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Expectations regarding aging among ethnically diverse undergraduates in Japan: a life course perspective on anticipated health and meaning in later life

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Abstract

This study explored expectations regarding aging among a diverse cohort of undergraduates in Japan. A concurrent mixed methods design was employed with online administration of the Expectations Regarding Aging scale (ERA-12), and open-format and demographic questions among 133 culturally diverse undergraduates in Tokyo. Independent samples *t*-tests, one-way analysis of variance (ANOVA), descriptive statistics, and thematic analysis were used to explore the data. ERA-12 scores and physical and cognitive function subscale results revealed negative perceptions about the aging process, while scores on the mental health subscale were significantly higher and positive. No significant differences emerged based on gender or cultural background. Qualitative data analysis revealed student awareness of lifestyle influences on health in later

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life, concerns about current health and risk factors, and potential to transcend negative physical changes by finding meaning in other aspects of life. Understanding expectations regarding aging among younger cohorts may inform gerontological education and public health promotion to support a life course approach to healthy aging.

Keywords: health expectancy, healthy aging, life course, young adults.

Introduction

Japan leads the world in population aging and has been referred to as a super-aged society due to rapid declines in birth rate and a demographic shift toward older ages (Muramatsu & Akiyama 2011). Within the next 50 years, up to 41% of Japan's population will be aged 65 years or older, which will have major impacts on public health services, social security, and intergenerational relations (National Institute for Population and Social Security Research 2017). At the same time, Japan's population is also becoming more diverse as younger adults from overseas take up new educational opportunities and fill employment vacancies, resulting from Japan's changing demographic structure (Hashimoto 2017). In the last decade, for example, there has been a 10% annual increase in university enrolments among international students, with nearly 500,000 currently in Japan and 37 universities offering government-funded bilingual education programs (Japan Student Services Organization 2019). To ensure that the increasingly diverse and aged population of Japan lives a healthy and active life, it is necessary to understand and promote health across the life course. This is because the majority of diseases that drive morbidity and mortality in Japan and similarly developed nations have their origin in behavioral and environmental factors from early adulthood, including poor diet, inactivity, tobacco use, and others (Lynch & Smith 2005). In this context, investigations of younger adults' expectations about aging can be useful as these may influence long-term behavioral and health outcomes.

The theoretical rationale for investigating younger adults' expectations about aging comes from the Life Course Perspective (Bengtson & Allen 2009). The Life Course Perspective asserts that the experience of aging is closely tied to perceptions, behaviors, life chances, and sociocultural

conditions that have cumulative impacts over one's life (Bengtson & Allen 2009). In the last two decades, there has been growing interest from health researchers and clinicians concerning the relationship among early life perceptions, behaviors, and environmental/cultural factors that ultimately influence morbidity and mortality outcomes in later life (Karmali & Lloyd-Jones 2013; Li et al. 2009; Wethington 2005). Expectations regarding aging is the operational concept for the present research, which describes perceptions about the capacity to achieve and maintain high levels of physical, mental, and cognitive functions in later life (Sarkisian et al. 2005). Importantly, expectations about aging not only are related to general conceptualizations about others or the current generation of older adults but also include an individual's self-referential projections about their possible future physical, mental, and cognitive health states (Faudzi 2019; Sarkisian et al. 2005). This is an important concept from a Life Course Perspective as expectations for physical and mental declines in old age may foreshadow disengagement from health-protective behaviors in early and midlife or reinforce negative stereotypes about the capabilities and roles of older adults (Herman et al. 2014; Hirvensalo & Lintunen 2011). This is relevant given recent epidemiological data that show widespread reductions in healthful lifestyle behaviors and increases in obesity among younger adults in Japan, which portends poorly for health in middle and later life (Matsushita et al. 2004; Tomkinson et al. 2019). It has also been reported that the early biomarkers of cardiovascular disease and other chronic health concerns have been observed among young adults, which suggests the need to consider lifestyle-related morbidity as a life course issue (Karmali & Lloyd-Jones 2013). To date, most studies of expectations regarding aging have been undertaken with cohorts over 45 years of age (Beser et al. 2012; Joshi et al. 2010; Kim 2009; Li et al. 2013), with comparatively less evidence reported among younger adults.

The Expectations Regarding Aging scale (ERA-12) is the most widely applied measure of health-related perceptions of aging, which has been validated in English, Chinese, Korean, and Turkish (Beser et al. 2012; Joshi et al. 2010; Kim 2009; Li et al. 2013; Menkin et al. 2017; Sarkisian et al. 2005). Research that utilizes the Expectations Regarding Aging construct (and the ERA-12 as a measurement tool) is most commonly undertaken within the disciplines of preventive medicine and clinical gerontology,

where the focus is on understanding potential precursors of long-term health-protective or health-risk behaviors or facilitating improved clinical service delivery for older adults (Davis et al. 2011; Joshi et al. 2010; Menkin et al. 2017). Studies of older and middle-aged adults using the ERA-12 have frequently identified negative expectations for aging on the overall scale as well as constituent physical, mental, and cognitive function subscales (Beser et al. 2012; Joshi et al. 2010; Kim 2009; Li et al. 2013). Among these cohorts, ethnic, gender, and occupational differences in expectations have also been reported (Davis et al. 2011; Menkin et al. 2017). Notably, only a cohort of middle-aged physicians from North America have shown comparatively high and positive expectations across physical, mental, and cognitive domains (Davis et al. 2011), which may indicate an important role for health knowledge in moderating expectations. Across all studies and cohorts, physical health and cognitive function expectations have been reported as considerably lower than expectations for mental health (Beser et al. 2012; Davis et al. 2011; Joshi et al. 2010; Kim 2009; Li et al. 2013).

