International Journal of Education and Social Science; Vol. 7 No. 5; October 2025
ISSN: 5778-6990 (Online), ISSN: 6790-5577 (Print)
Published by International Institute for Global Development (IIGD)

An Ecological Examination of Elderly American Racial/Ethnic Disparities in Time Allocation

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Abstract

Time allocation studies date back to the late 19th and early twentieth century (Bauman et al., 2019), but the role of race and ethnicity in shaping daily time use among elderly Americans remains underexplored (Bartel et al., 2019). Recent research has addressed related topics on timeuse that included health and well-being (Zick et al., 2019), disability and sleeping time (Shandra et al., 2014), and social interactions (Ferranna et al., 2022). This paper aimed to investigate racial and ethnic disparities in time allocation among elderly Americans using an ecological framework. The current research examined how racial/ethnic backgrounds influenced American timeuse in later life. Bronfenbrenner's ecological model (1974, 1968, 1989) offered a framework for this study, focusing on three levels of systems: the ontogenic system (demographic characteristics), the microsystem (immediate environment), and the exosystem (indirect influences like social networks and community context). The macrosystem, which reflected broader cultural and societal structures, was excluded but could inform future research. Understanding these factors may help policymakers promote racial and ethnic equity, improving active engagement in the daily lives of elderly Americans (Fetter & Lockwood, 2018).

Keywords: *Social Activity Engagement Racial/Ethnic Disparities Ecological Systems Elderly Americans.*

1. Introduction

Rising life expectancy and the aging of the baby boom generation into later stages of life have contributed to a growing population of individuals aged 60 and older in the United States (Ferranna et la., 2022). A central research question concerns how older adults allocate their time, particularly their participation in social activities, and the balance between reduced paid work and increased engagement in social activities (Sevilla et la., 2022). According to the 2020 Census, 55.8 million people, or 16.8% of the U.S. population, were aged 65 or older (Koff & Williams, 2020). This rapid growth, driven by the aging baby boomer generation (born 1946–1964), led to a significant increase from 13.0% in 2010 to 16.8% in 2020, marking the largest percentage-point rise over a decade (Hoolachan & McKee, 2019).

As the population of older Americans grows, understanding the characteristics of their daily lives becomes increasingly important. This study aims to (1) examine the social activity time allocation of elderly Americans and (2) explore the racial and other factors influencing these patterns within an ecological framework for the analyses of their time use.

Beyond the growing size of the aging population, several key trends highlight the importance of examining how older Americans use their time. These trends include (1) a delayed retirement age (Brown, 2013), (2) rising income levels post-retirement (Aguiar & Hurst, 2007), and (3) an increasing likelihood of older adults living alone (Putnam, 2001). From 2019 to 2023, the labor force participation rate among this group declined from 23.7% to

17.5% (U.S. BLS, 2023). By 2030, the U.S. Census Bureau projects that one in five U.S. residents will be aged 65 or older, with all baby boomers having reached at least age 65. Correspondingly, from 2013 to 2023, the average retirement age in the U.S. stayed relatively consistent, fluctuating between 61 and 62 years. In 2013, the average age was 61, while in 2023, it was 62. These figures reflect the broader trend of Americans retiring later than they did a few decades ago.

From 2013 to 2023, improvements in Social Security and private pensions have significantly bolstered the income of elderly Americans. As a result, poverty rates among the elderly have not characterized the group as a whole to the same extent as in the past. In 2022, the poverty rate among elderly individuals (65 and older) stood at 14.1%, up from 9.5% in 2020, reflecting some recent economic challenges. The increasing likelihood of living alone is another reason for elderly Americans that provides context for the current study on the time use of older Americans. (US SSA, 2024). As of 2023, about 28% of Americans aged 65 and older lived alone. This figure reflects a growing trend of older adults opting to live independently as they age.

Once retired, elderly Americans often reallocate time towards leisure (Aguiar & Hurst, 2007), household activities, and caregiving. Social interaction also plays a significant role, with some elderly choosing to spend time with friends or in community activities to compensate for isolation. Economic stability and income levels might influence how the elderly spend their time. Those with higher incomes may engage in more discretionary activities, such as travel, while those with lower incomes might limit their activities to more affordable pastimes or stay in the job market to get additional income (Ameriks et al., 2020).

