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ARTICLE

The Relationship between E-Health Literacy and Educational Participation Motivation among Elderly Individuals: The Chained Mediating Effects of Self-Identity and Social Capital

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Abstract

Aims/Background In light of the increased utilization of digital technology among the elderly population, understanding the relationship between e-health literacy, self-identity, social capital, and educational participation motivation has become crucial. This study aims to investigate these relationships and explore the mediating effects of self-identity and social capital on the elderly population. By shedding light on these aspects, the study seeks to contribute to the existing knowledge base and inform intervention strategies to enhance the elderly individuals' overall well-being and engagement with digital health resources.

Methods A questionnaire survey was conducted in a sample consisting of 578 elderly participants. Data of the surveyed variables were analyzed. Mediating effect analysis methods were employed to explore the mediating roles of self-identity and social capital in the relationship between e-health literacy and educational participation motivation among the elderly individuals.

Results The results revealed a significant positive correlation between e-health literacy, self-identity, social capital, and educational participation motivation among elderly individuals. Furthermore, self-identity and social capital were found to play significant mediating roles between e-health literacy and educational participation motivation. Specifically, self-identity and social capital acted as complete mediators, with a mediating effect value of 0.61, between e-health literacy and educational participation motivation. Additionally, the chained mediating effect of self-identity and social capital was also significant.

Conclusion This study demonstrated that e-health literacy and educational participation motivation are closely intertwined, with self-identity and social capital acting as the mediators in this association, in the elderly population, providing valuable guidance for enhancing the health and quality of life and offering insightful references for the development and implementation of relevant policies.

Key words: e-health literacy; self-identity; social capital; educational participation motivation; mediating effect

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Introduction

The accelerated ageing of the population happening at the global scale has posed significant challenges to the healthcare system, with China experiencing a particularly higher growth rate of population aging compared with other nations

(Beard et al, 2016). Ageing is accompanied by a continuous decline in psychological, physiological, and social functioning, which translates to an increasing number of physical and psychological problems that directly impact the quality of life (Jiang and Yang, 2022). Hence, it is crucial to investigate the engagement of the elderly in learning activities due to their demonstrated benefits in delaying cognitive decline, mitigating social isolation, and fostering positive emotional well-being (Liu and Wang, 2022). Since educational engagement is driven by educational participation motivation, studying this aspect among the elderly is of significant importance (Felberbaum et al, 2023).

Previous studies have uncovered numerous factors influencing elderly individuals' participation in community health education programs (Rezakhani Moghaddam et al, 2022; Uchida et al, 2024). Among these factors, e-health literacy, self-identity, and social capital stand out as potentially significant.

E-health literacy refers to an individual's ability to acquire, understand, evaluate, and apply health-related information obtained from online sources, and to use digital tools to manage and monitor personal health status. Therefore, studying e-health literacy among the elderly is key to dissecting the best ways for promoting effective access to health information and encouraging their participation in health management programs. Resource theory posits that both internal and external resources contribute to an individual's development and change from an ecological perspective (Alvaro et al, 2010). Internal resources include skills, values, abilities, and self-identity, which guide behaviour (Zou et al, 2020), while external resources comprise environmental characteristics such as social support networks, available social resources, and social institutions that can impact health development (Xiang et al, 2022). According to the resource theory, the mechanism by which e-health literacy affects educational participation motivation among the elderly likely entails the utilization of both internal and external resources.

Self-identity refers to an individual's recognition of one's unique existence, encompassing the harmony and consistency between one's ideal, real, and current selves, as well as the harmony and consistency between ideal, real, and present selves in an individual's personality structure (Gu et al, 2022). A study has indicated that individuals with enhanced self-identity are more likely to employ adaptive cognitive and emotional strategies (Wang et al, 2023). Furthermore, individuals with a stronger sense of self-identity are more inclined to adopt positive cognitive and emotional approaches. This heightened self-awareness allows them to seek external assistance and social support more effectively (Li et al, 2022).

