly elected governor was the former three term Vice Governor Daniel R. Fernando. The newly elected vice governor was the former three term Governor Wilhelmino Sy Alvarado. Thus, both formerly three term incumbents had been re-elected with only the role in reverse – the former vice governor is now in charge of executing policies while the previous governor is not in charge of policy formulation through the provincial legislative council. As to be expected, there were not more changes or movements in the provincial staffing.

Given this continuity, the team from the higher education institution, the College of Social

Science and Philosophy, CSSP of Bulacan State University, BSU met with the head of the PSWDO to formally present a letter containing the program on the Holistic Approach to Happiness of Senior Citizen in Bulacan Province. For convenience, the shorter title of 7F was adopted for the program, where the F would stand for last name of Governor Fernando. The Fernando Happiness Village was suggested as the theme of the program.

The presentation to the PSWDO resulted to the need to draft the Memorandum of Agreement (MOA) between the BSU CSSP and the Provincial Government of Bulacan, PGB, together with the formal letter proposal containing the intentions and approach of 7F. Both will be presented to the governor. A budget review was undertaken, resulting to a 7F launching by December 2019, in time for the gathering of the senior citizens for their Christmas party.

Both MOA and letter proposal were presented to the governor with one major input: the need to consider the independent variables of financials, fear and future. With this, the revised program framework is as follows:

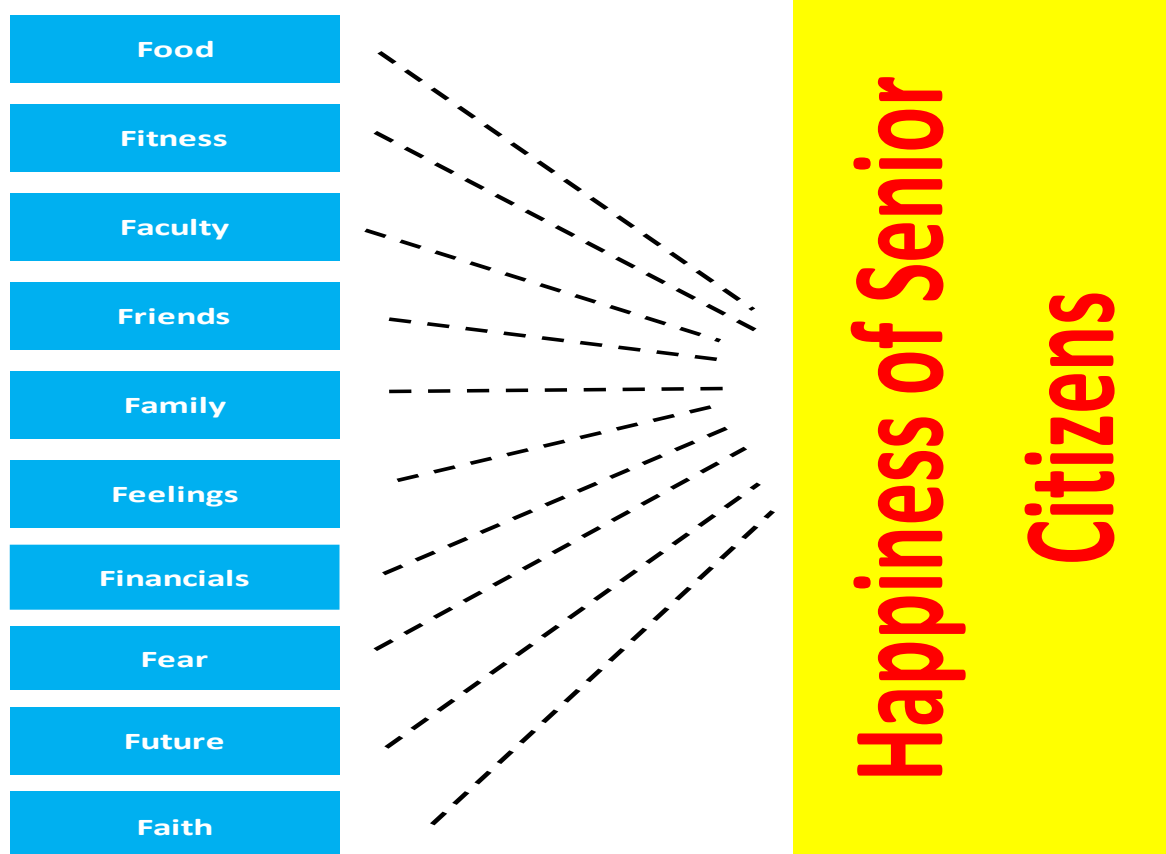


Figure 2. The Revised Program Framework Incorporating the Suggestions of the PGB

With this expanded program framework, the review of the literature will be undertaken as part of the technical support from the BSU CSSP. As part of the technical support of the BSU CSSP, the pilot testing of the survey questionnaire was undertaken. From an initial draft, there had been three revisions which were undertaken, resulting to the self-rating administration of the two survey questionnaires.

### CONCLUSIONS AND RECOMMENDATION

The following conclusions have been offered: It has been found from the study that the senior citizens were very happy in relation with their feelings and family, happy with the food, fitness, friend, and faith. But, moderately happy with their faculty, The 7 F factors– food, fitness, feelings, family, faculty, friend, and faith have been found positively and significantly related to level of happiness of senior citizens. Three factors out of seven factors have been found significantly contributing to happiness of senior citizens. These factors are namely: food, faculty and friend.

