

Research Article

The Impact of Positive Self-Perceptions of Aging on Subjective Well-Being through the Mediation of Psychological Resilience among Community-Dwelling Older Adults during COVID-19 in Taiwan

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During the COVID-19 pandemic, the well-being of older adults has been highlighted as a significant public health concern. In this study, we investigated the role of psychological resilience in mediating the relationship between positive self-perceptions of aging (SPA) and the subjective well-being (SWB) of community-dwelling older adults in Taiwan during the pandemic. We collected data through face-to-face interviews conducted from October 2021 to February 2022, involving 1,095 participants aged 50 years or above residing in a southern city in Taiwan. More than half of the study participants were female, aged 65 or older, and had less than a high school education. More than two thirds were married and/or living with partners. More than a third had two or more noncommunicable diseases. We calculated scores for SWB, positive SPA, and psychological resilience and examined correlations among the outcome and predictor variables. Our findings indicated that higher positive SPA was significantly associated with better SWB among community-dwelling older adults in Taiwan and that this association was mediated by psychological resilience. Specifically, after controlling for covariates, structural equation modeling (SEM) analysis revealed a significant main effect of positive SPA on SWB ($b = 0.412$, $\beta = 0.187$, and $p < 0.001$), while bootstrap mediation analysis showed a statistically significant indirect mediating effect from positive SPA on SWB via psychological resilience (0.597, 95% bootstrap CIs = [0.445, 0.749], and $p < 0.001$). These findings highlight the potential importance of cultivating positive self-perceptions of aging and implementing resilience-centered interventions to promote well-being among Chinese older adults in the community.

1. Introduction

Our research examines the subjective well-being of older adults in Taiwan during the COVID-19 pandemic in relation to their self-perceptions of aging and their psychological resilience. The well-being of older adults has long been a concern in gerontological literature [1] due to its implications for quality of life, health, and ability to function. During the COVID-19 outbreak, older adults' well-being has become an even stronger focus of attention [2, 3] due in large part to how the pandemic has brought added health risks, stress, and social isolation to people in their later years [4]. In recent years, older people's well-being has also been an

important concern in Taiwan with the rapid aging of the population and that concern has been heightened by the pandemic [2].

1.1. Subjective Well-Being. Across the different kinds of well-being examined by scholars (e.g., physical well-being), our focus is on subjective well-being (SWB). Recognizing that SWB has myriad dimensions of meaning [5], in a basic sense, it can be defined as how well a person rates themselves to be feeling. The measurement of SWB has been promoted by the World Health Organization as an important means for assessing people's general sense of

how well they feel and for comparing across populations and over time [6].

Used by public health practitioners and by researchers worldwide, the 5-item World Health Organization Well-Being Index (WHO-5) has become a key tool for measuring subjective well-being. WHO-5 was first introduced in 1998 as part of the DEPCARE project on well-being measures in primary health care [6]. While some sources describe the WHO-5 as a subjective measure of psychological well-being, others describe it as measuring generic well-being not tied to any specific health concern. Focusing on the positive, its five simple questions ask individuals about the degree to which they feel cheerful, calm, vigorous, well-rested, and engaged with daily life. This index has been found useful in the study of people's experiences of a broad range of situations including the pandemic [7] and their experiences of a variety of health conditions from depression to cardiovascular disease [6]. While not aging-specific, the WHO-5 has also long been used to study the subjective well-being of older adult populations [8]. It has also been translated into many languages and validated in different international contexts [6], such as in Chinese dialects in Taiwan [9], and it has been used in the Taiwan Longitudinal Study on Aging [10].

1.2. Self-Perceptions of Aging. Self-perceptions of aging (SPA), defined as a person's "thoughts and beliefs regarding their own aging process," was originally derived from Lawton [11] and further developed by Liang and Bollen [12] and in the Berlin aging study [11, 12]. SPA may be positive or negative. Measured in various ways, indexes of SPA measure the degree of positivity and/or negativity of beliefs and expectations held by older adults about their own aging [13]. Studying SPA is especially important in recent years because there is evidence that in some places like Switzerland, periods of increased physical distancing or lockdown during the pandemic were associated with less positive SPA and more negative SPA [14].

Research on SPA emerged in part out of gerontological concerns about the possible negative effects of ageism on older adults. The term "ageism" was coined by psychiatrist Robert N. Butler who defined it as "a systematic stereotyping of and discrimination against people because they are old that occurs on both individual and institutional levels. . ." [15]. Scholars have noted how ageism may include prejudice (negative attitudes and stereotypes), interpersonal discriminatory behavior (speech and actions), and/or institutional discrimination (policies and practices) [16]. While concerns about ageism often focus on younger peoples' negative views and behavior about other people as older adults, research on SPA focuses on negative attitudes held by older adults about aging in themselves. Older adults may acquire such negative attitudes about their own aging by being exposed to negative attitudes or stereotypes about older age or by witnessing or being subjected to discriminatory interpersonal behavior or institutional policies or practices, leading to internalizing and personalizing ageist attitudes and beliefs. SPA has been related to older adults' well-being in various contexts [17]. Drawing on the

stereotype embodiment theory (SET), Levy [18] argued that negative self-perceptions of aging were one of three components of ageism that had a detrimental impact on health through psychological, behavioral, and physiological pathways, along with negative age stereotypes and age discrimination inflicted by society against older adults.

Overall, SPA has been found to have important associations with older adults' mental and/or physical health [19]. This includes findings that less positive or more negative thoughts and beliefs of various kinds (e.g., general, physical, or psychological) about one's own aging have been variously associated with lower well-being, worse mental or physical outcomes [17], lower self-rated health [20], worse physical function [21], worse quality of life [22], and worse social functioning or engagement [23, 24]. They have also been linked with fewer preventive health behaviors [25], higher rates of hospitalization [26], worse self-rated health, and lower longevity [27].

In related scholarly literature, there are many possible explanations given for how SPA may affect the well-being of older adults. These are often focused on how more negative SPA could harm various forms of well-being. Such explanations include psychological, behavioral, experiential, and social ones. Along the psychological dimension, scholars have argued that negative stereotypes of aging absorbed throughout the life course can lead to negative expectations for one's own well-being in old age [12]. Behaviorally, researchers have suggested that the pessimism about aging associated with more negative SPA may discourage preventive and coping behaviors that are essential to the promotion of well-being [25, 28]. In an experiential sense, older adults with more negative SPA may have had worse lived experiences of aging, which both spurred their internalization of negative stereotypes of aging and detrimentally affected their well-being [29], (pp. 136-137). In a social sense, scholars have proposed that older adults with negative SPA are more likely to isolate themselves due to negative thoughts about their aging selves and expectations that later life is lonely, leading to lower quality of life and well-being [30].

SPA has been measured in two primary ways, including the Attitude Towards Own Aging (ATOA) subscale and the Aging-Related Cognitions (AgeCog) scales of Ongoing Development and of Physical Loss. As described by Boeder and Tse [17]; "ATOA represents a domain-general operationalization of SPA and measures views of aging on a positive continuum. In contrast, the AgeCog scales take a multidimensional, domain-specific approach, measuring the various positive and negative aspects of the aging experience separately [17]." This matters because differences in the measurement of SPA have shown different patterns of correlation to various types of health and well-being.

In our study, we use the AgeCog Ongoing Development scale, which centers on a positive view of aging as a time of "personal growth and development," rather than using the positive but domain-general ATOA or the AgeCog Physical Loss scale which offers negative views of aging [17, 31]. We chose to focus our analysis on the AgeCog Ongoing Development (ACOD) scale for several reasons. First, AgeCog

Ongoing Development's focus on positive views of aging (PVA) mirrors the positive spin of the WHO-5 index of subjective well-being. Second, scholars have found that the PVA measured on the ACOD scale has been shown to have correlations with positive psychological outcomes but not physiological ones [17], and the WHO-5 has been characterized as having a leaning towards psychological dimensions of well-being, as mentioned above. In contrast, negative views of aging on the AgeCog Physical Loss scale have been linked with negative physical outcomes, a domain that the WHO-5 does not address. Third, again, given the psychological leaning of the WHO-5, we chose the psychologically disposed AgeCog Ongoing Development scale instead of the more domain-general ATOA.

