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The Influence of Behavioral Lifestyle Factors on Recent Episodic Memory Retention Capacity in Young-Old Adults: An Empirical Investigation Leveraging the 2022 Wave Data from the China Family Panel Studies (CFPS)

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Abstract: Objective: This study aimed to examine the influence of behavioral lifestyle factors on recent episodic memory retention capacity among young-old adults (aged 60-69 years) in China. The findings provide scientific evidence to inform proactive strategies to mitigate cognitive decline risk within China's rapidly aging population. **Methods:** Utilizing data from the 2022 wave of the China Family Panel Studies (CFPS), a total of 2,772 adults aged 60-69 were included in the analytical sample. Recent episodic memory retention capacity (scored 0-5 points, based on self-reported assessment) served as the dependent variable. Six categories of behavioral lifestyle indicators (including exercise frequency, sleep quality, dietary patterns, etc.) were analyzed as independent variables. Associations were assessed using multivariate ordinal logistic regression models, controlling for relevant covariates. **Results:** Self-reported potential impairment in recent episodic memory was identified by 47.19% of respondents. Multivariate analysis revealed significant associations between behavioral lifestyle factors and memory retention capacity. Regular exercise (OR = 1.297, 95% CI: 1.118–1.504), meat consumption (OR = 1.765, 95% CI: 1.393–2.237), regular reading habits (OR = 1.599, 95% CI: 1.283–1.992), and internet use (OR = 1.413, 95% CI: 1.217–1.641) emerged as significant protective factors. Abnormal sleep duration was detrimentally associated with retention capacity (too short: OR = 0.728, 95% CI: 0.591–0.897; too long: OR = 0.810, 95% CI: 0.670–0.980). Significant associations were also observed for control variables: urban residence (OR = 1.270, 95% CI: 1.100–1.467), high school education or above (OR = 1.543, 95% CI: 1.293–1.841), and better self-rated health status (OR = 1.156, 95% CI: 1.089–1.227) were positively correlated with better memory retention. **Conclusions:** Optimal sleep duration, regular physical exercise, meat intake, habitual reading, and internet engagement positively predict self-assessed recent episodic memory retention capacity in Chinese young-old adults. These findings underscore the potential for multi-faceted lifestyle interventions to enhance cognitive health in aging populations. Specifically, strategies should encompass community-based sleep hygiene management, tailored nutritional interventions (especially promoting adequate protein sources like meat), enhanced digital literacy and internet accessibility programs, and the promotion of age-appropriate physical activity initiatives. Furthermore, implementing culturally responsive strategies adapted to urban-rural contexts – such as deploying "mobile cognitive health units" in rural areas and fostering digital reading platforms in urban settings – is recommended to optimize intervention effectiveness.

Keywords: Young-Old Adults; Behavioral Lifestyle Factors; Episodic Memory Retention; Cognitive Health Promotion;

Aging Population; Cognitive Aging; China Family Panel Studies (CFPS)
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1.Introduction

China possesses the world's largest elderly population, exhibiting a distinctive aging profile characterized by unprecedented scale, accelerated pace, and significant regional disparities. Data from the Seventh National Population Census (2020) reveal pronounced growth in the older population compared to the previous decade: the proportion of citizens aged 60 and above increased by 5.44 percentage points, while the proportion aged 65 and above rose by 4.63 percentage points. Crucially, as of 2020, individuals aged 65 and above accounted for 13.50% of the total population. This figure far surpasses the international threshold defining an aging society (7%) by a substantial margin of 6.50 percentage points, highlighting the pronounced severity of China's aging phenomenon[1]. Young-Old Adults (aged 60–69 years) account for 55.83% of the total elderly population in China[2]. While this population generally exhibits relatively better overall health, impairments in cognitive function—notably, early-stage deterioration within the episodic memory system—have become increasingly salient. Episodic memory retention, a core cognitive process vulnerable to aging effects and thus a key target in cognitive aging research, encompasses an individual's neurocognitive capacity for the stable storage and accurate retrieval of specific, recently experienced spatiotemporal events (typically within minutes to days). Distinct from semantic memory, this process critically depends upon the rapid binding of novel information streams by the hippocampal-entorhinal cortical circuit and subsequent strategic organization of these memory traces under the executive control of the prefrontal cortex (PFC)[3]. Neuroimaging evidence indicates accelerated hippocampal atrophy among young-old adults (aged 60–69 years), reaching an annual rate of approximately 1.4%[4]. This rate is significantly higher than the observed 0.5% atrophy rate in middle-aged populations. Critically, the magnitude of atrophy exhibits a strong correlation with declining episodic recall performance[4], establishing this decline as a sensitive early indicator of Alzheimer's disease pathology. As modifiable protective factors, behavioral lifestyles interact with the neurobiological substrates of memory retention through multiple pathways[5]. Drawing upon Stern's Cognitive Reserve Theory, such lifestyle factors may enhance neuroplasticity, potentially compensating for the cognitive decline risk associated with hippocampal atrophy. Supporting this, a large-scale 10-year follow-up study led by Jia Jianping and colleagues (n≈30,000) demonstrated that a healthy lifestyle profile can attenuate memory decline by up to 40%[6]. However, a notable research gap persists: population-specific evidence investigating these dynamics within China's young-old adult cohort remains scarce[7].