Social capital encompasses the advantages and resources that individuals can acquire and utilize through their social networks (Djojosoeparto et al, 2022). Research has found that social capital serves as an important protective factor against psychological stress, buffering the effects of adverse events in life, and helping individuals maintain their health (Ma and Wu, 2019; Mandelbaum et al, 2020; Norman and Skinner, 2006). A thorough literature review and theoretical analysis revealed that self-identity and social capital are crucial mediators in the relationship between e-health literacy and educational participation motivation among the elderly (Cotten et al, 2013). The distinctive attributes of elderly individuals, such as

their unique psychological, social, and health-related challenges, suggest that the pathways through which self-identity and social capital influence this relationship are complex and multifaceted. Despite the recognized importance of these factors, the specific mechanisms by which self-identity and social capital mediate the relationship between e-health literacy and educational participation motivation in the elderly remain insufficiently understood. Addressing this gap, the present study hypothesizes that self-identity and social capital serve as mediators in the relationship between e-health literacy and educational participation motivation. Specifically, our study explores whether e-health literacy indirectly enhances the motivation for educational participation among the elderly by improving self-identity and social capital (Fig. 1).

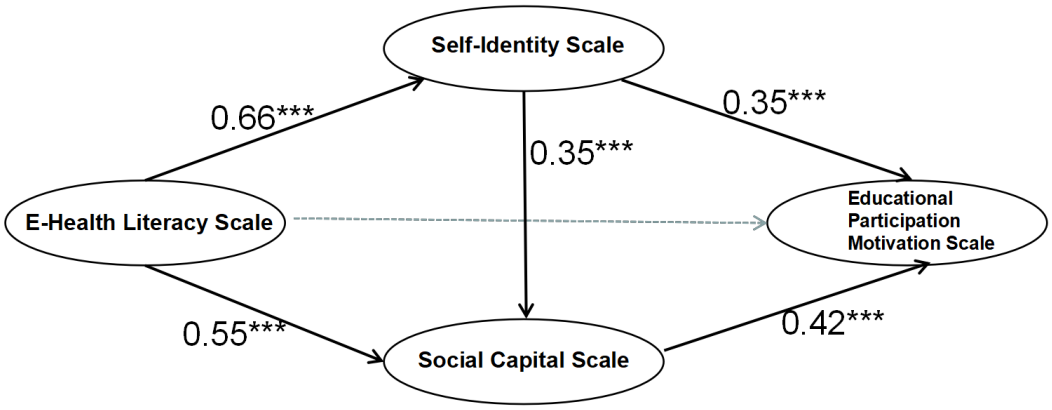

Fig. 1. Path diagram illustrating the mediating roles of self-identity and social capital in the relationship between e-health literacy and educational participation motivation among elderly individuals. Solid lines in the diagram represent significant path coefficients, while dashed lines indicate non-significant path coefficients. ***$p < 0.001$.

Methods

Study Participants

The study participants were selected from six Chinese communities in Zhaoqing City, Guangdong, using a random cluster sampling method from September 2022 to December 2022. These communities were randomly selected from a total of 70 communities located in the urban area of Zhaoqing City, which encompasses Chengdong Street, Chengxi Street, Huanggang Street, and Mugang Street. The selected communities from which study participants were recruited include the Yuelong Community, Lantang Community, Mugang Community, Jidong Community, Baoyue Community, and Baisha Community. Following distributing a total of 630 questionnaires, we received 578 valid responses, which accounted for an effective response rate of 91.75%. Only individuals aged 65 years and above were included in this study. Individuals that did not understand the content of the questionnaire or were unable to express responses in writing, and those with severe cognitive impairment that hinders understanding and providing accurate responses to questions were excluded.

This study was approved by the Ethics Committee of Zhaoqing Medical College (Approval No. 2022006). Written informed consent was obtained from all participants before they took part in the study. They were fully informed about the purpose, procedures, potential risks, and benefits of the research. Participants' privacy and data confidentiality were strictly protected.

Research Tools

E-Health Literacy Scale

We employed the eHealth Literacy Scale (eHEALS) developed by Norman and Skinner (2006) and revised by Ma and Wu (2019) for the Chinese population. The scale consists of three dimensions: the ability to apply, evaluate, and make decisions about online health information and services. It uses a Likert 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability coefficient (Cronbach's α) for this study was 0.835.

Self-Identity Scale

We used the Chinese version of the General Self-Identity Scale, translated and revised by Wang Zhu-jing (Hilgeman et al, 2017). This scale employs a Likert 4-point scale ranging from 1 (completely disagree) to 4 (completely agree), with higher scores indicating a greater level of self-identity. The reliability coefficient (Cronbach's α) for this study was 0.896.

Social Capital Scale

The Social Capital Scale used in this study was the version revised by Chen et al (2009), which is widely used in China. It employs a Likert 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating a higher level of social capital. The reliability coefficient (Cronbach's α) for this study was 0.863.

