

大学院教育支援機構（DoGS）海外渡航助成金 報告書

Outcome report

計画名 Plan	Association between Expectations Regarding Ageing with Cognitive Health: a study on healthy ageing in Nueva Ecija, Philippines.
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渡航計画の概要 Outline of the travel plan

The impact of ageism on health

Stereotypes about aging can have a significant impact on how someone experiences the aging process (Allen, 2016; B. R. Levy et al., 2022, 2023). According to the stereotype embodiment theory, beliefs about healthy aging can be internalized and influence peoples' actions, feelings, and thoughts across the lifespan (Levy, 2009). The theory states that when negative stereotypes about aging are internalized, as in a self-fulfilling prophecy, the chances of having health issues such as heart diseases (Levy et al., 2009) and mental illness increase (Gum & Ayalon, 2018; Han, 2018; B. R. Levy et al., 2022). This would occur because individuals who believe that aging is a period of inevitable health decline tend to be more susceptible to environmental stress and are often more likely to adopt poor health practices (Levy, 2009). Furthermore, such beliefs make them predisposed to engage in discriminatory behavior and hold prejudiced views (Rupp et al., 2006; WHO, 2021). Two meta-analyses conducted in the previous 10 years support this idea, showing that negative beliefs about ageing are associated with lower cognitive function and lower mental health (Hu et al., 2021; Lamont et al., 2015)

However, evidence about how stereotype embodiment is manifested comes mostly from western countries. Although some authors believe that concepts about aging originated in the west may not fit eastern cultures due to traditional values of respect towards older adults, recent literature indicates that negative attitudes toward older adults is growing in the region, especially in Japan (Hsu et al., 2023) and it may be an important factor on the way to promote health behaviors (Osawa et al., 2024).

In the current research, we assess for the first time the association between ageism on cognitive and mental health of Filipinos, and we explore how this relationship may be mediated by health behaviors (active lifestyle). Here, we consider as health behavior the activities indicated as a protective factor of cognitive health. Among them, engagement in physical, leisure and social activities, smoking and alcohol consumption and nutrition (Livingston et al., 2020). We measure the stereotype dimension of ageism through the Expectation Regarding Ageing (ERA-12) questionnaire, which in our previous study had good reliability and consistency in a sample of young Filipinos (Tolentino & Kakihara, 2024).

We also included a direct assessment of cognitive health through the WAIS-IV Digit Span test. Finally, we assess mental health of participants using different measures that are explained in detail in the next section. We hypothesize that: Ageism will have a significant effect on behaviors; behaviors will have a significant effect on cognitive and mental well-being, ageism will have a significant effect on cognitive and mental well-being mediated by behaviors.

Methods

Sample

The study used a cross-sectional design. Participants were recruited through word-of-mouth from different sectors of a state university in Muñoz city, from two High-Schools in San Jose city, and from a community center (barangay) in San Jose city. Recruitment was conducted through emails and in person communication. Criteria for participation included: residence in San Jose or Muñoz city (Nueva Ecija), being 50 years or older, have no historical of depression and psychiatric disease. In total 75 (44 females) Filipinos with a mean age of 59.5 (SD = 6.6) qualified as participants. On the day of the baseline assessment, participants received informed consent forms containing information about the procedure, research purpose, and voluntary participation. They were informed that in case of withdrawal or absence, their decision would not have any impact on academic scores. All the participants gave consent to participate. The data collection was given an ethical clearance by the Central Luzon State University (CLSU) and Kyoto University (KU) ethics board. Data was anonymized using codes.

Procedure and Analysis

The research followed a cross-sectional design. The objective of the study was: (a) To investigate the impact of ageism on psychological well-being of older Filipinos. (b) To assess how engaging in health behaviors mediates the effects of ageism on psychological well-being. We aimed for around 80 participants considering statistical power of 80% to detect a medium effect size. Structural equation modelling (SEM) will be conducted to test the mediation effect of an aggregated score of health-related behaviors (active lifestyle) on the correlation between a psychological well-being index and ageism. We expect that ageism will have a direct effect on health which is mediated by health behaviors (see **figure 1**).