Beyond research undertaken with middle-aged and older adults, two North American studies have explored the specific concept of health-related expectations regarding aging among younger people using the ERA-12 measure. These two studies employed modest samples of undergraduate gerontology and postgraduate medical students (Silver et al. 2016; Wiese et al. 2014). The results of these studies showed that younger adults held higher baseline expectations regarding aging than older adults, although the overall and subscale scores for expectations remained negative (Silver et al. 2016; Wiese et al. 2014). While studies of health-related expectancies related to aging are relatively scarce among younger adults, research into the more general construct of attitudes to aging is more common. The difference between the aforementioned concepts is that expectations regarding aging are self-referential (referring to personal anticipations about future self and experiences) in addition to providing general conceptualizations about older adults and aging and focused specifically on components of human health, whereas attitudinal studies are often oriented toward perceptions of others or society and address a broader range of psychosocial issues (Sarkisian et al. 2005).

The general construct of attitudes toward aging has been defined and measured in at least 10 different ways within the psychological and sociological literatures (see the Attitudes to Aging Questionnaire/AAQ, Anxiety about Aging Scale/AAS, Aging Perceptions Questionnaire/APQ, Aging Semantic

Differential/ASD, Kogan Scale, and others) (Barker et al. 2007; Kogan 1961; Laidlaw et al. 2007; Lasher & Faulkender 1993; Rosencranz & McNevin 1969). In contrast to expectations about aging (as measured using the ERA-12), the concept of attitudes to aging typically extends well beyond health to include such matters as fear of older people, physical appearance changes, wisdom development, received respect, stereotypes, matters relating to agism, and other issues (Iwasaki & Jones 2008; Kogan 1961; Lasher & Faulkender 1993; Rupp et al. 2005). Attitudes toward aging have been shown to vary considerably by country and culture, yet negative perceptions are often reported across a wide variety of domains and age cohorts (Holroyd et al. 2009; Löckenhoff et al. 2009). International comparative studies of younger adults have shown that, with the exception of a small number of geographic locations, there appears to be prevailing negative consensus regarding age-related reductions in attractiveness, capacity for everyday tasks, and capacity for learning (Löckenhoff et al. 2009). While attitudes to aging research provide a complementary area to expectations regarding aging, the latter concept is arguably more useful for elucidating specific health-related perceptions. Moreover, a recent systematic review of studies about perceptions of aging (broadly defined) identified the ERA-12 as among the top two (of 12 evaluated measures) most psychologically robust measures with a unique health-related construct in aging research (Faudzi et al. 2019).

Drawing on the Life Course Perspective and the current literature regarding aging expectations and attitudes, this research had two main objectives: 1) to explore health-related expectations regarding aging using the valid and reliable ERA-12 scale among a diverse cohort of university undergraduates in Japan and 2) to reveal subjective themes that potentially explain younger adults' expectations about later life and the aging process. The present research extends the existing literature on aging expectations in four important ways: 1) it represents the first time that the health-related concept of expectations regarding aging has been reported among cohorts in Japan; 2) it is one of only a small number of international studies to address expectations regarding aging among younger adults – assisting the development of a global evidence base; 3) it employs a concurrent mixed method approach that incorporates both quantitative and qualitative data – providing a more comprehensive perspective on perspectives about aging; and 4) it offers reliability and validity estimates for the ERA-12 with younger adult populations.

Methods

Design

A concurrent mixed methods design (QUAN-QUAL) was employed in this study (Creswell & Creswell 2017), which incorporated a valid and reliable scale augmented with open-format questions. This design permitted the collection of multiple data types, triangulation of findings, and an in-depth examination of the research issues (Creswell & Creswell 2017; Torrance 2012). An online survey methodology was employed to gather data from cohorts of undergraduate health students in Tokyo as this mode was considered to be both efficient and acceptable for technologically savvy younger adults. Data were collected using Google Forms, which respondents accessed during their discretionary time via a password-protected instance of Moodle 3.5 educational software.

Setting and Sample

The target sample included all undergraduate students (all subjects sampling; $N = 202$) who were enrolled in an English-language health science course at a bilingual Japanese university. The target university is one of only two completely bilingual tertiary institutions in Japan, so sampling the entire cohort of students enrolled in a compulsory health science course provided a relatively high level of representation of the growing number of students who participate in bilingual education. The setting was also chosen as enrolments included a relatively even split of English-speaking individuals who were born and educated in Japan and those who were born and educated in other countries. The unique composition of the program allowed the research to control for country of birth and prior education, potentially highlighting variations in aging expectations between Japanese and international students who have experienced a diversity of sociocultural conditions. The focus on bilingual and international students was also undertaken to reflect the changing demographics of Japanese society, particularly among younger age cohorts. All students who were enrolled in the course were invited to participate in the study between 2018 and 2019, and surveys were completed voluntarily (i.e. survey completion was not linked to course grade). Students were informed

of study aims and notified that submission of the online survey represented consent for the reporting of anonymized data. All respondents had native level or high English-language competence. This study was reviewed and approved by an institutional human research ethics committee (reference number 2017-23).