Conceptualizing a public administration program with the eventual formulation of the theoretical framework is a task that is best undertaken by the higher education institution, rather than by the provincial government. The rigor of research is necessary to be undertaken to ensure that the public administration perspective of sociology, economics, psychology, ethics, and politics, among others, are duly reviewed and appropriately incorporated in the theoretical framework.

Translating the theory into reforming a provincial program is not a walk in the park. There are the usual constraints on fiscal support. To address this, the current fiscal resource allocation of the PSWDO was necessary to jump start the reform process. The weekly meetings of the two organizations of older persons were the conduit to present the program and undertake the initial pilot testing of the survey questionnaires. The current upcoming events of the PSWDO for OSCA is the vehicle by which the program will be launched. For future research, the researcher highly recommend that this study will be done to determine the relationship between the demographic characteristics, 10 factors of happiness and happiness among senior citizens. The 2021 fiscal resource appropriation will be used to undertake the province-wide data collection with the mobilization of the two organizations of older persons, the OSCA and the FSCAP. The CSSP BSU will handle the data processing, analysis and reporting. Planning the implementation of this province wide data collection will mobilize the membership of both the OSCA and the FSCAP. Early on, there was the need to tap into the organizational resources of the direct stakeholders and target clientele of the program. With this in place, all planning activities can be undertaken with both the OSCA and the FSCAP.

## REFERENCES

### PUBLISHED BOOKS

1. Asprey, Dave (2107), Head Strong, The Bulletproof Plan to Activate Untapped Brain Energy to Work Smarter and Think Faster – in Just Two Weeks. Harper Collins Publishing NY, ISBN 978-0-06-2652430
2. Barnett, Rosalind C. and Rivers, Caryl (2016), The Age of Longevity: Reimagining Tomorrow for Our New Long Lives, Rowman and Littlefield New York, ISBN 9781442255289
3. Baumgart, Matthew, Synder, Heather M., Carillo, Maria C., Fazio, Sam, Kim, Hye, and Johns, Harry (2015), Summary of Evidence on Modifiable Risk Factors for Cognitive Decline and Dementia: A Population Based Perspective, *Alzheimer and Dementia*, 11(2015), 718-726, doi: 10.1016/j.jalz.2015.05.016
4. Berger, Amy, MS, CNS, NTP (2017) The Alzheimer's Antidote, Using a Low Carb, High Fat Diet to Fight Alzheimer's Disease, Memory Loss and Cognitive Decline. Green Press Initiative, Vermont. ISBN 9781603587105
5. Bradshaw, Diane Rev. (2011), I Am Arnold. Author House, Indiana, ISBN: 978-1-4670-2504-1
6. Bredesen, Dale, MD (2017) The End of Alzheimer's. The First Program to Prevent and Reverse Cognitive Decline. Avery, Random House, NY. ISBN 978073216228
7. Brown, Richard P., MD and Gerbarg, Patricia L., MD (2004) The Rhodiola Revolution. Transform Your Health with the Herbal Breakthrough of the 21<sup>st</sup> Century. Rodale. Pennsylvania, ISBN: 13 978-1-60961-578-9
8. Cortright, Brant, PhD (2015) The Neurogenesis Diet and Lifestyle, Upgrade Your Brain, Upgrade Your Life. Psyche Media, California, ISBN: 978-0-9861492-1-4
9. Fife, Bruce, N.D. (2011), Stop Alzheimer's Now, How To Prevent and Reverse Dementia, Parkinson's, ALS, Multiple Sclerosis and Other Neurodegenerative Disorders. Picadilly Books, Colorado, ISBN: 978-0-941599-85-6.
10. Fung, Helene PhD (2013), Aging in Culture. *The Gerontologist*. 53(3), p369-377, doi.org/10.1093/geront/gnt024
11. Longo, Valter (2016), The Longevity Diet. Avery Press, New York, ISBN: 9780525534082
12. Mercola, Joseph, MD (2017) Fat for Fuel, a Revolutionary Diet to Combat Cancer, Boost Brain Power, and Increase Your Energy. Hay House Inc., California, ISBN: 978-1-4019-5377-5
13. Newport, Mary, MD (2015) The Coconut Oil and Low Carb Solutions for Alzheimer's, Parkinson's and Other Diseases , A Step by Step Guide to Using Diet and High Energy Foods to Protect and Nourish the Brain. Basic Health Publications, California, ISBN: 978-1-59120-381-0

14. Newport, Mary, MD (2013) Alzheimer's Disease, what If There Was a Cure? The Story of Ketones. Basic Health Publications, California, ISBN: 978-1-59120-624-8
15. Perlmutter, David, MD (2013) Grain Brain, The Surprising truth About Wheat, Carbs, and Sugar – Your Brain's Silent Killers. Little Brown and Company, New York, ISBN: 978-0-316-23482-5
16. Perlmutter, David, MD (2015) Brain Maker: The Power of Gut Microbes to Heal and Protect Your Brain – for Life. Little Brown and Company, New York, ISBN: 978-0-316-38008-9
17. Volek, Jeff S., PhD RD and Phinney, Stephen D., MD, PhD (2011) The Art and Science of Low Carbohydrate Living, An Expert Guide to Making the Life-Saving Benefits of Carbohydrate Restriction Sustainable and Enjoyable. Beyond Obesity LLC, USA, ISBN: 978-0-98349-073-9
18. Westman, Eric, MD, Phinney, Stephen D., MD, and Volek, Jeff S., MD (2010) The New Atkins for A New You. Simon and Shuster, New York, ISBN: 978-1-4391-9028-9

