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The Effect of Age Identity on Depression in Middle-Aged and Older Adults: The Mediating Role of Attitudes Toward Aging and the Moderated Mediation Effect of Subjective Health Status

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ABSTRACT

The problem and the aim of the study. As populations age, understanding the psychological factors that shape mental health in later life is crucial. This study examines how age identity affects depression through attitudes toward aging and whether this pathway is moderated by subjective health. These findings underscore the need for targeted educational interventions to promote positive age perceptions and healthier aging.

Research methods. A cross-sectional online survey was conducted in April 2024 with 400 participants aged 50 years and older, stratified by age group (middle-aged: 50–64, older adults: 65+) and gender to ensure balanced representation. Data were analyzed using SPSS 24.0 and PROCESS macro 4.2 (model 4, model 14) to test mediation and moderated mediation effects.

Results. A more mature age identity was significantly associated with lower depression levels, and this relationship was partially mediated by attitudes toward aging, as confirmed by a significant indirect effect (Coefficient = -0.026, 95% CI [-0.051, -0.114]). Additionally, subjective health status significantly moderated the indirect effect of age identity on depression through attitudes toward aging, with stronger indirect effects observed in those with poorer subjective health, while the direct effect of age identity on depression was non-significant (effect = -0.062, $p > .05$).

Conclusion. These findings highlight the importance of educational programs that promote positive age identity and attitudes toward aging to reduce depression among older adults. Tailored interventions should especially target those with lower perceived health to enhance their psychological well-being.

KEYWORDS

age identity, depression, attitudes toward aging, subjective health status, middle-aged and older adults

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INTRODUCTION

As global population aging accelerates, the discrepancy between an individual's subjective age—how old they feel – and their chronological age has drawn increasing scholarly attention. On average, older adults report feeling roughly 20 % younger than their actual age, a tendency that becomes more pronounced after age 60 [1]. Inter-generational comparisons further reveal that successive cohorts perceive themselves as even younger, a perception intertwined with improved quality of life, better health, and extended life expectancy [2]. This "age gap" typically emerges in midlife and widens as aging progresses [3].

This phenomenon is encapsulated in the construct of age identity, a psychologically perceived age distinct from chronological age [4; 5]. Many middle-aged and older adults encounter social and economic discrimination solely due to their age, a context that can intensify a preference for a younger age identity. Such dynamics mirror the youth-oriented values and the entrenched negative discourse on aging found in many Western societies [6].

A growing body of empirical work demonstrates that adults who hold a younger age identity experience more favorable outcomes across multiple life domains. They typically endorse more positive attitudes toward aging [7], report lower levels of depressive symptoms [8], and enjoy a higher quality of life [9]. For example, Stephan and colleagues [10] showed that individuals who feel younger not only report less depression but also display lower mortality rates. Similarly, Langballe et al. [9] found that a younger self-perceived age is associated with superior health, greater intrinsic capacity, and enhanced quality of life. Those who identify as younger also tend to evaluate aging positively and exhibit lower anxiety about aging [11]. Collectively, these findings indicate that age identity constitutes a valuable psychological resource that shapes both attitudes toward aging and emotional health [12; 13].

Beyond mental health, age identity and attitudes toward aging can influence older adults' motivation for lifelong learning and their openness to educational opportunities. A positive self-view and accepting stance toward aging foster receptivity to new learning and social participation, thereby supporting quality of life through education. Accordingly, clarifying the dynamics of these constructs offers an important theoretical foundation for designing lifelong-learning and community programs for middle-aged and older populations.

It must be acknowledged, however, that the beneficial effects of a younger age identity may partially reflect prevailing youth-centric values and ageism [14; 15]. Perceived ageism is closely linked to higher depression [16] and poorer quality of life [17]. Exposure to negative aging stereotypes can prompt mid-life and older adults to distance themselves from their age group and identify with younger cohorts [18], potentially exacerbating depressive feelings. Thus, a younger age identity could – under some circumstances – serve as a risk factor rather than a protective one. To disentangle these possibilities, it is necessary to examine relevant mediators and moderators.