Educational Participation Motivation Scale

We used the Educational Participation Motivation Scale developed by Boshier and revised by Tan Jing-zhe (Amini et al, 2017; Oh and Yi, 2017). The scale consists of 24 items measured on a Likert 7-point scale ranging from 1 (completely disagree) to 7 (completely agree), with higher scores indicating stronger educational participation motivation. The reliability coefficient (Cronbach's α) for this study was 0.786.

Research Procedures

This study was conducted by trained researchers who distributed and collected the questionnaires at community activity centres and community health examination centres located at the chosen survey sites. The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, ensuring that the rights and welfare of all participants were protected. Standardized instructions were provided to participants, outlining the purpose and significance of the

Table 1. Comprehensive overview of key data points.

Characteristic	Category	Number	Percentage (%)
Gender	Male	197	34.08
	Female	381	65.92
Education level	Illiterate	18	3.11
	Primary school	43	7.44
	Junior high school	256	44.29
	High school/Vocational school	152	26.30
	University	109	18.86
Employment status	Retired	515	89.10
	Part-time job	57	9.86
	Full-time job	6	1.04
Marital status	Married	413	71.45
	Unmarried	15	2.60
	Divorced	8	1.38
	Widowed	142	24.57

study, and informed consent was obtained prior to their participation. Data collection and organization were performed, and statistical analysis was conducted using SPSS 22.0 (IBM Corp., Armonk, NY, USA).

Statistics Analysis

The SPSS 22.0 macro-PROCESS 4.1 (IBM Corp., Armonk, NY, USA) developed by Hayes in 2012 was utilized to conduct mediating effect analysis. The mediating effects were tested using the Bootstrap method with 5000 samples, while ensuring the reliability and scientific rigor of the data analysis (Ordóñez-Camblor et al, 2021). These software tools and related information were carefully selected and employed to maintain the integrity and validity of the research findings.

Prior to conducting the analyses, the normality of the data was assessed using appropriate methods, and a normality test was performed. The statistical methods used for analyzing the data included partial correlation analysis to examine the relationships between e-health literacy, self-identity, social capital, and educational participation motivation. Moreover, the significance levels of the statistical tests were determined, with the definition range of significance of *p*-values clearly specified. Results with *p*-value less than 0.05 were considered statistically significant.

Results

General Information

This study included participants aged between 65 and 87 years, with an average age of 70.13 ± 6.13. Table 1 outlines the descriptive distribution of participants by gender, education level, employment status, and marital status. It is important to note that, given the descriptive nature of this study, statistical tests such as *t*-tests or Chi-square tests were not applied for inter-group comparisons.

Table 2. Correlation matrix of e-health literacy, self-identity, social capital, and educational participation motivation among the elderly.

	Educational participation motivation	Self-identity	Social capital	E-health literacy
Educational participation motivation	1.00			
Self-identity	0.619**	1.00		
Social capital	0.755**	0.692**	1.00	
E-health literacy	0.621**	0.700**	0.735**	1.00

Note: ** indicates a significant positive correlation at the $p < 0.01$.

Scores and Correlation Analysis of E-Health Literacy, Self-Identity, Social Capital, and Educational Participation Motivation among the Elderly

The mean scores for each scale in this survey were as follows: e-health literacy was scored at 2.39 ± 0.30 points, self-identity at 2.25 ± 0.45 points, social capital at 3.15 ± 0.18 points, and educational participation motivation at 4.15 ± 0.46 points. The results of the correlation analysis indicated significant positive associations among e-health literacy, self-identity, social capital, and educational participation motivation (Table 2).

Mediating Effects of Self-Identity and Social Capital

The significant correlations among e-health literacy, self-identity, social capital, and educational participation motivation supported the statistical requirements for further mediating effect analysis of self-identity and social capital. To examine the mediating effects of self-identity and social capital in the relationship between e-health literacy and educational participation motivation, this study utilized SPSS 22.0 macros-PROCESS 4.1 (IBM Corp., Armonk, NY, USA) developed by Hayes in 2012 for the analysis, while controlling for gender and age as covariates. The results of the regression analysis (Table 3) revealed a significant positive predictive effect of e-health literacy on educational participation motivation ($\beta = 0.66$, $p < 0.001$). However, when e-health literacy, self-identity, and social capital were included in the regression equation, the previously observed predictive effect of e-health literacy on educational participation motivation became statistically insignificant ($\beta = 0.10$, $p > 0.05$). E-health literacy exhibited a significant direct positive effect on both self-identity ($\beta = 0.65$, $p < 0.001$) and social capital ($\beta = 0.55$, $p < 0.001$). Separately, self-identity could positively predict social capital ($\beta = 0.35$, $p < 0.001$). Furthermore, both self-identity and social capital demonstrated significant positive predictive effects on educational participation motivation ($\beta = 0.35$, $p < 0.001$; $\beta = 0.42$, $p < 0.001$).