#### FRAMEWORK

19. Balboa-Castillo, T, Lopez-Garcia E, Leon Munoz LM, Perez-Tasigchana RF, Banegas JR, Rodriguez-Artaleho, et al (2015), Chocolate and Health-Related Quality of Life: A Prospective Study. PLoS One 10(4): e0123161.doi:10.1371/journal.pone.0123161.
20. Cohen, Alan (2016), Complex System Dynamics in Aging: New Evidence, Continuing Questions, Biogerontology, 17, 205-220, doi: 10.1007/s10522-015-9584-x
21. Ferguson, Michael A., Nielsen, Jared A., King, Jace B., Dai, Li, Giangrasson, Danielle M., Holman, Rachel, Korenberg, Julie R., and Anderson, Jeffrey S. (2016), Reward, Salience and Attentional Network are Activated in Devout Mormons. Social Neuroscience, 13:1, 104-116, doi: 10.1080/17470919.2016.1257437
22. Laaksonen, Seppo (2018), A Research Note: Happiness by Age is More Complex Than U-Shaped. Journal of Happiness Studies, 19, 471-480, doi.org/10.1007/s10902-016-9830-1
23. Levin, Jeff, PhD, MPH, Chatters, Linda M., PhD, Taylor, Robert Joseph, PhD, MSW (2011), Theory of Religion and Aging: An Overview. Journal of Religion and Health, 50(2):389-406, doi:10.1007/s10943-009-9319-x
24. Martin, Peter PhD, Kelly, Norene MSc, Kahana, Boaz PhD, Kahan, Eva PhD, Willcox, Bradley J, MD MSc, Willcox, D. Craig PhD, Poon, Leonard W. PhD (2014), Defining Successful Aging: A Tangible or Elusive Concept. Gerontologist, 55(1): 14-25, doi:10.1092/geront/gnu04
25. Mhaske, Rajendra, 2017, Happiness and Aging, Journal of Psychological Research, Vol. 12, Number 1, 2017, 71-79, ISSN 0976-3937
26. Miller, Lisa PhD, Bansal, Ravi PHD, Wickramaratne, Priya PhD, Hao, Xuejun PhD, Tenke, Craig E. PhD, Weissman, Myrna M. PhD, and Peterson, Bradley, MD (2014) Neuroanatomical

- Religiosity and Spirituality: A Study in Adults of High and Low Familial Risk of Depression. JAMA Psychiatry, 71(2): 128-135, doi:10.1001/jamapsychiatry.2013.3067
27. Montemayor-Aldrete, Jose Antonio, Ugalde-Velez, Pablo, Del Castillo-Mussot, Marcelo, Vazquez, Gerardo Jorge, Montemayor-Valera, Ernesto Federico (2014), Second Law of Thermodynamics Formalism Applied Finite Duration Through Cycles of Living Dissipative System. Advances in Aging Research, 3: 368-379, doi: 10.4236/aar.2014.35047
28. Oestreicher, Christian, PhD (2007), A History of Chaos Theory. Dialogue in Clinical Neuroscience 9(3) 279-299 PMID 17969865, Dialogues in Clinical Neuroscience, 9(3), 211-221, [https://www.academia.edu/20503372/A\\_history\\_of\\_chaos\\_theory](https://www.academia.edu/20503372/A_history_of_chaos_theory)
29. Oshumi, Yoshinori (2106), Autophagy – an Intracellular Recycling System. Nobel Prize in Physiology Presentation. <https://www.nobelprize.org/uploads/2018/06/ohsumi-lecture.pdf>
30. Poljsak, Borut and Milisav, Irina (2018), Restoring NAD<sup>+</sup> Levels with NAD<sup>+</sup> Intermediates, The Second Law of Thermodynamics and Aging Delay. Rejuvenation Research, 21, 506-509, doi: 10.1098/rej.2017.2037
31. Sayadmansour, Alireza, (2014), Neurotheology: The Relationship Between Brain and Religion. Iran J Neurol 2014; 13(1):52-5. Iranian Journal of Neurology, 2014, 13(1); 52-55
32. Scholey, A. and Owne, L. (2013) Effects of Chocolates on Cognitive Function and Mood: A Systematic Review, Nutrition Reviews, 71(10), 665-681, doi:10.1111/nure.12065
33. Seligman, Martin and Royzman (2003), Happiness: The Three Traditional Theories, <https://www.authenticchappiness.sas.upenn.edu/newsletters/authenticchappiness/happiness>
34. Stibich, Mark, PhD (2018), Theories and Effects of Aging in Our Bodies, <https://www.verywellhealth.com/why-we-age-theories-and-effects-of-aging-2223922>
35. Steptoe, Andrew PhD, Deaton, Angus PhD and Stone, Arthur PhD (2014), Subjective Well Being, Health and Aging. The Lancet Ageing, 385(9968), p640-648, doi: 10.1016/S0140-6736(13)614890-0
36. Stiglitz, Joseph, Sen, Amartya and Fitoussi, Jean Paul (2017), Report by the Commission on the Measurement of Economic Performance and Social Progress. <https://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report>
37. Tobgay, Tashi, Torres, Cristina, Na-bangchang, Kesara, 2011, Health and Gross National Happiness, Journal of Multidisciplinary Health Car, doi:10.2147/JMDH.S21095



Beatriz Fabila Lopez, Moller, Valerie and Souza- Posa, Alfonso (2013), How Does Subjective Well Being Evolve with Age: A Literature Review. *Journal of Population and Ageing*, 6:227-246, doi: 10.1007/12062-013-0985-0