A prime mediating candidate is an individual's attitudes toward aging – the cognitive-affective evaluation of growing older [19]. Positive attitudes foster psychological security and life satisfaction, thereby buffering against depression [15]. Conversely, negative attitudes or anxiety about aging heighten depressive risk [20]. Karp and Lenze [21], for instance, reported that chronic aging anxiety raises dementia risk (OR = 4.58) among adults aged 60-70, while newly emergent anxiety increases the risk even further (OR = 7.21).

The strength of these pathways may vary with one's perceived health status, a variable with direct educational relevance. Older adults who view their health positively tend to experience greater control and autonomy, fueling self-directed learning and social engagement. Perceived health, more so than objective indicators, is a robust predictor of depression [22]. Those who feel younger often appraise their health more favorably, whereas those who feel older tend to view it negatively [23]. Empirical work shows that subjective age is tightly linked to intrinsic capacity, functional ability, and overall health [24], and that attitudes toward aging exert both short-term emotional and long-term physical effects [25].

Synthesizing this literature suggests a moderated mediation model: perceived health status may amplify or dampen the indirect effect of age identity on depression via attitudes toward

aging. Specifically, middle-aged and older adults who perceive their health positively may experience enhanced benefits – a younger age identity and positive aging attitudes jointly lowering depression. Conversely, those with a negative health perception may find that a younger age identity intensifies depressive symptoms.

Accordingly, this study aims to examine the moderated mediation effect of subjective health status on the relationship between age identity and depression, mediated by attitudes toward aging among middle-aged and older adults. To this end, the following research questions were formulated. First, do attitudes toward aging mediate the relationship between age identity and depression? Second, does perceived health status moderate this mediating pathway, yielding a conditional indirect effect?

Answering these questions will offer theoretical and practical insights for depression-prevention strategies aimed at improving older adults' quality of life. Findings can inform policies that nurture a healthy age identity, cultivate positive attitudes toward aging, and enhance perceived health. Moreover, an educational approach grounded in self-perception and aging acceptance may reduce social isolation and foster intergenerational integration through lifelong learning. Consequently, this study is expected to contribute foundational evidence for developing age-friendly educational content and policies.

MATERIALS AND METHODS

Research Model

This study proposes a conceptual research model, as illustrated in [Figure 1], based on the assumption that age identity influences depression through attitudes toward aging, and that this mediating effect is moderated by subjective health status among middle-aged and older adults.

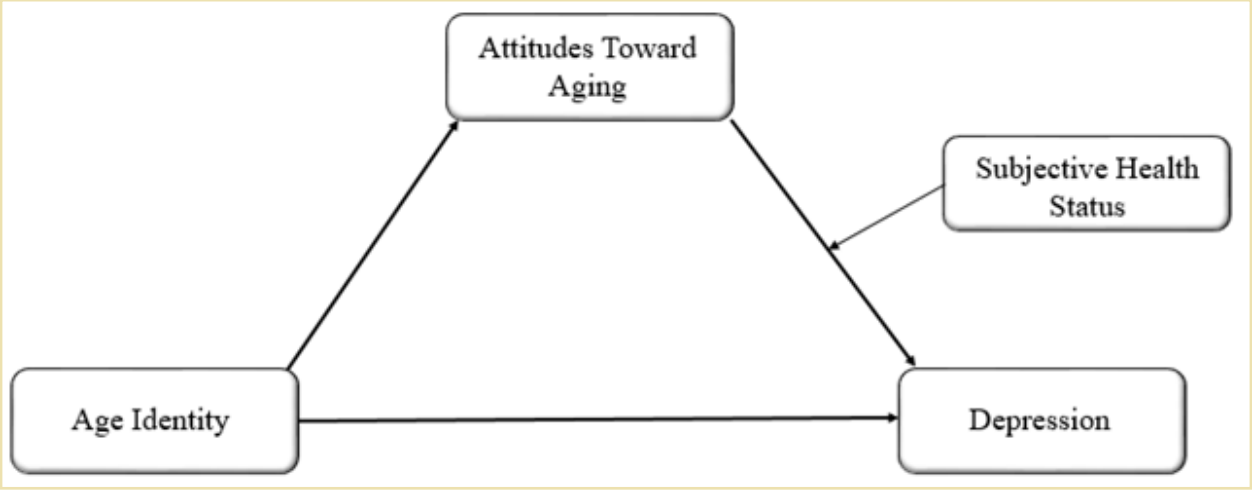

Figure 1 Conceptual Research Model

Data Collection Procedures and Characteristics of the Study Sample

This study utilized data from an online survey conducted in April 2024 through a professional survey agency. The participants consisted of 400 middle-aged and older adults aged 50 and above. Quota sampling was employed to ensure equal representation by age group (middle-aged: 50–64 years; older adults: 65 years and older) and gender (male/female), resulting in four balanced subgroups: 100 middle-aged men, 100 middle-aged women, 100 older men, and 100 older women. A total of 400 questionnaires were distributed, all of which were collected and included in the final analysis.