Leveraging data from the 2022 wave of the China Family Panel Studies (CFPS), this research developed a multi-dimensional assessment framework encompassing exercise patterns, sleep quality, dietary habits, and other relevant behavioral domains. This framework was employed to systematically investigate the influence of distinct healthy lifestyle behaviors on recent episodic memory retention capacity among young-old adults (aged 60-69 years). The study aims to generate robust scientific evidence essential for formulating targeted health management interventions for older populations and, ultimately, contribute to optimizing their overall quality of life.

2.Participants and Methods

2.1 Study Participants

Data used in this study were derived from the 2022 wave of the China Family Panel Studies (CFPS), a national longitudinal survey database implemented by Peking University, providing data for researching various topics such as economic activities, educational attainment, family relationships, population migration, and physical-mental health of Chinese residents. Based on research needs, the following inclusion and exclusion criteria were established:

Inclusion criteria: ① Aged 60–69 years; ② Complete questionnaire responses.

Exclusion criteria: Questionnaires with logical inconsistencies.

Through the above criteria, a database consisting of 2,772 respondents was finally obtained.

2.2 Variable Construction

2.2.1 Dependent Variable

The dependent variable was the score of respondents' recent episodic memory retention capacity, measured by the question in the 2022 CFPS questionnaire: "How much can you remember about the main events that happened to you within the past week?" A higher score indicated stronger recent episodic memory retention capacity. The question had five response options: "Can remember only a little," "Can remember only some," "Can remember half," "Can remember most," and "Can remember completely," which were assigned scores 1–5, respectively.

2.2.2 Core Independent Variables

Relevant questions on behavioral lifestyle in the 2022 CFPS questionnaire were used as core independent variables.

2.2.2.1 Exercise Frequency

Exercise frequency was measured by the item in the 2022 CFPS questionnaire: "How often have you participated in sports, fitness, or leisure activities in the past 12 months? (Excluding cycling/walking for commuting purposes only, including physical education classes)." The question had eight options: "Never," "Less than 1 time per month," "More than 1 time per month but less than 1 time per week," "1–2 times per week," "3–4 times per week," "5+ times per week," "Once a day," and "2+ times per day." Referencing the World Health Organization (WHO) recommendations for adult physical activity (recommending at least 150 minutes of moderate-intensity aerobic exercise per week)[7], "1+ times per week" was defined as the basis for regular exercise. Thus, options with "1–2 times per week" or higher frequencies were categorized as "with exercise habits," while lower-frequency options (including never, less than 1 time per month, and more than 1 time per month but less than 1 time per week) were categorized as "without exercise habits."

2.2.2.2 Nighttime Sleep Duration

Nighttime sleep duration was measured by the question: "How many hours do you sleep per day? (Excluding nap time)." Categorization referred to the Healthy China Action (2019–2030): 6–8 hours was classified as "normal," <6 hours as "too short," and >8 hours as "too long."[8].

2.2.2.3 Dietary Habits

Dietary habits were measured using two questions in the 2022 CFPS questionnaire regarding meat and fruit-vegetable intake: "Have you eaten meat in the past week? (Including pork, beef, mutton, chicken, duck, etc., or aquatic products such as fish, shrimp, and shellfish)" and "Have you eaten fresh vegetables or fruits in the past week?" Both questions had "Yes" and "No" options, which were analyzed as two separate variables.

2.2.2.4 Tobacco-Alcohol Behavior

Tobacco-alcohol behavior was measured by two questions: "Have you smoked in the past month?" and "Have you drunk alcohol 3+ times per week in the past month?" Both had "Yes" and "No" options, analyzed as separate variables.

2.2.2.5 TV/Movie Watching Behavior

TV/movie watching behavior was measured by the question: "Generally, how many hours per week do you spend watching TV, movies, or other video programs through various means?" Weekly viewing time was converted to average daily duration. Respondents with >30 minutes/day were categorized as "with TV/movie watching habits," and ≤30 minutes/day as "TV/movie watching habits".

2.2.3 Control Variables

Seven potential confounders were considered as control variables: age, gender (male/female), usual residence (urban/rural), region (eastern China/mid-western China), subjective income level (lower/higher), presence of chronic diseases, and self-rated health status (poorer/better).

Subjective income level was measured by "How would you rate your income position locally? (1 = very low, 5 = very high)". Scores 1–2 were categorized as "lower," and 3–5 as "higher."

Self-rated health status was measured by "How do you think your health condition is?" Options ("very healthy", "healthy", "relatively healthy", "fair", "unhealthy") were categorized as "better" (very healthy/healthy/relatively healthy) and "poorer" (fair/unhealthy).

2.3 Statistical Methods

Statistical analyses were performed using SPSS 25.0. Categorical data were described using frequencies and percentages, and continuous data using mean ± standard deviation. Univariate and multivariate ordinal logistic regression models were used to explore the effects of behavioral lifestyle on recent episodic memory retention capacity among younger older adults. A two-tailed $p < 0.05$ was considered statistically significant.