One important but often overlooked finding of recent reviews of the literature on SPA is that measures of positive SPA are unlikely to be merely the inverse of measures of negative SPA. As Boeder and Tse [17] remarked, "other areas of psychological research suggest that positive and negative versions of constructs can predict different outcomes and do not just mirror the same effect in the opposite direction" [17]. For instance, one recent study found that affective well-being in terms of positive affect was much more strongly associated with positive SPA than it was with negative SPA [31], (p. 351). Another study provided evidence about the distinct influence of positive, but not negative, SPA as a predictor of cognitive function [32] using the Brief APQ scale. Therefore, a focus on positive SPA as its own entity is called for.

Despite Diehl et al.'s [31] and Boeder and Tse's [17] important observation that positive SPA is not merely the inverse of negative SPA, many research studies use language that labels reverse coding of negative SPA as positive SPA. This tends to happen with the coding of studies which use some version of the nondomain-specific ATOA scale with items reflecting both positive and negative views of aging. Such reverse coding has occurred with most of the studies we cited earlier that linked alleged "positive SPA" with outcomes including better physical function [21], better functional health [12], better self-rated health [20], longer longevity [27], more preventive health behaviors [25], lower rates of hospitalization [26], and social functioning [23]. These articles used the words "positive SPA," but they did not operationalize positive SPA in the sense that we, following Diehl et al. [31] or Boeder and Tse [17], define it as tied solely to responses to positive statements about aging and not including reverse-coded data from responses to negative statements about aging.

Although several previous studies have argued that "positive SPA" is associated with phenomena adjacent to SWB, few have used true positive SPA or the measure of SWB that we use. Various operationalizations, "positive SPA" has been recognized as linked with SWB-adjacent outcomes such as better mental and/or physical health [17, 21, 22, 27], psychological well-being, social relationships [33, 34], and social engagement [24]. These studies have tended, however, to have used reverse-coded negative SPA or simply assumed that lower negative SPA equals higher positive SPA. In addition, they have tended to use different measures of SPA

than we use in our study, usually using the ATOA scale. One notable exception is Diehl et al. [31] who used true positive SPA measured with the same AgeCog Ongoing Development scale we use. In doing so, Diehl et al. [31] found a strong association between positive SPA and affective well-being, which, while not the same as subjective well-being, is at least perhaps close. None of these studies used WHO-5 to measure SWB.

Since, as shown above, other studies have found differences between true positive SPA, negative SPA, and reverse-coded positive SPA, and since true positive SPA has thus far received little attention, it is important to explore the relationship between true positive SPA and SWB. It is possible that true positive SPA has a different or stronger relationship to SWB in older adults than negative SPA or negative reverse-coded SPA do. In addition, it is possible that true positive SPA measured on the AgeCog Ongoing Development scale and SWB measured on the WHO-5 scale may have a distinctive relationship with each other and with mediating factors. In this way, our study can provide information to support the design of innovative health promotion interventions for senior well-being. Interventions aimed at fortifying positive SPA could play a pivotal role in enhancing older adults' self-efficacy, potentially motivating them to adopt effective coping strategies to preserve health outcomes [13].

Thus far, there have been few studies on SPA in Taiwan. Of those studies labeled as concerning "self-perceptions of aging" in Taiwan, many use tools other than ATOA or AgeCog [35, 36], making cross-study comparisons difficult. Like in other places, SPA has not received enough attention in Taiwan, especially in relation to positive SPA and its relation to well-being. We have not been able to find other studies in Taiwan focusing on positive SPA measured with the AgeCog Ongoing Development scale. This study contributes to filling that gap.

1.3. Psychological Resilience. Across age groups, resilience has gained attention in public mental health circles [37] as an important resource during the COVID-19 outbreak. The American Psychological Association (APA) has defined resilience as "the process and outcome of successfully adapting to difficult or challenging life experiences, i.e., adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress, especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands" [38]. Identified by Kim et al. [39] as a target for healthy aging, resilience encompasses the ability to "bounce back" and function effectively during challenging circumstances. Despite differences in socioeconomic backgrounds, personal experiences, and declining health, in many studies, older adults as a group have shown the potential to exhibit high levels of resilience [40].

Recently, researchers have found psychological resilience to be a fundamental variable in preventing or reducing the worst health and well-being outcomes during the COVID-19 pandemic [37]. Even after controlling for demographic,

social, and clinical factors, psychological resilience was found to be highly significant for subjective well-being in older adults living with chronic illness in at least one study [41]. Several studies report that individuals who had higher levels of psychological resilience tended to have better health outcomes and well-being in later life. For example, in investigating a representative sample of adults aged 50 and over in the United States, Taylor and Carr [42] found the protective effects of resilience to be persistent across time for self-rated health and depressive symptoms and to be cumulative for functional health (i.e., functional limitations, instrumental activities of daily living (IADLs), and activities of daily living (ADLs)). This study showed the profound advantages of psychological resilience and its paramount significance for effective management of the cumulative effects of disablement over time.

Recent research has focused on investigating the mediating role of resilience in the relationship between self-perceptions of aging and concepts that are adjacent to well-being. For example, in analyzing data from a U.S. sample aged 50 and over, the Health and Retirement Study found full mediation effects of psychological resilience on the relationship between self-perceptions of aging and purpose in life [43]. Another study conducted by Ribeiro-Gonçalves et al. [44] in Portugal showed resilience to be a mediating variable of psychological distress against the effects of ageism and loneliness among seniors. Another study has shown that individuals with “positive SPA” (in that case, including reverse coding) have demonstrated greater resilience against loneliness and distress during the COVID-19 pandemic [45], which arguably is closely related to well-being. Even though psychological resilience has been recognized as an essential intervention target in the Chinese population [46], we have not found a study of SWB and SPA in Taiwan that examines possible mediation through psychological resilience.

Theoretically, there are different ideas as to why psychological resilience may mediate the relationship between SPA and well-being. Apropos psychological and behavioral pathways, Mlinac et al. [47] suggests that “resiliency in the elderly involves optimistic psychology, adult improvement, and . . . adaptive coping mechanisms.” In relation to experiential and social pathways, those who are resilient may be likely to have had positive lived experiences and/or social support that created a context for optimism and adaptive coping [48]; these ideas will be expanded upon in the discussion section.

For these reasons, this study aims to investigate whether there is an association between better subjective well-being and higher positive self-perceptions of aging among community-dwelling older adults in Taiwan and to assess whether any such relationship is mediated by psychological resilience. Specifically, we used structural equation modeling (SEM) to explore the pathway and hypothesized that positive SPA would influence subjective well-being via psychological resilience. Based on previous related literature, our hypotheses were as follows for our sample:

H1: higher positive self-perceptions of aging scores are significantly associated with higher subjective well-being scores.

H2: higher positive self-perceptions of aging scores are significantly associated with greater psychological resilience.

H3a: greater psychological resilience has a significant positive association with higher scores on subjective well-being.

H3b: psychological resilience mediates the relationship between positive self-perceptions of aging scores and subjective well-being.

2. Methods

2.1. Participants. The data are from the second-wave survey of a university social responsibility (USR) program, which involves a multicounty study including two rural and two urban counties in a southern municipality in Taiwan from October 2021 to February 2022. A USR project is an undertaking that entrusts universities with the duty to conscientiously implement transparent strategies and measures that can effectively benefit both society and the environment. Such efforts may encompass a diverse range of actions, including fostering student-led initiatives for equity and justice, upholding democratic participation, advocating for sustainable development, and prioritizing the well-being of the community [49].

The survey instrument used in this study included measures of subjective well-being (SWB), self-perceptions of aging (SPA), and psychological resilience. It was organized into seven sections as follows: (A) demographics, including marital status, and place of residence; (B) family structure, profiles of relatives, and interaction patterns; (C) health status and behaviors; (D) social support and exchanges; (E) work history; (F) leisure activities, attitudes, and perspectives; and (G) economic status. The survey was administered to community-dwelling older adults through face-to-face interviews conducted by interviewers trained by the principal investigators. The interviewers guided each older adult through the survey and provided explanations for any questions that were unclear.