The results of the mediating effect analysis (Table 4 and Fig. 1) revealed that self-identity and social capital played a complete mediating role in the relationship between e-health literacy and educational participation motivation. The total mediating effect value was found to be 0.61. Specifically, indirect effects were generated through three paths: the path from e-health literacy to self-identity to educational participation motivation (indirect effect 1 = 0.17); the path from e-health literacy

Table 3. Regression analysis of the relationships between variables in the model.

Regression equation		Overall fit index			Regression coefficient significance				
Dependent variable	Predictor variable	R	R^2	F	β	SE	t	95% CI	p-value
Education participation motivation	Gender	0.64	0.41	44.64	0.15	0.058	2.56	[0.04, 0.26]	0.01
	Age				0.03	0.053	0.57	[–0.07, 0.13]	0.57
	E-health literacy				0.66	0.058	11.46***	[0.54, 0.78]	<0.001
Self-identity	Gender	0.63	0.39	42.45	0.10	0.056	1.77	[–0.01, 0.21]	0.08
	Age				0.05	0.054	0.93	[–0.06, 0.16]	0.35
	E-health literacy				0.65	0.058	11.17***	[0.54, 0.76]	<0.001
Social capital	Gender	0.81	0.66	92.57	0.06	0.046	1.30	[–0.03, 0.15]	0.19
	Age				0.02	0.048	0.43	[–0.07, 0.11]	0.67
	E-health literacy				0.55	0.056	9.79***	[0.43, 0.67]	<0.001
	Self-identity				0.35	0.053	6.57***	[0.25, 0.45]	<0.001
Educational participation motivation	Gender	0.79	0.62	62.51	0.07	0.046	1.53	[–0.02, 0.16]	0.13
	Age				0.00	0.048	–0.04	[–0.09, 0.09]	0.96
	E-health literacy				0.10	0.068	1.44	[–0.03, 0.23]	0.15
	Self-identity				0.35	0.064	5.50***	[0.22, 0.48]	<0.001
	Social capital				0.42	0.066	5.59***	[0.29, 0.55]	<0.001

Notes: ***$p < 0.001$; all variables in the model were standardized. SE, Standard Error; CI, Confidence Interval.

to self-identity to social capital to educational participation motivation (indirect effect 2 = 0.29); and the path from e-health literacy to social capital to educational participation motivation (indirect effect 3 = 0.15). The data presented in Table 4 indicate that the three indirect effects accounted for 27.93%, 47.14%, and 24.94% of the total effect, respectively. Moreover, the Bootstrap 95% confidence intervals for all these indirect effects did not encompass zero, demonstrating their statistical significance.

Discussion

Owing to the technological advancements, digital media usage has become increasingly prevalent. However, the impact of digital literacy, particularly e-health literacy, on the educational participation motivation of the elderly remains underexplored. This study aimed to investigate the influence and underlying mechanisms of e-health literacy, self-identity, social capital, and other factors on the educational participation motivation among elderly individuals.

Our study found a notable association between e-health literacy and educational participation motivation among older adults. E-health literacy involves the competence to locate, comprehend, and interpret health-related information from online sources and to apply this knowledge to manage one's health effectively (Milanti et al, 2024). Many elderly individuals are constrained by the difficulties in accessing adequate healthcare services due to poor health and geographic constraints,

Table 4. Mediating effect analysis of self-identity and social capital.