2.4 Ethical Statement

This study used data from the CFPS, which were collected following relevant ethical regulations. The CFPS protocol was approved by the Biomedical Ethics Committee of Peking University (Approval No. IRB00001052-14010), and all participants provided written informed consent. The survey strictly protected respondents' privacy and rights.

3.Results

3.1 General Characteristics and Behavioral Lifestyle of Respondents

Among the 2,772 respondents, the mean age was 64.58±2.97 years. There were 1,432 males (51.66%) and 1,340 females (48.34%). A total of 1,345 respondents (48.52%) resided in urban areas, and 1,427 (51.48%) in rural areas. Education levels showed that 2,120 (76.48%) had a junior high school education or below, and 652 (23.52%) had a high school education or above. Additionally, 2,483 (89.57%) were married, and 289 (10.43%) were unmarried. For other general characteristics and current behavioral lifestyle status, see Table 1.

Table 1 General Characteristics of Respondents

Variables	n (%)
Gender	
Male	1432 (51.66)
Female	1340 (48.34)
Region	
Eastern Region	1198(43.22)
Mid-western Region	1574(56.78)
Usual Residence	
Urban	1345 (48.52)
Rural	1427 (51.48)
Educational Attainment	
High School and Above:	652 (23.52)
Junior High School or Below	2120(76.48)
Marital Status	
Unmarried	289 (10.43)
Married	2483 (89.57)
Self-rated Income Level	
Low	742 (26.77)
High	2030 (73.23)
Presence of Chronic Diseases	
No	1944 (70.13)
Yes	828 (29.87)
Self-rated Health Status	
Unhealthy	1044 (37.66)

Variables	n (%)
Healthy	1728 (62.34)
Exercise Habits	
No	1738 (62.70)
Yes	1034 (37.30)
Nighttime Sleep Duration	
Normal Sleep (6–8h)	1991(71.83)
Short Sleep (<6h)	339(12.23)
Long Sleep (>8h)	442(15.94)
Meat Consumption in Past Week	
No	281 (10.14)
Yes	2491 (89.86)
Fresh Vegetable/Fruit Consumption in Past Week	
No	55 (1.98)
Yes	2699 (98.02)
Smoking Status in Past Month	
No	1991 (71.83)
Yes	781 (28.17)
Weekly Alcohol Consumption ≥3 Times in the Past Month	
No	2345 (84.60)
Yes	427 (15.40)
Noon Break Habits	
No	1896(68.40)
Yes	876(31.60)
TV/Movie Watching Habits	
No	1054 (38.02)
Yes	1718 (61.98)
Book Reading in Past 12 Months	
No	2435(87.84)
Yes	337(12.16)
Internet Use	
No	1652(59.60)
Yes	1120(40.40)

3.2 Recent Episodic Memory Retention Capacity Scores and Univariate Ordinal Logistic Regression Results

Among 2,772 respondents, the mean score for recent episodic memory retention was 2.59±1.30 (out of 5). Specifically, 782 respondents (28.21%) “ can remember only a little”, 526 (18.98%) “can remember only some”, 781 (28.17%) “can remember half”, 422 (15.22%) “can remember most”, and 261 (9.42%) “can remember completely” about major events that occurred in the past week.

Univariate ordinal logistic regression showed that gender, region, residence, education level, chronic disease status, self-rated health, exercise habits, sleep quality, meat consumption, fresh vegetable/fruit consumption, smoking, alcohol consumption, TV/movie watching habits, reading behavior, and internet use were significantly associated with recent episodic memory retention capacity (all P<0.05) (Table 2).

Table 2 Univariate Ordinal Logistic Regression Results for Subjective Recent Episodic Memory Retention