The sample was a convenience sample of older adults aged 50 years and older who were living in the community and volunteered to participate. The face-to-face interview through which the survey was administered was conducted by staff members, all of whom attended interviewer training prior to the formal fieldwork. Given the pandemic, all parties were required to wear face masks during the interviews. Exclusion criteria were as follows: (a) those who had severe cognitive impairments; (b) those who were bedridden; (c) those who were unwilling to disclose their demographics; and (d) those who did not sign an informed consent. We recruited a total of 1,095 community older adults aged 50 and over. The study protocol (A-ER-109-361) was approved by the University Human Research Ethics Committee, and no conflicts of interest were declared.

2.2. *Measurements.* Details about the measurement of subjective well-being, positive self-perceptions of aging, and psychological resilience are laid out below. The questionnaire was designed to be as simple as possible to increase the response rate during the pandemic.

2.2.1. *Subjective Well-Being (SWB).* The subjective well-being was measured by the five-item World Health Organization Well-Being Index (WHO-5) questionnaire. The WHO-5 consists of five items that assess subjective well-being in relation to mood, energy, and engagement by asking respondents about the degree to which they feel “cheerful and in good spirits,” “calm and relaxed,” and “active and vigorous,” wake up feeling “fresh and rested,” and feel like daily life is “filled with things that interest” them. The questionnaire uses a six-point scale (all of the time = 5, most of the time = 4, more than half of the time = 3, less than half of the time = 2, some of the time = 1, and at no time = 0) with higher scores indicating better well-being [6]. A previous study showed that the Chinese version of the WHO-5 is a reliable and valid instrument in a community population in Taiwan [9], and the Cronbach’s alpha coefficient of the study was 0.96, showing a high level of internal consistency in the measure.

2.2.2. *Positive Self-Perceptions of Aging (SPA).* In this study, we use the items measuring positive view of aging from the AgeCog scale of Ongoing Development [28, 50]. Using validated Chinese translations, we measured positive SPA using four items to gauge individuals’ self-perceptions of aging related to ongoing personal development. These items included that aging means that “I can continue to plan for the future,” “I can do more and more activities,” “I can still learn new things,” and “I can still put my ideas into practice.” In keeping with the norms of use of this scale, we used a four-point scale (strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1), where higher scores indicated higher positive SPA. The Cronbach’s alpha coefficient of the scale was 0.87 in this study, showing high internal consistency.

2.2.3. *Psychological Resilience.* Psychological resilience was measured by the 10-item Connor–Davidson Resilience Scale (CD-RISC-10). The ten items ask about one’s ability to adapt to change, handle whatever comes up, cope with stress and obstacles, not get easily discouraged, see the humor in problems, bounce back, be strong, and handle unpleasant feelings. The full set of items as worded in the study is included in Table 1. The scale used a 5-point Likert scale ranging from 0 (not true at all) to 4 (true nearly all the time), where higher scores indicated better resilience. The CD-RISC-10 is used widely to evaluate resilience and has yielded a single-factor model for Chinese older adults in principal components analysis [51]. The Cronbach’s alpha coefficient of the scale yielded high internal consistency at 0.95 in this study.

The control variables were demographic factors, including gender, age, educational level, marital status, and the

TABLE 1: Descriptions of subjective well-being, positive self-perceptions of aging, and psychological resilience ($n = 1,095$).

Variables	Mean \pm SD
<i>Subjective well-being (WHO-5, range: 0–5)</i>	
(1) I feel cheerful and in good spirits	3.34 \pm 1.29
(2) I feel calm and relaxed	3.34 \pm 1.31
(3) I feel active and vital	3.14 \pm 1.40
(4) I wake up feeling fresh and rested	3.18 \pm 1.36
(5) My daily life is filled with things that interest me	3.02 \pm 1.45
Total score (range: 0–25)	16.02 \pm 6.28
Total score (range: 0–100)	64.07 \pm 25.12
<i>Positive self-perceptions of aging (positive SPA, range: 1–4)</i>	
(1) Aging means I can continue to plan for the future	2.80 \pm 0.58
(2) Aging means I can do more and more activities	2.64 \pm 0.69
(3) Aging means I can still learn new things	2.96 \pm 0.64
(4) Aging means I can still put my ideas into practice	2.96 \pm 0.62
Total score	11.36 \pm 2.15
<i>Psychological resilience (CD-RISC 10, range: 0–4)</i>	
(1) I am able to adapt to change	2.72 \pm 0.86
(2) I can deal with whatever comes	2.78 \pm 0.84
(3) I try to see the humorous side of problems	2.63 \pm 1.02
(4) Coping with stress can strengthen me	2.73 \pm 0.92
(5) I tend to bounce back after illness or hardship	2.77 \pm 0.90
(6) I can achieve goals despite obstacles	2.79 \pm 0.90
(7) I can stay focused under pressure	2.76 \pm 0.92
(8) I am not easily discouraged by failure	2.64 \pm 1.02
(9) I think of myself as a strong person	2.82 \pm 0.93
(10) I can handle unpleasant feelings	2.72 \pm 0.99
Total score	27.35 \pm 7.73

Note. Standard deviation = SD.

number of chronic diseases. The individuals reported their gender dichotomously (0 = male, 1 = female). Age was dichotomized into a binary variable, denoting years of age attained at the conclusion of the interview month. A value of “0” corresponded to individuals below the age of 65, while “1” denoted those aged 65 years or above. Age was dichotomized after checking that age as a continuous variable was not correlated with subjective well-being in our sample. Educational levels were “high school diploma and above (0)” or “below a high school diploma (1).” Marital status was coded dichotomously (“0” = married/with partners and “1” = single including never married, widowed, separated, or divorced). Major chronic diseases were self-reported, and those with two or more major chronic diseases were classified as having multimorbidity [52].

2.3. Data Analysis

2.3.1. *Structural Equation Modeling (SEM).* SEM was used to examine the mediation effect linking positive SPA to SWB through psychological resilience. The measurement models were testing the fit of positive SPA consisting of four indicators and subjective well-being comprising five indicators, respectively. The main paths of interest included the direct effects of positive SPA on SWB and the indirect effects of positive SPA through psychological resilience. In

addition, positive SPA (independent variable), SWB (dependent variable), and psychological resilience (mediator) were regressed on the aforementioned covariates. In the framework of SEM, each item within the questionnaires was included separately and individually assessed as an indicator of latent constructs, with their corresponding factor loadings evaluated before moving on to interpret the mediation effects. This was done instead of utilizing averages across the item scores of the SWB, positive SPA, and psychological resilience variables of interest.

To test the mediation effect, the nonparametric bootstrapping approach (bootstrap resamples = 5,000) was used to obtain estimates for the indirect effect. Nonparametric bootstrapping resamples the raw data to form an empirical distribution of the indirect-effect point estimates to gauge the confidence interval and statistical significance of an indirect effect [53]. A good-fitting SEM has a comparative fit index (CFI) > 0.95, a Tucker Lewis index (TLI) > 0.95, a standardized root-mean square residual (SRMR) < 0.05 and a root-mean square error of approximation (RMSEA) < 0.08 [54]. All the analyses were conducted in R Studio software, and a maximum likelihood estimation with robust standard errors (MLR) was carried out with the latent variable analysis “lavaan” package in R studio. In lavaan, the default setting is to constrain the initial factor loading of each latent variable to 1, while leaving the variance of each latent variable unconstrained [55]. Consequently, we will examine both unstandardized estimates (raw coefficients or path coefficients) and standardized estimates which provide valuable insights into the strength and direction of the relationships between variables on a standardized scale, allowing for comparison of the relative importance of different paths and variables within the model.

Mediation analysis involves predefining a mediator and estimating the impact on the outcome, either through indirect means (mediated pathway) or direct means (non-mediated pathway). Within this study, we employ the terminology of “effect” encompassing direct effect, indirect effect, total effect, or the pathways of mediating variables, to denote the observed associations between the independent and dependent variables. The “indirect effect” refers to the influence of positive SPA and psychological resilience on SWB that can be attributed to psychological resilience, and “direct effect” pertains to the impact of positive SPA on SWB that cannot be ascribed to psychological resilience. Here, we present the SEM analysis elucidating the overall, indirect, and direct effects on SWB.