39. Waldinger, Robert J., and Schulz, Marc S. (2010), What's Love Got To Do With It?: Social Functioning, Perceived Health and Daily Happiness in Married Octogenarians. *Psychology Aging*, 25(2), 422-431, doi:10.1037/a0019087

#### FOOD INTAKE

40. Anastaciou CA, Yannakoulia M, Kosmidis, MH, Hadjigeorgiu, GM, Sakka, P. et al, (2017) Mediterranean Diet and Cognitive Health: Initial Results from the Hellenic Longitudinal Investigation of Aging and Diet. *PLoS ONE* 12(8):30182048. doi:10.1371/journal.pone.0182048

41. Buettner, Dan and Skemp, Sam (2016) Blue Zone: Lessons From the World's Longest Lived, *American Journal of Lifestyle Medicine*, 10(5), 318-321, doi: 10.1177/1559827616637066

42. Courchesne-Lauer, Alexandre, Croteau, Etienne, Castellano, Christian-Alexandre, St-Pierre, Valerie, Henebelle, Marie, Cunnane, Stephen C. (2016), Inverse Relationship Between Brain Glucose and Ketone Metabolism in Adults During Short Term Moderate Dietary Ketosis: A Dual Tracer Quantitative Positron Emission Tomography Study. *Journal of Cerebral Blood Flow and Metabolism*, 0(00) 1-9, doi:10.1177/0271678X16669366

43. Croteau, E., Castellano, CA., Richard, MA., Fortier, M., Nugent, S., Lepage, M., Duchesne, S., Whitingstall, K., Turcotte, EE., Bocti, C., Fulop, T., and Cunnane, SC., (2018), Ketogenic Medium Chain Triglycerides Increase Brain Energy Metabolism in Alzheimer's Disease. *Journal of Alzheimer's Disease*, 64(2): 551-561, doi:10.3233/JAD-180202

44. Cunnane, Stephen C., Courchesne-Lauer, Alexandre, Vandenberghe, Camille, St-Pierre, Valerie, Fortier, Melanie, Henebelle, Marie, Croteau, Etienne, Bocti, Christian, Fulop, Tamas, and Castellano, Christian-Alexandre (2016), Can Ketones Help Rescue Brain Fuel Supply in Later Life? Implications for Cognitive Health During Aging and the Treatment of Alzheimer's Disease. *Frontiers in Molecular Neuroscience*, 9:53, doi:10.3389/fnmol.2016.00053.

45. Cunnane, Stephen C. and Crawford, Michael A., (2013), Energetic and Nutrition Constrain on Infant Brain Development: Implications for Brain Expansion During Human Evolution, *Journal of Human Evolution* 77, 88-98. doi: 10.1016/j.jhevol.2014.05.001

46. Dennis, Isabelle, Portier, Brigitte, Heberden, Christine, Vancassel, Sylvie (2015), Omega 3 Polyunsaturated Fatty Acid and Brain Aging, *Current Opinion in Clinical Nutrition and Metabolic Care*, Volume 18, Issue 2, p 139-146. doi:10.1097/MCO.000000000000141.

47. Ding, Jianyang, Xu, Xiaolin, Wu, Xiuhua, Huang, Zucheng, Kong, HGanggang, Liu, Junhao, Huang, Zhiping, Liu, Qi, Li, Rong, Yang, Zhou, Liu, Yapu, and Zhu, Qingan (2018), Bone Loss and Biomechanical Reduction of Appendicular and Axial Bones Under Ketogenic Diet in Rats. *Experimental and Therapeutics Medicine*, 17, 2503-2510, doi: 10.3892/etm.2019.7241
48. Djousse, Luc, Kamineni, Aruna, Nelson, tracy L., Carnethon, Merced, Mozaffarian, Dariush, Siscovick, David and Mukamal, Kenneth, (2010), Egg Consumption and Risk of Type 2 Diabetes in Older Adult, *The American Journal of Clinical Nutrition*, 92(2): 422-427, doi:10.3945/ajcn.2010.29406
49. Kosinski, Christophe and Jornayvaz, Francois R. (2017), Effects of Ketogenic Diet on Cardiovascular Risk Factors: Evidence from Animal and Human Studies *Nutrients*, 9(517), doi:10.3390/nu9050517
50. Kulzow, Nadine, Witte, A. Veronica, Kerti, Lucia, Grittner, Ulrike, Schuchardt, Jan Phillip, Hanh, Andreas, Floel, Agnes, (2016), Impact of Omega 3 Fatty Acid Supplementation on Memory Functions in Healthy Older Adults, *Journal of Alzheimer's Disease*, vol. 55, no. 3, pp 713-725. doi: 10.3233/JAD-150886
51. Lange, Klaus W., Lange, Katharina M., Makulskha, Gertruda, Ewelina, Nakamura, Yokiko, Reissmann, Andreas, Kanaya, Shigehiko, and Hauser, Joachim (2017), Ketogenic Diet and Alzheimer's Disease. *Beijing Academy of Food Science/ Journal of Food Science and Human Wellness*, 6 (2017) 1-9, doi:10.1016/j.fshw.2016.10.003
52. Loughrey, David G., Lavecchia, Sara, Brennan, Sabina, Lawlor, Brian A., and Kelly, Michelle E. (2017) The Impact of the Mediterranean Diet on the Cognitive Functioning of Healthy Older Adult: A Systematic Review and Meta Analysis. *American Society of Nutrition, advance Nutrition*, 8: 571-86, doi: 10.3945/an.117.015495
53. Ludwig, David S., Willett, Walter C., Volek, Jeff S., Neuhouser, Marian L., (2018) Dietary Fat: From Foe to Friend. *Science*, vol 362, issue 6416, pp764-770, doi: 10.1126/science.aau2096
54. Manzano, Silvia, Erion, Joanna R., Santro, Tomislav, Steyn, Frederick J., Chen, Chen, Arumugam, Thiruma V., and Stranahan, Alexis M., (2014), Intermittent Fasting Attenuates Increases in Neurogenesis After Ischemia and Reperfusion and Improves Recovery, *Journal of Cerebral Blood Flow and Metabolism*, 34, 897-905, doi:10.1038/jcbfm.2014.36
55. Miranda, Jose M., Anton, Xaquin, Redondo-Valbuena, Celia, Roca-Saavedra, Paula, Rodriguez, Jose A., Lamas, Alexander, Franco, Carlos M., and Cepeda, Alberto (2015) Egg and Egg Derived Foods: Effects on Human Health and Use as Functional Food, *Nutrients*, 7(1): 706-739, doi:10.3390/nu7010706
56. Nonaka, Yudai, Takagi, Tesuo, Inai, Makoto, Nashimura, Shuhei, Urashima, Shogo, Honda, Kasumitsu, Aoyama, Toshiaki, Terada, Shin (2016), Lauris Acid Stimulates Ketone Body