Variables	β	SE	Wald χ^2	OR (95%CI)	P
Age	-0.017	0.011	2.39	0.983 (0.961 ~ 1.005)	0.138
Gender (Reference: Female)					
Male	0.291	0.068	18.31	1.338 (1.171 ~ 1.529)	<0.001
Region (Reference: Eastern China)					
Mid-western China	0.227	0.069	10.82	1.254 (1.096 ~ 1.435)	<0.001
Usual Residence(Reference: Rural)					
Urban	0.520	0.068	58.48	1.683 (1.471 ~ 1.924)	<0.001
Educational Attainment(Reference: Junior High School or Below)					
High School and Above	0.851	0.081	110.38	2.342 (1.999 ~ 2.744)	<0.001
Marital Status(Reference: Unmarried)					
Married	0.167	0.109	2.35	1.182 (0.954 ~ 1.465)	0.126
Self-rated Income Level	-0.010	0.030	0.11	0.990 (0.934 ~ 1.049)	0.732
Self-rated Health Status	0.182	0.028	42.25	1.200 (1.137 ~ 1.267)	<0.001
Presence of Chronic Diseases(Reference: No)					
Yes	-0.168	0.074	5.15	0.846 (0.732 ~ 0.977)	0.023
Exercise Habits(Reference: No)					
Yes	0.563	0.071	62.89	1.756 (1.529 ~ 2.016)	<0.001
Nighttime Sleep Duration(Reference: 6–8h)					
Short Sleep (<6h)	-0.399	0.105	14.44	0.671 (0.546 ~ 0.824)	<0.001
Long Sleep (>8h)	-0.470	0.094	25.00	0.625 (0.520 ~ 0.751)	<0.001
Meat Consumption in Past Week(Reference: No)					
Yes	0.871	0.115	57.36	2.389 (1.909 ~ 2.990)	<0.001
Fresh Vegetable/Fruit Consumption in Past Week(Reference: No)					
Yes	0.567	0.249	5.19	1.763 (1.082 ~ 2.874)	0.023
Smoking Status in Past Month(Reference: No)					
Yes	0.250	0.075	11.11	1.284 (1.108 ~ 1.488)	<0.001
Weekly Alcohol Consumption ≥3 Times in the Past Month(Reference: No)					
Yes	0.290	0.094	9.52	1.336 (1.111 ~ 1.607)	0.002
Noon Break Habits(Reference: No)					
Yes	-0.039	0.073	0.29	0.962 (0.834 ~ 1.109)	0.593
TV/Movie Watching Habits(Reference: No)					
Yes	0.184	0.070	6.91	1.202 (1.048 ~ 1.378)	0.009
Book Reading in Past 12 Months(Reference: No)					
Yes	0.973	0.104	87.69	2.646 (2.158 ~ 3.243)	<0.001
Internet Use(Reference: No)					
Yes	0.669	0.070	91.36	1.952 (1.702 ~ 2.239)	<0.001

3.3 Multivariate Ordinal Logistic Regression Results

The regression model identified exercise habits, nighttime sleep duration, meat consumption, reading behavior, and internet use as significant predictors of recent episodic memory retention (all P<0.05). Specific findings included: individuals with regular exercise habits had 1.297-fold higher odds of better memory retention than those without regular exercise habits(OR=1.297, 95%CI:1.118–1.504); compared to those with normal sleep duration (6–8 hours), both short sleep (<6 hours, OR=0.728, 95%CI:0.591–0.897) and long sleep (>8 hours, OR=0.810, 95%CI:0.670–0.980) were associated with reduced memory ability; respondents who consumed meat in the past week had 1.765-fold higher odds of better memory retention than non-consumers (OR=1.765, 95%CI:1.393–2.237); those who read books in the past 12 months had 1.599-fold higher odds of better memory retention than non-readers (OR=1.599, 95%CI:1.283–1.992); internet users in the past month had 1.413-fold higher odds of better memory retention than non-users (OR=1.413, 95%CI:1.217–1.641).

The model also revealed residence, education level, and self-rated health as significant influencing factors (all P<0.05): urban residents had 1.270-fold higher odds of better memory retention than rural residents (OR=1.270, 95%CI:1.100–1.467); individuals with high school education or above had 1.543-fold higher odds of better memory retention than those with junior high school education or below (OR=1.543, 95%CI:1.293–1.841); For every one-point increase in self-rated health scores, there was a 1.156-fold increase in the likelihood of better memory (OR = 1.156,95% CI: 1.089-1.227) Details are presented in Table 3.

Table 3 Multivariate Ordinal Logistic Regression Results for Recent Episodic Memory Retention Capacity

Variables	β	SE	Wald χ^2	OR (95%CI)	P
Age	-0.017	0.011	2.39	0.983 (0.961 ~ 1.005)	0.138
Gender (Reference: Female)					
Male	0.291	0.068	18.31	1.338 (1.171 ~ 1.529)	<0.001
Region (Reference: Eastern China)					
Mid-western China	0.227	0.069	10.82	1.254 (1.096 ~ 1.435)	<0.001
Usual Residence(Reference: Rural)					
Urban	0.520	0.068	58.48	1.683 (1.471 ~ 1.924)	<0.001
Educational Attainment(Reference: Junior High School or Below)					
High School and Above	0.851	0.081	110.38	2.342 (1.999 ~ 2.744)	<0.001
Marital Status(Reference: Unmarried)					
Married	0.167	0.109	2.35	1.182 (0.954 ~ 1.465)	0.126
Self-rated Income Level	-0.010	0.030	0.11	0.990 (0.934 ~ 1.049)	0.732
Self-rated Health Status	0.182	0.028	42.25	1.200 (1.137 ~ 1.267)	<0.001
Presence of Chronic Diseases(Reference: No)					
Yes	-0.168	0.074	5.15	0.846 (0.732 ~ 0.977)	0.023
Exercise Habits(Reference: No)					
Yes	0.563	0.071	62.89	1.756 (1.529 ~ 2.016)	<0.001
Nighttime Sleep Duration(Reference: 6–8h)					
Short Sleep (<6h)	-0.399	0.105	14.44	0.671 (0.546 ~ 0.824)	<0.001
Long Sleep (>8h)	-0.470	0.094	25.00	0.625 (0.520 ~ 0.751)	<0.001
Meat Consumption in Past Week(Reference: No)					
Yes	0.871	0.115	57.36	2.389 (1.909 ~ 2.990)	<0.001