The average age of participants was 62.2 years. Age distribution was as follows: 39.0% in their 50s, 46.3% in their 60s, and 14.8% aged 70 or older. Gender was evenly split with 50.0% male and 50.0% female. Regarding marital status, 81.0% were married, while 19.0% were divorced, widowed, or in other categories. Educational attainment was 47.0% high school or less and 53.0% college or

higher. In terms of economic status, 56.5% described themselves as "average," with a mean score of 2.918 on a 5-point scale, slightly below the median. Family relationship quality was rated positively, with 61.0% indicating "good," and the average score was 3.665. As for residence, 61.5% lived in large cities, while 38.5% resided in small or medium-sized cities or rural areas.

Measurement Instruments

The independent variable, age identity, was measured using a single-item scale developed by Westerhof and Barrett [26]. Respondents were asked, "How old do you feel compared to your actual age?" with three response options: "younger," "the same," or "older." Higher scores reflected a more realistic and mature acceptance of one's actual age.

The mediating variable, attitudes toward aging, was assessed using a single-item scale based on the 2008 Korean National Survey on Older Adults, as used in Han [14]. Participants responded to the statement, "Getting old means becoming helpless and useless," on a 5-point Likert scale, where higher scores indicated more negative attitudes toward aging.

The moderated mediating variable, subjective health status, was measured by the item, "Compared to your peers, how would you rate your current health status?" using a 5-point Likert scale. Higher scores reflected better perceived health.

The dependent variable, depression, was measured using the short form of the CES-D scale consisting of 11 items, developed by Heo et al. [27]. Respondents rated their experiences over the past week on a 4-point Likert scale. Two items ("I felt relatively good" and "I lived without major complaints") were reverse-coded. The internal consistency of the scale was high (Cronbach's α = .896), and the average score of all items was used in the analysis, with higher scores indicating greater levels of depression.

Data Analysis Methods

Data were analyzed using SPSS 24.0 and the SPSS PROCESS macro version 4.2. Descriptive statistics, reliability analysis, frequency analysis, and Pearson correlation analysis were first conducted. Mediation and moderated mediation effects were tested using Model 4 and Model 14 of PROCESS macro, respectively.

First, Model 4 was used to test the mediating effect of attitudes toward aging in the relationship between age identity and depression. A bootstrapping method with 5,000 resamples and 95% confidence intervals was applied.

Second, Model 14 was used to examine whether subjective health status moderated the mediating path from age identity – attitudes toward aging – depression. To assess moderation, the analysis was conducted at the mean (M) and ±1 standard deviation (SD) of subjective health. Both the independent and moderator variables were mean-centered to reduce multicollinearity

RESULTS

Descriptive Statistics and Correlations Among Key Variables Variables

This table presents the means, standard deviations, skewness, and kurtosis values for the major study variables: age identity, attitudes toward aging, subjective health status, and depression. All skewness and kurtosis values fall within the acceptable range, indicating normal distribution of the data.

Descriptive statistics for the main variables are presented in Table 1. The mean score for age identity was 2.315 (SD = .646), indicating a relatively mature self-perception of age among participants. Attitudes toward aging showed a mean of 2.653 (SD = 1.072), reflecting a moderately low level of age-related negativity. Subjective health status was moderate (M = 3.080, SD = .765), while the mean depression score was relatively low at 1.607 (SD = .571). All variables satisfied the assumption of normality, with skewness values ranging from −.409 to 1.216 and kurtosis values from −.788 to .837, aligning with Kline's [26] criteria for normal distribution.