Considering living arrangements, elderly individuals who live alone may experience more solitary activities, such as reading or watching TV, than those living with family or in group settings. Loneliness may also drive them to engage more in social activities outside the home or rely on community resources for interaction (Putnam, 2001). Conversely, those living with family members may spend more time in caregiving roles or engaging in shared family activities.

Although there is limited research on time use among elderly individuals, it is clear that some engage in a wide range of activities while others do not. However, little is known about how racial and ethnic factors influence time use in later life. The reasons behind varying levels of activity involvement in older adults have rarely been explored, particularly from an ecological perspective. To address these gaps, this study used data from a nationally representative time use survey to examine how elderly Americans allocate their time and which ecological factors influence these patterns. An ecological framework was employed to identify the factors affecting time use and to explore potential social policies that could enhance the well-being of older Americans.

Scope of Studies on Elderly Time Use

The study of time use has its roots in home economics during the 19th century (Bauman et al., 2019). However, research specifically focused on time use in later life remains relatively sparse (Ross, 1990). Existing literature on elderly time allocation touches on various aspects, such as social activities (Marcum, 2013), paid and unpaid work (Bartel et al., 2019), and leisure (Rokicka & Zajkowska, 2020; Clark et la., 2017). Some studies explore how elderly time use varies across national contexts (Kan et al., 2021).

Research has also delved into the influence of environmental factors on elderly time use (Plagg & Zerbe, 2020) and employed theoretical frameworks like disengagement theory

(Battista et al., 2017), adaptation to aging (Southwell, 2018), and person-environment interaction theory (Carp, 1979). Carp (1979) explored how the living environment influences the activity levels and time use of elderly individuals. It found that exposure to environments with more opportunities for engagement led to increased activity among elderly participants compared to those in less enriched settings. Findings indicate that a significant portion of time freed by retirement is often reallocated to passive activities (Gauthier & Smeeding, 2003). Understanding the interactions between these factors is crucial for public health, as it helps develop preventive strategies at both individual and societal levels to support healthy aging (Plagg & Zerbe, 2020). Social factors, such as employment status and social connections, play a key role in this process.

Plagg and Zerbe (2020) explored how environmental factors influence human aging, emphasizing the significant role that surroundings play in determining the health and quality of life as individuals grow older. The authors argued that aging was not solely a biological process but was deeply influenced by external environmental factors. Harvey (1990) explored time budget methodology in their examination of changing activity patterns, focusing on variables such as age, gender, marital status, education, and living arrangements. They noted that societal roles, such as being a spouse, influence how individuals allocated their obligatory and discretionary time. Their research findings suggest that time alone increases with age, while interactions with non-household members decline, particularly for individuals aged 70 and older, who spend significantly more time alone than younger age groups (Clark et al., 1990).

Ecological Perspective

The time allocation patterns of elderly Americans were analyzed using an ecological framework grounded in family ecology. Family ecology encompasses a variety of perspectives and is linked to numerous academic disciplines and theories (Pedersen & Revenson, 2005). Essentially, this ecological framework aims to synthesize and integrate different theoretical viewpoints used to study family behavior. A core tenet of this approach is that an individual's actions can be better understood within the context of a broader system (Bronfenbrenner, 1993).

By leveraging the integrative nature of family ecology, the ecosystem approach allows for a comprehensive view of behaviors, either within the entire system or focusing on specific components (Bronfenbrenner, 1993; Zick et al., 2019). While all time-use behaviors are interwoven within the whole system, particular actions are often more closely related to certain parts of the system than to the system as a whole. Therefore, this study adopted an ecosystem approach to effectively examine the time allocation patterns of older adults.

In examining the time allocation choices of elderly American, the ecosystem perspective emphasizes the importance of immediate physical, social, and economic environments in understanding how the participants utilized their time and the reasons behind their choices (Plagg & Zerbe, 2020). A fundamental principle is that environmental factors continue to influence decision-making even in later life. By adopting this perspective, the research aimed to explore how individual time use relates to the environmental factors that shape it (Brown, 2013). This study's contribution was to identify the common elements within the ecosystem model that influence the time allocation patterns of elderly individuals, with special attention on racial/ethnic factors in American social activity time use in later life.