Measures

The ERA-12 scale was the primary data collection tool in this study. This measure was originally developed and administered by Sarkisian et al. (2005) in the United States. It has demonstrated acceptable reliability (α = 0.89) and validity (content, concurrent, and construct) among older and younger adults from several countries (Joshi et al. 2010; Sarkisian et al. 2005; Silver et al. 2016; Wiese et al. 2014). The ERA-12 contains 12 statements about aging and three subscales addressing physical, mental, and cognitive functions (Sarkisian et al. 2005). Each scale statement expresses negative sentiment about aging (e.g. *Having more aches and pains is an accepted part of aging; It is normal to be depressed when you are old*; and *Forgetfulness is a natural occurrence just from growing old*) and is scored on a four-point Likert-type scale (1 = definitely true, 2 = somewhat true, 3 = somewhat false, and 4 = definitely false). Following survey completion, students were asked a series of follow-up open-format questions to elicit more comprehensive understanding about their expectations. The questions were worded as follows: *In a few sentences, please describe what you expect that your health and life will be like when you are aged over 65 years*; *How, if at all, do you think you current lifestyle or behavior may affect your future health*; and *Is there any other information that you can provide that could explain your health-related expectations about aging?* Demographic information was also collected from respondents, including age, gender, undergraduate year-level, country of birth, and location of previous educational institution.

Analyses

Quantitative data were initially cleaned, and the distribution was investigated using the Kolmogorov–Smirnov statistic to determine the appropriateness of tests of significance. Internal consistency (Cronbach's alpha)

and construct validity (Principal Component Analysis factor loadings) were checked to ensure that the results conformed with internationally reported reliability and validity estimates. Scores were recoded based on the ERA-12 scoring protocol (Sarkisian et al. 2005). The protocol requires that an overall score (out of 48) and subscale scores (out of 16) be recoded into scores out of 100. Total ERA-12 and subscale scores were determined based on existing scoring protocols and previous research publications (Sarkisian et al. 2005). Independent samples *t*-tests were used to explore potential differences in overall and subscale scores related to cultural background and gender, while descriptive statistics were used to report other sample characteristics. A one-way analysis of variance (ANOVA) with post-hoc tests (Turkey HSD) was undertaken to identify potentially significant differences at the subscale level. The significance level for determining potential differences between groups was set at $p < 0.05$. All statistical analyses were conducted using SPSS (version 25).

Responses to the open-format, qualitative questions were analyzed thematically using QSR NVIVO software (version 12) and coresearcher collaboration (Lofland et al. 2006). A four-step analysis procedure was undertaken as follows: 1) categorical coding (organizing student comments into basic descriptive categories), 2) analytic coding (grouping categorical codes based on latent or underlying themes within the data), 3) memo and theme development (development of rich thematic descriptions of the emergent ideas), and 4) coresearcher verification of thematic descriptions and exemplar quotations. This process was based on other published reports of qualitative health research (Annear & Lucas 2018) and is often described in the literature as inductive thematic analysis (Annear & Lucas 2018; Lofland et al. 2006).

Results

In 2019, 133 health science students (66% response among 202 eligible students) completed the ERA-12, open-format interview questions and demographic questions. After cleaning and evaluation of the dataset (five duplicate cases were removed), ERA-12 responses were found to conform to a normal distribution (Kolmogorov–Smirnov = *ns*). The ERA-12 displayed acceptable internal consistency reliability ($\alpha = 0.80$) and construct (factorial) validity. Data from the PCA verified the presence of three

components (subscales) with eigenvalues exceeding 1.00, explaining 32% (physical health), 12% (mental health), and 10% (cognitive function) of the variance (54% cumulative variance), respectively, and corresponding to the originally published scale (Sarkisian et al. 2005). Loadings for component one (physical health) subscale ranged from 0.49 to 0.74. Loadings for component two (mental health) ranged from 0.51 to 0.75. Finally, loadings for component three (cognitive function) ranged from 0.43 to 0.84. Beyond the scale data, all participating students provided qualitative statements about their expectations regarding aging in answer to the open-format questions, which provided a large set of subjective data (≈5000 words of textual data). Among the sample, there were more female respondents consistent with enrolments at the target university. Slightly more than half of all students were born and educated in Japan. Demographic characteristics and ERA-12 scores are summarized in Table 1.

ERA-12 Scale and Subscale Scores

Across the diverse student sample, the mean ERA-12 overall score was 44.84 out of 100, indicating relatively negative health-related expectations regarding aging. Mean subscale scores were also computed, and only the mental health subscale showed comparatively positive expectancies regarding aging with large differences observed in relation to scores on the other two subscales. The data showed relatively positive sentiment in relation to expectations for mental health items (depression and loneliness in later life), but more negative expectations in relation to physical health (expectations for pain and functional impairment) and cognitive function (expectations for memory problems). The results of a one-way ANOVA confirmed that there was a statistically significant difference between the three subscales, and post-hoc testing revealed a large difference between the mental health subscale and the other two (physical and cognitive subscales), F (2, 398) = 78.364, $p < 0.001$, $\Pi^2 = 0.28$ (large effect) (see Table 1 for subscale means and standard deviation [SD]). At the item level, highest scores were identified in relation to the statement concerning time with loved ones, with majority of respondents holding the comparatively positive expectation that they will spend more time (not less) with family and friends as they age (M = 3.02; SD = 0.84). Lowest scores were related to the statement concerning physical breakdown (physiological entropy), with a