Table 1

Descriptive Statistics of Key Variables (N=400)

	Mean		Skewness		Kurtosis	
	Statistics	S.D.	Statistics	S.E.	Statistics	S.E.
Age Identity	2.315	.646	-.409	.122	-.708	.243
Attitudes Toward Aging	2.653	1.072	.188	.122	-.788	.243
Subjective Health Status	3.080	.765	-.136	.122	-.029	.243
Depression	1.607	.571	1.216	.122	.837	.243

Before verifying the research model, multicollinearity was assessed through correlation analysis among the variables (Table 2). All correlations among the main variables were statistically significant. Focusing on the dependent variable, depression, age identity maturity was negatively correlated with depression ($r = -0.183$, $p < .001$), indicating that the more mature the age identity, the lower the level of depression. Conversely, a more negative attitude toward aging was associated with higher depression ($r = 0.389$, $p < .001$). Additionally, better subjective health status was linked to lower depression levels ($r = -0.339$, $p < .001$). The correlation coefficients ranged from 0.156 to 0.389, suggesting no risk of multicollinearity among the variables.

Table 2

Correlations among Key Variables (N=400)

	Age Identity	Attitudes toward aging	Subjective health status	Depression
Age Identity	1			
Attitudes Toward Aging	-.156**	1		
Subjective Health Status	.258***	-.247***	1	
Depression	-.183***	.389***	-.339***	1
**p<.01, ***p<.001				

Mediating Effect of Attitudes Toward Aging

To examine the mediating effect of attitudes toward aging on the relationship between age identity and depression among middle-aged and older adults, analysis was conducted using SPSS PROCESS macro Model 4 (see Table 3). Socio-demographic differences were reviewed, and economic status and family relationships were included as control variables.

The results showed that age identity had a significant negative effect on depression (Coefficient = -0.111, $p < .01$), indicating that a more mature age identity was associated with lower levels of depression.

When including the mediator, age identity had a significant negative effect on attitudes toward aging (Coefficient = -0.193, $p < .05$), while attitudes toward aging had a positive effect on depression (Coefficient = 0.117, $p < .001$). This suggests that a more mature age identity is associated with less negative attitudes toward aging, and more negative attitudes toward aging are related to higher levels of depression.

The model examining the effect of age identity on attitudes toward aging was significant ($F = 23.306$, $p < .001$), with age identity and control variables explaining 15.0% of the variance in attitudes toward aging. Furthermore, age identity, attitudes toward aging, economic status, and family relationships together explained 31.7% of the variance in depression. The total effect of age identity on depression was Coefficient = -0.111, whereas the direct effect, accounting for the mediation by attitudes toward aging, decreased to Coefficient = -0.088. This indicates that attitudes toward aging partially mediate the relationship between age identity and depression.

To test the significance of the indirect effect, a bootstrap analysis with 5,000 samples was performed. The indirect effect was estimated at -0.026, with a bootstrap confidence interval ranging from -0.051 to -0.114, excluding zero, confirming the statistical significance of the mediation effect.

Therefore, attitudes toward aging were confirmed as a significant mediator in the relationship between age identity and depression among middle-aged and older adults.

Table 3

Mediating Effect of Attitudes Toward Aging (N=400)

		Coeffect	SE	t	p	LLCI	ULCI
Mediation Model (Dependent Variable: Attitudes Toward Aging)							
Constant		5.065	.300	16.825	.000	4.473	5.656
Age Identity		-.193	.0778	-2.477	.014	-.346	-.040
Control Variables	Economic Status	-.194	.073	-2.654	-.008	-.338	-.050
	Family Relationship(s)	-.382	.067	-5.744	.000	-.512	-.251
R^2 =.150, F=23.306, p<.001							
Outcome Model (Dependent Variable: Depression)							
Constant		2.735	.189	14.509	.000	2.365	3.106
Age Identity		-.088	.038	-2.350	.019	-.162	-.014
Attitudes toward aging		.117	.024	4.858	.000	.070	.164
Control Variables	Economic Status	-.137	.035	-3.876	.000	-.206	-.067
	Family Relationship(s)	-.228	.033	-6.881	.000	.293	-.163
R^2 =.317, F=45.807, p<.001							

Total Effect, Direct Effect						
	Coeffect	SE	t	p	LLCI	ULCI
Total Effect	-.111	.038	-2.891	.004	-.186	-.035
Direct Effect	-.088	.037	-2.350	.019	-.162	-.014

Indirect Effect				
	Effect	Boot SE	Boot LLCI	Boot ULCI
Age Identity→ attitudes toward aging → depression	-.026	.012	-.051	-.114
LLCI = the lower limit of the 95% bootstrap confidence interval for the indirect effect				
ULCI = the upper limit of the 95% bootstrap confidence interval for the indirect effect				

Moderated Mediation Effect of Subjective Health Status

To examine the moderated mediation effect of subjective health status on the influence of age identity on depression via attitudes toward aging among middle-aged and older adults, analysis was conducted using SPSS PROCESS macro Model 14 (see Table 4, Figures 2).