Variables	β	SE	Wald χ^2	OR (95%CI)	P
Fresh Vegetable/Fruit Consumption in Past Week (Reference: No)					
Yes	0.567	0.249	5.19	1.763 (1.082 ~ 2.874)	0.023
Smoking Status in Past Month(Reference: No)					
Yes	0.250	0.075	11.11	1.284 (1.108 ~ 1.488)	<0.001
Weekly Alcohol Consumption ≥3 Times in the Past Month(Reference: No)					
Yes	0.290	0.094	9.52	1.336 (1.111 ~ 1.607)	0.002
Noon Break Habits(Reference: No)					
Yes	-0.039	0.073	0.29	0.962 (0.834 ~ 1.109)	0.593
TV/Movie Watching Habits(Reference: No)					
Yes	0.184	0.070	6.91	1.202 (1.048 ~ 1.378)	0.009
Book Reading in Past 12 Months(Reference: No)					
Yes	0.973	0.104	87.69	2.646 (2.158 ~ 3.243)	<0.001
Internet Use(Reference: No)					
Yes	0.669	0.070	91.36	1.952 (1.702 ~ 2.239)	<0.001

4.Discussion

4.1 Current Status Analysis of Respondents' Recent Episodic Memory Retention

In this study, the mean score for recent episodic memory retention capacity among respondents was 2.59±1.295 (out of 5). Individuals who " can remember only a little" or "can remember only some" about major events that occurred in the past week were classified as having subjective cognitive decline (SCD). The prevalence of possible SCD among young-old adults in this study was 47.19%, nearly half. Data from CHARLS (China Health and Retirement Longitudinal Study) 2015 showed that 30%–40% of rural Chinese older adults aged 60 or above reported subjective memory decline (SCD), lower than the proportion in this study [9]. Cognitive ability is closely associated with mental health. Psychological factors such as anxiety and depression can exacerbate older adults' subjective perception of their own cognitive decline [10]. The COVID-19 pandemic may have further amplified such emotional issues, leading to an increase in the reporting rate of subjective cognitive decline (SCD) among young-old adults in 2022.

4.2 The Impact of Behavioral Lifestyle on Respondents' Recent Episodic Memory Retention

This study employed a sequential analytical approach. First, univariate ordinal logistic regression analyses were conducted to identify preliminary associations between behavioral lifestyle factors and recent episodic memory retention capacity. Subsequently, multivariate ordinal logistic regression modeling was implemented to adjust for potential confounders and establish statistically independent predictors. The multivariate model established that nighttime sleep duration, regular exercise engagement, meat consumption frequency during the preceding week, consistent reading habits, and internet utilization were significant independent factors associated with respondents' recent episodic memory retention performance.

The model showed that respondents with normal sleep duration had better recent episodic memory retention than those with short or long sleep durations. Multiple studies have also demonstrated a U-shaped relationship between sleep duration and memory ability, indicating that both insufficient (<6 hours) and excessive (>8 hours) sleep are harmful to memory. The underlying mechanism may involve sleep disorders impairing the function of the cerebrospinal fluid lymphatic system (glymphatic system), thus reducing the clearance efficiency of beta-amyloid proteins [11]. Meanwhile, increased cortisol secretion and circadian rhythm disorders caused by insufficient sleep may also lead to cognitive decline[12-13]. Prolonged sleep duration disrupts the secretion rhythms of melatonin and cortisol. The function of the hippocampus is highly dependent on circadian rhythm regulation, and circadian dysregulation can lead to decreased neural plasticity and memory processing

ability [14].

The model also showed that individuals with regular exercise habits had better recent episodic memory retention than those without. Exercise increases blood flow to the hippocampus and promotes hippocampal neurogenesis. Studies have shown that the brain volume of regular exercisers (particularly in the hippocampus) is significantly larger than that of sedentary individuals, and the annual atrophy rate of the hippocampus is reduced[15]. Additionally, exercise can also reduce oxidative stress levels in the brain, promote mitochondrial biogenesis, inhibit mitochondria-mediated excessive cell apoptosis, maintain mitochondrial fission-fusion balance, and enhance mitochondrial autophagic activity, thereby improving recent episodic memory retention[16].

Respondents who consumed meat in the past week had better recent episodic memory retention than non-consumers. The cognitive protective effect of meat primarily stems from its nutritional components, including vitamin B12, iron, zinc, and proteins: Vitamin B12 maintains myelin integrity, and its deficiency leads to elevated homocysteine, directly damaging neurons[17]. Iron and zinc are involved in neurotransmitter synthesis: iron serves as a cofactor for the rate-limiting enzyme in dopamine synthesis, while zinc regulates hippocampal synaptic plasticity. High-quality proteins provide more essential amino acids, serving as substrates for neurotransmitter synthesis[18].

Respondents with reading habits had better recent episodic memory retention than non-readers, with the mechanism being that reading enhances functional connectivity between the default mode network and language centers[19].It can also continuously activate the frontal-temporal network, improve neural circuit efficiency, and form “cognitive reserve” to buffer damage from aging, thereby enhancing cognitive ability[20-21].