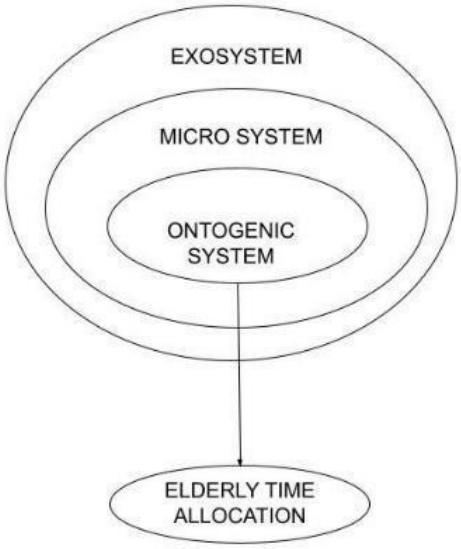

Figure 1. The Ecosystem Framework

The ecosystem framework assumes that individual development occurs within a series of nested contexts, akin to the layers of an onion (Bronfenbrenner, 1989). To achieve a comprehensive understanding of individuals, information from these various levels must be synthesized into an overall system perspective. In this research analysis, the nested contexts for examining elderly time use behavior include: Oncogenic system -- the innermost layer, representing the individual's characteristics. Microsystem -- the second layer, encompassing the immediate social and economic factors that directly impact older adults. Ecosystem -- the third layer, which includes the previous two contexts and factors from other environments that influence elderly time use (See Figure 1).

In this conceptual framework, elderly American time use is viewed as being influenced by three sets of factors. The oncogenic system encompasses personal factors, which were measured through variables such as sex, age, and race groups. These factors were closely connected to those in the microsystem, which reflected the educational and economic environment measured with education, income and household composition (Rogerson & Wallenius, 2019). Additionally, measures from the ecosystem included residential location and type of housing.

2. Methodology

Data Description

The sample for this investigation was extracted from the American Time Use Survey Data Extract Builder: Version 3.2 [dataset] from IPUMS ATUS (Flood et al., 2023). The 2023 dataset was chosen as it offered the most recent nationally representative data on time use for American populations. The sample for the current research was restricted to men and women aged 60 and older who participated in the 2023 time use study (see Table 1). A data set of 3,830 subjects from 2023 who met the age criteria were selected for statistical analysis.

Statistical Procedures

To gain a deeper understanding of the factors influencing time allocation patterns among the elderly, the analysis began with descriptive statistics of their time use, followed by a more detailed examination of ecological factors affecting the structure of time allocation. Descriptive activity data were derived from time activity information, showing the average

minutes per day spent in selected five activity categories, namely social activity time, housework time, travel time, sport time, and paid work time. Differences in mean time use were then analyzed based on ecological framework factors and tested using T-tests or ANOVA. Regression models were estimated using race as a key factor for social activity time, which had the highest mean category for this research. Since the average time spent on the other activity categories was low, therefore, they were not included in the model. The effect of racial/ethnic factors was used for the high-frequency social activity patterns that were tested, analyzed, and reported for the major findings.

3. Results

Analysis of Time-Use Data

Table 1 shows the 3830 subjects in this study, 1734 (45.27%) were males and 2096 (54.73%) were females. The average age for all the subjects was 71 years, and respondents ranged in age from 60 to 85 years. The majority of the subjects in this study were white 3293 (85.98%), Black were 403 (10.52%), and the combined other races were 134 (3.5%). The education levels of the subjects in this study were typical for this birth cohort, with the mean years of schooling being 16.5. Thirty-two point five eight percent (n=1248) of the individuals in the sample were living alone, while 57.39 % (n=2198) were two-person households, and the rest were 384 (10.03%). The average total family income of the sample was $11.515.93. The largest percentage (n=3679; 96.6%) live in stable residents. The residential regions were evenly distributed in the northwest, midwest, south, and west, with the south region having the highest percentage (37.39%). All extracted timeuse data in chosen activities were grouped into five categories. Table 2 illustrates activity time distribution.

Housework Time

Housework time includes a wide variety of tasks related to household activities like meal preparation, indoor and outdoor cleaning, shopping, laundry, gardening, caring for other family members, and pet care. For this sample, the average time spent on housework by elderly individuals was 156.55 minutes per day or 2.6 hours per day.