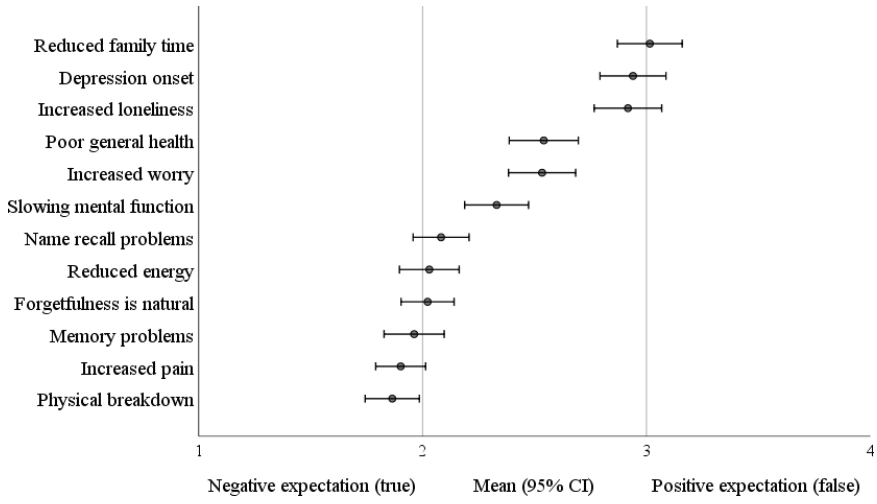
Table 1. Respondent demographic information and ERA-12 scale scores (N = 133)

Mean age (SD) and range	19 years (1.89); 11 years (17 – 28)
Gender, *n* (%)	Female, 87 (65%)
	Male, 46 (35%)
Birth country, *n* (%)	Japan, 74 (56%)
	USA, 28 (21%)
	China, 8 (6%)
	Other, 23 (17%)
High-school location, *n* (%)	Japan, 69 (52%)
	USA, 32 (24%)
	China, 9 (7%)
	Other, 23 (17%)
Academic year level, *n* (%)	First, 121 (91%)
	Second, 8 (6%)
	Third, 2 (1.5%)
	Fourth, 2 (1.5%)
ERA-12 scores (mean and SD/100)	
Total score	44.84 (14.70)
Mental Health Subscale (items 5–8)	61.71 (20.85)
Cognition subscale (items 9–12)	36.65 (18.55)
Physical health subscale (items 1–4)	36.15 (17.58)

majority of respondents holding the comparatively negative expectation that their body will inevitably wear out over time like a piece of machinery (M = 1.86; SD = 0.70). Item level scores are summarized in Figure 1.

Independent samples T-tests were conducted to evaluate potential differences in expectations based on gender and cultural backgrounds. These analyses revealed no significant differences between students who were born or educated in Japan and those who were born or educated outside of Japan in relation to either total ERA-12 score or subscale scores, $t(131) = -0.28$ to -1.62; p = ns. There were also no significant differences in terms of male and female students in relation to ERA-12 scores and

Figure 1. Mean ERA-12 item scores and confidence intervals (*N* = 133)



subscale scores, $t(131) = -0.27$ to -1.59; p = ns. These data indicate a relatively stable and consistent set of expectations regarding aging on the basis of both gender and cultural backgrounds. Age and year level were relatively similar across the cohort (88% of the sample were aged between 18 and 20 years and 91% were first year students), so tests of significance were not conducted with these variables.

Qualitative Statements

Students' subjective comments about their expectancies for health and life after the age of 65 revealed their underlying perceptions of the aging process. Following analytic coding and coresearcher verification, three themes emerged: 1) *lifestyle awareness*, 2) *health challenges and risks*, and 3) *transcendence of the physical body*. No negative or conflicting cases were identified during the analysis. Thematic explanations and exemplar student quotations are outlined later.

Lifestyle Awareness

Students within the sample expressed an understanding of the connection between health in later life and their current lifestyle behaviors. They considered factors such as personal knowledge, lived experiences, and regular habits as positive influences on their current health and held expectations of continued wellness as they age – so long as these behaviors were maintained through the life course. Moreover, some students also wrote about the importance of vicarious experiences of healthy aging from older role models, typically parents or grandparents, who showed that higher levels of physical and mental function are possible at older ages. Exemplar quotations from these students include the following:

> *I feel that I am going to be a relatively healthy person even when I age. From a relatively young age, I have been trying my best to practice habits that will keep my body in a healthy condition, including regular participation in sports and exercise.* (#90, Male, 18 years)

> *I want to remain active every day when I am older. I have seen two ends of the spectrum when it comes to aging, but I have certainly seen from my grandfather that moving about and doing something daily helps him stay mentally and physically healthy and less prone to illnesses.* (#111, Female, 18 years)

> *I plan to continue eating the healthy diet that I was raised on and have a regular habit at the gym. My dad is a personal trainer and nutritionist, so [because of his example and instruction] I am comfortable that I know how to live a life that will lead to good health in my old age.* (#103, Female, 18 years)

Health Challenges and Risk Factors

Some students within the cohort expressed negative expectations about their future health based on their current personal circumstances, family history of disease, or exposure to health risk factors. These issues were considered as limiting current health behaviors or creating future morbidity or mortality risks. Student viewpoints related to this theme were relatively frank and nihilistic in places, and references were again made to the power of familial experiences in shaping expectations about health in later life. Example statements from student participants included the following:

> *My family has a history with diabetes and thyroid issues. I currently have Hashimoto's Disease (my body is attacking my thyroid) and I know a big part of this came from my depression phase after my parents divorced.* (#48, Female, 21 years)

I think I will have been diagnosed with lung cancer by [65] because I [am exposed to] second-hand smoke a lot from my father, who has been a very heavy smoker for a long time. (#35, Female, 18 years)