Respondents who used the internet had better recent episodic memory retention than non-users. Internet use exerts a protective effect on memory by promoting information processing speed and working memory capacity, providing continuous cognitive stimulation, and enhancing brain neuroplasticity—thereby improving memory encoding and retrieval abilities[22]. Neuroimaging studies provide evidentiary support for this, with relevant images showing increased gray matter volume in the anterior cingulate cortex of frequent internet users, suggesting enhanced neural reserve[23].

4.3 The Impact of Control Variables on Respondents’ Recent Episodic Memory Retention

The regression model also showed that control variables such as place of residence, educational attainment, and self-rated health status also influenced respondents’ recent episodic memory retention.

Urban respondents demonstrated better recent episodic memory retention than rural respondents. Possible reasons include: Urban areas have superior medical resources, facilitating older adults’ access to chronic disease screening and early intervention. Data from CHARLS 2011-2015 also show that the prevalence of cognitive impairment among older adults in rural China is significantly higher than in urban areas, which may be associated with inadequate management of chronic diseases such as hypertension and diabetes[24]. Poor control of chronic diseases accelerates hippocampal atrophy, damaging the neural substrate of episodic memory. Additionally, urban areas provide richer cognitive activation scenarios (e.g., libraries, community courses, digital devices), continuously stimulating the prefrontal-hippocampal circuitry. In contrast, rural older adults have narrower social circles and monotonous cognitive activities, which may lead to weakened neurosynaptic plasticity[25].Meanwhile, rural older adults often face higher physical labor burdens and economic stress, with chronic stress leading to elevated cortisol levels that inhibit hippocampal neurogenesis. In contrast, urban older adults typically enjoy more comprehensive retirement security and lower psychological stress loads.

Respondents with high school education or above had better recent episodic memory retention than those with junior high school education or below. Individuals with high school education or above build more complex neural network connectivity through long-term education, which provides functional compensation during Alzheimer’s pathological invasion and delays subjective memory decline. Neuroimaging studies have shown that at the same degree of brain atrophy, individuals with higher education can score 30% higher on cognitive tests[26]. Additionally, individuals with higher education are more inclined to maintain cognitive activities such as reading and internet use. Such lifelong learning behaviors can continuously stimulate neuronal dendrite proliferation and maintain synaptic transmission efficiency[25].

Respondents with better self-rated health also had higher recent episodic memory retention. This may be because those

with good self-rated health generally have better control of chronic diseases, and reduced vascular risk factors help protect hippocampal microcirculation, avoiding ischemic neuronal death[25]. Individuals in better health generally have more energy and willingness to engage in cognitive stimulation and social activities, which helps maintain their memory abilities.

4.4 Research Advantages and Limitations

The study has the following advantages: In terms of data representativeness, the study is based on the national authoritative database CFPS (China Family Panel Studies), and the sample covers urban and rural young-old populations, so the conclusions have high external validity. In terms of variable multidimensionality, the study simultaneously incorporates multidimensional indicators such as exercise habits, sleep quality, dietary behavior, smoking/drinking behaviors, and TV/movie viewing behaviors, comprehensively analyzing the impact of behavioral lifestyles on subjective recent episodic memory retention.

The limitations of this study are as follows: First, the cross-sectional design makes it difficult to determine the causal relationship between behavioral lifestyles and subjective recent episodic memory retention, which needs to be verified by longitudinal studies. Second, variables such as self-rated health and income may be affected by social desirability bias or different understandings of health standards, affecting the accuracy of the results. At the same time, the subjective memory assessment (dependent variable) is subjective and may be affected by emotions, expectations, etc.

4.5 Suggestion

Based on the research conclusions, this study proposes the following practical recommendations: ① Community health services should strengthen sleep health management by establishing sleep disorder screening clinics, promoting cognitive-behavioral therapy, and forming senior mutual sleep monitoring groups to improve sleep quality among young-old adults [27-28]. ② Implement precision nutritional interventions by introducing “cognitive-friendly meals” in community canteens (each meal contains 40g lean meat and 200g dark-colored vegetables), and enhance awareness of the link between nutrition and cognitive function[29]. ③ Further promote internet penetration among older adults by encouraging the introduction of elder-friendly internet systems and sports facilities, establishing online fitness platforms for seniors, and promoting scientific fitness programs[30-31]. ④ Implement urban-rural differentiated cognitive function promotion policies: establish “mobile cognitive health stations” in rural areas equipped with simple brain health screening devices to monitor the risk of hippocampal atrophy in older adults [32]. Construct a digital reading cultural ecosystem for older adults in urban areas to promote the development of digital reading among the elderly[33].

Conclusion

Adequate sleep duration, regular exercise, meat intake, reading, and internet use can positively predict recent episodic memory retention among young-old adults. It is recommended to enhance memory function in older adults through: Community-based sleep health management and precision nutritional interventions (e.g., “cognitive-friendly meals”); Promoting internet accessibility and age-appropriate physical activities; Implementing urban-rural differentiated strategies, including “mobile cognitive health stations” in rural areas and digital reading promotion in cities.