The results showed that age identity had a significant negative effect on attitudes toward aging (Coefficient = -0.193, $p < .05$), indicating that a more mature age identity was associated with less negative attitudes toward aging. The model was statistically significant with an F-value of 23.306 ($p < .001$), and age identity along with control variables (economic status and family relationships) explained 15.0% of the variance in attitudes toward aging.

In the outcome model, the moderating effect of subjective health status on the relationship between age identity and depression was examined. The model was significant with an F-value of 34.359 ($p < .001$), explaining 34.4% of the variance in depression. Moreover, the interaction between attitudes toward aging and subjective health status was also significant (Coefficient = -0.054, $p < .05$), indicating that subjective health status moderates the indirect effect of age identity on depression through attitudes toward aging.

An important finding in this analysis was that the direct effect of age identity on depression was not statistically significant. This implies that the direct influence of age identity on depression becomes non-significant when accounting for attitudes toward aging, subjective health status, and their interactions. In other words, the effect of age identity on depression through attitudes toward aging is fully mediated by subjective health status.

Further conditional effect analyses based on three levels of subjective health status (mean, mean ± 1 standard deviation) showed that the conditional indirect effects were all statistically significant, with confidence intervals excluding zero. Specifically, the indirect effect of age identity on depression via attitudes toward aging was weaker in groups with good subjective health status but stronger in groups with poor subjective health status. This suggests that better subjective health status buffers the negative effect of age identity on depression through attitudes toward aging.

Table 4

The Moderated Mediation Effect of Subjective Health Status (N=400)

Variables		Coeffect	SE	t	p	LLCI	ULCI
Mediation Model (Dependent Variable: Attitudes Toward Aging)							
Constant		2.412	.301	8.013	.000	1.820	3.004
Age Identity		-.193	.078	-2.477	.014	-.346	-.040
Control Variables	Economic Status	-.194	.073	-2.654	.008	-.338	-.050
	Family Relationship(s)	-.382	.067	-5.744	.000	-.512	-.251
R^2 =.150, F=23.306, p< .000							
Outcome Model (Dependent Variable: Depression)							
Constant		2.734	.174	15.720	.000	2.392	3.076
Age Identity		-.062	.038	-1.647	.100	-.136	.012
Attitudes Toward Aging(A)		.111	.024	4.685	.000	.064	.157
Subjective Health Status(B)		-.129	.037	-3.528	.001	-.201	-.057
A× B		-.054	.027	-2.012	.045	-.107	-.001
Control Variables	Economic Status	-.091	.037	-2.438	.015	-.164	-.018
	Family Relationship(s)	-.199	.033	-5.975	.000	-.264	-.134
R^2 =.344, F=34.359, p<.000							

Increase in R^2 Due to Interaction			
Interaction term	R^2	F	p
A × B	.007	4.047	.045

Conditional Effect of Subjective Health Status						
	Effect	SE	t	p	LLCI	ULCI
-.765(M-1SD)	.152	.031	4.883	.000	.091	.213
.000(M)	.119	.024	4.685	.000	.064	.157
.765(M+1SD)	.070	.032	2.211	.028	.008	.132
LLCI = the lower limit of the 95% bootstrap confidence interval for the indirect effect						
ULCI = the upper limit of the 95% bootstrap confidence interval for the indirect effect						

The direct effect of age identity on depression was not statistically significant (effect = -0.062, p > .05). However, the conditional indirect effects of age identity on depression through attitudes toward aging, moderated by subjective health status, were statistically significant across three levels of subjective health status (mean and ±1 SD). This was confirmed as the 95% bootstrap confidence intervals for the conditional indirect effects did not include zero (LLCI and ULCI excluded zero). Therefore, the moderated mediation effect of subjective health status on the pathway from age identity to depression via attitudes toward aging among middle-aged and older adults was statistically supported (see Table 5).