I believe that I will succumb to the hereditary brain disease that runs in the males in my family and die at around 50–60 years old. I do expect to be relatively healthy mentally and physically until that age. If I do live to be older than 65, I believe my mental health will be in good condition, but my physical condition may be worse. (#89, Male, 18 years)

Transcendence of the Physical Body

While expecting inevitable declines in physical function to different degrees, some students expect to reorient their attention toward emotionally and psychologically rewarding experiences and behaviors associated with close relationships, hobbies, or education/learning activities. In some cases, students assigned more priority to psychological and emotional wellbeing in later life compared to maintaining health and mobility. These students articulated their personal and broad conceptualization of health that included loving and supportive relationships in the context of accepting physical limitations, pain, or illness. Student quotations that embody the concept of transcendence of the physical body include the following:

I hope to be a happy old man even though I may be suffering from some physical pain…To me, being socially and psychologically healthy is much more important than keeping myself physically healthy. (#129, Male, 19 years)

As I am not active, my body will probably be in poor health in later life…However, I have many hobbies, so I will hopefully continue to enjoy doing the things that I love even if I have health complications. I have no idea if I will ever get married, but if I do, I hope I will continue to have a healthy relationship with my partner even after I am old. (#59, Female, 18 years)

I expect my life as an older person to be as exciting as it is now. I think that growing old is part of a great adventure that we are all experiencing. At age 65, there is still a lot to learn as well as do whatever situation life brings me. (#97, Female, 18 years)

Discussion

The Life Course Perspective asserts that experiences in later life are closely linked to accumulated perceptions, behaviors, and sociocultural

conditions that begin early in life (Bengtson & Allen 2009). It is important to understand the expectations regarding aging that are held by younger adults as these may influence future morbidity, mortality, and quality of life via behavioral pathways (Lynch & Smith 2005). Such understanding may also inform the development of educational interventions, gerontology courses, and public health promotion that aim to increase knowledge about healthy aging and human life course. In this section, the results of the ERA-12 survey and open-format questions are discussed with reference to current literature and theories of aging. Research limitations and implications for gerontological education and health promotion are also considered.

Among the student sample, overall scores on the ERA-12 scale were slightly negative, which indicates that on balance, respondents generally perceive old age to be a difficult period of the human life course. Scores were consistent across gender and cultural background among the student cohort (i.e. no significant differences were observed), which suggests that there was homogeneity of expectations at least within the present sample. Overall ERA-12 scores were broadly similar to results reported in studies of graduate medical students and undergraduate gerontology students in the United States (Silver et al. 2016; Wiese et al. 2014). For example, Silver et al. (2016) and Wiese et al. (2014) reported ERA-12 mean scores of 45.86 (SD = 9.05) and 41.20 (SD = 13.70), respectively, among their student samples compared to an overall score 45 in the present study. However, the overall score identified in the present study was considerably higher compared to mean scores from studies of middle-aged and older adults from other countries, which have typically ranged from 23 to 38 (Beser et al. 2012; Joshi et al. 2010; Kim 2009; Li et al. 2013; Sarkisian et al. 2005). The similarity of overall score between the present cohort and studies of North American students suggests a possible trend for age-related declines in expectations regarding aging. It is possible that as people experience more health problems or functional declines with age that they reevaluate and revise their expectations for aging. It is equally plausible, however, that students in health-related education (including gerontological and medical and health science courses) may hold greater awareness or knowledge of the capacities of older adults, and this may explain higher expectancies compared to general cohorts of middle-aged and older adults.

At the subscale level, the pattern of response among younger adults in Japan exhibited both similarities and important differences compared to other age, regional, and professional cohorts who have completed the ERA-12. Specifically, significantly higher expectations for aging were found in relation to the mental health subscale (addressing items related to anxiety, loneliness, and depression) with a positive mean score of 62. These findings are distinct from other studies that have been conducted with younger adult cohorts in North America. For example, in the previous two studies that employed the ERA-12 among younger adults, mental health subscales scores were both in the negative range, with Silver et al. (2016) reporting a mean value of 48.86 (SD = 12.02) and Wiese et al. reporting 37.00 (SD = 17.50) (Silver et al. 2016; Wiese et al. 2014). In the present study, responses on the mental health subscale were the only result that showed relatively high and positive expectations. Comparatively lower and negative, expectancies were observed for the physical health and cognitive function subscales, which is consistent with responses reported in other populations – both younger and older (Joshi et al. 2010; Sarkisian et al. 2005; Silver et al. 2016; Wiese et al. 2014). Higher and positive scores on the mental health subscale identified in the present study are a novel finding that suggests that younger adults in our sample do not perceive a strong connection between aging and the onset or worsening of anxiety, depression, and loneliness. This result accords with other health research, which shows that across the life course mental illnesses are amenable to successful intervention and management (Windle et al. 2010; Wuthrich & Rapee 2013), and other findings that older adults are no more prone to mental health problems than other age cohorts (Kessler et al. 2010). Outside of a single middle-aged health professional cohort (Davis et al. 2011), our study was the only one to show comparatively high and positive expectations on any of the ERA-12 subscales.