3. Results

3.1. Basic Description. The descriptive results of sample characteristics ($n = 1,095$) are shown in Table 2. It shows that the majority of participants was female (60.1%), 65 years old or above (51.3%), and had less than a high school education (65.3%). The majority (71.5%) of the older adults were married or with partners. The morbidity rate, defined as two or more chronic diseases, was 37.1%.

The descriptive statistics for the subjective well-being (SWB), positive self-perceptions of aging (positive SPA), and psychological resilience results are shown in Table 1. The results for the WHO-5 scale for our sample of older adults in Taiwan during the pandemic yielded means ranging from 3.02 to 3.34, and the mean total score was 64.07 on a scale from 0 to 100 (SD = 25.12), for which 0 is the worst and 100 the best possible SWB. This WHO-5 pandemic score is a bit lower than the prepandemic average score of 65.6 in the national survey report of the Taiwan Longitudinal Study on Aging [56]. The mean of positive SPA in our sample ranged from 2.64 to 2.96, where a higher score indicated more positive self-perceptions of aging concerning ongoing personal development. The average psychological resilience scores for the sample ranged from 2.63 to 2.82, where a higher score indicated greater psychological resilience.

The correlations among the variables are in Figure 1. For demographic variables such as sex, age, education level, marital status, and number of chronic diseases, we utilized dummy coding as the single factor in SEM analysis. Based on Shrestha [57], variance inflation factors (VIFs) values greater than 10 indicated the presence of multicollinearity. In our regression analysis, we calculated the VIF for all variables, and none exceeded the threshold of 5, indicating the absence of problematic multicollinearity.

3.2. SEM Analysis. Good-fitting indicators performance in SEM including CFI > 0.95, TLI > 0.95, SRMR < 0.05, and RMSEA < 0.08 [54] were used to examine the hypotheses in our study. The proposed SEM model demonstrated a good fit with our data, as indicated by several fit indices ($\chi^2 = 816.645$, $df = 162$, $p < 0.001$, CFI = 0.965, TLI = 0.959, SRMR = 0.032, and RMSEA = 0.047 (95% CIs = [0.044, 0.051])). In addition to the Chi-square test, other fit indices were assessed, including the Comparative Fit Index (CFI), Tucker Lewis Index (TLI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). These fit indices collectively suggested the proposed SEM model adequately represented the relationships among the variables in our dataset. The standardized factor loading of all items ranged from 0.702 to 0.932. Furthermore, we assessed the modification indices in SEM, representing one-degree-of-freedom chi-square score statistics for fixed and constrained parameters. These indices offer an estimate of potential improvements in the likelihood-ratio chi-square statistic if a specified parameter is treated as a free parameter. We observed substantial improvements in the modification indices for the following item correlations: (1) WHO1 and WHO2, (2) RES1 and RES2, as well as (3) RES9 and RES10. Table 3 shows the unstandardized and standardized estimates in mediation analysis for well-being. Hypothesis 1 (H1) proposes a significant effect of positive SPA on SWB, with higher positive SPA corresponding to greater SWB. This model finding demonstrates a significant effect ($b = 0.412$, $\beta = 0.187$, and $p < 0.001$), hence H1 was supported. Hypothesis 2 (H2), which hypothesized that higher positive SPA would have a significant positive association with greater psychological

TABLE 2: Basic characteristics of the participants (n = 1,095).

Variables	Mean ± SD/n (%)
Gender	
Male	437 (39.9%)
Female	658 (60.1%)
Age	66.13 ± 9.83
Less than 65 years old	533 (48.7%)
65 years old or above	562 (51.3%)
Education level	
Less than a high school education	715 (65.3%)
High school or above	380 (34.7%)
Marital status	
Married/partnered	783 (71.5%)
Single (never married, widowed, separated, or divorced)	312 (28.5%)
Number of chronic diseases	1.49 ± 1.76
Less than two	689 (62.9%)
Two or more	406 (37.1%)

Note. Standard deviation = SD.

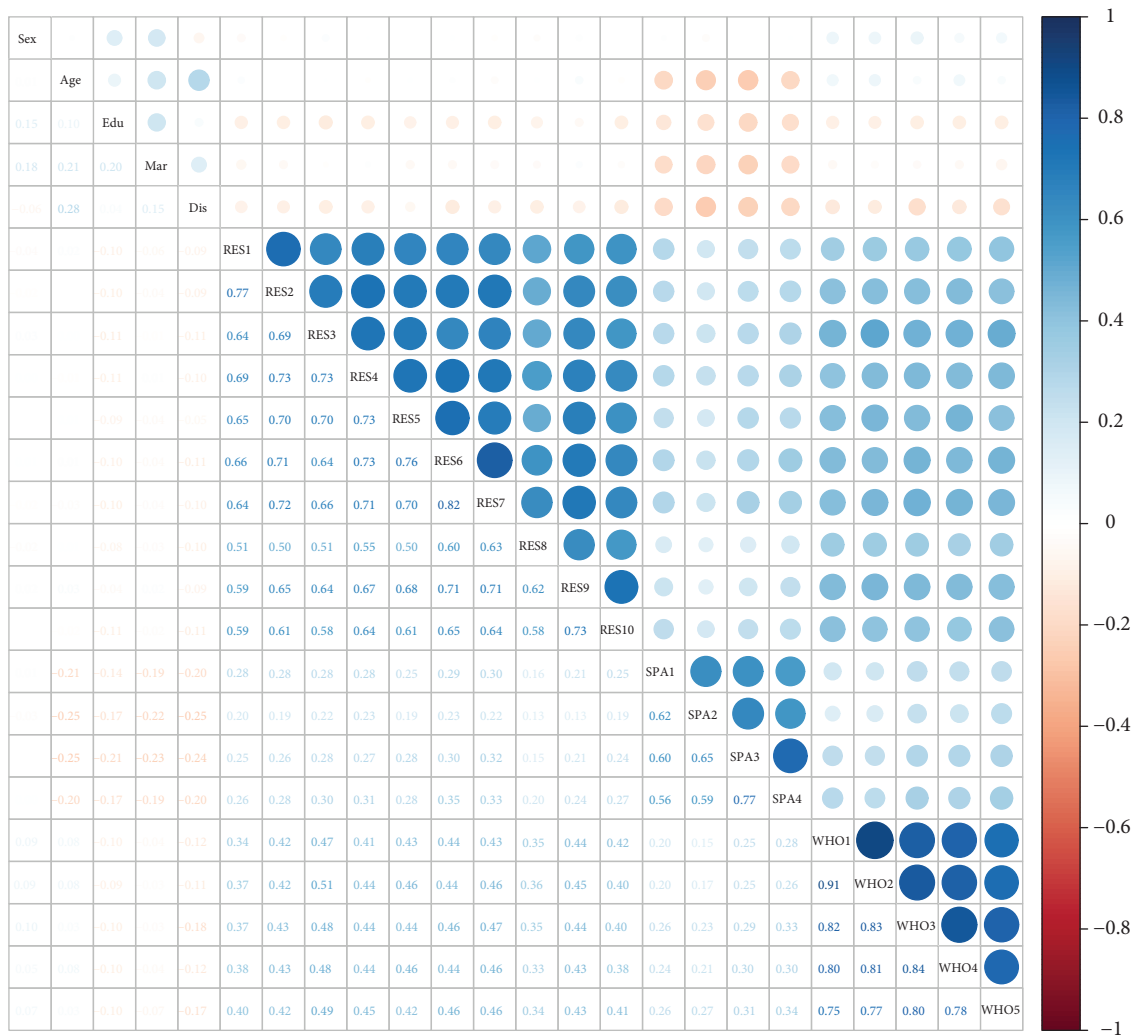


FIGURE 1: Correlation plots among all variables. Note. The correlation matrix was visualized with lower and upper triangular areas configured separately. The lower area consists of correlation coefficients denoted as numbers, and the upper area shows the absolute values of corresponding correlation coefficients denoted as the circle size. SWB items were WHO1~WHO5; positive SPA items were SPA1~SPA4. Psychological resilience items were RES1~RES10.

TABLE 3: Mediation and bootstrapping estimates for subjective well-being (SWB).