	Value of the indirect effect	Boot standard error	Boot lower limit	Boot upper limit	Relative mediating effect
Total indirect effect	0.61	0.12	0.39	0.85	
Indirect effect 1	0.17	0.07	0.03	0.32	27.93%
Indirect effect 2	0.29	0.06	0.18	0.43	47.14%
Indirect effect 3	0.15	0.04	0.08	0.25	24.94%

Notes: The Boot standard error and the lower and upper limits of the Bootstrap confidence interval (BootCI) represent the standard error and the 95% confidence interval boundaries, respectively. These values were estimated using the percentile Bootstrap method with bias correction for the indirect effect.
Indirect effect 1 represents the mediated effect of self-identity on the relationship between e-health literacy and educational participation motivation. Specifically, it captures the extent to which e-health literacy influences educational participation motivation indirectly, via an effect on self-identity.
Indirect effect 2 corresponds to the mediated effect of social capital on the same relationship. It measures the indirect influence of e-health literacy on educational participation motivation through its effect on social capital.
Indirect effect 3 signifies the combined mediation of both self-identity and social capital. This effect captures the joint contribution of these two mediators in bridging the relationship between e-health literacy and educational participation motivation.

and these obstacles tend to aggravate with age. Nevertheless, digital technologies, including computers, smartphones, and the internet, offer a solution to overcoming these barriers, potentially easing the burden on healthcare systems and reducing associated costs (Wang et al, 2020). Mobile phones and the internet can bestow the elderly individuals with an equitable channel to access health information, which is instrumental in improving their physical condition and quality of life (Huang et al, 2022; Liu et al, 2023). However, whether these technologies have a positive impact on the elderly health heavily relies on their ability to use them effectively (Rasekaba et al, 2022; Zhang et al, 2022). Studies have highlighted a digital divide among the elderly, who either exhibit lower levels of digital technology adoption (Oche et al, 2022; Quialheiro et al, 2023) or demonstrate more frequent usage of mobile phones and internet technologies, especially among the higher-income older adults (Boaheng et al, 2019). E-health literacy has been observed to exert positive impact on the physical well-being of individuals (Li et al, 2021). While research on health literacy among the elderly is limited and scattered, this study took a further step to address the lacunae, contributing to understanding how e-health literacy influences their educational participation motivation (Buyl et al, 2020).

In this study, self-identity emerged as a critical factor shaping the relationship between e-health literacy and educational participation motivation among older adults. Self-identity theory suggests that an individual's social network characteristics and the quality of self-identity among network members can reduce stress and enhance social adaptability (Wu et al, 2019). Research indicates that self-identity significantly impacts an individual's physical condition (Snippe et al, 2021). In the digital era, the ability to access health-related information online has a substantial influence on the social connections and relationships among older adults (Győrffy

et al, 2023). Older adults proficient in acquiring health information online tend to exhibit higher confidence levels and possess broader social networks. Those with good e-health literacy are more likely to participate in social activities and encourage their peers to access health information via the online channel. This study demonstrated that self-identity significantly mediates the relationship between e-health literacy and educational participation motivation, thereby enhancing our understanding of this dynamic association.

Social capital also plays a significant role in influencing e-health literacy and educational participation motivation among the elderly. Published literature shows that learning motivation can be promoted by social capital (Alaslani and Alandejani, 2020) and enhanced by information literacy (Duong et al, 2020). The elderly individuals possessing high levels of e-health literacy are more likely to access health information and take proactive measures to manage their health. Furthermore, high social capital levels represent a driver of participation in various social activities, including health education programs. In contrast, elderly individuals lacking e-health literacy and social capital may face barriers to participating in health education activities. Thus, older adults with higher levels of e-health literacy and social capital are more attuned to the importance of maintaining good health and the benefits of health education, which are intangible factors encouraging their active participation in these activities.

This study suggests that e-health literacy influences the motivation of older adults to engage in educational activities, with social capital serving as a mediating factor. Self-identity and social capital interactively moderate the influence of e-health literacy on educational participation motivation among the elderly. Enhancing the self-identity of the elderly through heightening their e-health literacy can promote their social capital, thereby boosting their motivation to participate in health education programs. Older individuals with higher e-health literacy possess better abilities to access health information, contributing to a positive feedback loop that continuously strengthens health awareness and refines health-related behaviours. Additionally, elderly individuals with strong self-identity have a deeper understanding of their personal values and beliefs, which lead them to appreciating the value of health education activities more and encouraging them to engage in these activities more actively (Győrffy et al, 2023). Those with high social capital usually have extensive social networks and resources, making it easier to discover and participate in health education activities, and they can obtain more support and assistance through social connections (Yap et al, 2019). These three factors—e-health literacy, self-identity, and social capital—interact to create a compound effect. For instance, high levels of e-health literacy can enhance the self-identity of the elderly, increasing their enthusiasm for participating in health education activities. Subsequently, self-identity further influences educational participation motivation through social capital, as high levels of self-identity encourage the elderly to actively use their social resources and networks for participation in the health education programs.