Students' qualitative comments augmented and extended the quantitative ERA-12 results. In their response to open-format questions, many students wrote about their awareness of the connection between lifestyle behaviors and long-term health. In particular, students who had active and healthy parents or grandparents often reported positive expectations for their own future aging experiences, which suggests that family relationships, upbringing, or childhood environment may influence appropriate lifestyle behaviors and desirable quality of life outcomes. These positive

expectancies were balanced, however, by comments from other students who indicated that they were living with long-term health problems or that they have a family history of chronic disease or exposures to known risk factors (e.g. second-hand smoke associated with parental tobacco use), which they expected to reduce their health-related quality life as they age. Nihilistic perspectives about physical aspects of the aging process were commonly articulated, which supported negative sentiments identified in the quantitative ERA-12 data (i.e. comparatively low and negative scores on the physical health and cognitive function subscales). Across both the *Lifestyle Awareness* and *Health Challenges and Risks* themes, students indicated that familial factors influenced their health-related expectations, both positively and negatively. This aligns with social ecological theory and research on health behavior, which suggests that family relationships play a critical role in determining the health outcomes and behaviors of younger people via a range of pathways (e.g. role modeling health behaviors, passing on genetic risks, or creating a healthy or unhealthy home environment) (Sallis et al. 2015; Stokols 1992).

Beyond their expectations about the aging body, students also wrote about their anticipation of positive psychological experiences of later life regardless of their physical condition or functional declines. These students considered that their experience of aging could *transcend the physical body* and depend to a larger extent upon such factors as close relationships, meaningful hobbies, or educational activities. This perception reinforced results from the ERA-12 survey, wherein students exhibited high and comparatively positive scores on the mental health subscale (addressing issues of depression, anxiety, and loneliness). This is the first time that such results have been reported among a cohort of younger adults and corroborated across both quantitative and qualitative measures. Such perceptions are not commonly identified among younger adult cohorts, but they align with certain psychosocial theories of aging that emphasize the importance of reframing notions of self and individual capabilities away from physical attributes or function. Potentially related theories of aging include Gerotranscendence (Tornstam 2011) and Selective Optimization with Compensation (Baltes & Dickson 2001). Gerotranscendence is a gerontological perspective that is seen mostly among older adults as they transition from a materialistic and rationalistic conception of life to a more transcendent viewpoint where meaning,

relationships, and ego reduction become more important in daily life (Tornstam 2011). Selective Optimization and Compensation posits that successful adaptations to aging rely on accepting the limits of physical and mental resources, while reallocating personal resources and capacities in the pursuit of other meaningful goals (e.g. selecting social or educational opportunities due to functional losses and committing more personal resources to the pursuit of adapted or new interests that align with these selections) (Baltes & Dickson 2001). In support of both perspectives, students wrote about reorienting behaviors and interests to better accommodate expected functional or health declines, for example, optimizing one's time and energy on less demanding hobbies, learning opportunities, or relationships following some anticipated physical or cognitive declines. Thus, it appears that even with expectations for declining physical or cognitive function, younger adults in Japan are able to conceptualize a meaningful and rewarding experience of later life that is supportive of their mental health. Such perspectives hold promise for gerontological courses or life course health promotion strategies that seek to facilitate age positive views about the experience of growing older in developed societies.

Limitations and Future Research

While the present sample was not large enough to permit generalizability beyond the target site, the pattern of ERA-12 results (particularly the overall score) corresponds closely with international studies involving other age and regional cohorts. A larger follow-up study should be undertaken with a representative sample of younger adults from Japan, which could include the development and application of a validated Japanese-language version of the ERA-12 (which does not currently exist). Considering our unique findings for comparatively high and positive expectations for mental health and qualitative results concerning the transcendence of bodily challenges, follow-up qualitative studies of younger adults' perceptions about mental health and aging in Japan may be useful. For example, it may be helpful for future research to pose questions about how Japanese society potentially supports psychological adjustment to old age and whether there are any unique protective factors related to lifestyle or culture. Finally, as international administration of the ERA-12 expands

to different age and ethnic cohorts, it may be appropriate to conduct a meta-analysis to examine absolute differences in effects across diverse groups once an adequate quantum of data is available. If such differences are verified via meta-analysis (in relation to expectations about physical, mental, and cognitive health), it would provide powerful rationale for further global targeting or refinement of gerontological education and public health marketing strategies.

Implications for Health Promotion and Gerontological Education

Gerontological education and health promotion in aging societies like Japan should include content on experiences of aging from a number of perspectives, including physical, cognitive, and mental health. Considering the comparatively low and negative expectations concerning physical and cognitive health reported in the present study (and some other international reports), it is advisable to include balanced content about the physiological capacities and potential of older adults as related to the concept of normal aging. It is well known, for example, that major cognitive decline in later life is related to disease processes (such as Alzheimer's Disease), rather than changes attributable to normal aging (Andersen-Ranberg et al. 2001). The promotion of lifelong health in Japan among younger cohorts should also demonstrate evidence for the connection between lifestyle behaviors and reduced risk of chronic disease, disability, and frailty, which has been well established in the international literature (Chodzko-Zajko et al. 2009; Fries et al. 2011). While many students are aware of this connection, others hold negative and nihilistic views about aging and their future health state based on their present and familial experiences, which should be challenged through education. A focus on emotional and mental health should also support a holistic and transcendent view of aging, which emphasizes how later life can be a positive experience even in the context of declining or changing health.