Table 1. Frequencies and Percentages of Characteristics of the Sample (n=3830)

Variables Characteristics	N	%
Ontogenic Systems……		
Sex		
Male	1734	45.27
Female	2096	54.73
Race		
White	3293	85.98
Black	403	10.52
Others	134	3.50
Age		
60-64	840	21.93
65-69	917	23.94
70-74	821	21.44
75-79	604	15.77
>=80	648	16.92
Microsystem ……		
Education		
Elementary	1097	31.60

High school	615	17.71
College	256	7.37
Graduate	1504	43.32
Missing	358	
Income		
1 Low	284	8.42
2 Low mid	977	8.96
3 Mid high	1125	33.34
4 High	988	29.28
Exosystem ……		
Residential Region		
Northeast	629	16.42
Midwest	953	24.88
South	1432	37.39
West	816	21.31
House Type		
Permanent living	3679	96.06
Other	151	3.94
Household Size		
1 person	1248	32.58
2 persons	2198	57.39
3 more	384	10.03

Social Activity Time

The Social Activity Time categories encompass various activities related to socializing, relaxing, and leisure, focusing on interacting with others. This includes socializing and communicating with others, whether in casual settings or more formal occasions. Additionally, this category includes attending or hosting parties, receptions, or ceremonies, as well as attending meetings for personal interest (excluding volunteering activities). Older adults spend 385.85 minutes (6.43 hours) of daily time in social activities.

Table 2. The Distribution of Activity

Activity Variable	Obs	Mean	Std. Dev
Housework Time	3,830	156.55	154.03
Social Time	3,830	385.85	220.84
Sport Time	3,830	19.97	55.09
Travel Time	3,830	52.44	77.19
Paid work Time	3,830	69.15	175.38

Sport Activity Time

The category of sport activity includes a diverse range of physical and recreational activities. This encompasses participating in sports such as basketball, soccer, tennis, and other organized or casual games. It also includes exercise and fitness activities like running, weightlifting, yoga, and aerobics. Additionally, this category includes recreational activities such as hiking, swimming, and biking. On average, older Adults spend very low 19.97 minutes of daily time in sport activities that was very low.

Travel Time

The Travel Time Activity categories in the dataset encompass the time spent traveling for various purposes. This includes travel related to work, such as commuting to or from a job or work-related travel, as well as travel for household activities, like running errands or grocery shopping. It also covers travel for personal care, such as going to medical appointments, and travel for social or recreational activities, including attending events or social gatherings. Additionally, this category includes travel for education, such as commuting to school, travel for childcare. On average, older participants spend 52.44 minutes of daily time in travel.

Paid Work Time

This includes time spent in work for pay, nonwork activities at the workplace before and after work, coffee and lunch breaks, and travel to work. The mean of paid work time per day is 69.15 minutes, which is comparatively low. Figure 3 presents a chart showing the mean values for the five time-use categories among elderly individuals.

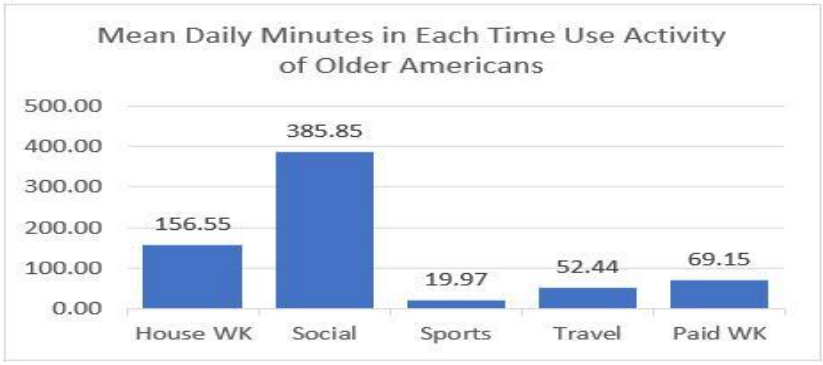

Figure 3. Total Five Activities [Mean Minutes=683.97/1440 per day (47.5%)]

Tabulations of Social Activity of Time Allocation by Age Groups and Gender

To examine differences in timeuse further by age and gender (Román & Gracia, 2022), Figure 4 presents the plots of male and female mean time values per day for category of social activity time use for a 5-year age grouping. When the subjects are plotted in six age ranges (60, 66, 71, 76, 81, 85>), some of the paths reveal a variation in time use between male and female groups.