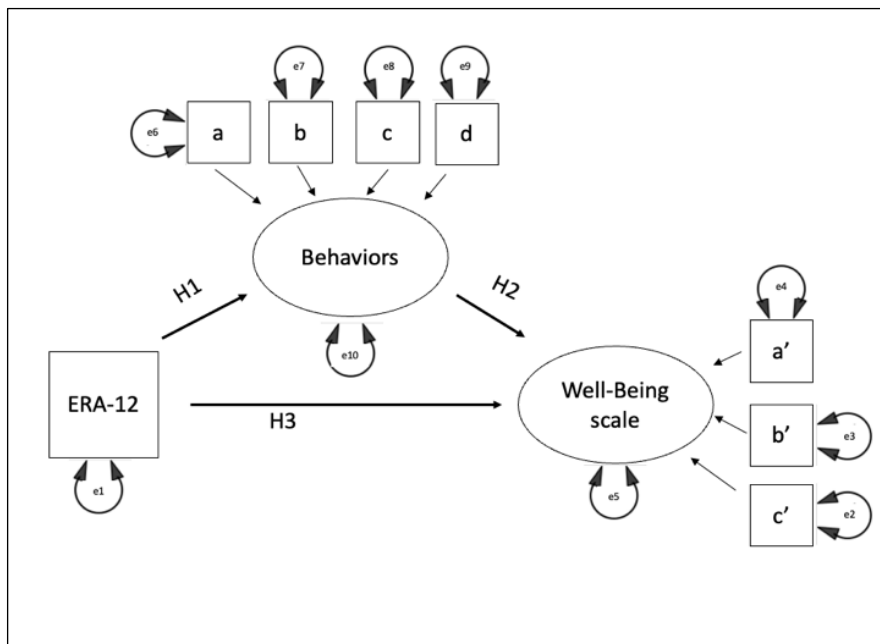


Figure 1: H1 - ERA-12 has a significant effect on behavior, H2 - Behaviors have a significant effect on cognitive and mental well-being, H3 – ERA-12 has a significant effect on cognitive and mental well-being controlling for behaviors. a', b' and c' = Digit Span and , , c'= 3 items loneliness. a = physical, leisure activities and sleep social engagement, c=nutrition.

Announcement about the research was made inside the university and in community centers and two high schools from the region (**figure 2**). The announcement informed potential participants about the project, and the inclusion criteria. People in CLSU who demonstrated interest contacted by phone or mail the main investigator to make an appointment at CLSU to receive oral and written information. All the questionnaires and information in the study were translated and given in Tagalog and English. Research staffs from CLSU were trained by the main investigator to help in data collection. The time to finish the questionnaire was around 45min and the interviews were made one-by-one with a research staff guiding them through the questions. The cognitive test was conducted by two research staffs with experience in psychometric evaluation and the main investigator. Participants were blinded for the topic ageism to avoid demand characteristic bias in their responses. If they knew that we were expecting to find an association between ageism and their psychological well-being status, it may have affected their responses (McCambridge et al., 2012). Translations were made by a professional translator recommended by CLSU. The main data collection started in the first week of October 2024 and last approximately 2 weeks.



Figure 2: Field research in “Barangay Porais”, community center in Porais region (San Jose city – Nueva Ecija).