Production in the KT -5 Astrocyte Cell Line. *Journal of Oleo Science*, 65, (8) 693-699 (2016), doi:10.5650/jos.ess16069

57. Raji, Cyrus A., Erickson, Kirk I., Lopez, Oscar, Kuller, Lewis, Gach, H. Michael, Thompson, Paul M., Riverol, Mario, and Becker, James T., (2014), Regular Fish Consumption and Age-Related Brain Grey Matter Loss, *American Journal of Preventive Medicine*, 47(4), 444-451. doi:10.1016/j.amepre.2014.05.037

58. Rauch, Jacob T., Silva, Jeremy E., Lowery, Ryan P., McCleary, Sean A., Shiled, Kevin A., Ormes, Jacob A., Sharp, Matthew H., Weiner, Steven I., Georges, John I., Volek, Jeff S., D'Agostino, Dominic P, Wilson, Jacob M. (2014), The Effects of Ketogenic Dieting on Skeletal Muscle and Fat Mass. *Journal of the International Society of Sports Nutrition* 2014, 11 (Suppl 1), p40, doi:10.1186/1550-2783-11-S1-P40

59. Ravussin, E, Redman, LM, Rochon J, Das, SK, Fontana, L, Kraus, WE, Romashkan, S, Williamson, Dam Meydani, SN, Villareal, DT, Smith, SR, Stein, RI, Scott, TM, Stewart, TM, Saltzman, E, Klein, S, Bhapkar, M, Martin, CK, Gilhooly, CH, Holloszy, JO, Hadley, EC, Roberts, SB, CALERIE Study Group (2015), A 2 Year Randomized Controlled Trial of Human Calorie Restriction: Feasibility and Effects on Predictors of Health Span and Longevity, *Journal of Gerontology and Biological Science* 70(9), 1097-104, doi:10.1093/Gerona/glv057.

60. Rebello, Candida J., Keller, Jeffrey N., Liu, Ann G., Johnson, William D., Greenway, Frank L., (2014) Pilot Feasibility and Safety Study Examining the Effects of Medium Chain Triglyceride Supplementation in Subjects with Mild Cognitive Impairment: A Randomized Controlled Trial. *BBA Clinical*, doi:10.1016/j.bbacli.2015.01.001

61. Simm, PJ, Bicknell, Royle J., Lawrie, J., Nation, J., Draffin, K., Steward, KG., Cameron, FJ., Scheffer, IE., Mackay, MT., (2017), The Effect of the Ketogenic Diet on the Developing Skeleton. *Epilepsy Research*, 136:62-66, doi:10.1016/eplepsyres.2017.07.014

62. Taylor, Matthew K., Sullivan, Debra K., Mahnken, Jonathan D., Burns, Jeffrey M., Swedrlow, Russell H. (2018), Feasibility and Efficacy Data From a Ketogenic Intervention in Alzheimer's Disease. *Alzheimer's and Dementia: Translation Research and Clinical Intervention*, 4(2018) 28-36, doi:10.1016/j.trci.2017.11.002

63. Titova, Olga E., Ax, Erika, Brooks, Samantha J., Sjogren, Per, Cederholm, Tommy, Kilander, Lena, Kullberg, Joel, Larsson, Elna Marie, Johansson, Lars, Ahlstrom, Hakkan, Lin, Lars, Schioth, Helgi B, Benedict, Christian (2013) Mediterranean Diet Habits in Older Individuals: Associations with Cognitive Functioning and Brain Volume. *Experimental Gerontology*, 48 (2013) 1443-1448. doi: 10.1016/j.exger.2013.10.002

64. Vasconsuelos, AR, Orellana, AMM, Piaxio, AG, Scavone, C, Kawamoto, EM (2018), Intermittent Fasting and Calorie Restriction: Neuroplasticity and Neurodegeneration, from the

Handbook on Famine, Starvation and Nutrient Deprivation, [https://doi.org/10.1007/978-3-319-40007-5\\_99-1](https://doi.org/10.1007/978-3-319-40007-5_99-1)