These multidimensional interventions integrate lifestyle modification with targeted policies to address memory decline across diverse elderly populations.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

Reference

[1] Ning, J. (2021). Major data results of the seventh national population census. China Statistics, 5, 4–5.

[2] Yang, H. (2022). New trends in population aging and new characteristics of the elderly population in China. Population Research, 46(5), 104.

[3] Pan, P.(2023). Brain mechanisms of cognitive control and the impact of aging on its neural mechanisms. Advances in

Psychology, 13, 1109.

[4] Lu, M., Sun, X. L., Qiao, C., Liu, Y., Ding, J. H., & Hu, G. (2014). Uncoupling protein 2 deficiency aggravates astrocytic endoplasmic reticulum stress and nod-like receptor protein 3 inflammasome activation. Neurobiology of aging, 35(2), 421–430. https://doi.org/10.1016/j.neurobiolaging.2013.08.015

[5] Zhang, J., Liu, D., Liu, J., Cai, C., Hu, F., Cheng, G., Xu, L., & Zeng, Y. (2025). Effects of self-managed lifestyle behavioral changes on cognitive impairment control in Chinese older adults: a population-based prospective study. Translational psychiatry, 15(1), 165. https://doi.org/10.1038/s41398-025-03365-9

[6] Jia, J., Zhao, T., Liu, Z., Liang, Y., Li, F., Li, Y., Liu, W., Li, F., Shi, S., Zhou, C., Yang, H., Liao, Z., Li, Y., Zhao, H., Zhang, J., Zhang, K., Kan, M., Yang, S., Li, H., Liu, Z., … Cummings, J. (2023). Association between healthy lifestyle and memory decline in older adults: 10 year, population based, prospective cohort study. BMJ (Clinical research ed.), 380, e072691. https://doi.org/10.1136/bmj-2022-072691

[7] Djurdjevic, D., Terzic-Supic, Z., Todorovic, J., Bjegovic Mikanovic, V., Radovanovic Spurnic, A., & Laaser, U. (2024). Association between health-enhancing physical activity and the social factors, lifestyle and dietary characteristics. PloS one, 19(11), e0311974. https://doi.org/10.1371/journal.pone.0311974

[8] Wang, L., Wang, H., Wang, Z., Jiang, H., Li, W., Wang, S., Hao, L., Zhang, B., & Ding, G. (2021). Interpretation of Healthy Diet Campaign in Healthy China Initiative 2019-2030. China CDC weekly, 3(16), 346–349. https://doi.org/10.46234/ccdcw2021.092

[9] Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J. P., Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., Lambert, E., … Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. British journal of sports medicine, 54(24), 1451–1462. https://doi.org/10.1136/bjsports-2020-102955

[10] Hu, Y., Peng, W., Ren, R., Wang, Y., & Wang, G. (2022). Sarcopenia and mild cognitive impairment among elderly adults: The first longitudinal evidence from CHARLS. Journal of cachexia, sarcopenia and muscle, 13(6), 2944–2952. https://doi.org/10.1002/jcsm.13081

[11] Wang, Z., & Li, S.(2021). The impact of cognitive ability on the physical health of the elderly. Journal of Shandong University (Philosophy and Social Sciences Edition), (6), 128–137.

[12] Li, Y., Sahakian, B. J., Kang, J., Langley, C., Zhang, W., Xie, C., Xiang, S., Yu, J., Cheng, W., & Feng, J. (2022). The brain structure and genetic mechanisms underlying the nonlinear association between sleep duration, cognition and mental health. Nature aging, 2(5), 425–437. https://doi.org/10.1038/s43587-022-00210-2

[13] Ruiz-Gayo, M., & Olmo, N. D. (2020). Interaction Between Circadian Rhythms, Energy Metabolism, and Cognitive Function. Current pharmaceutical design, 26(20), 2416–2425. https://doi.org/10.2174/1381612826666200310145006

[14] Chang, W., Li, J., Ni, W., et al. (2023). Association between unhealthy sleep duration and memory and cognitive function in middle-aged and older adults. Modern Preventive Medicine, 50(14), 2613–2619. https://doi.org/10.20043/j.cnki.MPM.202210638

[15] Ruiz-Gayo, M., & Olmo, N. D. (2020). Interaction Between Circadian Rhythms, Energy Metabolism, and Cognitive Function. Current pharmaceutical design, 26(20), 2416–2425. https://doi.org/10.2174/1381612826666200310145006

[16] Erickson, K. I., Voss, M. W., Prakash, R. S., Basak, C., Szabo, A., Chaddock, L., Kim, J. S., Heo, S., Alves, H., White, S. M., Wojcicki, T. R., Mailey, E., Vieira, V. J., Martin, S. A., Pence, B. D., Woods, J. A., McAuley, E., & Kramer, A. F. (2011). Exercise training increases size of hippocampus and improves memory. Proceedings of the National Academy of Sciences of the United States of America, 108(7), 3017–3022. https://doi.org/10.1073/pnas.1015950108