Instruments

Ageism:

The ERA-12 was used as a proxy of participants level of ageism (stereotype dimension). The survey is a short version of ERA38 that was created to measure the extent to which individuals expect to experience an age-related decline based on their idea about older age (Sarkisian et al., 2002, 2005). The long version of the questionnaire was indicated as the only among 11 ageism scales to achieve minimum requirements for psychometric validation (Ayalon et al., 2019), and the shorter version captures 88% of the variation in the ERA-38 (Sarkisian, Steers, et al., 2005). The ERA-12 consists of 12 questions related to three different scales: expectations regarding physical health (Items 1 to 4), expectations regarding mental health (Items 5 to 8), and expectations regarding cognitive function (Items 9 to 12). Sentences such as “I expect that as I get older, I will become more forgetful” are judged in a 4-level likelihood scale: definitely true, somewhat true, somewhat false, and definitely false. Higher scores indicate higher expectations regarding aging, and lower scores indicate expected health decline. As sentences are negative stereotypes, “definitely true” is coded as 1, whereas “definitely false” is coded as 4. Internal consistency (Cronbach’s coefficient alpha) for the scales measured by ERA-12 exceeded 0.75 in a population of older adults (Sarkisian et al., 2005). A three-week test-retest conducted with subjects of our previous study indicated an acceptable reliability of the scale for longitudinal measurement ($r = .74$) (Tolentino & Kakihara, 2024).

Participants also reported their age, gender, number of siblings, and mother and father’s level of education.

Psychological well-being:

Here we assess different dimensions of mental well-being. To measure social isolation three items of the loneliness scale of the University of California (Russell et al., 1978), as it was assessed in the Filipino Longitudinal study of Ageing . The items include how often one feels a lack of companionship, how often one feels left out, and how often one feels isolated from others. We also included the WHO-5 a widely recognized and validated tool for assessing subjective well-being and has been used in numerous studies across various

populations (Topp et al., 2015). Finally, we included three dimensions of the The Well-Being Assessment (Adult - 24 items), Life Satisfaction, Meaning and Purpose, and Financial Evaluation (Lee et al., 2021).

Health Behaviors:

Here we assess the frequency of engagement in physical or leisure activities. Questions will be based on WHO's Global Physical Activity Questionnaire (GPAQ)(Armstrong & Bull, 2006). For example: "In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?".

Social activities will be measured using the social capital framework. The framework consist of two dimensions, cognitive and structural. The former refers to how people perceive social relations in their community (eg, trust of others, mutual help, and community attachment), while the latter component captures what people actually do (eg, informal socialising with their neighbours and participation in social activities) (Hikichi et al., 2017).

We also included assessment of habit related to nutrition, smoking and alcohol consumption based on WHO's guideline of healthy ageing.

成果 Outcome

Figure 3 shows the characteristics of the study participants. Of the 75 respondents, 60% were female and 50% were married. Their mean age was 59.48 years (SD = 6.61) and approximately 56% had received less or equivalent to high school education. The proportion of female participants in the study was relatively higher than the proportion in the general Filipino population of older people, and the level of education of our sample is also relative higher. In further analysis we use gender, education and age as covariates.