## FITNESS

65. Akers, Catherine, Cherasse, Yoan, Fujita, Yuki, Srinivisan, Sakthivel, Sakurai, Takeshi, Sakaguchi, Masanori, (2018), Concise Review: Regulatory Influence of Sleep and Epigenetics in adult Hippocampal Neurogenesis and Cognitive and Emotional Function, Stem Cells, <http://dx.doi.org/10.1002/stem.2815>
66. DelleFave, Antonella, Bassi, Marta, Boccaletti, Elena S., Roncaglione, Carlotta, Bernardelli, Guiseppina, and Marie, Daniela (2018), Promoting Well Being in Old Age: The Psychological Benefits of Two Training Programs of Adapted Physical Activity, Frontiers in Psychology, 9.828.doi:10.3389//fpsyg.2018.00828
67. Farioli-Vecchioli, Stefano, Mattera, Andrea, Micheli, Laura, Ceccarelli, Manuela, Leonardi, Luca, Saraulli, Daniele, Conztanzi, Marco, Cestari, Vincenzo, Rouault, Jean-Pierre, and Tirone, Felice, (2014), Running Rescues Defective Adult Neurogenesis by Shortening the Length of the Cell Cycle of Neural Stem and Progenitor Cells, Stem Cells, 32: 1968-1982, doi.org/10.1002/stem.1679
68. Iunuma, Mitsuo, Kondo, Hiroko, Kurahashi, Minori, Ohnishi, Mika, Tamura, Yasuo, Chen, Huayue, and Kubo, Kin-ya (2014), Relationship Between the Early Toothless Condition and Hippocampal Functioning Morphology, Anatomy and Physiology Current Research, 4:3. doi:10.4172/2161-0940.1000149.
69. Joo, EY, Kim H, Suh, S, Hong SB, Hippocampal Substructural Vulnerability to Sleep Disturbance and Cognitive Impairment in Patients with Chronic Primary Insomnia: Magnetic Resonance Imaging Mophometry, SLEEP 2014,; 37(7): 1189-1198, doi: 10.5665/sleep.3836
70. Kandola, Aaron, Hnedrikse, Joshua, LUCassen, Paul J., Yucel, Murat (2016), Aerobics Exercise to Improve Hippocampal Plasticity and Function in Humans: Practical Implications for Mental Health Treatment, Frontier of Human Neuroscience, 10:373, doi:10.3389/fm.hum.2016.00373
71. Koyanagi, Iyo, Akers, Catherine, Vergara, Pablo, Srinivasan, Sakhtivel Sakurai, Takeshi, and Sakaguchi, Masanori, (2019), Memory Consolidation During Sleep and adult Hippocampal Neurogenesis, Neural Regeneration Research, 14(1), 20-23, doi:10.4103/1673-5374.234695
72. Lee, Michael L., Katsuyama, Angela M., Duge, Leanne S., Sriram, Chaitra, Krushelnytskyy, Mikhaylo, Kim, Jeansok J., and Dela-Iglesia, Horacio o., (2016) Fragmentation of Rapid Eye Movement and Non Rapid Eye Movement Sleep Without Total Sleep Loss Impairs Hippocampus-

Dependent Fear Memory Consolidation, Sleep. Volume 39, No. 11, 2021-2030, doi: 10.5665/sleep/6236

73. Lopez-Virgen, Veronica, Zarate-Lopez, David, Adirsch, Fabian L, Collas-Aguilar, Jorge, and Gonzalez-Perez, Oscar (2015), effects of Sleep Deprivation in Hippocampal Neurogenesis, *GaceteMedica de Mexico*, 15, 90-95,

74. Navarro- Sanchis, Critina, Brock, Oliver, Winsky-Somerer, Raphaele, and Thuret, Sandrine (2017), Modulation of Adult Hippocampal Neurogenesis by Sleep: Impact on Mental Health, *Frontiers in Neural Circuits*, 11:74, doi:10.3389/fncir.2017.00074

75. Nokia, Miriam S., Lensu, Sanna, Ahtiainen, Juha P., Johansson, Petra P., Koch, Lauren G., Britton, Steven L., and Kainulainen, Heikki, (2016), Physical Exercise Increases Adult Hippocampal Neurogenesis in Male Rats Provide it is Aerobic and Sustained, (2016), *The Journal of Physiology and Neuroscience*, 594.7, pp 1855-1873. doi: 10.1113//JP271552

76. Raphael, Carol (2017), Oral Health and Aging, *American Journal of Public Health*; 107 (Suppl 1):S44-S45. Doi:10.2105/AJPH.2017.303835

77. So, Ji H., Huang, Chao, Ge, Minyan, Cal, Guangyao, Zhang, Lanqui, Lu, Yisheng, and Mu, Yangling (2017), Intense Exercise Promotes Adult Hippocampal Neurogenesis but not Spatial Discrimination, *Frontiers in Cellular Neuroscience*. 11.13.doi:10.3389/fncel.2017.00013.