Variables	<i>b</i>	<i>p</i> value	Standardized regression (β)	
Positive SPA \rightarrow SWB (H1)	0.412	<0.001***	0.187	
Positive SPA \rightarrow psychological resilience (H2)	0.672	<0.001***	0.412	
Psychological resilience \rightarrow SWB (H3a)	0.889	<0.001***	0.518	
Indirect effect via mediator (H3b)	0.597	<0.001***	0.213	
Total effects on SWB	1.120	<0.001***	0.400	
Partial effect of demographics on SWB	0.051	0.030*	0.059	
	<i>b</i>	95% CI _{lower}	95% CI _{upper}	<i>p</i> value
<i>Indirect effect of positive SPA on SWB via mediator (5,000 bootstrap results) (H3b)</i>				
Indirect effect	0.597	0.445	0.749	<0.001***
Total effects	1.120	0.881	1.359	<0.001***

Note. *b* = unstandardized pathway estimates; **p* < 0.05; ****p* < 0.001.

resilience, was also supported ($b = 0.672$, $\beta = 0.412$, and $p < 0.001$). Greater psychological resilience was also found to be significantly related to higher SWB ($b = 0.889$, $\beta = 0.518$, and $p < 0.001$); therefore, H3a was also supported. H3b involved mediation testing, with psychological resilience used as the mediator between positive SPA and SWB. The indirect effect via the mediator was 0.597 ($\beta = 0.213$, $p < 0.001$), and the total effect on well-being was 1.120 ($\beta = 0.4$, $p < 0.001$). Thus, the statistical assumptions were met for examining H3b.

A bootstrap mediation analysis was conducted to examine the mediating effect, as shown in Table 3. If the confidence interval does not include zero, the coefficient is significantly different from zero. The indirect mediating effect from positive SPA to SWB through psychological resilience was 0.597, which was statistically significant (95% bootstrap CIs = [0.445, 0.749], $p < 0.001$). Also, as shown in Figure 2, the standardized estimates regarding mediation bootstrap analysis of standardized regression relationships between positive SPA and SWB as mediated by psychological resilience showed a significant indirect effect, indicating the existence of mediation in the model. They also showed a significant direct effect ($\beta = 0.187$, $p < 0.001$), indicating partial mediation. Thus, these findings indicate that some effects of positive SPA on SWB are carried through psychological resilience, thus supporting H3b for some dimensions of positive SPA. We computed the effect size with the Delta method implemented in many SEMs to estimate the magnitude of the indirect effect and total effect [58]. The indirect effect was 0.27, and the total effect was 0.50. This indicated that the mediation bootstrap analysis of standardized regression relationships between positive SPA and SWB was mediated by psychological resilience. The significant indirect effect showed the existence of mediation in the model, and the significant direct effect ($\beta = 0.187$, $p < 0.001$) demonstrated partial mediation. These findings indicate that some effects of positive SPA on SWB are carried through psychological resilience, thus supporting H3b.

4. Discussion

Our research represents a pioneering effort in investigating the complex interplay among psychological resilience, positive self-perceptions of aging (SPA), and

subjective well-being (SWB) via a SEM analysis. We followed Boeder and Tse's [17] and Diehl et al.'s [31] concept of true positive SPA by including only positively-worded items and excluding reverse-coded negative items. Using true positive SPA, we demonstrated the significant association between higher positive SPA and higher levels of SWB. To the best of our knowledge, our study is the first to validate the mediating role of psychological resilience in the relationship between positive SPA and SWB, especially true positive SPA and SWB using the WHO-5 index.

There are many possible explanations for why higher true positive SPA would be associated with higher SWB. In terms of psychological disposition, it is possible that older adults with more positive SPA are generally more optimistic and likely to focus on positive aspects of life, giving them better SWB. Behaviorally, their positive attitudes about aging may also give them hope, leading them to be more likely to engage in preventive behavior [25], thinking that prevention will make a positive difference, and thus enhancing their well-being through prevention [28]. Experimentally, they have more positive SPA because they have had more salutary life experiences, which have, in turn, promoted SWB. Socially, it may be that those who have positive SPA tend to have more satisfying or supportive social relationships, which also contribute to their sense of well-being.

Diehl et al. [31] argued that it is crucial for future researchers to investigate "context- and person-specific factors that can minimize the development of negative SPA and maximize the maintenance of positive SPA" (p. 355). This can be challenging in that deeply ingrained negative SPA or weak positive SPA in old age can be difficult to modify within a short timeframe. However, at least one recent study showed that short-term changes in social context can lead to rapid change in SPA in either a negative or positive direction [14]. Specifically, the enforced physical distancing measures implemented by the Swiss government during the pandemic increased negative SPA and decreased positive SPA. However, as the restrictions were eased, the pattern reversed, with negative SPA decreasing slightly and positive SPA increasing considerably, underscoring the responsiveness of SPA and especially positive SPA to external factors associated with the pandemic [14].

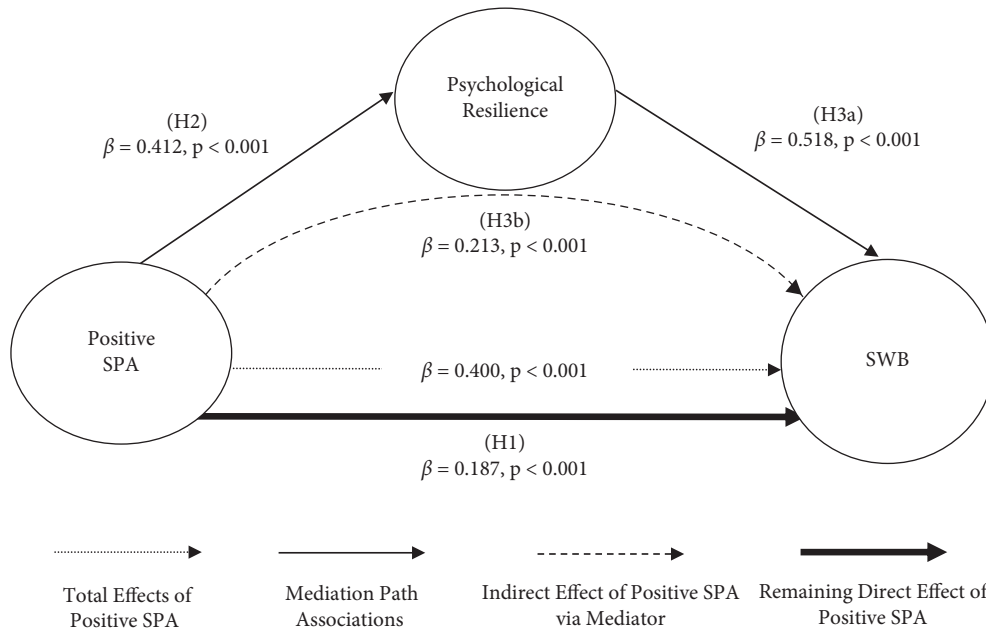


FIGURE 2: Mediation bootstrap analysis of standardized regression relationships between positive self-perceptions of aging (positive SPA) and subjective well-being (SWB) as mediated by psychological resilience.

In showing that psychological resilience mediates the relationship between more positive SPA and better SWB, we have uncovered a leverage point for promoting well-being in later life, but the question remains as to why resilience mediates this relationship. That is, why are more positive SPA associated with higher levels of psychological resilience and why does resilience constitute a path through which positive SPA impacts SWB? Uncovering the mechanisms underlying this relationship would enhance our ability to leverage it.

The mechanisms may have a similar logic to our above-mentioned explanation of the possible connections between positive SPA and SWB. Psychologically, older adults with positive SPA may view challenges of aging optimistically as opportunities for growth, constructive coping, and problem solving rather than as daunting obstacles. Those with more positive SPA may have a greater sense of self-efficacy, believing that they have the ability to cope with the challenges that arise as they get older and ultimately cultivating resilient traits rather than being paralyzed by a sense of helplessness [24]. Behaviorally, those with more positive SPA may be more likely to engage in resilient coping, proactively taking effective steps to cope with challenges and adapt, leading to what Moody characterized as decrement with compensation [59]. Experientially, people with positive SPA may be more likely to have positive experiences of later life bolstering their reserves of positive energy and their ability to be resilient and thus their SWB. In addition, older adults with more positive SPA may attract stronger social networks and social support systems [60], creating a context conducive to resilient coping. Any or all of these explanations may account for the role of psychological resilience in mediating the relationship between positive SPA and SWB. Future studies should further investigate these

possible mechanisms in order to better leverage positive SPA and psychological resilience and their interaction as intervention targets to promote well-being in later life.