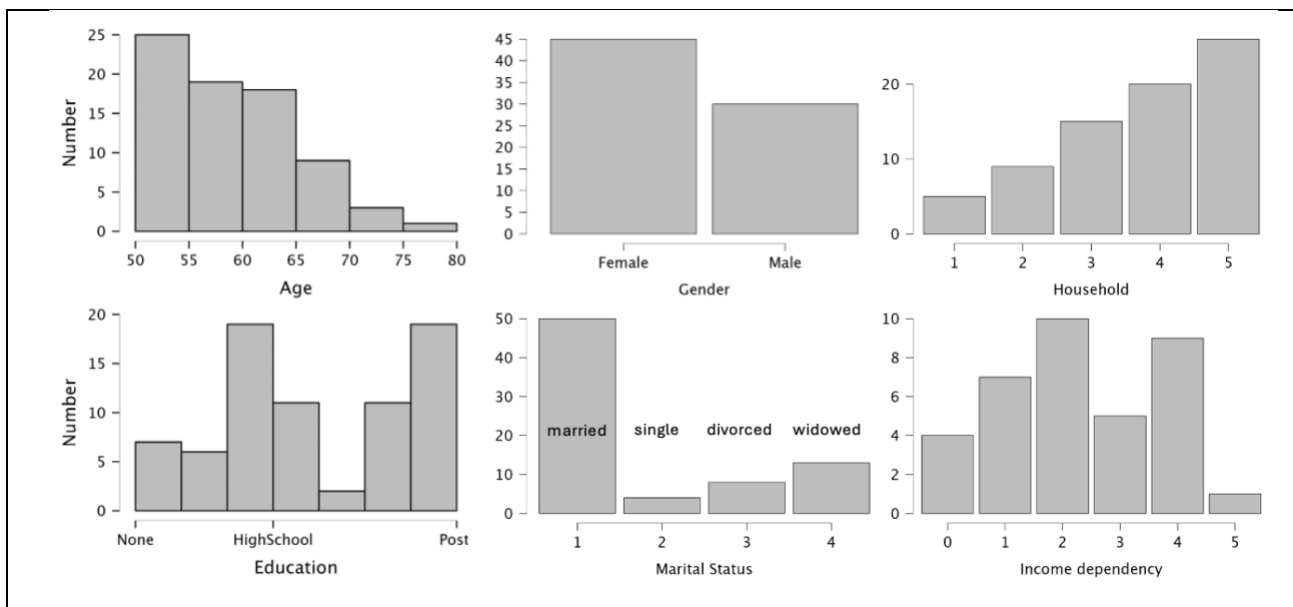


Figure 3. Socio-demographic characteristics: First row from the left to the right shows distribution of participants based on age, gender, and number of members in the household. Second row shows educational status (1 = none, 2 = nursery school, 3 = some high school, 4 = finished high school, 5 = some college credit, 6 = technical vocational training, 7 = Bachelor degree, 8 = Master or Doctoral degree), marital status, and number of members in the household that are dependent on their income.

Table 2 displays descriptive statistics for the ERA-12 scores. On average, respondents had low scores for the ERA-12. Most participants believed to be somewhat true or definitely true most of the negative stereotypes about ageing, especially regarding physical health (items 1 to 4).

Table 1

Percentage of Answers for Each Question of ERA-12.

	Definitely true	Somewhat true	Somewhat false	Definitely false
1. When people get older, they need to lower their expectations of how healthy they can be.	48	41.33	5.33	5.33
2. Having more aches and pains is an accepted part of aging.	70.67	26.67	2.67	0
3. The human body is like a car: When it gets old, it gets worn out.	72	24	4	0
4. Every year that people age, their energy levels go down a little more.	69.33	30.67	0	0
5. I expect that as I get older, I will spend less time with friends and family.	21.33	45.33	17.33	16
6. Being lonely is just something that happens when people get old.	34.67	30.67	20.00	14.67
7. As people get older, they worry more.	40	49.33	6.67	4
8. It's normal to be depressed when you are old.	32	33.33	24	10.67
9. I expect that as I get older, I will become more forgetful.	30.66	54.67	12	2.67
10. It's an accepted part of aging to have trouble remembering names.	28	50.67	13.33	8
11. Forgetfulness is a natural occurrence just from growing old.	44	44	9.33	2.67
12. It is impossible to escape the mental slowness that happens with aging.	36	46.67	13.33	4

We aggregated the participants' behavior measures in a single index of active lifestyle (Active Life Index). The index included the questions on physical activity, hobbies, nutrition and drinking/smoking habits, and social behavior. Level of active lifestyle was varied across different questions. For example, while more than 80% never or rarely drink alcohol and did not smoke, just 33 % always or frequently eat fresh vegetables and fruits.

45% indicated they rarely or just sometimes have a good quality sleep, and about 30% never or rarely engaged in moderate intensity physical activities. We then compared the Active Life Index with the total ageism scores.