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References

Andersen-Ranberg, K., Vasegaard, L. & Jeune, B. (2001). Dementia is not inevitable: A population-based study of Danish centenarians. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 56(3): 152–159. doi: 10.1093/geronb/56.3.P152

Annear, M. & Lucas, P. (2018). Dementia in a regional hospital setting: Contextual challenges and barriers to effective care. *International Journal of Ageing and Later Life* 12(1): 91–119. doi: 10.3384/ijal.1652-8670.17344

Baltes, B. & Dickson, M. (2001). Using life-span models in industrial-organizational psychology: The theory of selective optimization with compensation. *Applied Developmental Science* 5(1): 51–62. doi: 10.1207/S1532480XADS0501_5

Barker, M., O'Hanlon, A., McGee, H. M., Hickey, A. & Conroy, R. M. (2007). Cross-sectional validation of the aging perceptions questionnaire: A multidimensional instrument for assessing self-perceptions of aging. *BMC Geriatrics* 7(9): 1–13. doi: 10.1186/1471-2318-7-9

Bengtson, V. L. & Allen, K. R. (2009). The life course perspective applied to families over time. In P. Boss, W. Doherty, R. La Rossa, W. Schumm & S. Steinmetz (eds.), *Sourcebook of Family Theories and Methods* (pp. 469–504). New York: Springer.

Beser, A., Kucukguclu, O., Bahar, Z. & Akpinar, B. (2012). Study of validity and reliability of the scale regarding the expectations about aging. *HealthMed* 6(9): 3107–3112.

Chodzko-Zajko, W. J., Proctor, D. N., Singh, M. A. F., Minson, C. T., Nigg, C. R., Salem, G. J. & Skinner, J. S. (2009). Exercise and physical activity for older adults. *Medicine & Science in Sports & Exercise* 41(7): 1510–1530. doi: 10.1249/MSS.0b013e3181a0c95c

Creswell, J. W. & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* Thousand Oaks: Sage Publications.

Davis, M. M., Bond, L. A., Howard, A. & Sarkisian, C. A. (2011). Primary care clinician expectations regarding aging. *The Gerontologist* 51(6): 856–866. doi: 10.1093/geront/gnr017

Faudzi, F. N. M., Armitage, C. J., Bryant, C. & Brown, L. J. (2019). A systematic review of the psychometric properties of self-report measures of attitudes to aging. *Research on Aging* 41(6): 549–574. doi: 10.1177/0164027518825117

Fries, J. F., Bruce, B. & Chakravarty, E. (2011). Compression of morbidity 1980–2011: A focused review of paradigms and progress. *Journal of Aging Research* 2011: 1–10. doi: 10.4061/2011/261702

Hashimoto, K. (2017). Japan's "super global universities" scheme: Why does the number of "foreign" students matter? In A. Ata, L. Tran & I. Liyanage (eds.), *Educational Reciprocity and Adaptivity* (pp. 25–44). New York: Routledge.

Herman, D. R., Baer, M. T., Adams, E., Cunningham-Sabo, L., Duran, N., Johnson, D. B. & Yakes, E. (2014). Life course perspective: Evidence for the role of nutrition. *Maternal and Child Health Journal* 18(2): 450–461. doi: 10.1007/s10995-013-1280-3

Hirvensalo, M. & Lintunen, T. (2011). Life-course perspective for physical activity and sports participation. *European Review of Aging and Physical Activity* 8(1): 13–22. doi: 10.1007/s11556-010-0076-3

Holroyd, A., Dahlke, S., Fehr, C., Jung, P. & Hunter, A. (2009). Attitudes toward aging: Implications for a caring profession. *Journal of Nursing Education* 48(7): 374–380. doi: 10.3928/01484834-20090615-04

Iwasaki, M. & Jones, J. A. (2008). Attitudes toward older adults: A reexamination of two major scales. *Gerontology & Geriatrics Education* 29(2): 139–157. doi: 10.1080/02701960802223209

Japan Student Services Organization. (2019). *Results of an Annual Survey of International Students in Japan 2018*. Tokyo: JASSO.

Joshi, V. D., Malhotra, R., Lim, J. F., Ostbye, T. & Wong, M. (2010). Validity and reliability of the expectations regarding aging (ERA-12) instrument among middle-aged Singaporeans. *Annals of the Academy of Medicine Singapore* 39(2): 394–398.

Karmali, K. & Lloyd-Jones, D. (2013). Adding a life-course perspective to cardiovascular-risk communication. *Nature Reviews Cardiology* 10(2): 111. doi: 10.1038/nrcardio.2012.185

Kessler, R. C., Birnbaum, H. G., Shahly, V., Bromet, E., Hwang, I., McLaughlin, K. A., Sampson, N., Andrade, L. A., De Girolamo, G., Demyttenaere, K., Haro, J. M., Karam, A. N., Kostyuchenko, S., Kovess, V., Lara, C., Levinson, D., Matschinger, H., Nakane, Y., Browne, O., Ormel, J., Posada-Villa, J., Sagar, R., Stein, D. J. (2010). Age differences in the prevalence and co-morbidity of DSM-IV major depressive episodes: Results from the WHO World Mental Health Survey Initiative. *Depression and Anxiety 27*(4): 351–364. doi: 10.1002/da.20634

Kim, S. H. (2009). Older people's expectations regarding ageing, health-promoting behaviour and health status. *Journal of Advanced Nursing* 65(1): 84–91. doi: 10.1111/j.1365-2648.2008.04841.x

Kogan, N. (1961). Attitudes toward old people: The development of a scale and an examination of correlates. *Journal of Abnormal and Social Psychology* 62(1): 44. doi: 10.1037/h0048053

Laidlaw, K., Power, M. & Schmidt, S. (2007). The Attitudes to Ageing Questionnaire (AAQ): Development and psychometric properties. *International Journal of Geriatric Psychiatry* 22(4): 367–379. doi: 10.1002/gps.1683

Lasher, K. P. & Faulkender, P. J. (1993). Measurement of aging anxiety: Development of the anxiety about aging scale. *International Journal of Aging and Human Development* 37(4): 247–259. doi: 10.2190/1U69-9AU2-V6LH-9Y1L