Several limitations of this study should be acknowledged. Firstly, the generalizability of the findings may be limited due to the sole recruitment of participants

from a single city. Further research is needed to validate our findings in other cities across China. Secondly, this study risks having a certain degree of "social expectation" bias in the evaluation of interpersonal relationships between individuals as a self-evaluation scale was used in the investigation. Therefore, in future research, we plan to further optimize the questionnaire design and data collection methods by introducing more objective measurement indicators to the scale and integrating interview questions to solicit qualitative data. This approach will help gain a more comprehensive understanding of the educational participation motivation and health literacy of the elderly.

Conclusion

Among the older adults, their self-identity and social capital act as mediators in the relationship between e-health literacy and educational participation motivation. Thus, it is crucial for society as a whole and relevant stakeholders to place significant emphasis on enhancing the digital literacy of the elderly population in China. Enhancing e-health literacy, strengthening self-identity and social capital are potentially effective avenues to promote the participation of elderly individuals in community health education activities and programs. In addition, providing elderly people with convenient and easy-to-use digital technology support services is imperative to driving their participation. In summary, for the betterment of the elderly health, it is necessary to improve the level of access to and the utilization of digital health information in this particular demographic group.

Key Points

- E-health literacy, self-identity, and social capital are key factors in motivating older adults to participate in community health education activities.
- Enhancing digital literacy is a critical prerequisite for promoting health education participation among the elderly.
- Improving access to and utilization of digital health information is essential to betterment of the elderly health.
- Providing elderly people with user-friendly digital technology support services is an urgent priority.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author Contributions

JD, XC, and EL designed the research study. SC and YC performed the research. YC and EL provided resources. SC curated the data and drafted the manuscript. SC and XC contributed to visualization. JD supervised and administered the project. All authors contributed to the important editorial changes in the manuscript. All

authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical regulations of the Declaration of Helsinki. This study was approved by the Ethics Committee of Zhaoqing Medical College, with the approval number (Approval No. 2022006). Written informed consent was obtained from all participants before they took part in the study. They were fully informed about the purpose, procedures, potential risks, and benefits of the research. Participants' privacy and data confidentiality were strictly protected.

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Conflict of Interest

The authors declare no conflict of interest.

References

Alaslani K, Alandejani M. Identifying factors that influence students performance through social networking sites: An exploratory case study. Heliyon. 2020; 6: e03686. https://doi.org/10.1016/j.heliyon.2020.e03686

Alvaro C, Lyons RF, Warner G, Hobfoll SE, Martens PJ, Labonté R, et al. Conservation of resources theory and research use in health systems. Implementation Science. 2010; 5: 79. https://doi.org/10.1186/1748-5908-5-79

Amini M, Hassani Mehraban A, Haghani H, Mollazade E, Zaree M. Factor Structure and Construct Validity of Children Participation Assessment Scale in Activities Outside of School-Parent Version (CPAS-P). Occupational Therapy in Health Care. 2017; 31: 44–60. https://doi.org/10.1080/07380577.2016.1272733

Beard JR, Officer A, de Carvalho IA, Sadana R, Pot AM, Michel JP, et al. The World report on ageing and health: a policy framework for healthy ageing. Lancet. 2016; 387: 2145–2154. https://doi.org/10.1016/S0140-6736(15)00516-4

Boaheng JM, Amporfu E, Ansong D, Osei-Fosu AK. Determinants of paying national health insurance premium with mobile phone in Ghana: a cross-sectional prospective study. International Journal for Equity in Health. 2019; 18: 50. https://doi.org/10.1186/s12939-019-0946-x

Buyl R, Beogo I, Fobelets M, Deletroz C, Van Landuyt P, Dequanter S, et al. e-Health interventions for healthy aging: a systematic review. Systematic Reviews. 2020; 9: 128. https://doi.org/10.1186/s13643-020-01385-8

Chen X, Stanton B, Gong J, Fang X, Li X. Personal Social Capital Scale: an instrument for health and behavioral research. Health Education Research. 2009; 24: 306–317. https://doi.org/10.1093/her/cyn020

Cotten SR, Anderson WA, McCullough BM. Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. Journal of Medical Internet Research. 2013; 15: e39. https://doi.org/10.2196/jmir.2306

Djojosoeparto SK, Kamphuis CBM, Harrington JM, Løvhaug AL, Roos G, Sawyer ADM, et al. How theory can help to understand the potential impact of food environment policies on socioeconomic inequalities in diet: an application of Bourdieu's capital theory and the scarcity theory. European Journal of Public Health. 2022; 32: iv66–iv70. https://doi.org/10.1093/eurpub/ckac052