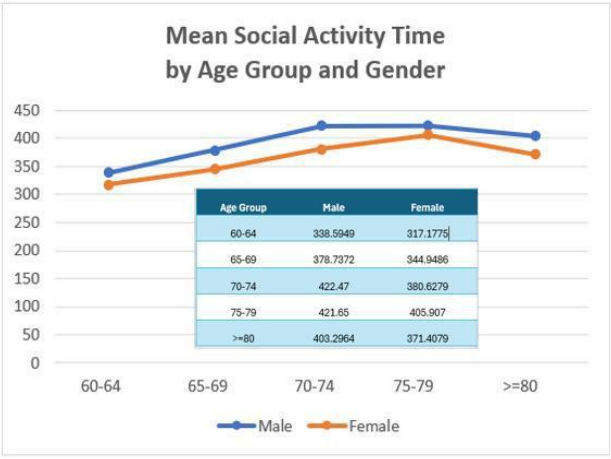

Figure 4. Age and Gender for Social Time

Statistical Methods

As shown in Table 3, a one-way analysis of variance (ANOVA) was conducted to examine whether there were significant differences in time spent on social activity time (measured in

minutes) among different racial groups. The independent variable was race, categorized into three groups, while the dependent variable was social activity time. Analyses of variance indicate that there are significant differences in social activity time by race group. Other activity categories were excluded from ANOVA analyses because of the low average minutes for those activities.

Table 3 ANOVA for the Effect of Race Group on Social Activity Time

Source	SS	df	MS	F	Prob > F
Model	953,382.16	2	476,691	9.82	0.0001
Race group	953,382.16	2	476,691	9.82	0.0001
Residual	185,800,000	3,827	48,545.19		
Total	186,700,000	3,829	48,768.83		

An ANOVA was conducted to examine the impact of racial groups on social activity time, yielding statistically significant results. This suggests that race factors contribute to differences in social activity time allocation of older adults. In this ANOVA analysis, the race group shows a statistically significant effect on social activity time, with an F-value of 9.82 and a p-value of 0.0001. The significant F-statistic indicates that, on average, the social activity levels vary systematically by race group, supporting that demographic characteristic, like race, influenced patterns of elderly American social engagement (Steptoe & Fancourt, 2019).

The link between demographic race factors in the oncogenic ecosystem and social activity time was confirmed by some studies that suggested that cultural, social, and economic variations across racial groups could shape how individuals engage in social activities and how much time they allocate to those activities (Berkman & Glass, 2000; Putnam, 2001). Berkman and Glass (2000) argued that social network structures and community support often differ across racial groups, directly influencing social activity levels. Putnam (2001) further supports this notion, demonstrating that racial diversity within a community context is often linked to differential levels of social participation and connectedness, and shows the relationships between race, social networks, and community engagement. Therefore, while race is statistically significant in predicting social activity time, the low R-squared indicates that other variables from micro or ecosystems likely play a part role in explaining overall social engagement. This aligns with previous research that pointed to a complex interplay of factors, including socioeconomic status, education, and community infrastructure, that collectively impact social activity patterns beyond racial demographics alone (Marsden & Hurlbert, 1987).

Multiple Regression Analysis

As a prelude to the multiple regression analysis, the zero-order correlation coefficients between the independent variables are examined. Table 4 depicts a matrix of Pearson correlation coefficients of the independent variables used in the multiple regressions.

Table 4. Correlation Coefficients of Independent Variables (n=3830)

Correlation:	1	2	3	4	5	6	7
1. Age	-						
2. Race	-.0373	-					
3. Income	-.1371	-.05	-				
4 Education	-.0463	-.0264	.4107	-			

5. Region	.0029	.0293	.0329	.0482	-	
6. Household Size	-.1621	-.0316	.2985	.0048	.0346	-
7. Housing Type	-.0090	-0143	-.1513	-.1261	-.0578	-.0562 -

Presentation of Test Results

The results showed that multiple regression models were significant for social activities, as indicated by F-statistics ($p < .05$). In examining the relationship between race and social activity, findings reveal the race category is associated with a 0.584-unit increase in social activity time, controlling for all other variables. This result suggests that racial group affiliation may influence levels of social engagement. The statistical significance of this association ($p = 0.037$) provides a strong basis for inferring that the observed effect is unlikely to be due to random variation alone. Thus, these results emphasize the role of racial group differences in shaping social activity patterns and warrant further exploration into the cultural or social dynamics underlying this relationship. The findings suggest that factors from the oncogenic level had a greater influence on older Americans' time use compared to factors from the ecosystem, while microsystem indicators had no effect. The findings support the idea that older adults may have unmet needs for activity, and their environment plays a critical role in shaping how they spend their time (Carp, 1979).