Li, K., Cardinal, B. & Settersten, R. (2009). A life-course perspective on physical activity promotion: Applications and implications. *Quest* 61(3): 336–352. doi: 10.1080/00336297.2009.10483620

Li, X., Lv, Q., Li, C., Zhang, H., Li, C. & Jin, J. (2013). The relationship between expectation regarding aging and functional health status among older adults in China. *Journal of Nursing Scholarship* 45(4): 328–335. doi: 10.1111/jnu.12036

Löckenhoff, C. E., De Fruyt, F., Terracciano, A., McCrae, R. R., De Bolle, M., Costa, P. T., Aguilar-Vafaie, M. E., Ahn, C., Ahn, H., Alcalay, L., Allik, J., Avdeyeva, T. V., Barbaranelli, C., Benet-Martínez, V., Blatný, M., Bratko, D., Cain, T. R., Crawford, J. T., Lima, M. P., Yik, M. (2009). Perceptions of aging across 26 cultures and their culture-level associates. *Psychology and Aging* 24(4): 941–954. doi: 10.1037/a0016901

Lofland, J., Snow, D., Anderson, L. & Lofland, L. (2006). *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis*. Belmont: Wadsworth Inc.

Lynch, J. & Smith, G. D. (2005). A life course approach to chronic disease epidemiology. *Annual Review of Public Health* 26: 1–35. doi: 10.1146/annurev.publhealth.26.021304.144505

Matsushita, Y., Yoshiike, N., Kaneda, F., Yoshita, K. & Takimoto, H. (2004). Trends in childhood obesity in Japan over the last 25 years from the national nutrition survey. *Obesity Research* 12(2): 205–214. doi: 10.1038/oby.2004.27

Menkin, J. A., Guan, S.-S. A., Araiza, D., Reyes, C. E., Trejo, L., Choi, S. E., Willis, P., Kotick, J., Jimenez, E., Ma, S. (2017). Racial/ethnic differences in expectations regarding aging among older adults. The Gerontologist 57(2): 138–148. doi: 10.1093/geront/gnx078

Muramatsu, N. & Akiyama, H. (2011). Japan: Super-aging society preparing for the future. *The Gerontologist* 51(4): 425–432. doi: 10.1093/geront/gnr067

National Institute for Population and Social Security Research. (2017). *Population Projections for Japan: 2016–2065*. Tokyo: NIPSSR.

Rosencranz, H. A. & McNevin, T. E. (1969). A factor analysis of attitudes toward the aged. *The Gerontologist* 9(1): 55–59. doi: 10.1093/geront/9.1.55

Rupp, D. E., Vodanovich, S. J. & Credé, M. (2005). The multidimensional nature of ageism: Construct validity and group differences. *Journal of Social Psychology* 145(3): 335–362. doi: 10.3200/SOCP.145.3.335-362

Sallis, J. F., Owen, N. & Fisher, E. (2015). Ecological models of health behavior. In K. Glanz, B. Rimer & K. Viswanath (eds.), *Health Behavior and Health Education: Theory, Research, and Practice* (pp. 465–486). San Francisco, CA: Jossey-Bass.

Sarkisian, C. A., Steers, W. N., Hays, R. D. & Mangione, C. M. (2005). Development of the 12-item expectations regarding aging survey. *The Gerontologist* 45(2): 240–248. doi: 10.1093/geront/45.2.240

Silver, M. P., Warrick, N. I. & Cyr, A. (2016). Student expectations about mental health and aging. *Gerontology & Geriatrics Education* 37(2): 185–207. doi: 10.1080/02701960.2015.1005288

Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist* 47(1): 6–22. doi: 10.1037/0003-066X.47.1.6

Tomkinson, G. R., Lang, J. J. & Tremblay, M. S. (2019). Temporal trends in the cardiorespiratory fitness of children and adolescents representing 19 high-income and upper middle-income countries between 1981 and 2014. *British Journal of Sports Medicine* 53(8): 478–486. doi: 10.1136/bjsports-2017-097982

Tornstam, L. (2011). Maturing into gerotranscendence. *Journal of Transpersonal Psychology* 43(2): 166–180.

Torrance, H. (2012). Triangulation, respondent validation, and democratic participation in mixed methods research. *Journal of Mixed Methods Research* 6(2): 111–123. doi: 10.1177/1558689812437185

Wethington, E. (2005). An overview of the life course perspective: Implications for health and nutrition. *Journal of Nutrition Education and Behavior* 37(3): 115–120. doi: 10.1016/S1499-4046(06)60265-0

Wiese, C. H., Fragemann, K., Keil, P. C., Bundscherer, A. C., Lindenberg, N., Lassen, C. L., Markowski, K., Graf, M., Trabold, B. (2014). Geriatrics in medical students' curricula: Questionnaire-based analysis. *BMC Research Notes* 7(1): 472. doi: 10.1186/1756-0500-7-472

Windle, G., Hughes, D., Linck, P., Russell, I. & Woods, B. (2010). Is exercise effective in promoting mental well-being in older age? A systematic review. *Aging & Mental Health* 14(6): 652–669. doi: 10.1080/13607861003713232

Wuthrich, V. M. & Rapee, R. M. (2013). Randomised controlled trial of group cognitive behavioural therapy for comorbid anxiety and depression in older adults. *Behaviour Research and Therapy* 51(12): 779–786. doi: 10.1016/j.brat.2013.09.002