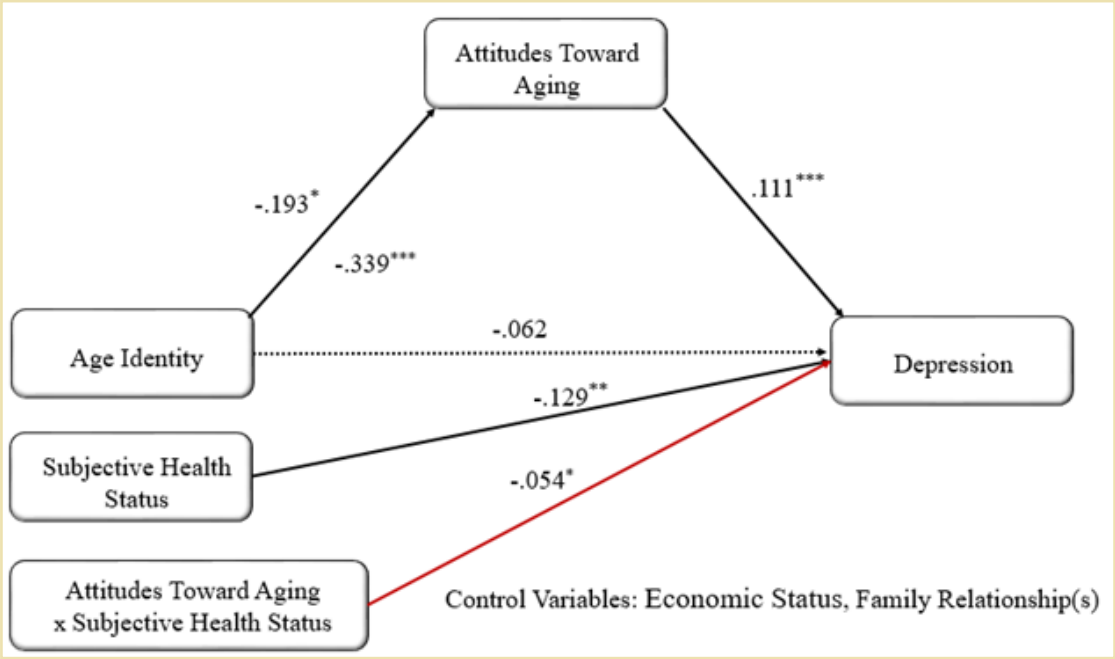

Figure 2 Statistical Model of the Moderated Mediation Effect of Subjective Health Status

Table 5

Direct Effect of Age Identity on Depression, Conditional Indirect Effects, and Index of Moderated Mediation (N=400)

Direct Effect of Age Identity on Depression					
Effect	SE	t	p	LLCI	ULCI
-.062	.038	-1.647	.100	-.136	.012
Conditional Indirect Effect of Age Identity on Depression(Age Identity→ Attitudes Toward Aging→ Depression)					
		Effect	Boot SE	Boot LLCI	Boot ULCI
-.765(M-1SD)		-.029	.014	-.059	-.004
.000(M)		-.021	.010	-.042	-.003
.765(M+1SD)		-.013	.008	-.031	-.000
Index of Moderated Mediation by Subjective Health Status					
		Index	Boot SE	Boot LLCI	Boot ULCI
Subjective Health Status		.010	.008	-.001	.028
LLCI = the lower limit of the 95% bootstrap confidence interval for the indirect effect					
ULCI = the upper limit of the 95% bootstrap confidence interval for the indirect effect					

DISCUSSION

The key findings are interpreted in relation to previous studies as follows.

First, the mediating effect of attitudes toward aging was significant in the relationship between age identity and depression. A more mature age identity was associated with less negative attitudes toward aging, which in turn was linked to lower levels of depression. This finding aligns with prior studies showing that age identity influences attitudes toward aging [7], and attitudes toward aging affect depression levels [15; 21]. However, while previous research generally emphasized that a younger age identity correlates with positive psychological variables, this study highlights that a mature age identity – reflecting acceptance and positive recognition of one's age – fosters positive attitudes toward aging and mitigates depression.