Duong TV, Pham KM, Do BN, Kim GB, Dam HTB, Le VTT, et al. Digital Healthy Diet Literacy and Self-Perceived Eating Behavior Change during COVID-19 Pandemic among Undergraduate Nursing and Medical Students: A Rapid Online Survey. International Journal of Environmental Research and Public Health. 2020; 17: 7185. https://doi.org/10.3390/ijerph17197185

Felberbaum Y, Lanir J, Weiss PL. Designing Mobile Health Applications to Support Walking for Older Adults. International Journal of Environmental Research and Public Health. 2023; 20: 3611. https://doi.org/10.3390/ijerph20043611

Gu T, Cheng Z, Zhang Z, Li C, Ni Y, Wang X. Formation mechanism of contributors' self-identity based on social identity in online knowledge communities. Frontiers in Psychology. 2022; 13: 1046525. https://doi.org/10.3389/fpsyg.2022.1046525

Győrffy Z, Boros J, Döbrössy B, Girasek E. Older adults in the digital health era: insights on the digital health related knowledge, habits and attitudes of the 65 year and older population. BMC Geriatrics. 2023; 23: 779. https://doi.org/10.1186/s12877-023-04437-5

Hilgeman MM, Allen RS, Carden KD. Identity processes as a predictor of memory beliefs in older adults. Aging & Mental Health. 2017; 21: 712–719. https://doi.org/10.1080/13607863.2016.1154013

Huang Q, Li Y, Wu X, Ge S, Qu Z, Wang A, et al. The willingness and influencing factors to choose smart senior care among old adults in China. BMC Geriatrics. 2022; 22: 967. https://doi.org/10.1186/s12877-022-03691-3

Jiang Y, Yang F. Association between internet use and successful aging of older Chinese women: a cross-sectional study. BMC Geriatrics. 2022; 22: 536. https://doi.org/10.1186/s12877-022-03199-w

Li P, Yang J, Zhou Z, Zhao Z, Liu T. The influence of college students' academic stressors on mental health during COVID-19: The mediating effect of social support, social well-being, and self-identity. Frontiers in Public Health. 2022; 10: 917581. https://doi.org/10.3389/fpubh.2022.917581

Li S, Cui G, Yin Y, Wang S, Liu X, Chen L. Health-promoting behaviors mediate the relationship between eHealth literacy and health-related quality of life among Chinese older adults: a cross-sectional study. Quality of Life Research. 2021; 30: 2235–2243. https://doi.org/10.1007/s11136-021-02797-2

Liu X, Chau KY, Liu X, Wan Y. The Progress of Smart Elderly Care Research: A Scientometric Analysis Based on CNKI and WOS. International Journal of Environmental Research and Public Health. 2023; 20: 1086. https://doi.org/10.3390/ijerph20021086

Liu Y, Wang W. Research on Quality Evaluation of Product Interactive Aging Design Based on Kano Model. Computational Intelligence and Neuroscience. 2022; 2022: 3869087. https://doi.org/10.1155/2022/3869087

Ma Z, Wu M. The Psychometric Properties of the Chinese eHealth Literacy Scale (C-eHEALS) in a Chinese Rural Population: Cross-Sectional Validation Study. Journal of Medical Internet Research. 2019; 21: e15720. https://doi.org/10.2196/15720

Mandelbaum J, Moore S, Silveira PP, Meaney MJ, Levitan RD, Dubé L. Does social capital moderate the association between children's emotional overeating and parental stress? A cross-sectional study of the stress-buffering hypothesis in a sample of mother-child dyads. Social Science & Medicine (1982). 2020; 257: 112082. https://doi.org/10.1016/j.socscimed.2018.12.023

Milanti A, Chan DNS, Choi KC, So WKW. eHealth literacy of migrant domestic workers in Hong Kong in the COVID-19 pandemic: A mixed methods study. PLoS One. 2024; 19: e0296893. https://doi.org/10.1371/journal.pone.0296893

Norman CD, Skinner HA. eHEALS: The eHealth Literacy Scale. Journal of Medical Internet Research. 2006; 8: e27. https://doi.org/10.2196/jmir.8.4.e27