Table 5. Regression Coefficients for Social Activity Time

Source	SS	df	MS	Number of obs = 3,830	
Mode	13613877.4	7	1944839.63	> F = 0.0000	
Residua	173121956	3,822	45296.1684	R-squared = 0.0729	
				Adj R-squared = 0.0712	
Total	186735833	3,829	48768.8256	Root MSE = 212.83	
Social Activity Time	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]
Race	0.5836	0.2797	2.09	0.037	0.0352 to 1.1320
Age	5.4799	0.4925	11.13	0.000	4.5143 to 6.4455
Family Income	-5.1974	1.1025	-4.71	0.000	-7.3589 to -3.0358
Education	-2.4367	0.4189	-5.82	0.000	-3.2580 to -1.6155
Region	- 2.2172	3.4791	-0.64	0.524	-9.0383 to 4.6039
Household Size	- 16.1027	4.7431	-3.39	0.001	-25.4019 to -6.8034
House Type	2.6012	4.1766	0.62	0.533	-5.5874 to 10.7898
Intercept	103.5323	51.6145	2.01	0.045	2.3377 to 204.7269

4. Discussion and Conclusion

The study is designed to examine the American elderly's time use patterns in daily activities. Variables identified in an ecological model were used to examine the determinants of elderly time allocation patterns. The ecological model consists of three levels: the oncogenic system, the microsystem, and the ecosystem. Seven independent variables and five dependent variables were explored for the analyses of this study. Social activity time was analyzed in detail, and the other categories for housework time, travel time, personal, and paid work time were skimmed since they only took up a small portion of the American elderly's daily time use. T-tests and ANOVA were used to compare the difference between mean minutes spent in each activity by selected indicators. Pearson correlations were estimated, and identified variables were included in the multiple regression equations.

Key findings reviewed that race had a statistically significant positive effect, meaning that different racial groups experience slight differences in social activity time. Age had a positive

relationship with social activity time. Older individuals tend to spend more time on social activities, possibly because they may have more available time after retirement. Family income and education both have negative relationships with social activity time, meaning higher family income and education levels are associated with less time spent on social activities. Household size is negatively associated with social activity time. Larger households tend to see less social activity time, possibly due to increased domestic responsibilities or caregiving. Region and House Type are not significant, meaning they do not appear to have a meaningful impact on social activity time in this sample.

This study illustrates the important practice of using an ecological perspective in examining elderly Americans' daily experiences. By identifying the common factors in the ecological model, older American time use can be understood from a broad view as well as from three ecosystems. For example, the regression tests show that the race, age factors from the oncogenic appear to have a stronger linear relationship, and those region and housing types in microsystem have less influence on the social activity time use of older Americans. This indicates that personal characteristics are better predictors than regional or physical characteristics of activity patterns.

Apart from the advantages, the limitations of the study need to be acknowledged. First, the sample of American elderly was small, yielding concern in terms of generalizability. So, this study can only be regarded as an exploratory one, and more research on American elderly time-use patterns is needed to support the results of this study. Second, the time-use categories used are broad, and thus, this study cannot provide insights regarding specific time-use patterns. For example, social activities might have personal care time and screen time for social network that might not include in social activities. As a result, no statements can be inferred about the time using a computer for socialization.

Race shows a significant effect, indicating the need to further explore cultural or socio-economic differences in time allocation (Chiappori & Mazzocco, 2017). Because the nature of the analysis does not allow an examination of the well-being or satisfaction of the American elderly in daily life, further research is needed using the elderly's time-use patterns as intervening variables to predict the satisfaction of older Americans in some activities. In addition, future research can compare time use pattern between young old and old elderly (Kim & Cha, 2021). In sum, the effects of ecological indicators on the American elderly's time use patterns need further investigation, and continuing research on this relationship would provide insight into the complexity of this relationship, including the satisfaction of elderly people in each activity. The ecological model can incorporate additional layers, such as the macro-system, as Plagg and Zerbe (2020) suggested that understanding these environmental interactions is key to promoting successful aging and developing policies that support healthy living environments for older populations. This perspective aligns with the ecological approach to aging, which suggests that adapting environments to the needs of social policy support for elderly Americans can significantly improve their well-being. Future research at macro-system with potential social policies that can promote community engagement programs or improve accessibility for older adults and enhance their quality of life in later years.

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