This result can be interpreted from the perspective of ageism. A younger age identity might reflect conformity to societal norms that idealize youth and stigmatize aging, which may harm self-acceptance and mental health [29; 30]. Conversely, a mature age identity is relatively free from ageist bias and serves as a psychological foundation for embracing aging as a natural and positive part of life's development. Consequently, lifelong and community education programs should emphasize fostering mature age identities and positive aging attitudes. Institutions such as senior colleges, civic lifelong learning centers, and community hubs can play vital roles in facilitating cognitive and cultural shifts regarding aging, thereby contributing to both individual and societal resilience against ageism.

Second, subjective health status was found to moderate the mediated relationship between age identity and depression through attitudes toward aging. Specifically, better subjective health status weakened the impact of age identity on depression, while poorer subjective health amplified it. This is consistent with previous research demonstrating that self-rated health interacts with cognitive and emotional resources to influence psychological stability [22; 23]. The educational implications of this finding are significant, as improving individuals' health perceptions and attitudes toward aging can be achieved not merely by information provision but through structured health education, psychological support, and self-awareness training. Programs focusing on aging psychology, self-care, and health awareness can enhance middle-aged and older adults' self-perception, serving as critical mechanisms to alleviate depression and promote successful aging.

Third, the study highlights the urgent need for policy and educational interventions addressing socio-cultural issues related to ageism. Many middle-aged and older adults currently harbor negative perceptions of aging and tend to avoid confronting the aging process [31; 32]. Such societal attitudes can distort age identity and exacerbate depression. Educational strategies, including intergenerational understanding programs, aging awareness curricula, and retirement life planning, should be expanded. These efforts require comprehensive approaches encompassing identity formation, emotional acceptance, and social meaning-making rather than simple knowledge dissemination. Additionally, curricula emphasizing psychological growth and maturation in later life (curriculums for positive aging) are essential.

Finally, this study underscores the importance of an interdisciplinary and integrative approach by demonstrating that the interaction of age identity, attitudes toward aging, and subjective health status decisively impacts mental health. Developmental psychology, health psychology, lifelong education, and social welfare disciplines must collaborate to design prevention-oriented mental health education programs and policies tailored to the aging population.

CONCLUSION

In summary, the present study examined the mediating effect of attitudes toward aging and the moderated mediation effect of subjective health status in the relationship between age identity and depression among middle-aged and older adults. Data were collected in April 2024 through an online survey administered by a professional research agency, targeting 400 individuals aged 50 and older. Using quota sampling, the sample was evenly divided by age group (middle-aged adults aged 50–64 and older adults aged 65 and above) and gender (100 males and 100 females in each group). All 400 responses were returned and used in the analysis. Data analysis was conducted using SPSS 24.0 and PROCESS Macro 4.2. The key findings of this study are interpreted in light of prior research, offering insights into the psychological processes underlying aging and mental health.

The main conclusions are as follows.

First, most participants exhibited a mature age identity, held non-negative attitudes toward aging, and reported relatively low levels of depression. This suggests a generally accepting attitude toward aging among middle-aged and older adults, which can be interpreted as a positive sign.

Second, attitudes toward aging significantly mediated the relationship between age identity and depression. A mature age identity was linked to less negative aging attitudes, which subsequently reduced depression levels. Notably, this study differs from prior research that focused on the positive effects of a younger age identity by demonstrating that a mature age identity is a critical protective factor for mental health in middle-aged and older adults.

Third, subjective health status moderated the indirect effect of age identity on depression through attitudes toward aging. Poor subjective health strengthened this indirect effect, while better health attenuated it. This finding indicates that subjective health status is an important contextual variable influencing cognitive appraisal and emotional responses related to mental health.

These results highlight the importance of fostering mature age identities and positive aging attitudes to support mental health among middle-aged and older adults. Considering the internalization of ageism and its impact on identity and psychological well-being, social and educational interventions targeting age identity are necessary. Programs promoting aging acceptance and intergenerational understanding may serve as effective strategies.

Future research should incorporate experiences and perceptions of age discrimination into the model to more precisely elucidate the psychological mechanisms through which mature age identity benefits mental health. Although this study collected data via a professional survey agency, the non-probability sampling limits generalizability. Subsequent research should employ larger, representative samples to further investigate the complex relationships among age identity, attitudes toward aging, depression, and health in middle-aged and older populations.

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