Oche O, Dobyns R, Lin C, Kennelty KA. Determining the Factors that Impede or Facilitate the Utilization of Telemedicine (Video Visits) for Geriatric Patients. Telemedicine Reports. 2022; 3: 156–165. https://doi.org/10.1089/tmr.2022.0018

Oh AR, Yi ES. A study on the effects of exercise motivation of the elderly people on euphoria. Journal of Exercise Rehabilitation. 2017; 13: 387–392. https://doi.org/10.12965/jer.1735084.542

Ordóñez-Camblor N, Paino M, Fonseca-Pedrero E, Pizarro-Ruiz JP. Mediation of the stigma in the influence of negative symptomatology over recovery in psychosis. International Journal of Clinical and Health Psychology. 2021; 21: 100220. https://doi.org/10.1016/j.ijchp.2021.100220

Quialheiro A, Miranda A, Garcia M, Jr, Carvalho ACD, Costa P, Correia-Neves M, et al. Promoting Digital Proficiency and Health Literacy in Middle-aged and Older Adults Through Mobile Devices With the Workshops for Online Technological Inclusion (OITO) Project: Experimental Study. JMIR Formative Research. 2023; 7: e41873. https://doi.org/10.2196/41873

Rasekaba TM, Pereira P, Rani G V, Johnson R, McKechnie R, Blackberry I. Exploring Telehealth Readiness in a Resource Limited Setting: Digital and Health Literacy among Older People in Rural India (DAHLIA). Geriatrics. 2022; 7: 28. https://doi.org/10.3390/geriatrics7020028

Rezakhani Moghaddam H, Ranjbaran S, Babazadeh T. The role of e-health literacy and some cognitive factors in adopting protective behaviors of COVID-19 in Khalkhal residents. Frontiers in Public Health. 2022; 10: 916362. https://doi.org/10.3389/fpubh.2022.916362

Snippe MHM, Peters GY, Kok G. The operationalization of self-identity in reasoned action models: a systematic review of self-identity operationalizations in three decades of research. Health psychology and behavioral medicine. 2021; 9: 48–69. https://doi.org/10.1080/21642850.2020.1852086.

Uchida Y, Kanamori M, Fukushima S, Takemura K. Interdependent culture and older adults' well-being: Health and psychological happiness in Japanese communities. Current Opinion in Psychology. 2024; 55: 101729. https://doi.org/10.1016/j.copsyc.2023.101729

Wang L, Di X, Yang L, Dai X. Differences in the Potential Accessibility of Home-Based Healthcare Services among Different Groups of Older Adults: A Case from Shaanxi Province, China. Healthcare. 2020; 8: 452. https://doi.org/10.3390/healthcare8040452

Wang R, Kim SJ, Kwon I. The Profiles and Antecedents of Supervisor-Directed Emotional Labor Strategies: The Role of Self-Identity and LMX Orientations in Emotional Labor Strategy. Behavioral Sciences. 2023; 13: 865. https://doi.org/10.3390/bs13100865

Wu A, Li X, Wang J, Li D. Why Are High-Achieving Students Susceptible to Inhibition? An Idiographic Analysis of Student Self-Identity in China. Frontiers in Psychology. 2019; 10: 1918. https://doi.org/10.3389/fpsyg.2019.01918

Xiang GX, Gan X, Jin X, Zhang YH, Zhu CS. Developmental Assets, Self-Control and Internet Gaming Disorder in Adolescence: Testing a Moderated Mediation Model in a Longitudinal Study. Frontiers in Public Health. 2022; 10: 808264. https://doi.org/10.3389/fpubh.2022.808264

Yap KH, Mohan D, Stephan BCM, Warren N, Allotey P, Reidpath DD. Effects of Subjective Memory Complaints (SMCs) and Social Capital on Self-Rated Health (SRH) in a Semirural Malaysian Population. Journal of Aging Research. 2019; 2019: 9151802. https://doi.org/10.1155/2019/9151802

Zhang Z, Henley T, Schiaffino M, Wiese J, Sachs D, Migliaccio J, et al. Older adults' perceptions of community-based telehealth wellness programs: a qualitative study. Informatics for Health & Social Care. 2022; 47: 361–372. https://doi.org/10.1080/17538157.2021.2006198

Zou R, Xu X, Hong X, Yuan J. Higher Socioeconomic Status Predicts Less Risk of Depression in Adolescence: Serial Mediating Roles of Social Support and Optimism. Frontiers in Psychology. 2020; 11: 1955. https://doi.org/10.3389/fpsyg.2020.02020