[17] Akinci, M., Aguilar-Domínguez, P., Palpatzis, E., Shekari, M., García-Prat, M., Deulofeu, C., Fauria, K., García-Aymerich, J., Gispert, J. D., Suárez-Calvet, M., Grau-Rivera, O., Sánchez-Benavides, G., Arenaza-Urquijo, E. M., & ALFA study (2025). Physical activity changes during midlife link to brain integrity and amyloid burden. Alzheimer's & dementia : the journal of the Alzheimer's Association, 21(5), e70007. https://doi.org/10.1002/alz.70007

[18] Galyean, S., Alcorn, M., Chavez, J., Niraula, S. R., & Childress, A. (2025). The effect of culinary medicine to enhance protein intake on muscle quality in older adults: a randomized controlled trial. Aging clinical and experimental research, 37(1), 171. https://doi.org/10.1007/s40520-025-03075-8

[19] Li, Y., Li, Y., Gu, X., Liu, Y., Dong, D., Kang, J. H., Wang, M., Eliassen, H., Willett, W. C., Stampfer, M. J., & Wang, D. (2025). Long-Term Intake of Red Meat in Relation to Dementia Risk and Cognitive Function in US Adults. Neurology, 104(3), e210286. https://doi.org/10.1212/WNL.0000000000210286

[20] Wang, S.(2021). Intervention study of mind-body exercise on elderly with mild cognitive impairment in nursing institutions[Master's thesis, Jilin University].

[21] Wang, Y., Wang, S., Zhu, W., Liang, N., Zhang, C., Pei, Y., Wang, Q., Li, S., & Shi, J. (2022). Reading activities compensate for low education-related cognitive deficits. Alzheimer's research & therapy, 14(1), 156. https://doi.org/10.1186/s13195-022-01098-1

[22] Chang, Y. H., Wu, I. C., & Hsiung, C. A. (2021). Reading activity prevents long-term decline in cognitive function in older people: evidence from a 14-year longitudinal study. International psychogeriatrics, 33(1), 63–74. https://doi.org/10.1017/S1041610220000812

[23] Lin, L.(2020). Research on non-pharmacological comprehensive intervention for patients with mild cognitive impairment in nursing institutions based on the theory of social multi-information stimulation [Doctoral dissertation, Soochow University]. https://doi.org/10.27351/d.cnki.gszhu.2020.004420

[24] Gao, Y. (2016). Investigation of risk factors for cognitive impairment and study on the correlation between TCM syndromes and cognitive function [Doctoral dissertation, Beijing University of Chinese Medicine]. [25]Li, G., Tian, H., Yao, C., et al. (2023). Current status and influencing factors of cognitive function among Chinese elderly. Nursing Science, 12, 597.

[26] Liu, D., Li, L., An, L., Cheng, G., Chen, C., Zou, M., Zhang, B., Gan, X., Xu, L., Ou, Y., Wu, Q., Wang, R., & Zeng, Y. (2021). Urban-rural disparities in mild cognitive impairment and its functional subtypes among community-dwelling older residents in central China. General psychiatry, 34(5), e100564. https://doi.org/10.1136/gpsych-2021-100564

[27] Ai, M., Chen, Y., & Zhang, Z. (2019). The influence of education on cognitive function: Shaping and reserve. Journal of National Academy of Education Administration, 7, 89–95

[28] Feng, Y., Luo, Y., & Li, T. (2023). Primary chronic disease management: Time for sleep disorders. Guangdong Medical Journal, 44(3), 293–296.

[29] Wang, W., Li, C., Chen, Z., Zhang, W., Wang, Z., Guo, X., Guan, J., & Li, G. (2024). Detection of Sleep Apnea-Hypopnea Events Using Millimeter-wave Radar and Pulse Oximeter. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference, 2024, 1–5. https://doi.org/10.1109/EMBC53108.2024.10782344

[30] Malouf, M., Grimley, E. J., & Areosa, S. A. (2003). Folic acid with or without vitamin B12 for cognition and dementia. The Cochrane database of systematic reviews, (4), CD004514. https://doi.org/10.1002/14651858.CD004514

[31] Jia, L., Du, Y., Chu, L., Zhang, Z., Li, F., Lyu, D., Li, Y., Li, Y., Zhu, M., Jiao, H., Song, Y., Shi, Y., Zhang, H., Gong, M., Wei, C., Tang, Y., Fang, B., Guo, D., Wang, F., Zhou, A., … COAST Group (2020). Prevalence, risk factors, and management of dementia and mild cognitive impairment in adults aged 60 years or older in China: a cross-sectional study. The Lancet. Public health, 5(12), e661–e671. https://doi.org/10.1016/S2468-2667(20)30185-7

[32] Li, Y., Su, X. M., Ge, J. Z., Li, S. T., & Li, J. (2024). Zhonghua xin xue guan bing za zhi, 52(12), 1397–1404. https://doi.org/10.3760/cma.j.cn112148-20231110-00433

[33] Dong, L., & Xie, Z.(2021). Research on digital reading promotion for the elderly based on innovation diffusion theory. Publishing Research, 4, 70–75.