A noteworthy finding of our study was the observed partial effect of demographic characteristics on positive SPA ($b = -0.116$, $\beta = -0.375$, and $p < 0.001$) but no association with psychological resilience or subjective well-being. These results suggest that individuals with a less positive SPA are more likely to be female, older, have lower levels of education, be unmarried or unpartnered, and experience a higher number of chronic diseases. Contrasting findings were reported by Moser et al. [61], indicating no significant associations of sex, age, and educational attainment with SPA. Yet, recent research conducted by the UK Center for Aging Better [62] revealed that men generally held more positive attitudes towards aging compared to women and individuals in the oldest age group (70+) tended to display the most positive views on aging across all age cohorts, the latter finding which was the opposite to ours. While demographics were not the primary focus of our study, we recommend the inclusion of these factors in future studies to adequately address the baseline variations in sociodemographic characteristics.

There is an old Chinese proverb, “having an elderly person in the family is like having a treasure in one’s home” [63]. This saying encapsulates the traditional notion that older adults are valued for the wisdom they have accumulated throughout their lives and emphasizes the importance of continuing learning and growth throughout the aging process. To promote the well-being of older adults in the Chinese context, it appears crucial to establish supportive environments that facilitate positive attitudes toward aging, psychological resilience, and opportunities for learning, growth, and personal development. Our findings

suggest that cultivating positive SPA and nurturing psychological resilience may contribute to improved subjective well-being, particularly in the face of a global pandemic.

4.1. Implications for the Resilient Aged Society. The global demographic landscape is undergoing a remarkable transformation, characterized by a substantial increase in the number of older adults. One concept that arises in this context is that of a resilient aged society, where individuals can age well and uphold a high quality of life despite the adversities and obstacles that come with aging or global epidemics. While our study was conducted during the pandemic, there are many unexpected and stressful events that older adults will continue to need to navigate and resilience is an essential component for adapting to and coping with such events. Exploring the implications of fostering psychological resilience in older adults can provide valuable insights for the development of policies and interventions aimed at promoting well-being within the aging population.

These findings suggest the possibility that by simultaneously promoting age-positive notions and implementing targeted resilience interventions, we may be able to enhance the well-being of the aging population. Policymakers must acknowledge the potential of older adults and the valuable contributions they can make to society. By both challenging ageist stereotypes and shifting the narrative surrounding aging into a more positive light, society can more fully harness the skills, knowledge, and experiences of older individuals. This necessitates the implementation of innovative programs that highlight the positive aspects of aging and create opportunities for older adults to actively participate in social, economic, and cultural domains. Embracing the strengths of older adults and valuing their wisdom can lead to a more inclusive and harmonious society for people of all ages. Policymakers should implement policies that support community level interventions to promote positive views of aging and resilience enhancement in older adults [64, 65] in a way that is responsive to the local culture [37]. Beyond the pandemic, integrating resilience-centered interventions into the community will still be crucial [66], equipping individuals with tools to navigate stress and unexpected events. Such initiatives hold great promise for both individuals and society as Taiwan's population continues its trajectory of rapid aging over the coming decades.

4.2. Limitations and Future Studies. There are some limitations in our study. First, due to the household registration act and having to conduct the interview-based surveys during the COVID-19 period, only convenience samples could be collected in this study. Future studies may consider surveys in cooperation with local governments using representative sampling techniques. Second, the study was cross-sectional, which makes it difficult to know whether correlations are likely indicative of possible causal relationships. Further longitudinal studies are needed to investigate the directionality for causal relationships. Third, our study was not designed to parse out the mechanisms

through which positive SPA and psychological resilience may affect SWB or the mechanism through which psychological resilience may become a mediator between positive SPA and SWB. Fourth, our deliberate choice to use positive SPA via the AgeCog Ongoing Development Scale as our measure of SPA is not meant as a general recommendation. It would not be appropriate for studies examining older adults' sense of physical well-being which has been shown to be more responsive to negative SPA via the AgeCog Physical Losses Scale. Fifth, positive SPA items of AgeCog are not exhaustive of what positive views of aging may be important for SWB. For example, the positive items found on the ATOA may also be important. Sixth, the items we used to measure SWB and psychological resilience are not the only ones used to operationalize those constructs. In addition, we treated all demographic variables as a single latent factor in SEM analysis. Future investigations should also delve deeper into the impact of unalterable demographics individually, such as biological sex and chronological age, to attain a better sense of baseline disparity. In addition, recent findings about nonlinear changes in age-related trajectories of AgeCog scales (e.g., positive SPA) [31] and SWB among older individuals [67] need to be considered. Finally, it is possible that the relationships would be different during nonpandemic times. Future studies should delve into the mechanisms between positive SPA and SWB, as well as psychological resilience.

5. Conclusion

To our knowledge, this study represents the first exploration of the potential mediating role of resilience in the association between positive self-perceptions of aging and well-being among community-dwelling older adults in Taiwan during the COVID-19 pandemic. The SEM findings provide compelling evidence that psychological resilience mediates the relationship between higher positive self-perceptions of aging and better subjective well-being. In light of these results, it is imperative for programs to not solely prioritize the promotion of positive self-perceptions of aging but also emphasize the development and integration of resilience-centered interventions for the postpandemic era [68–74].

Data Availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Additional Points

What Is Known about This Topic? (i) The COVID-19 outbreak has been a challenge to subjective well-being among older adults. (ii) Studies have shown that self-perceptions of aging are related to subjective well-being in older adults. (iii) Studies have shown that psychological resilience can improve subjective well-being during a pandemic. *What This Paper Adds.* (i) The present study adds knowledge about the

relationship between positive self-perceptions of aging, psychological resilience, and subjective well-being in older adults in Taiwan. (ii) This study shows that positive self-perceptions of aging were related to subjective well-being in older adults in Taiwan during the pandemic. (iii) This study showed that psychological resilience mediated the association between positive self-perceptions of aging and subjective well-being in this population. (iv) Interventions to improve the well-being of older adults should aim to increase both positive self-perceptions of aging and psychological resilience. (v) Interventions targeting psychological resilience in older adults may be especially helpful for individuals holding lower positive self-perceptions of aging.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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References