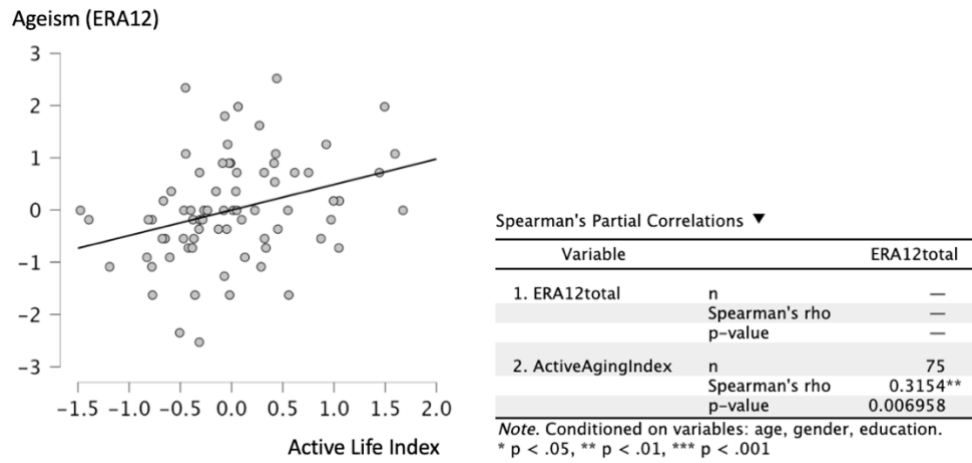


Figure 4: Expectations Regarding Aging (ERA-12) scores and active life index correlation. Higher scores in ERA-12 means more positive expectations. Higher scores in the active life index means more active. Correlation was controlled for age, gender, and education.

Then we aggregated the measures of executive function in a single cognitive index. The association between ERA-12 scores and digitspan total score was not significant. The aggregated cognition score showed a significant positive association. Both cognitive measures were significant correlated as expected.

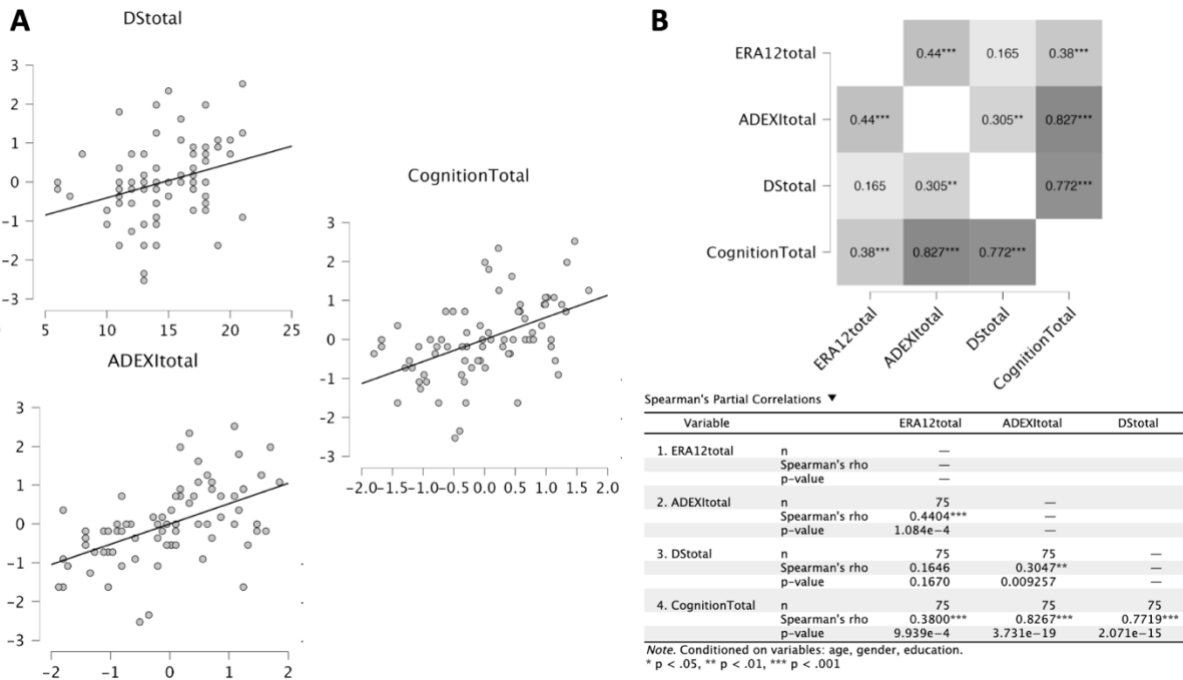


Figure 5: The correlation plots in **A** shows the linear relationship between ERA-12 scores and the digit span total scores (forward and backward), ERA-12 and the ADEXI total score and ERA-12 and cognition total scores (Digit Span + ADEXI). **B** shows the heat map with Rho and significance results. We controlled for age, gender and education.