78. Trincherro, Mariela F., Buttner, Karina A., Sulkes-Cuevas, Jessica M., Temprana, Silvio G., Fontanet, Paula A., Monzon-Salinas, M. Christina, Ledda, Fernanda, Paratcha, Gustavo, and Schinder, Alejandro F., (2017), High Plasticity of New Granule Cells in the Aging Hippocampus, *Cell Reports* 21, 1129-1139, doi.org/10.1016/j.celrep.2017.09.064

79. Varma, Vijay R., Chuang, Yi-Fang, Harris, Gregory C., Tan, Erwin J., and Carlson, Michelle C. (2015), Low Intensity Daily Walking Activity Associated With Hippocampal Volume in Older Adults, *Hippocampus*, 25(5), 605-615, doi:10.1002/hippo.22379

#### FEELINGS AND FAMILY

80. Gutchess, Angela (2019), *Cognitive and Social Neuroscience of Aging*, Cambridge Fundamentals of Neuroscience and Psychology, Cambridge University Press, ISBN: 978-1-107-08464-3, doi:10.1017/97811316026885

81. Kang, Eun-chai, Wen, Zhixing, Song, Hongjun, Christian, Kimberly M., and Ming, Guo-Li, (2016) *Adult Neurogenesis and Psychiatric Disorders*, Cold Spring Harbor Perspective in Biology 2015; 8:a019026, doi:10.1101/cshperspect.a019026

82. Leuner, Bernadette, Caponiti, Julia M., and Gould, Elizabeth (2016), Oxytocin Stimulates Adult Neurogenesis Even Under Conditions of Stress and Elevated Glucocorticoids, *Hippocampus* 2012 April; 22(4): 861-868, doi:10.1002/hipo.20947

83. Levone, Brunno R., Cryan, John F., O'Leary, Olivia F. (2014), Role of Adult Hippocampal Neurogenesis for Stress Resilience, *Journal of the Neurobiology of Stress*, 1 (2015) 147-155, doi:10.1016/j.ynstr.2014.11.003
84. Lin, Yu-Ting, Chen, Chieng Chun, Huang, Chiung Chun, Nishimori, Katsuhiko, and Hsu, Kuei Sen, (2017), Oxytocin Stimulates Hippocampal Neurogenesis via Oxytocin Receptors Expressed in CA3 Pyramidal Neurons, *Nature Communications*, 8:537, doi: 10.1038/s41467-017-00675-5
85. Mather, Mara (2016), The Affective Neuroscience of Aging, *Annual Review of Psychology*, 2016. 67:213-38, doi: 10.1146/annurev-psych-122414-033540
86. Pfau, Madeline L., and Russo, Scott J., (2015), Peripheral and Central Mechanism of Stress Resilience, *Neurobiology of Stress*, 1(2105) 66-79, doi:10.1016/j.ynstr.2014.09.004
87. Schwaiger, Marion, Heinrichs, Marcus, and Kmusta, Robert, (2019), Oxytocin Administration and Emotion Recognition Abilities in Adults with a History of Childhood Adversity, *Psychoneuroendocrinology*, 99(2019) 66-71, doi: 10.1016/j.psyneuen.2018.08.025
88. Segi-Nishida, Ere (2017), The Effects of Serotonin Targeting Anti- Depressant on Neurogenesis and Neuronal Maturation of the Hippocampus Mediated via 5HT1A and 5-HT4 Receptor, *Frontiers in Cellular Neuroscience*, 11:142, doi:10.3389/fncel.2017.00142
89. Song, Ning-Ning, Huang, Ying, Yu, Xin, Lang, Bing, Ding, Yu-Quiang, and Zhang, Lei, (2017), Divergent Roles of Central Serotonin in Adult Hippocampal Neurogenesis, *Frontiers in Cellular Neuroscience*. 11:185, doi:10.3389/fncel.2017.00185
90. Tadjubaev, Arman, (2013), Oxytocin In Prevention of Schizophrenia, *International Journal of Prevention and Treatment*, 1(1): 1-11, doi:10.5923/j.ijpt.20130101.01
91. Tully, John, Gabay, Anthony S., Brown, Danielle, Murphy, Declan GM., Balckwood Nigel, (2018), The Effect of Intranasal Oxytocin on Neural Response to Facial Emotions in Healthy Adults as Measured by Functional MRI: A Systematic Review, *Psychiatric Research: Neuroimaging*, 272 (2018) 17-29, doi:10.1016/j.ppsychresns.2017.11.017

#### **FACULTY**

92. Grossman, Igor, Na, Jinkyung, Varnum, Michael E.W., Park, Denise C., Kitayam, Shinobu, Nisbett, Richard E, Reasoning About Social Conflicts Improves into Old Age, *Proceedings of the National Academy of Sciences of the USA*, 2010, 107 (16) 7246-7250, doi:10.1073/pnas.1001715107
93. Gruber, Jonathan and Wise, David A., (2010) *Social Security Programs and Retirement Around the World*, National Bureau of Economic Research, ISBN:978-0-226-30948-4.

94. Hertel, Guido, Thiegel, Markus, Rauschenbach, Cornelia, Grube, Anna, StamoV-Rossnagel, Christian, and Krumm, Stefan (2103), Age Differences in Motivation and Stress at Work, Research Gate, doi:10.1007/978-3-642-35057-3\_6
95. Schaie, Warner and Willis, Sherry L., 2010, The Seattle Longitudinal Study of Adult Cognitive Development, ISSBD Bulletin.2010; 57 (1):24-29
96. Schmiedek, Florian, Lovden, Martin, and Lindenbergen, Ulman (2010), Hundred Days of Cognitive Training Enhance Broad Cognitive Abilities in Adulthood: Findings from the COGITO Study, Frontiers in Aging Neuroscience, Volume 2, Article 27, doi:10.3389/fnagi.2010.00027
97. Staff, Roger T., Hogan, Michael J., Williams, Daniel S., Whalley, LJ, (2018), Intellectual Engagement and Cognitive Ability in Later Life (The Use it or Lose It Conjecture): Longitudinal , Prospective Study, BMJ 2018:363:k493\25, doi:10.1136/bmj.k4925
98. Taylor, Paul, 2009, Growing Old in America, Expectation versus reality, <http://pewsocialtrends.org>