- [1] F. Nyqvist, A. K. Forsman, G. Giuntoli, and M. Cattan, "Social capital as a resource for mental well-being in older people: a systematic review," *Aging & Mental Health*, vol. 17, no. 4, pp. 394–410, 2013.
- [2] J.-J. Chen, L.-F. Liu, C.-I. Lin, and H.-C. Lin, "Multidimensional determinants of well-being among community-dwelling older adults during the early stage of the COVID-19 pandemic in Taiwan," *Gerontology and Geriatric Medicine*, vol. 8, p. 233372142211112, 2022.
- [3] H. H. S. Kim and J. H. Jung, "Social isolation and psychological distress during the COVID-19 pandemic: a cross-national analysis," *The Gerontologist*, vol. 61, no. 1, pp. 103–113, 2021.
- [4] A. C. Krendl and B. L. Perry, "The impact of sheltering in place during the COVID-19 pandemic on older adults' social and mental well-being," *The Journals of Gerontology: Serie Bibliographique*, vol. 76, no. 2, pp. e53–e58, 2021.
- [5] National Research Council, *Subjective Well-Being: Measuring Happiness, Suffering, and Other Dimensions of Experience*, The National Academies Press, Washington, DC, 2013.
- [6] C. W. Topp, S. D. Østergaard, S. Søndergaard, and P. Bech, "The WHO-5 Well-Being Index: a systematic review of the literature," *Psychotherapy and Psychosomatics*, vol. 84, no. 3, pp. 167–176, 2015.
- [7] M. L. Lara-Cabrera, M. Betancort, A. Muñoz-Rubilar, N. Rodríguez-Novio, O. Bjerkeset, and C. De Las Cuevas, "Psychometric properties of the WHO-5 Well-Being Index among nurses during the COVID-19 pandemic: a cross-sectional study in three countries," *International Journal of Environmental Research and Public Health*, vol. 19, no. 16, Article ID 10106, 2022.
- [8] R. Heun, M. Bonsignore, K. Barkow, and F. Jessen, "Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population," *European Archives of Psychiatry and Clinical Neuroscience*, vol. 251, no. S2, pp. i127–31, 2001.
- [9] C. Lin, S. Lee, B. Wu, L. Huang, H. Sun, and H. Tsen, "Psychometric properties of the Taiwanese version of the World Health Organization-five well-being index," *Acta Psychiatrica Scandinavica*, vol. 127, no. 4, p. 331, 2013.
- [10] Health Promotion Administration [HPA], "Taiwan longitudinal study on aging (TLSA)," 2023, <https://reurl.cc/jDagOn>.
- [11] M. P. Lawton, "The Philadelphia geriatric center morale scale: a revision," *Journal of Gerontology*, vol. 30, no. 1, pp. 85–89, 1975.
- [12] J. Liang and K. A. Bollen, "The structure of the Philadelphia geriatric center morale scale: a reinterpretation," *Journal of Gerontology*, vol. 38, no. 2, pp. 181–189, 1983.
- [13] H. Tovel, S. Carmel, and V. H. Raveis, "Relationships among self-perception of aging, physical functioning, and self-efficacy in late life," *The Journals of Gerontology: Serie Bibliographique*, vol. 74, no. 2, pp. 212–221, 2019.
- [14] A. Seifert, "Impact of the COVID-19 pandemic on self-perception of aging among older adults," *Gerontology and Geriatric Medicine*, vol. 7, 2021.
- [15] R. N. Butler, "Dispelling ageism: the cross-cutting intervention," *The Annals of the American Academy of Political and Social Science*, vol. 503, no. 1, pp. 138–147, 1989.
- [16] P. D. Allen, K. E. Cherry, and E. Palmore, "Self-reported ageism in social work practitioners and students," *Journal of Gerontological Social Work*, vol. 52, no. 2, pp. 124–134, 2009.
- [17] J. Boeder and D. C. Tse, "Measuring self-perceptions of aging: differences between measures when predicting health outcomes," *The Journals of Gerontology: Serie Bibliographique*, vol. 76, no. 5, pp. 825–835, 2021.
- [18] B. Levy, "Stereotype embodiment: a psychosocial approach to aging," *Current Directions in Psychological Science*, vol. 18, no. 6, pp. 332–336, 2009.
- [19] M. Diehl, A. F. Brothers, and H. W. Wahl, "Self-perceptions and awareness of aging: past, present, and future," *Handbook of the Psychology of Aging*, pp. 155–179, 2021.
- [20] A. K. Beyer, J. K. Wolff, L. M. Warner, B. Schuz, and S. Wurm, "The role of physical activity in the relationship between self-perceptions of ageing and self-rated health in older adults," *Psychology and Health*, vol. 30, no. 6, pp. 671–685, 2015.
- [21] E. Nilsson, H. Igelström, I. Vikman, A. Larsson, and M. Pauelsen, "Positive self-perceptions of aging play a significant role in predicting physical performance among community-dwelling older adults," *International Journal of Environmental Research and Public Health*, vol. 18, no. 21, Article ID 11151, 2021.
- [22] V. Velaithan, M.-M. Tan, T.-F. Yu, A. Liem, P.-L. Teh, and T. T. Su, "The association of self-perception of aging and quality of life in older adults: a systematic review," *The Gerontologist*, vol. 64, no. 4, Article ID gnad041, 2024.
- [23] Y. Cai, X. Ren, J. Wang, Y. Hou, M. Zhang, and O. Chen, "Associations between self-perceptions of aging and social functioning in older adults: an analysis based on health and retirement study data," *Archives of Gerontology and Geriatrics*, vol. 119, Article ID 105307, 2024.
- [24] Z. Zhang, J. Wang, B. Ma, J. Wang, Y. Jia, and O. Chen, "Positive self-perceptions of aging increase physical resilience to facilitate social re-engagement of older adults who fall: analysis based on health and retirement study data," *Archives of Physical Medicine and Rehabilitation*, vol. 104, no. 8, pp. 1253–1259, 2023.

- [25] B. R. Levy and L. M. Myers, "Preventive health behaviors influenced by self-perceptions of aging," *Preventive Medicine*, vol. 39, no. 3, pp. 625–629, 2004.
- [26] J. K. Sun, E. S. Kim, and J. Smith, "Positive self-perceptions of aging and lower rate of overnight hospitalization in the US population over age 50," *Psychosomatic Medicine*, vol. 79, no. 1, pp. 81–90, 2017.
- [27] C. Tully-Wilson, R. Bojack, P. M. Millea, H. M. Stallman, A. Allen, and J. Mason, "Self-perceptions of aging: a systematic review of longitudinal studies," *Psychology and Aging*, vol. 36, no. 7, pp. 773–789, 2021.
- [28] S. Wurm, L. M. Warner, J. P. Ziegelmann, J. K. Wolff, and B. Schüz, "How do negative self-perceptions of aging become a self-fulfilling prophecy?" *Psychology and Aging*, vol. 28, no. 4, pp. 1088–1097, 2013.
- [29] J. Boeder, "The development of self-perceptions of aging: the interplay between society and the self across the lifespan," *Doctoral dissertation, The Claremont Graduate University*, 2021, https://scholarship.claremont.edu/cgu_etd/200.
- [30] R. X. Hu and L. W. Li, "Social disconnectedness and loneliness: do self-perceptions of aging play a role?" *The Journals of Gerontology: Serie Bibliographique*, vol. 77, no. 5, pp. 936–945, 2022.
- [31] M. Diehl, M. Wettstein, S. M. Spuling, and S. Wurm, "Age-related change in self-perceptions of aging: longitudinal trajectories and predictors of change," *Psychology and Aging*, vol. 36, no. 3, pp. 344–359, 2021.
- [32] K. E. Brown, J. Kim, T. Stewart, E. Fulton, and A. C. McCarrey, "Positive, but not negative, self-perceptions of aging predict cognitive function among older adults," *The International Journal of Aging and Human Development*, vol. 93, no. 1, pp. 543–561, 2021.
- [33] A. Brothers, M. Gabrian, H. W. Wahl, and M. Diehl, "Future time perspective and awareness of age-related change: examining their role in predicting psychological well-being," *Psychology and Aging*, vol. 31, no. 6, pp. 605–617, 2016.
- [34] E. Schwartz, L. Ayalon, and O. Huxhold, "Exploring the reciprocal associations of perceptions of aging and social involvement," *The Journals of Gerontology: Serie Bibliographique*, vol. 76, no. 3, pp. 563–573, 2021.
- [35] J. N. Lin, "Gender differences in self-perceptions about aging and sleep among elderly Chinese residents in Taiwan," *Journal of Nursing Research*, vol. 24, no. 4, pp. 347–356, 2016.
- [36] Y. L. Wu and S. R. Chao, "The effects of a beauty program on self-perception of aging and depression among community-dwelling older adults in an agricultural area in Taiwan," *Healthcare*, vol. 11, no. 10, p. 1377, 2023.
- [37] J. Blanc, A. Q. Briggs, A. A. Seixas, M. Reid, G. Jean-Louis, and S. R. Pandi-Perumal, "Addressing psychological resilience during the coronavirus disease 2019 pandemic: a rapid review," *Current Opinion in Psychiatry*, vol. 34, no. 1, pp. 29–35, 2021.
- [38] American Psychological Association [Apa], "Resilience," 2014, <https://www.apa.org/topics/resilience>.
- [39] E. S. Kim, R. Tkatch, D. Martin, S. MacLeod, L. Sandy, and C. Yeh, "Resilient aging: psychological well-being and social well-being as targets for the promotion of healthy aging," *Gerontology and Geriatric Medicine*, vol. 7, 2021.
- [40] S. MacLeod, S. Musich, K. Hawkins, K. Alsgaard, and E. R. Wicker, "The impact of resilience among older adults," *Geriatric Nursing*, vol. 37, no. 4, pp. 266–272, 2016.
- [41] K. M. Tecson, L. R. Wilkinson, B. Smith, and J. M. Ko, "Association between psychological resilience and subjective well-being in older adults living with chronic illness," *Baylor University Medical Center Proceedings*, vol. 32, no. 4, pp. 520–524, 2019.
- [42] M. G. Taylor and D. Carr, "Psychological resilience and health among older adults: a comparison of personal resources," *The Journals of Gerontology: Serie Bibliographique*, vol. 76, no. 6, pp. 1241–1250, 2021.
- [43] H. Kim, B. A. Thyer, and J. C. Munn, "The relationship between perceived ageism and depressive symptoms in later life: understanding the mediating effects of self-perception of aging and purpose in life, using structural equation modeling," *Educational Gerontology*, vol. 45, no. 2, pp. 105–119, 2019.
- [44] J. A. Ribeiro-Gonçalves, P. A. Costa, and I. Leal, "Loneliness, ageism, and mental health: the buffering role of resilience in seniors," *International Journal of Clinical and Health Psychology*, vol. 23, no. 1, Article ID 100339, 2023.
- [45] A. Losada-Baltar, L. Jiménez-Gonzalo, L. Gallego-Alberto, M. D. S. Pedroso-Chaparro, J. Fernandes-Pires, and M. Márquez-González, "We are staying at home." Association of self-perceptions of aging, personal and family resources, and loneliness with psychological distress during the lockdown period of COVID-19," *The Journals of Gerontology: Serie Bibliographique*, vol. 76, no. 2, pp. e10–e16, 2021.
- [46] L. Ran, W. Wang, M. Ai, Y. Kong, J. Chen, and L. Kuang, "Psychological resilience, depression, anxiety, and somatization symptoms in response to COVID-19: a study of the general population in China at the peak of its epidemic," *Social Science & Medicine*, vol. 262, no. 262, Article ID 113261, 2020.
- [47] M. E. Mlinac, T. H. Sheeran, B. Blissmer, F. Lees, and D. Martins, "Psychological resilience," in *Resilience in Aging*, B. Resnick, L. Gwyther, and K. Roberto, Eds., Springer, New York, NY, 2011.
- [48] E. Feliciano, A. Feliciano, D. Palompon, and A. Boshra, "Aging-related resiliency theory development," *Belitung Nursing Journal*, vol. 8, no. 1, pp. 4–10, 2022.
- [49] European Commission, "Social responsibility of universities in europe and development of a community reference framework," 2018, https://www.fpce.up.pt/ciie/sites/default/files/investigations/attachment/2013_EU-USR_leaflet_0.pdf.
- [50] S. Wurm, M. J. Tomasik, and C. Tesch-Römer, "Serious health events and their impact on changes in subjective health and life satisfaction: the role of age and a positive view on ageing," *European Journal of Ageing*, vol. 5, no. 2, pp. 117–127, 2008.
- [51] M. Meng, J. He, Y. Guan et al., "Factorial invariance of the 10-item Connor-Davidson resilience scale across gender among Chinese elders," *Frontiers in Psychology*, vol. 10, p. 1237, 2019.
- [52] A. Déruaz-Luyet, A. A. N'Goran, N. Senn et al., "Multimorbidity and patterns of chronic conditions in a primary care population in Switzerland: a cross-sectional study," *BMJ Open*, vol. 7, no. 6, Article ID e013664, 2017.
- [53] I. J. A. Pesigan and S. F. Cheung, "SEM-based methods to form confidence intervals for indirect effect: still applicable given nonnormality, under certain conditions," *Frontiers in Psychology*, vol. 11, Article ID 571928, 2020.
- [54] K. Joreskog and D. Sorbom, *Structural Equation Modelling: Guidelines for Determining Model Fit*, University Press of America, NY, 1993.
- [55] S. Mackinnon, R. Curtis, and R. O'Connor, "Tutorial in longitudinal measurement invariance and cross-lagged panel models using lavaan," *Meta-Psychology*, vol. 6, 2022.
- [56] Health Promotion Administration [HPA], "2019 taiwan longitudinal study on aging survey report," 2019, <https://reurl.cc/VN2M6A>.