Then we conducted a structural equation modelling to test our main hypothesis. Here we used the ERA-12 total score, Cognitive total score and the Active Life Index. The analysis was performed using the lavaan package in R. The analysis utilized Maximum Likelihood (ML) estimation with the NLMINB optimization method. The sample comprised 74 observations, and the model estimated 11 parameters. The direct effect of ERA-12 on Cognition was significant (Estimate = 0.209, $p = 0.011$), suggesting that positive expectations may impact cognitive health. The direct effect of Ageism on Active Life Index was significant, (Estimate = 0.194, $p = 0.014$) indicating that subjects with higher expectations are more active. The direct effect of Active Life Index on Cognition was also significant (Estimate = 0.340, $p = 0.004$), implying that more active subjects have a better cognitive health. Finally, the indirect effect of Ageism on Cognition through Active Life Index was not significant (Estimate = 0.066, $p = 0.061$), indicating that active lifestyle was not a mediator.

We conducted the same analysis with the mental well-being composite index. The direct effect of ERA-12 on mental well-being was not significant (Estimate = 0.04, $p = 0.543$). The direct effect of Ageism on Active Life Index was significant, (Estimate = 0.203, $p = 0.006$), in line with previous analysis. The direct effect of Active Life Index on mental well-being was also significant (Estimate = 0.253, $p = 0.011$), implying that more

active subjects have a better mental well-being. Finally, the indirect effect of Ageism on mental well-being through Active Life Index was not significant (Estimate = 0.051, $p = 0.062$), indicating that active lifestyle did not mediate the effect of ageism on mental well-being.

To explore whether the null association between ageism and the mental well-being index was due to our theoretical construct, we conducted a set of correlation analyses with ERA-12 and its mental dimension with the subdimensions of well-being index. We observed a significant correlation only between the general well-being scores (WHO-5) and expectations regarding mental well-being (ERA12mental), which would not survive a posterior correction for multiple comparisons.