#### **FRIENDS AND FAMILY**

99. Ayalon, Liat and Clemens, Tesch-Romer, 2017, Taking a Closer Look at Ageism: Self and Other Directed Ageist Attitudes and Discrimination, European Journal of Ageing, 2017 Mar; 14(1):1-4, doi: 10.1007/s10433-016-0409-9
100. Grossman, Igor, Na, Jinkyung, Varnum, Michael E.W., Park, Denise C., Kitayam, Shinobu, Nisbett, Richard E, Reasoning About Social Conflicts Improves into Old Age, Proceedings of the National Academy of Sciences of the USA, 2010, 107 (16) 7246-7250, doi:10.1073/pnas.1001715107
101. Hikichi, Hiroyuki, Kondo, Katsunori, Takeda, Tokunori, Kawachi, Ichiro, 2017, Social Interaction and Cognitive Decline: Results of a Seven Year Community Intervention, Alzheimer's and Dementia: Translational Research and Clinical Interventions 3 (2017) 23-32, doi: 10.1016/j.trci.2016.11.003
102. Kelly, Michelle E., Duff, Hollie, Kelly, Sara, Mchugh Power, Johanna E., Brennan Sabina, Lawlor, Brian A., Loughrey, David G., 2017, The Impact of Social Activities, Social Networks, Social Support and Social Relationship on the Cognitive Functioning of Healthy Older Adults, Systematic Review, (2017) 6:259, doi: 10.1186/s13643-017-0632-2
103. Kim, Cunyoen, Wu, Bailiang, Tanaka, Emiko, Watanabe, Taeko, Watanabe, Kumi, Chen, Wencan, Ito, Sumio, Okumura, Rika, Arai, Tetsuaki, Amne, Tokei, 2016, Association Between a Change in Social Interaction and Dementia Among Elderly People, International Journal of Gerontology, 10(2016) 76-80, doi: 10.1016/j.ijge.2016.03.006

104. Mohammad, SiniturAtihrah, Dom, MazuiyahMohd, Ahmad, SabarinahSh, (2016), Incusion of Social Realm Within Elderly Facilities to Promote Their Wellbeing, Procedia – Social and Behavioural Sciences 234 (2016) 114-124
105. Wang, Hui-Xin, Xu, Weili, Pei, Jin-Jing, 2011, Leisure Activities, Cognition and Dementia, Biochimica et Biophysica Acta, 10.1016//j.bbadis/2011.09.002.
106. World Health Organization, WHO Progress Report of the Director General, Seventy First World Health Assembly, 29 March 2018

### FAITH

107. Lifshitz, Rinat, Nimrod, Galit, Bachner, Yaachov G., 2018, Spirituality and Well Being in Later Life: A Multidimensional Approach, Journal of Aging and Mental Health, doi:10.1080/13607863.2018.1460743
108. Mackinlay, Elizabeth, Burns, Richard 2017, Spirituality Promotes Better Health Outcomes and Lowers Anxiety About Aging: The Importance of Spiritual Dimensions for Baby Boomers as They Enter Older Adulthood, Journal of Religion, Spirituality and Aging, Volume 29, Issue 4, 248-265, doi:10.1080/15528030.2016.1264345
109. [www.who.int](http://www.who.int) for the data on life expectancy at birth at the global level and those for the Philippine
110. Zimmer, Zachary, Jagger, Carol, Chiu, Chi-Chun, Ofstedal, Mary Beth, Rojo, Florencia, Saito, Yasuhiko, 2016, Spirituality, Religiosity, Aging and Health In Global Perspective: A Review, SSM-Population Health, 2(2016) 373-381, doi:10.1016/j.ssmph.2016

### GENERAL REFERENCES

111. Aging Societies definition: <https://www.un.emb-japan.go.jp/jp/statements/okamura071316.html>
112. Bulacan Province Statistics Data from the Philippine Statistics Authority <https://psa.gov.ph/content/bulacan-quickstat-june-2018>
113. Happiness and Aging <https://psycnet.apa.org/record/2018-03780-007>
114. Help Age International Data Base <https://www.helpage.org/resources/ageing-data/global-ageing-statistics/>
115. Oxford Happiness Survey <https://www.happiness-survey.com/>
116. Philippine Country Report on Caring Societies [https://www.academia.edu/36343596/PHILIPPINE\\_COUNTRY\\_REPORT\\_12\\_th\\_ASEAN\\_and\\_Japan\\_High\\_Level\\_Officials\\_Meeting\\_HLOM\\_on\\_Caring\\_Societies](https://www.academia.edu/36343596/PHILIPPINE_COUNTRY_REPORT_12_th_ASEAN_and_Japan_High_Level_Officials_Meeting_HLOM_on_Caring_Societies)





117. Rogerson, Andrew and Stacey, Simon (2018), Successful Aging in Singapore, Geriatrics doi:10.3390/geriatrics3040081
118. Singapore Statistics Office Data Base <https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-structure/latest-data>
119. South Korea Statistics Office Data Base <http://kostat.go.kr/portal/eng/index.action>
120. World Bank Data Base <https://data.worldbank.org/>
121. World Health Organization Aging and Health <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
122. Wozniak D, Jopp DS (2012) Positive Gerontology: Well-Being and Psychological Strengths in Old Age. J Gerontol Geriatric Res 1:e109. doi:10.4172/2167-7182.1000e109