- [57] N. Shrestha, "Detecting multicollinearity in regression analysis," *American Journal of Applied Mathematics and Statistics*, vol. 8, no. 2, pp. 39–42, 2020.
- [58] M. W.-L. Cheung, "Computing multivariate effect sizes and their sampling covariance matrices with structural equation modeling: theory, examples, and computer simulations," *Frontiers in Psychology*, vol. 9, p. 1387, 2018.
- [59] H. R. Moody and J. R. Sasser, *Aging: Concepts and Controversies*, Sage, Los Angeles, 8th edition, 2015.
- [60] G. Yao, Y. Luo, H. Wu, M. Gao, and J. Sun, "Association between positive control in self-perceptions of aging and motoric cognitive risk syndrome among Chinese community-dwelling older adults: a cross-sectional study," *BMC Geriatrics*, vol. 23, no. 1, p. 211, 2023.
- [61] C. Moser, J. Spagnoli, and B. Santos-Eggimann, "Self-perception of aging and vulnerability to adverse outcomes at the age of 65–70 years," *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, vol. 66, no. 6, pp. 675–680, 2011.
- [62] Uk Centre for Ageing Better, "Reframing ageing: public perceptions of ageing, older age and demographic change," 2021, <https://reurl.cc/7knpn9>.
- [63] S. Chiu and S. Yu, "An excess of culture: the myth of shared care in the Chinese community in Britain," *Ageing and Society*, vol. 21, no. 6, pp. 681–699, 2001.
- [64] I. Helmreich, A. Kunzler, A. Chmitorz et al., "Psychological interventions for resilience enhancement in adults," *Cochrane Database of Systematic Reviews*, vol. 2017, no. 2, Article ID CD012527, 2017.
- [65] S. E. Lupe, L. Keefer, and E. Szigethy, "Gaining resilience and reducing stress in the age of COVID-19," *Current Opinion in Gastroenterology*, vol. 36, no. 4, pp. 295–303, 2020.
- [66] F. X. Zhang, "The community resilience measurement throughout the COVID-19 pandemic and beyond—an empirical study based on data from Shanghai, Wuhan and Chengdu," *International Journal of Disaster Risk Reduction*, vol. 67, Article ID 102664, 2022.
- [67] T. Hansen and M. Blekesaune, "The age and well-being 'paradox': a longitudinal and multidimensional reconsideration," *European Journal of Ageing*, vol. 19, no. 4, pp. 1277–1286, 2022.
- [68] R. R. Carandang, A. Shibamura, E. Asis, D. C. Chavez, M. T. Tuliao, and M. Jimba, "Are filipinos aging well?": determinants of subjective well-being among senior citizens of the community-based ENGAGE Study," *International Journal of Environmental Research and Public Health*, vol. 17, no. 20, p. 7636, 2020.
- [69] A. P. Fontes and A. L. Neri, "Resilience in aging: literature review," *Ciência & Saúde Coletiva*, vol. 20, no. 5, pp. 1475–1495, 2015.
- [70] F. J. Infurna, D. Gerstorf, S. Robertson, S. Berg, and S. H. Zarit, "The nature and cross-domain correlates of subjective age in the oldest old: evidence from the OCTO Study," *Psychology and Aging*, vol. 25, no. 2, pp. 470–476, 2010.
- [71] Z. Liao, H. Zhou, and Z. He, "The mediating role of psychological resilience between social participation and life satisfaction among older adults in China," *BMC Geriatrics*, vol. 22, no. 1, p. 948, 2022.
- [72] E. Sagone and M. E. D. Caroli, "Relationships between psychological well-being and resilience in middle and late adolescents," *Procedia-Social and Behavioral Sciences*, vol. 141, pp. 881–887, 2014.
- [73] K. M. Sønderkov, P. T. Dinesen, Z. I. Santini, and S. D. Østergaard, "The depressive state of Denmark during the COVID-19 pandemic," *Acta Neuropsychiatrica*, vol. 32, no. 4, pp. 226–228, 2020.
- [74] W. Zheng, Y. Huang, and Y. Fu, "Mediating effects of psychological resilience on life satisfaction among older adults: a cross-sectional study in China," *Health and Social Care in the Community*, vol. 28, no. 4, pp. 1323–1332, 2020.