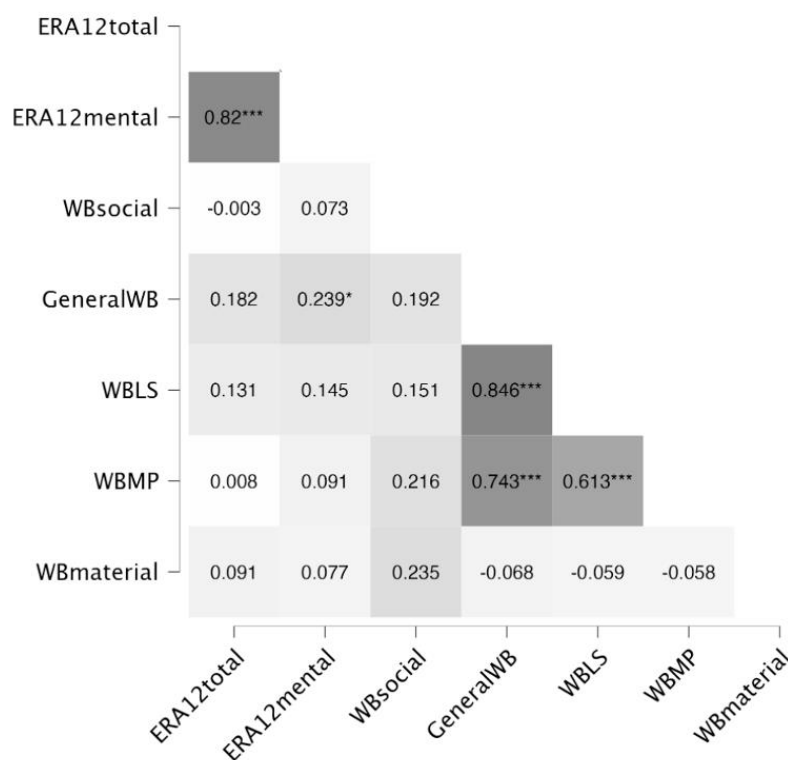


Figure 6: The heatmap shows the spearman correlation between ERA-12 and its mental dimension (ERA12mental) scores and the dimensions of well-being: social (WBSocial), general or WHO-5 (generalWB), life satisfaction (WBLs), meaning and purpose (WBMP) and material (WBmaterial). Controlled for age, gender and education.

今後の展望 Prospects for the future

The results of this research project showed that Filipino adults who expected to maintain high levels of health when they get older, were more likely to show better cognitive health. A structural equation modelling analysis indicate that expectations regarding ageing has an impact on cognitive status after controlling for the covariates (age, gender and education) but this association was not mediated by an active lifestyle index.

Nevertheless, we observed a significant positive correlation between expectations and an active lifestyle, as well as active lifestyle and cognition, suggesting that an increase on sample size could reveal the indirect effect on our results.

Besides being the first to address these associations with a Filipino sample, our study has several other strengths. First, our dataset offers an indicator of cognitive performance through a direct test, thus it avoided the bias of cognitive self-assessment, such as cultural influence. Second, a novel aspect of the present study is the use of active lifestyle as a mediator between ageism and cognitive and mental well-being. It adds to the study of Osawa et al., (2024) which found an association between positive views on aging and active lifestyle in a sample of older adults in Japan.

We could not find an association between ageism and mental well-being outcomes. One possible explanation is the characteristics of our sample. Both demographical and cultural aspects could have influenced the results. For example, literature on Filipino psychology indicate the importance of the concepts of “kapwa” and “kalikasan”, on the formation of Filipino well-being (Cervantes, 2023). Kapwa is the concept of self in the others, or social relationships, while kalikasan is our relationship with the natural environment we live in. Kalikasan concept in Filipino psychology have origin on traditional animist culture which to some extent resembles Japanese Shintoism (Samaco-Zamora & Fernandez, 2016), while Kapwa may be explained through the perspective of collectivist society (Krys et al., 2022). Our sample showed a relatively high social activity and social well-being, is it possible that a ceiling effect may have occurred. In addition, most of them were relatively well-educated what could have biased the results. Further studies may benefit from a more representative of the whole Filipino population and larger sample size.

Our findings are in line with the theory of stereotype embodiment which predicts that stereotypes about aging may impact our decisions, lifestyle, and further influence our health status in older age (B. Levy, 2009). Several studies have consistently indicated the association between ageism and health (Hu et al., 2021; Kim, 2009; Nakamura et al., 2022), including in longitudinal designs (Avidor et al., 2017; B. R. Levy et al., 2014). It is increasingly recognized that individuals who have positive views about aging tend to have better physical condition, are less likely to develop psychiatric problems (Levy et al., 2014), and live longer (Levy et al., 2002). Moreover, in environments where older adults are respected and institutions are inclusive, people tend to age with good health, feel sense of value, and are more connected to their community (WHO, 2015).

The body of evidence in this literature has important implications for policy making and education. Our previous studies indicate that it is possible to improve the level of expectations regarding age with affordable and educational interventions (Tolentino & Kakihara, 2024). Thus, raising about awareness to ageism may be a first step to bring up a healthy older population which is able to contribute to society and live with dignity. Finally, the findings of the current study raised questions to be addressed in further studies. It will be important to understand the mechanisms behind stereotype embodiment in east Asian countries. Identifying social and cultural factors that may positively interfere in the model created in the west may be valuable to our society.

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